FINAL

WEST SACRAMENTO LEVEE IMPROVEMENTS PROGRAM
CHP ACADEMY AND THE RIVERS EARLY IMPLEMENTATION PROJECTS
408 PERMISSION ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT

PREPARED FOR:

U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814
Contact: John Suazo
916/557-6719

and

West Sacramento Area Flood Control Agency
1110 West Capitol Avenue
West Sacramento, CA 95691
Contact: John Powderly
916/617-4674

PREPARED BY:

ICF International
630 K Street, Suite 400
Sacramento, CA 95814
Contact: Tanya Matson
916/737-3000

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Approach to the Final EIS/EIR and Executive Summary

Approach to the Final EIS/EIR

Overview of Comments

This document is the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the West Sacramento Levee Improvements Program CHP Academy and The Rivers Early Implementation Projects revising the Draft EIS/EIR circulated for public review in May 2010. Forty-nine comment letters were submitted on the Draft EIS/EIR, including those from:

- four Federal agencies,
- five state agencies,
- five local agencies,
- 12 non-governmental organizations, and
- 23 individuals.

In December 2010, WSAFCA prepared an Administrative Final EIS/R. The Administrative Final was provided to agencies with certain authority or oversight over the projects for review and comment. Three comment letters were submitted on the Administrative Final EIS/R, including those from one Federal agency and two state agencies.

The comments fall in six primary categories, in order of volume:

- concern regarding U.S. Army Corps of Engineers (USACE) levee vegetation policy as it relates to the WSLIP,
- concern regarding pedestrian recreation access to The Rivers community,
- questions and comments on analysis of biological resources,
- questions and comments on analysis of air quality effects,
- questions and comments on analysis of construction-related effects, and
- other miscellaneous comments.

More than half the comments were on the first issue regarding application of USACE levee vegetation policy. Nearly a third of the comments were in opposition to the installation of a pedestrian access gate at The Rivers. The comments and responses are included in their entirety as Part II of this document. Part I is the main body of the Final EIS/EIR.

Overview of Changes to the Final EIS/EIR

As introduced above, this document is presented in two parts:

- Part I is the introduction, alternatives descriptions, discussion of the affected environment, discussion of the environmental effects, and supporting information from the Draft EIS/EIR, revised based on comments received; and

- Part II is the record of comments received and responses.

The major changes to the Final EIS/EIR are described below.

Deferment of Programmatic Coverage and Refocusing on Project-Level Actions

The actions proposed by West Sacramento Area Flood Control Agency (WSAFCA) described and analyzed in the Draft EIS/EIR included program-level coverage for the WSLIP and project-level coverage for two early implementation projects (EIPs) under the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). The Final EIS/EIR is for project-level coverage only for the two EIPs, based on the following rationale.

Relationship of WSAFCA and USACE Activities. The intent of WSAFCA is to implement EIPs to incrementally improve flood protection for West Sacramento to the 200-year level. However, it is understood that WSAFCA's EIP actions are interim measures. Through the civil works process, a General Reevaluation Report (GRR) is being conducted by USACE and its non-Federal and local sponsors for the West Sacramento Project to carry out a program for the entire city. A programmatic EIS/EIR is in preparation for the GRR, providing program-level analysis. Once the GRR is in place, flood improvement actions may be implemented as analyzed under the programmatic EIS/EIR for the GRR. .

In the early planning phase, WSAFCA as the CEQA lead agency pursued a programmatic document to facilitate adoption of the WSLIP as the context for the EIPs. Due to the overlapping nature of the GRR with the WSLIP, it has been determined that there is no need for two independent program-level documents. Further, as WSLIP planning has progressed, it has been determined that there will likely be only one additional EIP to be pursued by WSAFCA beyond the current two EIPs under consideration in this EIS/EIR. The scope of this future EIP would likely necessitate its own EIS/EIR, substantially diminishing the value of tiering from a programmatic document.

USACE NEPA Perspective. Early on in the scoping and pre-administrative draft phase of developing the Draft EIS/EIR, it was determined that there would not be a programmatic Federal action; i.e., there is no programmatic Section 408 permission nor other program-level Federal authorization. Logically, it was further determined that there was no need for a programmatic record of decision (ROD); rather, ROD(s) would be project-level only for the EIPs that would incrementally implement the overall WSLIP. Therefore, USACE did not have need for programmatic coverage under NEPA.

Topic-specific Programmatic Analysis Needs. Another initial factor in pursuing a program-level document was the guidance under Section 408 to ensure that discrete Section 408 actions consider watershed-level, system-wide effects. Of particular interest are analyzing hydrology and hydraulic effects to ensure there are no negative upstream or downstream impacts, as well as evaluation of cumulative effects. These effects are addressed in this document programmatically. The document has been therefore streamlined with a project-level focus plus necessary program-level analyses.

Analysis of Part 1506 under NEPA. Section 1506.1(c) states that "[w]hile work on a required program [EIS] is in progress and the action is not covered by an existing program statement, agencies shall not undertake in the interim any major Federal action covered by the program which may significantly affect the quality of the human environment unless such action: 1) Is justified independently of the program; 2) Is itself accompanied by an adequate environmental impact statement; and 3) Will not prejudice the ultimate decision on the program. Interim action prejudices the ultimate decision on the program when it tends to determine subsequent development or limit alternatives." The EIP actions described in the WSLIP EIS/EIR meet these conditions because they can be justified in providing distinct benefits and independent utility without the full program, they are fully described and analyzed in their own EIS/EIR, and they will not prejudice the program because they have been deliberately designed and analyzed to be "no regrets" projects that are compatible with an overall program. Moreover, it should further be pointed out that the statutory conditions apply based on a "required program EIS;" however, there is no requirement for a program EIS for the WSLIP.

Responsiveness to Concern over USACE Levee Vegetation Policy. As discussed above, substantial comments were received regarding the application of USACE levee vegetation policy related to the WSLIP. It is recognized that the EIPs addressed in this document would result in no vegetation loss as it relates to meeting the USACE levee vegetation policy; however, the application of the policy to the program as a whole is more problematic due to the speculative nature of potential alternative compliance mechanisms (such as a variance) and the lack of engineering information to determine vegetation loss given the early stage of design development at the program level. Many commenting parties requested deferment of adopting the WSLIP and requisite programmatic analysis until these details are better known and also in anticipation of a long-term approach to compliance with USACE levee vegetation policy that is specific and sensitive to California's Central Valley context, currently under development.

Document Restructuring

Following on the decision to refocus WSAFCA's actions at the project level only for the EIPs, the document has been restructured to streamline the alternatives descriptions, discussion of the affected environment, and effects analyses. Specifically:

- the program description from Chapter 2 of the Draft EIS/EIR has become a new Appendix B for the Final EIS/EIR to provide contextual information for the EIPs, and the detailed project-level descriptions that were formerly presented in the EIP chapters have been moved to Chapter 2;
- information from the program-level affected environment discussion from Chapter 3 of the Draft EIS/EIS has been added to the project-level discussions for the EIPs or has been included as a technical appendix to the Final EIS/EIR, as needed for each resource; and
- information from the program-level effects analyses has been retained for key topics where programmatic analysis is appropriate in evaluation of project-level action, such as flood control and geomorphology.

Inclusion of No Action Alternative Scenarios

As discussed above, one particular area of concern expressed in the comments received was the speculative nature of potential alternative compliance mechanisms with USACE levee vegetation policy, especially as related to the No Action Alternative. Whereas the Draft EIS/EIR described and analyzed the most conservative no action scenario, which was assumed to be full compliance with USACE levee vegetation policy and loss of all trees in accordance with a strict interpretation of that guidance, the Final EIS/EIR has been revised to acknowledge and analyze four potential no action scenarios:

- full application of USACE levee vegetation policy, as detailed in Engineering Technical Letter 1110-2-571, Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures (ETL), meaning prohibition and removal of woody vegetation within the levee prism or within 15 feet of the landside or waterside levee toes (the scenario described and analyzed in the Draft EIS/EIR);

- no application of the ETL; assuming the continued existence into the future of the vegetation conditions at the time of the analysis;
- application of the interim guidance for USACE levee vegetation policy from the *California's Central Valley Flood System Improvement Framework* (Framework) process, meaning trees within the levee prism on the landside slope, upper 20 feet of the waterside slope, or within 10 feet of the landside toe must be trimmed up five feet above the ground (or 12 feet above the crown road) and thinned; and
- application of a possible variance, such as the variance issued for Natomas Levee Improvement Program (NLIP) under USACE's draft variance policy, meaning removal of trees within the levee prism on the landside slope or within the landside operations and maintenance corridor, and allowance of trees within the levee prism on the waterside slope based on demonstration of not affecting the critical levee prism.

The potential effects of each of these No Action Alternative scenarios are presented in the Final EIS/EIR for each EIP, as well as effects relative to the action alternatives.

Refinement of The Rivers EIP Applicant Preferred Alternative

In the Draft EIS/EIR, The Rivers EIP site is presented as 4,500 feet in length in the alternatives description, as well as the affected environment and effects analyses for all the resource areas. Through further engineering analysis and technical review, it was determined that other alternative measures to address under-seepage merited further consideration in the eastern portion of the project reach along Rivercrest Drive (see Figure 2-6). Therefore, this portion of the reach was withdrawn from the proposed EIP at this time and has been deferred for further study. The proposed project length under The Rivers EIP is now 3,035 feet. The affected environment descriptions and effects analyses for all the resource areas for the Final EIS/EIR remain the same as in the Draft EIS/EIR at the originally proposed length of 4,500 feet, except vegetation and wildlife. USACE has consulted with USFWS and NMFS under ESA regarding effects on vegetation and wildlife. To more accurately represent the likely actual effects on these resources in the EIS/EIR, and for consistency between the EIS/EIR and the permitting documents, the effects analyses for these resources have been revised to reflect the presently proposed shorter project length.

The eastern approximately 1,465 feet of the original study reach no longer part of the proposed project will continue to be evaluated by WSAFCA for possible future and separate EIP action, but most likely will be deferred for study by USACE under the on-going West Sacramento Project GRR (described further in Chapter 1). Existing conditions and current risk levels will continue for the remainder of the reach, however it is anticipated that improvements to this reach will be implemented under the West Sacramento GRR or another EIP, as described above.

Clarification of and Reduction in Vegetation Effects

Continuing in the theme of concern regarding USACE levee vegetation policy, comments were received regarding the range of potential vegetation effects and the ability to discern between trees lost as a direct result from constructing the proposed improvements versus trees lost due to policy compliance. As the design has been further refined in collaboration with the engineering team, the number of trees potentially affected has been substantially reduced. Specifically, for The Rivers EIP, the Draft EIS/EIR had identified total potential loss of 75 to 100 trees; through refinement of the project, that number has been reduced to 37 in the Final EIS/EIR (none of which are attributable to USACE levee vegetation policy; all are within the direct construction footprint). Survey results are included in the Final EIS/EIR to enumerate these effects. The anticipated tree loss for the CHP Academy EIP remains zero.

Inclusion of Proposed Habitat Mitigation

Similar to the issue above regarding clarity and specificity in vegetation effects, comments were received requesting information on proposed habitat mitigation, specifically for tree loss. In coordination with the resource agencies, potential mitigation areas have been identified and preliminary calculations yield that on-site mitigation is feasible for all tree impacts at The Rivers site. A figure showing the potential mitigation area has been included in the Final EIS/EIR, along with a description of the mitigation activities.

Elimination of Pedestrian Access to The Rivers Community

Finally, based on public feedback, the installation of a pedestrian recreation access gate proposed in the Draft EIS/EIR to The Rivers community at the levee crown has been removed from consideration under this project.

Approach to the Executive Summary

This executive summary is intended to provide a concise overview of the EIS/EIR for at-a-glance convenience. As such, EIS/EIR content is used verbatim to the maximum extent possible. The executive summary contents are limited to Chapter 1 (Introduction), Chapter 2 (Alternatives), and a table of environmental effects.

Section ES.2
Introduction

WSAFCA is proposing to reduce flood risk for the city of West Sacramento by incrementally improving the levees around the city in the form of early implementation projects (EIPs). This document provides project-level analysis for two EIPs, known as the CHP Academy and The Rivers EIPs.

The EIPs are proposed by WSAFCA under a framework known as the West Sacramento Levee Improvements Program (WSLIP). To protect human health and safety and prevent adverse effects on property and its economy, the City of West Sacramento (City), as part of WSAFCA, and in partnership with the California Department of Water Resources (DWR), embarked on a comprehensive evaluation of the condition of the levees protecting the city in 2006 (HDR, Inc. 2008). The results of the comprehensive evaluation revealed several deficiencies that require substantial improvements to meet current flood protection standards.

In light of the flood risk to West Sacramento, the WSLIP was formed as a framework for planning, funding, and implementing EIPs under WSAFCA's sponsorship. It is anticipated that WSAFCA will pursue EIPs until USACE determines the Federal interest in a project being studied under the West Sacramento General Reevaluation Report (GRR), as described in Section 1.5. EIPs are being advanced by WSAFCA to more immediately address flood risk before the GRR is complete and projects under the GRR could be implemented.

To implement the proposed EIPs, WSAFCA is requesting permission from the USACE pursuant to Section 14 of the Rivers and Harbors Act of 1899 (Title 33 of the United States Code [USC], Section 408, [33 USC 408]), hereinafter referred to as Section 408, for the alteration of the Federal flood control project.

Document Purpose and Structure

Document Overview

This document is a joint EIS/EIR and is intended to satisfy the requirements of NEPA and the CEQA for disclosing environmental effects and recommended mitigation measures related to a proposed action and alternatives prior to making a decision on project approval.

Specifically, this document analyzes the CHP Academy and The Rivers EIPs to support a NEPA ROD and CEQA Notice of Determination (NOD).

USACE is preparing this EIS for the purposes of compliance with NEPA due to its authority over alteration to Federal project levees. That authority, pursuant to Section 14 of the Rivers and Harbors

Act of 1899 (33 USC 408), is commonly referred to as "Section 408 approval," and is the nexus for USACE's responsibility for NEPA compliance. Through that Federal nexus, NEPA and CEQ's NEPA implementing regulations require Federal agencies to evaluate the environmental impacts of a proposed Federal action. In this case, USACE's role as the decision-making authority that would provide Section 408 approval to WSAFCA is the Federal action that triggers USACE's designation as lead agency under NEPA. Furthermore, since WSAFCA's EIPs are not USACE civil works projects, USACE's responsibilities are limited to NEPA compliance, Section 408 approval, and consideration of future crediting based on the outcome of the GRR. USACE has no responsibilities for funding, design, or project implementation and construction.

WSAFCA is the lead agency and implementing agency preparing this EIR for the purposes of compliance with CEQA. WSAFCA is a Joint Powers Authority created in 1994 through a Joint Exercise of Powers Agreement by the City, Reclamation District 900 (RD 900), and Reclamation District 537 (RD 537).

This EIS/EIR is the most appropriate means to comply with both NEPA and CEQA because of the need to coordinate among Federal and state agencies.

Application of NEPA and CEQA Principles and Terminology

For this environmental evaluation, the more rigorous of the two laws was applied in cases in which NEPA and CEQA differ. In some cases in this document, both NEPA and CEQA terminology are used, as in Chapter 1 where the project purpose and need and project objectives are discussed. The terms *environmental consequences, environmental impacts,* and *environmental effects* are considered synonymous in this analysis, and *effects* is used for consistency.

Technical terms used in the EIS/EIR are typically defined in their first instance of use in the text. A list of acronyms and abbreviations follows the Table of Contents. An index follows Chapter 9.

Resource Analysis Structure

Chapters 3 and 4 contain the project-level analyses for the CHP Academy EIP and The Rivers EIP, respectively, following the structure below. It should be noted that the EIPs are analyzed independently under separate chapters for clarity and specificity.

- Introduction
    - Sources of Information
- Affected Environment
    - Regulatory Setting
    - Environmental Setting
- Environmental Consequences
    - Assessment Methods
    - Determination of Effects
    - Effects and Mitigation Measures

Table ES-1 provides a key for relating the effect findings by relative severity (increasing in degree of adversity to the environment).

Table ES-1. Key to Effect Findings (by increasing adversity)

Finding
Beneficial
No Effect
Less than Significant
Significant
Significant and Unavoidable

Regional Setting and Study Area

The regional setting of the EIPs and WSLIP framework is the Sacramento River Flood Control Project (SRFCP), beginning as far north as Redding, California, and extending south to the Sacramento–San Joaquin River Delta (Delta) (Figure 1-1). For the analysis of effects (direct, indirect, or cumulative), the regional context of the SRFCP is taken into consideration.

The study area refers to the city of West Sacramento itself and the lands within WSAFCA's boundaries, which encompass portions of the Sacramento River, the Yolo Bypass, the Sacramento Bypass, and the Sacramento Deep Water Ship Channel (DWSC). The flood protection system associated with these waterways consists of over 50 miles of levees in RD 900, RD 537, DWR's Maintenance Area 4, and the DWSC (Figure 1-2). These levees completely surround the city with the exception of intersecting waterways.

The city of West Sacramento is located in eastern Yolo County at the confluence of the American and Sacramento Rivers. The city lies within the natural floodplain of the Sacramento River, which bounds the city along the east. It is made up of reclaimed land protected from floods by levees and the Yolo and Sacramento Bypass systems. These bypasses divert floodflows around the city to the west. In addition to the area within the city limits (in Yolo County), the study area partially extends into Solano County on the extreme southwestern edge along the DWSC.

The DWSC and barge canal bisect the city into two subbasins, separating the developing Southport area from the more established neighborhoods of Broderick and Bryte to the north (City of West Sacramento 2000). The DWSC provides a navigable passageway for commercial shipping to reach the Port of West Sacramento (formerly Port of Sacramento) from the Pacific Ocean via the San Francisco Bay, Delta, and connecting waterways.

The area that would be improved by the EIPs—the city of West Sacramento—is the downstream-most metropolitan area within the SRFCP, along with the city of Sacramento across the Sacramento River on the left bank. *Note: All levees, reaches, and landmarks are referred to using river navigation terminology. Left bank and right bank refer to locations when facing downstream in the direction of flow.* The downstream location of the study area is important relative to other flood risk reduction projects occurring upstream within the SRFCP, namely, the American River Common Features Project, Natomas Levee Improvement Program, projects undertaken by the Three Rivers Levee

Improvement Authority, the Sutter Basin Project, and the Yuba Basin Project (Figure 1-3). These and other projects are described under Section 1.5, Related Actions, Programs, and Planning Efforts.

Purpose and Need

Purpose, Approach, and Objectives

WSAFCA's goal is to achieve a minimum of 200-year flood protection for the city by improving the levees protecting West Sacramento. A 200-year flood is a flood that has a 0.5% chance of occurring in any given year, or annual exceedance probability (AEP). The purpose of the EIPs is to incrementally implement improvements to meet that goal in manageable elements based on ability to address the levee deficiencies, available funding, minimizing environmental effects, and similar considerations.

The approach to meet this purpose is to provide a comprehensive evaluation of the entire levee system that protects the city, develop recommended strategies for improvement, and provide a basis for partnerships with Federal and state agencies to implement improvements that meet the flood protection and compatible recreation and open space goals. The objectives under this purpose and approach are to:

- construct levee improvements as soon as possible to reduce flood risk as quickly as possible;
- construct improvements that are politically, socially, economically, and environmentally acceptable;
- provide recreation and open space elements for the city that are compatible with flood improvement actions;
- preserve and enhance riparian and other native habitats; and
- ensure continuing Federal assistance for levee repairs and maintenance.

Need for Action

Five needs have been identified for the action.

- Study results from the comprehensive levee evaluation have shown that the levees protecting the city need improvements to reduce the current level of risk to human health and safety, property, and the adverse economic effect that serious flooding would cause.
- Study results further have shown that the levees in WSAFCA's area are deficient when compared against current Federal standards. Action is needed to bring them up to current standards in order to maintain eligibility for Federal emergency management assistance. Those improvements are necessary to meet FEMA's minimum acceptable level of flood protection (commonly referred to as the 100-year flood) as specified by the National Flood Insurance Program (NFIP). (HDR, Inc. 2008.)
- As required by Senate Bill (SB) 5 (signed by Governor Schwarzenegger in October 2007), the Central Valley Flood Protection Board (CVFPB) must adopt a Central Valley Flood Protection Plan (CVFPP) by July 1, 2012. The CVFPP will require a 200-year level of flood protection for urban areas by the year 2025. Levee improvements are necessary to meet that requirement.

- As a growing community, the City has recreation and open space needs and goals that are unmet. Surrounding waterways represent not only an element of flood risk but also great opportunity for water-based recreation and public open space. Flood protection improvement elements typically underlie or are adjacent to proposed recreation elements that are part of the City's planning documents. There is a need to provide West Sacramento residents with recreation elements that are compatible with flood protection improvements.
- As described in Section 1.2, WSAFCA's area is the downstream-most metropolitan area in the SRFCP. As other projects have been implemented or improvements are being planned to reduce risk and increase flood protection for upstream communities, there is concern that the performance of the SRFCP needs to be evaluated comprehensively to ensure that the individual projects are kept in balance, that effects among the projects are being evaluated, and that risk is not being transferred between communities. WSAFCA's study area represents an important subarea of the SRFCP and merits such study, heightened by West Sacramento's downstream location.

Specific levee deficiencies at the CHP Academy EIP and The Rivers EIP sites are through-seepage, geometry, and under-seepage, along with short reaches of instability. Flood and recreation improvements implemented under the EIPs would assist in incrementally reducing local flood risk in the proximity of the projects by addressing these deficiencies.

To further demonstrate the need for action, details about West Sacramento's flood risk and the consequences of levee failure in West Sacramento are described in the Alternatives chapter (2.4.2.2, Consequences of Levee Failure). Additional context for the objectives of, purpose of, and need for the WSLIP, can be found in Chapter 1.

Project Background

Regional Flood Management History

The SRFCP was authorized by Congress in 1917. The SRFCP was the major project for flood control on the Sacramento River and its tributaries (Figure 1-1). It was sponsored locally by The Reclamation Board of the State of California (Reclamation Board, reauthorized in 2007 as the Central Valley Flood Protection Board [CVFPB]) and was the first Federal flood control project constructed outside the Mississippi River Valley. Currently, there are several major flood risk reduction projects being planned or implemented within the SRFCP area (Figure 1-3). Projects relevant to the EIPs are discussed in further detail under Section 1.6, Related Actions, Programs, and Planning Efforts.

Prior to European settlement in the mid-19th century, the floodplain of the Sacramento River in the 150 miles between the city of Redding and the Delta varied from 2 to 30 miles wide and annually covered more than 1 million acres. Low, discontinuous levees were built by individual landowners from the 1840s to the 1890s. Those levees concentrated floodflows and contributed to problems that were worsened by upstream hydraulic mining in the Sierra Nevada foothills in the late 1800s. With the authorization of the SRFCP, USACE and the State of California began managing the project as a "regional system," constructing improvements to approximately 1,100 miles of levees and creating bypasses and floodways.

Although the flood control structures have been extensively improved and upgraded since construction, the underlying foundation of most of the levees and channels pre-dates any state or USACE involvement and still retains the original materials that include dredged riverbed sands, soil, and organic matter. At the time of the SRFCP authorization in 1917, the areas being protected by the levees were primarily agricultural with minimal improved infrastructure such as railroads and highways. Many of these areas are now heavily urbanized and densely populated, including the city of West Sacramento.

The Federal government maintains oversight but has no ownership of or maintenance responsibilities for the Federal levee system, except for few select features that continue to be owned and operated by USACE. Considering these exceptions, the great majority of levees, channels, and related flood control structures are owned, operated, and maintained by local levee and reclamation districts (at the county and sub-county level) and the State of California. Most of the levee and reclamation districts existed prior to the SRFCP authorization in 1917 and have been carrying out maintenance responsibilities. Today, however, most of the levee districts are substantially underfunded and unable to maintain the system to meet current Federal standards. The levees surrounding the city are maintained by RDs 537 and 900 and DWR's Maintenance Area 4.

In recent decades, a number of evaluations of levee conditions, as well as repair and reconstruction efforts, have occurred. Some have been in specific response to damage resulting from particular flood events; others have been in response to general levee deterioration over time and deferred maintenance.

In 1986, 1995, and 1997, there were record flood stages in the Sacramento region. As a result, USACE evaluated the level of flood protection in the study area with updated hydrology and levee analysis. It was determined that the risk of flooding from the Sacramento River and its tributaries ranges from 1 in 25 (25-year) to more than 1 in 100 (100-year) each year (or 4% to 1% probability), depending on the location.

Local Flood Management History, Programs, and Activities

Consistent with much of the Sacramento Valley as described above, the levees protecting West Sacramento were initially constructed in the 1840s to 1890s. They later became part of the SRFCP authorized by Congress in 1917. These levees have been strengthened and maintained through several subsequent projects in partnership between USACE, the State of California, the City, and the agencies that maintain the levees.

Recent milestones in the flood management context of West Sacramento include the following activities.

- In 1992, the USACE concluded that the levees along the Sacramento River and Yolo Bypass did not provide protection from a 100-year flood event.
- In 1993, a flood control project was completed as part of the Sacramento Urban Area Levee Reconstruction Project. This project placed a stability berm and related features to address through-seepage along the entire length of the Sacramento River levee bordering the Southport area (referred to in the study area as the Sacramento River South Levee).
- In 1994, the City and reclamation districts formed a Joint Powers Authority, WSAFCA, to coordinate, fund, and construct major flood protection improvements that were beyond the means of the individual entities (City of West Sacramento 2000).

- In 1995, WSAFCA formed an assessment district to fund the local cost share for the West Sacramento Project. This project was part of the Federal Sacramento Metropolitan Area Project authorized by the Water Resources Development Act of 1996 (WRDA), as described above. The WSAFCA assessment funded geotechnical and engineering investigations of the Sacramento River levees and the southern boundary cross levee in the Southport area (PB 2007). The West Sacramento Project was designed to provide the city with a greater than 200-year level of protection.

- During the 1997 record flood stage event, the levees surrounding the city sustained minor damage. As design work was nearing completion on the West Sacramento Project, under-seepage was noted along the Sacramento Bypass levee.

- In 1998, stability issues became apparent along a levee maintained by RD 537 just north of the Southern Pacific Railroad tracks.

- In 2002, the West Sacramento Project was substantially completed. This project involved raising more than 1 mile of the south levee of the Sacramento Bypass by up to 5 feet and raising 4.5 miles of the Yolo Bypass levee by up to 5.5 feet.

- As described above, in May 2007, property owners in West Sacramento approved a new annual parcel assessment to provide funding for flood improvements, facilitating the WSLIP study.

- In 2008, WSAFCA completed an EIP known as the I Street Bridge EIP. This EIP improved a critical section of levee in the redevelopment area along the riverfront of the city to reduce flood risk to public safety, private property, and public infrastructure. The EIP improved a 475-linear-foot reach of the Sacramento River North Levee to address the problems of through- and under-seepage. This EIP and Section 408 action was expeditiously completed by WSAFCA, the State of California, and USACE.

Local Recreation Needs

The City, as a member agency of WSAFCA, is proposing recreation elements that are compatible with flood improvements to meet recreation needs. For example, the Sacramento River is central to the identity and image of the city, yet opportunities to enjoy it are hampered by lack of safe and accessible public access points. The city is also lacking developed facilities and infrastructure for dedicated off-street bikeways, environmental interpretation and education, fishing, boating, hiking, and other active and passive outdoor recreation experiences. This situation has been heightened by the recent growth of the local population, demographically influenced by young families and individuals oriented toward outdoor recreation.

The *City of West Sacramento Parks Master Plan* (Parks Master Plan) from 2003 identified several key recreation opportunities for the city that will enable its citizens and visitors to enjoy the resources provided by the Sacramento River and other waterways. The recreation needs relative to the WSLIP are summarized below.

- **Improved water access.** Residents value the water resources available in West Sacramento. They desire improved access to water-related recreation such as fishing, boating, swimming, and passive use (e.g., wildlife viewing and hiking).

- **Recreation corridors and trails.** The residents support corridors for bicycling, walking, and horseback riding.

Related Actions, Programs, and Planning Efforts

This section lists other flood management activities that comprise the regional planning context.

- Sacramento Metropolitan Area, California, Feasibility Report (West Sacramento Project)
- West Sacramento General ReEvaluation Report
- Sacramento River Deep Water Ship Channel Project
- Sacramento Weir Sediment Removal Project
- Central Valley Flood Protection Act
- Natomas Levee Improvement Program
- Sacramento River Flood Control System Evaluation
- Sacramento–San Joaquin Rivers Comprehensive Study
- American River Common Features Project
- Sacramento River Bank Protection Project
- Flood Control and Coastal Storm Emergency Act

Community Outreach, Agency Coordination, and Issues of Known Controversy

Community Outreach

USACE and WSAFCA have established a proactive multi-media outreach program to communicate the WSLIP. The approach to the outreach program has been to go beyond the guidelines and requirements of NEPA and CEQA for public noticing to ensure the affected community and other interested stakeholders are informed, engaged, and involved through an accessible, open, and transparent process. Thus far, the outreach program has included more than a dozen actions, including meetings, publications, web-postings, and other community involvement activities.

To date, the results of the outreach program have been very favorable, constructive, and supportive for the WSLIP. The tone and substance of the input has been consistent with the voter-approved assessment to fund the local share of the WSLIP. Comments received from the public have been considered to refine the project description and the environmental analysis.

A more detailed accounting of the scoping process is provided in Appendix A. Comments and responses received during the public comment period may be found in Part 2 of this document.

Agency Consultation and Coordination

The EIPs have been planned in coordination and cooperation with numerous local, state, and Federal agencies. In Chapters 3 and 4, the regulatory setting for each respective resource describes the compliance with applicable Federal, state, regional and local laws and regulations, including consultation to date with various agencies, such as U.S. Fish and Wildlife Service (USFWS), the

National Marine Fisheries Service (NMFS), and the California Department of Fish and Game (DFG), as well as Native Americans.

This EIS/EIR will be used by Responsible and Trustee Agencies to determine the effects of the proposed action.

Issues of Known or Expected Controversy

NEPA requires that project proponents identify issues of known controversy that have been raised in the scoping process and throughout the development of the project. The Draft EIS/EIR yielded substantial comment for two primary issues, one regarding implementation of USACE levee vegetation policy (mostly as related to the description and analysis of the program), and concern over pedestrian recreation access to The Rivers community. In response, for the Final EIS/EIR, WSAFCA has refocused coverage on the EIPs only, has identified USACE's EIS for the GRR as providing programmatic coverage, has analyzed multiple compliance mechanisms for USACE levee vegetation policy, and has dropped the installation of a pedestrian access gate at The Rivers as an element of the project. It is WSAFCA's intent to be responsive to public feedback in concept and in practice, as demonstrated through these refinements. Revisions to the Final EIS/EIR are presented in greater detail in the preceding section regarding approach. The following potentially controversial issues were disclosed in the Draft EIS/EIR and remain issues which may arise in the development and execution of the EIPs.

- Construction-Related Effects
- Property Take and Restricted Property Access
- Restriction of Vegetation on Levees
- Climate Change and Sea-Level Rise

Section ES.3
Alternatives

Introduction

Chapter 2 describes the following elements:

- general information about improvements, including the screening process;
- project-level description for two EIPs: CHP Academy EIP and The Rivers EIP; and
- environmental commitments incorporated into the program and project description to be considered in the environmental analysis for all action alternatives.

General Information about Alternatives

Approach to Alternatives

NEPA and CEQA generally require that an EIS and EIR (respectively) consider a range of alternatives that would attain most of the project purpose, need, and objectives while avoiding or substantially lessening project effects.

Consistent with NEPA standards, alternatives at the program level are analyzed on an equal, non-preferential basis (i.e., there is no proposed project/preferred alternative) and at an equal level of detail. In describing and analyzing the EIPs under the WSLIP, flood and recreation improvements have been packaged into two project-level alternatives each for two project locations, in accordance with NEPA and CEQA. As required under NEPA and CEQA, a no-action (no-project) alternative has been included to allow comparison of impacts of a range of alternatives including no project implementation.

Alternative Screening Process

The alternative screening process includes a pre-program screen, program-level screen, and project-level screen. The pre-program and program screening process is described in Appendix B, along with a complete description of the WSLIP alternatives at the programmatic level.

Project-Level Screen

At the project level, screening criteria are applied to identify reach-specific improvements. The criteria for the WSLIP include the following elements:

- ability to meet the project objectives (i.e., address the deficiencies) to reduce risk;
- availability of funds;
- scalability of construction;
- real estate requirements;

- land use compatibility;
- permit requirements;
- environmental constraints;
- integration of multi-purpose objectives, such as delivery of recreation features that are compatible with flood improvements;
- evolving technical policy; and
- public feedback, including that discovered during the EIS/EIR process.

No Action Alternative

Introduction to No Action

The No Action Alternative serves as a benchmark against which the effects and benefits of the action alternatives are evaluated. The No Action Alternative consists of continuation of current conditions and operation and maintenance practices that reasonably would be expected to occur in the foreseeable future if the EIPs were not implemented based on current plans and consistent with available infrastructure and community services.

No Flood Improvements Implemented under the No Action Alternative

Under the No Action Alternative, WSAFCA would not implement flood improvements. The levees protecting the city would continue to require improvements to meet FEMA's minimum acceptable level of flood protection. In addition, the associated risk to human health and safety, property, and the adverse economic impact that serious flooding could cause would continue, and the risk of a catastrophic flood would remain high.

Future State or Federal Action

Despite the likelihood of state- or Federal-led implementation of repairs (such as analyzed in the West Sacramento Project GRR), for the purpose of evaluating impacts under the No Action Alternative, the EIS/EIR assumes that the improvements would not occur. Again, as stated above, the No Action Alternative therefore assumes no levee repair or strengthening would be implemented, the purpose and objectives would not be met, and flood risk would continue.

Consequences of Levee Failure

Assuming that no levee repair or strengthening would occur under the No Action Alternative means that the West Sacramento levee system would remain or become more susceptible to failure as a result of identified deficiencies such as seepage, erosion, inadequate levee height, and slope instability. These conditions could cause portions of the levee system to fail, triggering widespread flooding, extensive damage to the city's existing residential, commercial, agricultural, and industrial structures, and potential loss of life and property. Extensive damage to utilities, roadways, major interstate transportation corridors, and other infrastructure systems would also likely occur. The water supply and sewage facilities would likely fail. Floodwaters would become contaminated by chemicals released from inundated vehicles, homes, industrial facilities, businesses, and equipment.

Flood depth maps prepared for West Sacramento indicate that under a 100-year flood event scenario, inundation levels would range from 1 foot to 15 feet, depending on the local elevation of the land surface. Figure 2-1 shows the ultimate estimated inundation depths for a 100-year flood event.

In 2006, two hypothetical levee failures were analyzed for West Sacramento utilizing 100-year water surface elevations and hydrology. This analysis was performed to assist the City in its flood emergency preparedness planning. One failure was located in the northern part of the city, on the Sacramento River North Levee, and the other was located in the Southport area, on the Sacramento River South Levee (failure locations are shown in Figures 2-2 and 2-3). (Wood Rodgers 2006.)

The analysis indicates that a levee failure on the Sacramento River North Levee during a 100-year event would flood the entire north area with at least 1 foot of water within 24 hours, at which point vehicular evacuation would become impossible (a depth of 1 foot is regarded as impassable from the standpoint of vehicular traffic). Certain neighborhoods close to the levee failure would lose access to evacuation routes within three hours of levee failure. Figure 2-2 shows the estimated time to 1-foot inundation depths throughout the northern area. Within 3 days, floodwater depths would reach 3 to 10 feet, depending on land surface elevation (as shown in Figure 2-1). Floodwaters would flow from north to south, seeking the lowest topographical elevation, and eventually discharge into the DWSC. The study estimates that floodwaters would begin to spill into the DWSC less than 24 hours after the breach. Modeling indicates that the DWSC could absorb up to 20,000 cubic feet per second (cfs) in discharge flow from waters flooding the north area of the city before overtopping and flooding the Southport area. (Wood Rodgers 2006.)

A levee failure on the Sacramento River South Levee during a 100-year event would flood the entire Southport area with at least 1 foot of water within 24 hours. Jefferson Boulevard, the only vehicular evacuation route for Southport, would be inundated by 1 foot of water within 4 hours, making it impassable. Figure 2-3 shows the estimated time to 1-foot inundation depths throughout the Southport area. Inundation depth could reach 3 feet in 36 hours and 10 feet after three days (Figure 2-1). Floodwaters would flow from east to west, then turn south, collecting at the South Cross Levee. The maximum stage from the floodwater was estimated at elevation 22 feet. The elevation at the top of the South Cross Levee is 21.5 feet. If the South Cross Levee were overtopped, further flooding would occur downstream of the city of West Sacramento. (Wood Rodgers 2006.)

Levee failure and subsequent flooding of the city of West Sacramento would affect the entire city, jeopardizing lives, and would cause substantial damage to structures, contents, and other property such as landscaping and automobiles. As of 2005, a population of 40,439 was living in 15,448 housing units within the city (Sacramento Area Council of Governments 2008a and 2008b). All of these residents could be displaced by a catastrophic flood event. Additionally, the city is home to 30,655 jobs (Sacramento Area Council of Governments 2008c), 734 commercial and industrial structures, 46 public structures and 27 park facilities, which would all be affected by a flood event (HDR, 2009). Environmental and agricultural resources could also sustain major damage in a flood event; 22.6% of the land area within the city is either farmland or open space (City of West Sacramento 2009). If a catastrophic flood event occurred resulting in inundation up to 15 feet, land damages are estimated to be $237,763,648 and structural damages could be up to $1,750 ,118,102 (PB 2007). These values are based on the 100-year event.

A flood event in West Sacramento would also disrupt state and interstate highway, rail, and shipping traffic, causing long-term effects on the region's and the state's economy and ability to move people and goods. West Sacramento has one of the most comprehensive transportation networks on the west coast. Its central geographic location and extensive north-south and east-west highway access has made it a major distribution center. High volumes of truck and passenger traffic pass through the city on Interstate 80 and US-50/Business 80 every day, with truck traffic transporting approximately $63 billion worth of cargo annually through West Sacramento (HDR Engineering 2009). Major transcontinental rail lines passing through the city provide commercial and passenger rail service to all parts of the nation, and the Port of West Sacramento runs domestic and international shipping services (City of West Sacramento 2009). Approximately 9.3 million tons of rail freight valued at approximately $5 billion travels through West Sacramento annually (HDR Engineering 2009). Flooding of this transportation and distribution infrastructure would cut off major statewide and interstate transportation corridors.

Relationship of Flood Map Modernization to No Action

FEMA is in the process of reevaluating the level of flood protection provided by the levee system protecting the city. The city is currently designated as falling under Zone X, meaning it has less than a 1% chance of flooding in any given year (100-year flood protection). If the city were remapped out of Zone X and into an A, AE, AR, or A-99 Zone, flood insurance would become mandatory for all citizens and businesses that hold federally guaranteed mortgage loans. In addition, Federal and state regulations would prevent or constrain further development in the city, which may further delay levee improvement funding because a flood improvement development fee is incurred for new development.

A change in the flood hazard designation for West Sacramento would interrupt the preferred regional "blueprint" for future growth through 2035 adopted by the Sacramento Area Council of Governments (SACOG) and Valley Vision in 2004. With a change in flood hazard designation, 40,000 new dwelling units and the commercial and industrial developments associated with 50,000 new jobs would need to be redirected to other areas in the region over the next four decades (Sacramento Area Council of Governments 2004).

Levee Vegetation Policy and No Action

The Draft EIS/EIR had described that the No Action Alternative would result in the removal of non-compliant vegetation. Further, the Draft EIS/EIR described that a possible mechanism for compliance with the policy is a variance or exemption authorized by USACE, and noted that USACE was at that time developing implementation guidance for variances. Finally, the Draft EIS/EIR described the efforts of the Interagency Flood Management Collaborative. Closely coordinated with this group, the California Levees Roundtable (Roundtable) formed in 2007 to address vegetation issues affecting the levee system in the Central Valley. The Federal, state, and local member agencies, including USACE and CVFPB, agreed to work together to draft a phased, system-wide levee vegetation plan, with short- and long-term elements. The vegetation plan transitioned into the *California's Central Valley Flood System Improvement Framework* (Framework), adopted on March 26, 2009.

The Framework functions as short-term guidance before the comprehensive Central Valley Flood Protection Plan is ready in 2012. During development of the Framework, USACE created several basic tenets to help integration of vegetation requirements for the short and long term to maintain Public Law (PL) 84-99 eligibility. The tenets acknowledge the complex issues facing the flood control system in addition to vegetation, clarify areas of short-term flexibility in compliance with USACE levee vegetation policy, and address long-term compliance at a broad scale.

To date, USACE has agreed that the flood system will continue to be eligible for Federal levee rehabilitation assistance in the event of a flood if the state is demonstrating positive progress and meeting the milestones in achieving the Framework's short-term goals and maintenance objectives. In an April 2, 2010, letter to the CVFPB, USACE's Director of Civil Works stated, "the Framework Agreement will continue to be the guiding document as DWR continues to develop its long-term plan to resolve vegetation issues; a plan we understand will be finalized and provided to the USACE in July 2012" (Stockton pers. comm.).

In light of these circumstances, the Final EIS/EIR description of the No Action Alternative has been revised in this document to reflect multiple possible future scenarios:

- full application of the ETL, meaning prohibition and removal of woody vegetation within the levee prism or within 15 feet of the landside or waterside levee toes (the scenario described and analyzed in the Draft EIS/EIR);
- no application of the ETL; assuming the continued existence into the future of the vegetation conditions at the time of the analysis;
- application of the interim guidance for USACE levee vegetation policy from the Framework process, meaning trees within the levee prism on the landside slope, upper 20 feet of the waterside slope, or within 10 feet of the landside toe must be trimmed up five feet above the ground (or 12 feet above the crown road) and thinned; and
- application of a possible variance, such as the variance issued for Natomas Levee Improvement Program (NLIP) under USACE's draft variance policy, meaning removal of trees within the levee prism on the landside slope or within the landside operations and maintenance corridor, and allowance of trees within the levee prism on the waterside slope based on demonstration of not affecting the critical levee prism.

Appendix C provides additional technical background and compliance information regarding USACE levee vegetation policy.

Recreation under No Action

The No Action Alternative would also delay implementing elements of the Parks Master Plan, Bicycle and Pedestrian Path Master Plan, and the Sacramento Riverfront Master Plan (SRMP).

Project-Level Alternatives

Introduction and Project Phasing

At this time, WSAFCA is proposing the CHP Academy EIP and The Rivers EIP. These sites have both had observed past performance issues, with evidence of seepage at both sites (and possible boils at The Rivers). Table ES-3 provides an overview of the deficiencies and upgrades proposed at these sites for flood management. Recreation improvements are also proposed.

Table ES-3. CHP Academy and The Rivers EIP Alternatives

EIP	Program Component	Applicant Preferred Alternative	Alternative B
CHP Academy	Flood	Slurry cutoff wall and waterside slope flattening	Stability berm with interior drain, and relief wells
	Recreation	Paved bike trail, non-motorized access controls	Paved bike trail, non-motorized access controls
The Rivers	Flood	DSM cutoff wall, and landside slope flattening (landside hinge point stationary, kick out toe)	Deep sheet pile wall and landside slope flattening
	Recreation	Paved bike trail, paved pedestrian trail, paved landing, landside levee embankment ramps, interpretive signs, non-motorized access controls	Paved bike trail, paved pedestrian trail, paved landing, landside levee embankment ramps, interpretive signs, non-motorized access controls

CHP Academy EIP

The CHP Academy EIP area is approximately 6,500 feet long and is located on the Sacramento Bypass Levee, (Figure 2-4). The easternmost 1,200 feet of the waterside slope of the levee (adjacent to the weir) is lined with a concrete cap. This concrete cap prevents the levee from eroding when the weir is open and water is allowed to enter into the Sacramento Bypass from the Sacramento River. A stability berm and an interior drain system installed as part of the West Sacramento Project in 1999 runs the length of the levee on the landside. As stated above, deficiencies at this site are through-seepage, geometry, and under-seepage, along with short reaches of instability.

The Rivers EIP

The Rivers EIP area is approximately 4,500 feet long and is located on the Sacramento River North Levee, just north of the confluence of the Sacramento and American Rivers, including part of The Rivers residential development (Figure 2-6). As stated above, levee deficiencies at this site include geometry, stability, through-seepage, and under-seepage.

Please note: In the Draft EIS/EIR, The Rivers EIP site is presented as 4,500 feet in length in the alternatives description, as well as the affected environment and effects analyses for all the resource areas. Through further engineering analysis and technical review, it was determined that other alternative measures to address under-seepage merited further consideration in the eastern portion of the project reach along Rivercrest Drive (see Figure 2-6). Therefore, this portion of the reach was withdrawn from the proposed EIP at this time and has been deferred for further study. The proposed project length under The Rivers EIP is now 3,035 feet. The affected environment descriptions and effects analyses for all the resource areas for the Final EIS/EIR remain the same as in the Draft EIS/EIR at the originally proposed length of 4,500 feet, except vegetation and wildlife. USACE has consulted with USFWS and NMFS under ESA regarding effects on vegetation and wildlife. To more accurately represent the likely actual effects on these resources in the EIS/EIR, and for consistency between the EIS/EIR and the permitting documents, the effects analyses for these resources have been revised to reflect the presently proposed shorter project length.

The eastern approximately 1,465 feet of the original study reach no longer part of the proposed project will continue to be evaluated by WSAFCA for possible future and separate EIP action, but most likely will be deferred for study by USACE under the on-going West Sacramento Project GRR (described further in Chapter 1). Existing conditions and current risk levels will continue for the remainder of the reach, however it is anticipated that improvements to this reach will be implemented under the West Sacramento GRR or another EIP, as described in Relationship to WSAFCA and USACE Activities in the Approach to this Final EIS/EIR.

Environmental Commitments

Environmental commitments are measures incorporated as part of the project description, meaning they are proposed as elements of the proposed action and are to be considered in conducting the environmental analysis and determining effects and findings. To avoid and minimize construction-related effects, WSAFCA would implement the following environmental commitments to reduce or offset short-term, construction-related effects. Measures have been developed for each of the topics below, to be applied in the resource analyses.

- Raptors
- USACE Levee Vegetation Guidance
- Protected Trees and Riparian Trees
- Invasive Plant Species Prevention
- Stormwater Pollution Prevention Plan
- Temporary Visual Barriers between Construction Zones and Residences
- Noise-Reducing Construction Practices
- Temporary Resident Relocation, Property Acquisition, and Compensation for Loss of Business
- Traffic Control and Road Maintenance Plan
- Coordination to Ensure Minimal Overlap in Disturbance to Traffic during WSLIP Construction
- Coordination of Construction Periods with Railroad Service Officials
- Coordination of Construction Periods with CHP
- Notification of Construction Area Closure
- Bentonite Slurry Spill Contingency Plan [1]
- Spill Prevention, Control, and Counter-Measure Plan
- Implementation of Measures to Maintain Surface Water Quality and Groundwater Quality
- Monitoring of Turbidity in Adjacent Water Bodies
- Soil Supply Protection Measures
- Notification of Excavation or Dewatering near Groundwater Plume

[1]Also referred to as a *frac-out plan*, which addresses the movement of mud toward the surface caused by excessive drilling pressure.

Effects Summary Table

Table ES-4 is a summary of the effects of the CHP Academy EIP and The Rivers EIP. The effects that are significant and unavoidable or that are potentially significant and unavoidable, depending on site or project characteristics, are listed below.

- TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee
- AQ-2: Construction Emissions to Exceed Applicable Thresholds
- NZ-4: Exposure of Sensitive Receptors to Temporary Vibration Caused by Pile Driving
- SOC-2: Effects on Residents
- VIS-1: New Source of Light or Glare
- VIS-3: Changes to the Existing Visual Character or Quality of the Site and Its Surroundings as a Result of Construction, Operations, and Maintenance
- VIS-4: Conflicts with Local Visual Resource Policies
- REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor
- PUB-1: Damage of Public Utility Infrastructure and Disruption of Service
- CR-2: Change in the Significance of an Archaeological Resource
- CR-3: Disturbance of Native American and Historic-Period Human Remains

1 **Table ES-4. Summary of Effects and Mitigation Measures for the WSLIP, CHP Academy EIP, and The Rivers EIP**

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
FLOOD CONTROL AND GEOMORPHIC CONDITIONS			
CHP Academy Applicant Preferred Alternative			
FC-1: Alteration of the Existing Drainage Pattern of the Site or Area	Significant	Less than significant	FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design
FC-2: Decrease in Through- and Under-Seepage	Beneficial	N/A	N/A
FC-3: Transfer of Seepage to Upstream or Downstream Levees	Less than significant	N/A	N/A
FC-4: Increase in Levee Slope Stability	Beneficial	N/A	N/A
CHP Academy Alternative B			
FC-1: Alteration of the Existing Drainage Pattern of the Site or Area	Significant	Less than significant	FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design
FC-4: Increase in Levee Slope Stability	Beneficial	N/A	N/A
FC-5: Redirection of Under-Seepage	Beneficial	N/A	N/A
The Rivers Applicant Preferred Alternative			
FC-1: Alteration of the Existing Drainage Pattern of the Site or Area	Significant	Less than significant	FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design
FC-2: Decrease in Through- and Under-Seepage	Beneficial	N/A	N/A
FC-3: Transfer of Seepage to Upstream or Downstream Levees	Less than significant	N/A	N/A
FC-4: Increase in Levee Slope Stability	Beneficial	N/A	N/A
The Rivers Alternative B			
FC-1: Alteration of the Existing Drainage Pattern of the Site or Area	Significant	Less than significant	FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design
FC-2: Decrease in Through- and Under-Seepage	Beneficial	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
FC-3: Transfer of Seepage to Upstream or Downstream Levees	Less than significant	N/A	N/A
FC-4: Increase in Levee Slope Stability	Beneficial	N/A	N/A
WATER QUALITY AND GROUNDWATER RESOURCES			
CHP Academy Applicant Preferred Alternative			
WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids	Less than significant	N/A	
WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials	Less than significant	N/A	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality
WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation	Significant	Less than significant	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
CHP Academy Alternative B			
WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids	Less than significant	N/A	
WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials	Less than significant	N/A	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality
WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation	Significant	Less than significant	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
The Rivers Applicant Preferred Alternative			
WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids	Less than significant	N/A	
WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials	Less than significant	N/A	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality
WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation	Significant	Less than significant	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
The Rivers Alternative B			
WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids	Less than significant	N/A	

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials	Less than significant	N/A	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality
WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation	Significant	Less than significant	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
GEOLOGY, SEISMICITY, SOILS AND MINERAL RESOURCES			
CHP Academy Applicant Preferred Alternative			
GEO-1: Effects on Levee Stability	Beneficial	N/A	N/A
GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction	Less than significant	N/A	N/A
GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance	Less than significant	N/A	N/A
GEO-4: Structural Damage and Injury from Development on Expansive Soils	Significant	Less than significant	GEO-MM-1: Implement the Corrective Actions Identified as Part of a Project-Specific Geotechnical Report
CHP Academy Alternative B			
GEO-1: Effects on Levee Stability	Beneficial	N/A	N/A
GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction	Less than significant	N/A	N/A
GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance	Less than significant	N/A	N/A
GEO-4: Structural Damage and Injury from Development on Expansive Soils	Significant	Less than significant	GEO-MM-1: Implement the Corrective Actions Identified as Part of a Project-Specific Geotechnical Report
The Rivers Applicant Preferred Alternative			
GEO-1: Effects on Levee Stability	Beneficial	N/A	N/A
GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction	Less than significant	N/A	N/A
GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
The Rivers Alternative B			
GEO-1: Effects on Levee Stability	Beneficial	N/A	N/A
GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction	Less than significant	N/A	N/A
GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance	Less than significant	N/A	N/A
TRANSPORTATION AND NAVIGATION			
CHP Academy Applicant Preferred Alternative			
TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic	Less than significant	N/A	N/A
TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee	Less than significant	N/A	N/A
TN-3: Increase in Safety Hazards Attributable to Construction-Generated Traffic	Less than significant	N/A	N/A
TN-4: Increase in Emergency Response Times	Less than significant	N/A	N/A
TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers	Less than significant	N/A	N/A
TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures	Less than significant	N/A	N/A
CHP Academy Alternative B			
TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic	Less than significant	N/A	N/A
TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee	Less than significant	N/A	N/A
TN-3: Increase in Safety Hazards Attributable to Construction-Generated Traffic	Less than significant	N/A	N/A
TN-4: Increase in Emergency Response Times	Less than significant	N/A	N/A
TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures	Less than significant	N/A	N/A
The Rivers Applicant Preferred Alternative			
TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic	Less than significant	N/A	N/A
TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee	Significant	No feasible mitigation	Significant and unavoidable
TN-3: Temporary Restriction of Access to Parking	Less than significant	N/A	N/A
TN-4: Increase in Emergency Response Times	Less than significant	N/A	N/A
TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers	Less than significant	N/A	N/A
TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures	Less than significant	N/A	N/A
The Rivers Alternative B			
TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic	Less than significant	N/A	N/A
TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee	Significant and unavoidable	Significant and unavoidable	No feasible mitigation
TN-3: Temporary Restriction of Access to Parking	Less than significant	N/A	N/A
TN-4: Increase in Emergency Response Times	Less than significant	N/A	N/A
TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers	Less than significant	N/A	N/A
TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
AIR QUALITY AND CLIMATE CHANGE			
CHP Academy Applicant Preferred Alternative			
AQ-1: Causes Conflicts with or Obstruction of an Applicable Air Quality Plan	Less than significant	N/A	N/A
AQ-2: Construction Emissions to Exceed Applicable Thresholds	Significant	Less than significant to significant and unavoidable	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-2: Implement Fugitive Dust Control Plan If Unmitigated Emissions Exceed PM10 or PM 2.5 Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents AQ-MM-4: Pay Required Fees to SMAQMD to Offset NO_X Emissions
AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10	Less than significant	N/A	N/A
AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds
AQ-5: Exposure to Objectionable Odors from Diesel Exhaust	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents
CHP Academy Alternative B			
AQ-1: Cause Conflicts with or Obstruction of an Applicable Air Quality Plan	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
AQ-2: Construction Emissions to Exceed Applicable Thresholds	Significant	Less than significant – Significant and unavoidable	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-2: Implement Fugitive Dust Control Plan If Unmitigated Emissions Exceed PM10 or PM2.5Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents AQ-MM-4: Pay Required Fees to the SMAQMD to Offset NO_X Emissions
AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10	Less than significant	N/A	N/A
AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds
AQ-5: Exposure to Objectionable Odors from Diesel Exhaust	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents
The Rivers Applicant Preferred Alternative			
AQ-1: Causes Conflicts with or Obstruction of an Applicable Air Quality Plan	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
AQ-2: Construction Emissions to Exceed Applicable Thresholds	Significant	Less than significant to significant and unavoidable	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-2: Implement Fugitive Dust Control Plan If Unmitigated Emissions Exceed PM10 and PM2.5 Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents AQ-MM-4: Pay Required Fees to SMAQMD to Offset NO_X Emissions
AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10	Less than significant	N/A	N/A
AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds
AQ-5: Exposure to Objectionable Odors from Diesel Exhaust	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents
The Rivers Alternative B			
AQ-1: Cause Conflicts with or Obstruction of an Applicable Air Quality Plan	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
AQ-2: Increase in Construction Emissions to Exceed Applicable Thresholds	Significant	Less than significant to significant and unavoidable	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-2: Implement Fugitive Dust Control Plan If Unmitigated Emissions Exceed PM10 Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents AQ-MM-4: Pay Required Fees to the SMAQMD to Offset NO_X Emissions
AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10	Less than significant	N/A	N/A
AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds
AQ-5: Exposure to Objectionable Odors from Diesel Exhaust	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents
NOISE			
CHP Academy Applicant Preferred Alternative			
NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise	Less than significant	N/A	N/A
NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations	Less than significant	N/A	N/A
CHP Academy Alternative B			
NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations	Less than significant	N/A	N/A
The Rivers Applicant Preferred Alternative			
NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise	Less than significant	N/A	N/A
NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations	Less than significant	N/A	N/A
NZ-3: Exposure of Sensitive Receptors to Temporary Construction-Related Vibration	Significant	Less than significant	NZ-MM-1: Employ Measures to Prevent Exposure of Buildings and Structures to Excessive Groundborne Vibration
The Rivers Alternative B			
NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise	Less than significant	N/A	N/A
NZ-2 Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations	Less than significant	N/A	N/A
NZ-3: Exposure of Sensitive Receptors to Temporary Construction-Related Vibration	Significant	Less than significant	NZ-MM-1: Employ Measures to Prevent Exposure of Buildings and Structures to Excessive Groundborne Vibration
NZ-4: Exposure of Sensitive Receptors to Temporary Vibration Caused by Pile Driving	Significant	Significant and unavoidable	NZ-MM-2: Limit Pile-Driving Vibration and Implement a Pile-Driving Vibration Control Plan
VEGETATION AND WETLANDS			
CHP Academy Applicant Preferred Alternative			
VEG-1: Disturbance or Removal of Riparian Habitat as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor VEG-MM-4: Compensate for Loss of Protected Trees
VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction	Less than significant	N/A	N/A
VEG-5: Conflict with an Adopted HCP/NCCP or Other Approved Local, Regional of State Habitat Conservation Plan	No effect	N/A	N/A
CHP Academy Alternative B			
VEG-1: Disturbance or Removal of Riparian Habitat as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor VEG-MM-4: Compensate for Loss of Protected Trees

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction	Less than significant	N/A	N/A
VEG-5: Conflict with an Adopted HCP/NCCP or Other Approved Local, Regional of State Habitat Conservation Plan	No effect	N/A	N/A
The Rivers Applicant Preferred Alternative			
VEG-1: Disturbance of Removal of Riparian Vegetation as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor VEG-MM-4: Compensate for Loss of Protected Trees
VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction	Less than significant	N/A	N/A
VEG-5: Conflict with an Adopted HCP/NCCP or Other Approved Local, Regional of State Habitat Conservation Plan	No effect	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
The Rivers Alternative B			
VEG-1: Disturbance of Removal of Riparian Vegetation as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor VEG-MM-4: Compensate for Loss of Protected Trees
VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction	Less than significant	N/A	N/A
VEG-5: Conflict with an Adopted HCP/NCCP or Other Approved Local, Regional of State Habitat Conservation Plan	No effect	N/A	N/A
FISHERIES AND AQUATICS			
CHP Academy Applicant Preferred Alternative			
FISH-1: Temporary Effects on Seasonal Floodplain Habitat for Special-Status Fish	Less than significant	N/A	N/A
CHP Academy Alternative B			
FISH-1: Temporary Effects on Seasonal Floodplain Habitat for Special-Status Fish	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
The Rivers Applicant Preferred Alternative			
FISH-1: Increase in Sedimentation and Turbidity in Adjacent Water Bodies as a Result of Construction	Less than significant	N/A	N/A
FISH-2: Release of Contaminants into Adjacent Water Bodies as a Result of Construction	Less than significant	Less than significant	Mitigation Measure WQ-MM-1, Implement Measures to Maintain Surface Water Quality and Groundwater Quality
FISH-3: Noise and Disturbance of Special-Status Fish Species as a Result of Construction	Less than significant	N/A	N/A
The Rivers Alternative B			
FISH-1: Increase in Sedimentation and Turbidity in Adjacent Water Bodies as a Result of Construction	Less than significant	N/A	N/A
FISH-2: Release of Contaminants into Adjacent Water Bodies as a Result of Construction	Less than significant	Less than significant	Mitigation Measure WQ-MM-1, Implement Measures to Maintain Surface Water Quality and Groundwater Quality
FISH-3: Noise and Disturbance of Special-Status Fish Species as a Result of Construction	Less than significant	N/A	N/A
WILDLIFE			
CHP Academy Applicant Preferred Alternative			
WILD-1: Disturbance or Loss of VELB and Their Habitat (Elderberry Shrubs)	Significant	Less than Significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-2: Disturbance or Loss of Western Pond Turtle and Their Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-1: Conduct a Preconstruction Survey for Western Pond Turtle and Exclude Turtles from Work Area, If Present

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
WILD-3: Disturbance or Loss of Giant Garter Snake and Their Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop Appropriate Compensation Plan for Giant Garter Snake
WILD-4: Disturbance to Nesting Swainson's Hawks and Loss of Nesting and Foraging Habitat	Significant	Less than Significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-5: Disturbance to Nesting Special-Status Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-6: Disturbance to Burrowing Owl and Loss of Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-3: Conduct Preconstruction Surveys for Burrowing Owl Prior to Construction and If Present, Protect Nests through Use of Agency-Approved Protection Buffers WILD-MM-4: Coordinate with Resource Agencies and Develop Appropriate Compensation Plans for Burrowing Owl
WILD-7: Disturbance or Loss of Bats and Bat Roosts	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-5: Conduct a Preconstruction Survey for Roosting Bats and Avoid or Mitigate for Potential Effects
WILD-8: Disturbance to Nesting Non-Special-Status Migratory Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-9: Disturbance or Loss of Common Wildlife Species and Their Habitats	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
WILD-10: Disruption of Wildlife Movement Corridors	Less than significant	N/A	N/A
WILD-11: Conflict with an Adopted HCP/NCCP or Other Approved Local, Regional of State Habitat Conservation Plan	No effect	N/A	N/A
CHP Academy Alternative B			
WILD-1: Disturbance or Loss of VELB and Their Habitat (Elderberry Shrubs)	Significant	Less than Significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-2: Disturbance or Loss of Western Pond Turtle and Their Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-1: Conduct a Preconstruction Survey for Western Pond Turtle and Exclude Turtles from Work Area, If Present
WILD-3: Disturbance or Loss of Giant Garter Snake and Their Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop Appropriate Compensation Plan for Giant Garter Snake
WILD-4: Disturbance to Nesting Swainson's Hawks and Loss of Nesting and Foraging Habitat	Significant	Less than Significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-5: Disturbance to Nesting Special-Status Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
WILD-6: Disturbance to Burrowing Owl and Loss of Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-3: Conduct Preconstruction Surveys for Burrowing Owl Prior to Construction and If Present, Protect Nests through Use of Agency-Approved Protection Buffers WILD-MM-4: Coordinate with Resource Agencies and Develop Appropriate Compensation Plans for Burrowing Owl
WILD-7: Disturbance or Loss of Bats and Bat Roosts	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-5: Conduct a Preconstruction Survey for Roosting Bats and Avoid or Mitigate for Potential Effects
WILD-8: Disturbance to Nesting Non-Special-Status Migratory Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-9: Disturbance or Loss of Common Wildlife Species and Their Habitats	Less than significant	N/A	N/A
WILD-10: Disruption of Wildlife Movement Corridors	Less than significant	N/A	N/A
WILD-11: Conflict with an Adopted HCP/NCCP or Other Approved Local, Regional of State Habitat Conservation Plan	No effect	N/A	N/A
The Rivers Applicant Preferred Alternative			
WILD-1: Disturbance or Loss of VELB and Their Habitat (Elderberry Shrubs)	Significant	Less than Significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
WILD-2: Disturbance or Loss of Western Pond Turtle and Their Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-1: Conduct a Preconstruction Survey for Western Pond Turtle and Exclude Turtles from Work Area, If Present
WILD-3: Disturbance to Nesting Swainson's Hawks and Loss of Nesting and Foraging Habitat	Significant	Less than Significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's Hawk
WILD-4: Disturbance to Nesting Special-Status Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's hawk
WILD-5: Disturbance to Burrowing Owl and Loss of Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-3: Conduct Preconstruction Surveys for Burrowing Owl Prior to Construction and If Present, Protect Nests through Use of Agency-Approved Protection Buffers WILD-MM-4: Coordinate with Resource Agencies and Develop An Appropriate Compensation Plan for Burrowing Owl

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
WILD-6: Disturbance or Loss of Bats and Bat Roosts	Significant	Less than significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-5: Conduct a Preconstruction Survey for Roosting Bats and Avoid or Mitigate for Potential Effects
WILD-7: Disturbance to Nesting Non-Special-Status Migratory Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's hawk
WILD-8: Disturbance or Loss of Common Wildlife Species and Their Habitats	Less than significant	N/A	N/A
WILD-9: Disruption of Wildlife Movement Corridors	Less than significant	N/A	N/A
WILD-10: Conflict with an Adopted HCP/NCCP or Other Approved Local, Regional of State Habitat Conservation Plan	No effect	N/A	N/A
The Rivers Alternative B			
WILD-1: Disturbance or Loss of VELB and Their Habitat (Elderberry Shrubs)	Significant	Less than Significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-2: Disturbance or Loss of Western Pond Turtle and Their Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-1: Conduct a Preconstruction Survey for Western Pond Turtle and Exclude Turtles from Work Area, If Present

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
WILD-3: Disturbance to Nesting Swainson's Hawks and Loss of Nesting and Foraging Habitat	Significant	Less than Significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's Hawk
WILD-4: Disturbance to Nesting Special-Status Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's hawk
WILD-5: Disturbance to Burrowing Owl and Loss of Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-3: Conduct Preconstruction Surveys for Burrowing Owl Prior to Construction and If Present, Protect Nests through Use of Agency-Approved Protection Buffers WILD-MM-4: Coordinate with Resource Agencies and Develop An Appropriate Compensation Plan for Burrowing Owl
WILD-6: Disturbance or Loss of Bats and Bat Roosts	Significant	Less than significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-5: Conduct a Preconstruction Survey for Roosting Bats and Avoid or Mitigate for Potential Effects

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
WILD-7: Disturbance to Nesting Non-Special-Status Migratory Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's hawk
WILD-8: Disturbance or Loss of Common Wildlife Species and Their Habitats	Less than significant	N/A	N/A
WILD-9: Disruption of Wildlife Movement Corridors	Less than significant	N/A	N/A
WILD-10: Conflict with an Adopted HCP/NCCP or Other Approved Local, Regional of State Habitat Conservation Plan	No effect	N/A	N/A
LAND USE AND AGRICULTURE			
CHP Academy Applicant Preferred Alternative			
LU-1: Temporary Changes in Land Uses to Accommodate Construction	Less than significant	N/A	N/A
CHP Academy Alternative B			
LU-1: Temporary Changes in Land Uses to Accommodate Construction	Less than significant	N/A	N/A
The Rivers Applicant Preferred Alternative			
LU-1: Temporary Changes in Land Uses to Accommodate Construction	Less than significant	N/A	N/A
LU-2: Change in Land Use Designations or Potential to Conflict with Local Land Use Designations as a Result of Construction	Less than significant	N/A	N/A
The Rivers Alternative B			
LU-1: Temporary Changes in Land Uses to Accommodate Construction	Less than significant	N/A	N/A
LU-2: Change in Land Use Designations or Potential to Conflict with Local Land Use Designations as a Result of Construction	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
SOCIOECONOMICS AND COMMUNITY EFFECTS			
CHP Academy Applicant Preferred Alternative			
SOC-1: Temporary Increase in Employment in the Region during Construction	Beneficial	N/A	N/A
CHP Academy Alternative B			
SOC-1: Temporary Increase in Employment in the Region during Construction	Beneficial	N/A	N/A
The Rivers Applicant Preferred Alternative			
SOC-1: Temporary Increase in Employment in the Region during Construction	Beneficial	N/A	N/A
SOC-2: Effects on Residents	Significant and unavoidable	N/A	N/A
The Rivers Alternative B			
SOC-1: Temporary Increase in Employment in the Region during Construction	Beneficial	N/A	N/A
SOC-2: Effects on Residents	Significant and unavoidable	N/A	N/A
ENVIRONMENTAL JUSTICE			
CHP Academy Applicant Preferred Alternative			
EJ-1: Disproportionate Effect on Minority or Low-Income Populations	No effect	N/A	N/A
CHP Academy Alternative B			
EJ-1: Disproportionate Effect on Minority or Low-Income Populations	No effect	N/A	N/A
The Rivers Applicant Preferred Alternative			
EJ-1: Disproportionate Effect on Minority or Low-Income Populations	No effect	N/A	N/A
The Rivers Alternative B			
EJ-1: Disproportionate Effect on Minority or Low-Income Populations	No effect	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
VISUAL RESOURCES			
CHP Academy Applicant Preferred Alternative			
VIS-1: New Source of Light or Glare	Significant	Significant and unavoidable	No feasible mitigation
VIS-2: Temporary Visual Effects as a Result of Construction Activities	Less than significant	N/A	N/A
CHP Academy Alternative B			
VIS-1: New Source of Light or Glare	Significant	Significant and unavoidable	No feasible mitigation
VIS-2: Temporary Visual Effects as a Result of Construction Activities	Less than significant	N/A	N/A
The Rivers Applicant Preferred Alternative			
VIS-1: New Source of Light or Glare	Significant	Significant and unavoidable	No feasible mitigation
VIS-2: Temporary Visual Effects as a Result of Construction Activities	Less than significant	N/A	N/A
VIS-3: Changes to the Existing Visual Character or Quality of the Site and Its Surroundings as a Result of Construction, Operations, and Maintenance	Significant	Significant and unavoidable	No feasible mitigation
VIS-4: Conflicts with Local Visual Resource Policies	Significant	Significant and unavoidable	No feasible mitigation
The Rivers Alternative B			
VIS-1: New Source of Light or Glare	Significant	Significant and unavoidable	No feasible mitigation
VIS-2: Temporary Visual Effects as a Result of Construction Activities	Less than significant	N/A	N/A
VIS-3: Changes to the Existing Visual Character or Quality of the Site and Its Surroundings as a Result of Construction, Operations, and Maintenance	Significant	Significant and unavoidable	No feasible mitigation
VIS-4: Conflicts with Local Visual Resource Policies	Significant	Significant and unavoidable	No feasible mitigation

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
RECREATION			
CHP Academy Applicant Preferred Alternative			
REC-1: Temporary Disruption of Recreation Opportunities during Construction	Less than significant	N/A	N/A
REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor	Less than significant	N/A	N/A
REC-3: Long-Term Increase in Recreation Opportunities	Beneficial	N/A	N/A
REC-4: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities	Beneficial	N/A	N/A
CHP Academy Alternative B			
REC-1: Temporary Disruption of Recreation Opportunities during Construction	Less than significant	N/A	N/A
REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor	Less than significant	N/A	N/A
REC-3: Long-Term Increase in Recreation Opportunities	Beneficial	N/A	N/A
REC-4: Increased Human Health Benefit as A Result of Increased Physical Activity Opportunities	Beneficial	N/A	N/A
The Rivers Applicant Preferred Alternative			
REC-1: Temporary Disruption of Recreation Opportunities during Construction	Less than significant	N/A	N/A
REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor	Significant	Significant and unavoidable	No feasible mitigation
REC-3: Permanent Loss of Recreation Facilities or Opportunities	Less than significant	N/A	N/A
REC-4: Long-Term Increase in Recreation Opportunities	Beneficial	N/A	N/A
REC-5: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities	Beneficial	N/A	N/A
The Rivers Alternative B			
REC-1: Temporary Disruption of Recreation Opportunities during Construction	Less than significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor	Significant	Significant and unavoidable	No feasible mitigation
REC-3: Permanent Loss of Recreation Facilities or Opportunities	Less than significant	N/A	N/A
REC-4: Long-Term Increase in Recreation Opportunities	Beneficial	N/A	N/A
REC-5: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities	Beneficial	N/A	N/A
UTILITIES AND PUBLIC SERVICES			
CHP Academy Applicant Preferred Alternative			
PUB-1: Damage of Public Utility Infrastructure and Disruption of Service	Significant	Less than significant	PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training
PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction	Less than significant	N/A	N/A
PUB-3: Increase in Emergency Response Times	Less than significant	N/A	N/A
CHP Academy Alternative B			
PUB-1: Damage of Public Utility Infrastructure and Disruption of Service	Significant	Less than significant	PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training
PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction	Less than significant	N/A	N/A
PUB-3: Increase in Emergency Response Times	Less than significant	N/A	N/A
PUB-4: Expansion of Stormwater Drainage Facilities	Less than significant	N/A	
The Rivers Applicant Preferred Alternative			
PUB-1: Damage of Public Utility Infrastructure and Disruption of Service	Significant	Significant and unavoidable	PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction	Less than significant	N/A	N/A
PUB-3: Increase in Emergency Response Times	Less than significant	N/A	N/A
The Rivers Alternative B			
PUB-1: Damage of Public Utility Infrastructure and Disruption of Service	Significant	Significant and unavoidable	PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training
PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction	Less than significant	N/A	N/A
PUB-3: Increase in Emergency Response Times	Less than significant	N/A	N/A
PUBLIC HEALTH AND ENVIRONMENTAL HAZARDS			
CHP Academy Applicant Preferred Alternative			
PH-1: Incidental Release of Hazardous Materials during Construction	Less than significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
PH-2: Exposure to Hazardous Materials Encountered at Project Site	Significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering PH-MM-1: Complete Phase I and Phase II (If Necessary) Environmental Site Assessment Investigations and Implement Required Measures
PH-3: Safety Hazards from the Construction Site and Vehicles	Less than significant	N/A	N/A
PH-4: Protection of People or Structures from Flood Hazards	Beneficial	N/A	N/A
CHP Academy Alternative B			
PH-1: Incidental Release of Hazardous Materials during Construction	Less than significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
PH-2: Exposure to Hazardous Materials Encountered at Project Site	Significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering PH-MM-1: Complete Phase I and Phase II (If Necessary) Environmental Site Assessment Investigations and Implement Required Measures
PH-3: Safety Hazards from the Construction Site and Vehicles	Less than significant	N/A	N/A
PH-4: Protection of People or Structures from Flood Hazards	Beneficial	N/A	N/A
The Rivers Applicant Preferred Alternative			
PH-1: Incidental Release of Hazardous Materials during Construction	Less than significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
PH-2: Exposure to Hazardous Materials Encountered at Project Site	Significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering PH-MM-1: Complete Phase I and Phase II (if necessary) Environmental Site Assessment Investigations and Implement Required Measures
PH-3: Safety Hazards from the Construction Site and Vehicles	Less than significant	N/A	N/A
PH-4: Protection of People or Structures from Flood Hazards	Beneficial	N/A	N/A
PH-5: Emission or Handling of Hazardous Materials Substances, or Waste within 0.25 Mile of an Existing or Proposed School	Significant	Less than significant	PH-MM-1: Complete Phase I and Phase II (if necessary) Environmental Site Assessment Investigations and Implement Required Measures PH-MM-2: Notify Washington Unified School District and Applicable Schools Located within 0.25 Mile of Project Construction Activities

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
The Rivers Alternative B			
PH-1: Incidental Release of Hazardous Materials during Construction	Less than significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
PH-2: Exposure to Hazardous Materials Encountered at Project Site	Significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering PH-MM-1: Complete Phase I and Phase II (if necessary) Environmental Site Assessment Investigations and Implement Required Measures
PH-3: Safety Hazards from the Construction Site and Vehicles	Less than significant	N/A	N/A
PH-4: Protection of People or Structures from Flood Hazards	Beneficial	N/A	N/A
PH-5: Emission or Handling of Hazardous Materials Substances, or Waste within 0.25 Mile of an Existing or Proposed School	Significant	Less than significant	PH-MM-1: Complete Phase I and Phase II (if necessary) Environmental Site Assessment Investigations and Implement Required Measures PH-MM-2: Notify Washington Unified School District and Applicable Schools Located within 0.25 Mile of Project Construction Activities
CULTURAL RESOURCES			
CHP Academy Applicant Preferred Alternative			
CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes	Less than Significant	N/A	N/A
CR-2: Change in the Significance of an Archaeological Resource	Significant	Significant and unavoidable	CR-MM-1: Implement Inadvertent Discovery Procedures
CR-3: Disturbance of Native American and Historic-Period Human Remains	Significant	Significant and unavoidable	CR-MM-2: Implement Human Remains Discovery Procedures
CHP Academy Alternative B			
CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes	Less than Significant	N/A	N/A

Effect	NEPA/CEQA Finding	Finding with Mitigation Considered	Mitigation Measure
CR-2: Change in the Significance of an Archaeological Resource	Significant	Significant and unavoidable	CR-MM-1: Implement Inadvertent Discovery Procedures
CR-3: Disturbance of Native American and Historic-Period Human Remains	Significant	Significant and unavoidable	CR-MM-2: Implement Human Remains Discovery Procedures
The Rivers Applicant Preferred Alternative			
CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes	Less than Significant	N/A	N/A
CR-2: Change in the Significance of an Archaeological Resource	Significant	Significant and unavoidable	CR- MM-1: Implement Inadvertent Discovery Procedures
CR-3: Disturbance of Native American and Historic-Period Human Remains	Significant	Significant and unavoidable	CR-MM-2: Implement Human Remains Discovery Procedures
The Rivers Alternative B			
CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes	Less than Significant	N/A	N/A
CR-2: Change in the Significance of an Archaeological Resource	Significant	Significant and unavoidable	CR- MM-1: Implement Inadvertent Discovery Procedures
CR-3: Disturbance of Native American and Historic-Period Human Remains	Significant	Significant and unavoidable	CR-MM-2: Implement Human Remains Discovery Procedures

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List of Acronyms and Abbreviations

$\mu g/m^3$	micrograms per cubic meter
µS/cm	microSiemens per centimeter
A.D.	Anno Domini
AADT	annual average daily traffic
AB 32	Assembly Bill 32, the California Global Warming Solutions Act of 2006
AB 75	Assembly Bill 75
AB 939	Assembly Bill 939
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
ADT	Average daily traffic
AEP	annual exceedance probability
AEPs	Annual Exceedance Probabilities
af	acre-feet
AG	California Attorney General
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act
APA	Applicant Preferred Alternative
APE	area of potential effect
ASTM	American Society for Testing and Materials
B.P.	Before Present
BA	biological assessment
BAAQMD	Bay Area Air Quality Management District
Basin Plan	Water Quality Control Plan
bgs	below ground surface
BMPs	best management practices
BNSF	Burlington Northern Santa Fe Railroad
BO	biological opinion
BOD	biochemical oxygen demand
BSSCP	bentonite slurry spill contingency plan
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
$CaCO_3$	calcium carbonate
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
Carl Moyer Program	Carl Moyer Memorial Air Quality Standards Attainment Program
CAT	Climate Act Team
CBSC	California Building Standards Code
CCAA	California Clean Air Act

CCR	California Code of Regulations
CDEC	California Data Exchange Center
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
cfs	cubic feet per second
City	City of West Sacramento
CIWMP	Countywide Integrated Waste Management Plan
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNG	compressed natural gas
CNPPA	California Native Plant Protection Act of 1977
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
Common Features	American River Common Features Project
Comp Study	Sacramento and San Joaquin River Basins Comprehensive Study
Comprehensive Study	Sacramento and San Joaquin River basins California Comprehensive Study
CO-OPS	NOAA Center for Operational Oceanographic Products and Services
CPTs	cone penetration test equipment
CPUC	California Public Utilities Commission
CRHR	California Register of Historic Resources
CTR	California Toxics Rule
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CVP	Central Valley Project
CWA	Federal Clean Water Act
cy	cubic yards
dB	decibel
dBA	A-weighted decibel
DBH	diameter at breast height
Delta	Sacramento–San Joaquin River Delta
DFG	California Department of Fish and Game
DIPE	di-isopropyl ether
DO	dissolved oxygen
DPM	diesel particulate matter
DPSs	distinct population segments
DSM	deep soil mixing
DWR	California Department of Water Resources
DWSC	Sacramento Deep Water Ship Channel
EB	eastbound
EC	Electrical conductivity
EFH	essential fish habitat

EIPs	early implementation projects
EIS/EIR	Environmental Impact Statement/Environmental Impact Report
EPA	U.S Environmental Protection Agency
ESA	Endangered Species Act
ETBE	ethyl tertiary butyl ether
ETL	Engineering Technical Letter
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
Flood Control Project	Sacramento River Flood Control Project
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act
FR	Federal Register
ft/s	feet per second
ft^2	square feet
General Construction Permit	General Permit for Construction Activities
GHGs	Greenhouse Gases
GIS	geographic information system
GPS	geographic positioning system
GRR	West Sacramento General Reevaluation Report
H	horizontal feet
HABS/HAER	Historic American Building Survey/Historic American Engineering Record
HAPs	hazardous air pollutants
HEP	Habitat Evaluation Procedure
HPMP	Historic Properties Management Plan
I-5	Interstate 5
I-80	Interstate 80
in/sec	inches per second
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
LF	less favorable
LIDAR	Light Detection and Ranging
L_{min} and L_{max}	minimum and maximum sound levels
LNG	liquefied natural gas
LOS	Level of service
L_{xx}	percentile-exceeded sound levels
m/km	meters/kilometer
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MBTA	Migratory Bird Treaty Act
MDPS	Main Drain Pump Station

MF	more favorable
mg/L	milligrams per liter
MOA	memorandum of agreement
MOU	memorandum of understanding
MRZ	mineral resource zone
MTBE	methyl tertiary butyl ether
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NAVD 88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD29	National Geodetic Vertical Datum of 1929
NHC	Northwest Hydraulic Consultants
NHPA	National Historic Preservation Act
NLIP	Natomas Levee Improvements Program
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Determination
NOI	notice of intent
NOP	Notice of Preparation
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTR	National Toxics Rule
NTUs	Nephelometric turbidity units
NWPs	Nationwide permits
O&M	operations and maintenance
OHWM	ordinary high water mark
OMB	Federal Office of Management and Budget's
OPR	California Office of Planning and Research
PA	Programmatic Agreement
Parks Master Plan	City of West Sacramento Parks Master Plan
PCBs	polychlorinated biphenyls
PCBs	polychlorinated biphenyls
PERP	Portable Equipment Registration Program
PG&E	The Pacific Gas and Electric Company
pH	potential of hydrogen
PIR	problem identification report
PL	Public Law
PM10	particulate matter less than 10 microns in diameter
PM2.5	particulate matter less than 2.5 microns in aerodynamic diameter
ppm	parts per million

PPMP	pollution prevention and monitoring program
ppt	parts per thousand
Ppv	peak particle velocity
PRC	Public Resources Code
Qa	Quaternary alluvium
Qal	undivided older alluvium deposits
Qb	Quaternary basin
Qmu and Qml	Modesto formation (upper and lower member)
Qp	peat deposits
Qru and Qrl	Riverbank formation (upper and lower member)
Qsc	stream channel deposits
RD	Reclamation District
RD 537	Reclamation District 537
RD 900	Reclamation District 900
Reporting Rule	Greenhouse Gas Reporting Rule
RM	River Mile
ROD	Record of Decision
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SAFCA	Sacramento Area Flood Control Agency
SAM	Standard Assessment Program
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SEIS/SEIR	Supplemental Environmental Impact Statement and Subsequent Environmental Impact Report
SHPO	State Historic Preservation Officer
SIP	state implementation plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLM	sound level meter
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARA	Surface Mining and Reclamation Act of 1975
SO_2	sulfur dioxide
SPCCP	spill prevention, control, and counter-measure plan
SPRR	Southern Pacific Railroad
SPTs	standard penetration tests
SR	State Route
SRA	shaded riverine aquatic
SRFCP	Sacramento River Flood Control Project
SRMP	Sacramento Riverfront Master Plan
ST1	first short-term measurement
ST2	second short-term measurement
State Water Board	State Water Resources Control Board
SVAB	Sacramento Valley Air Basin

SWP	State Water Project
SWPPP	stormwater pollution prevention plan
TACs	toxic air contaminants
TAME	tertiary amyl methyl ether
TBA	tertiary butyle alcohol
TCPs	traditional cultural properties
TDS	total dissolved solids
TMDL	total maximum daily load
TSS	Total suspended sediment
UBC	Uniform Building Code
Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended in 1987 (42 USC 4601 et seq.)
UPRR	Union Pacific Railroad
US 50	US Highway 50
USACE	U.S Army Corps of Engineers
USC	United States Code
USFWS	U.S Fish and Wildlife Service
USGS	U.S Geological Survey
UYLIP	Upper Yuba River Levee Improvement Project
V	vertical feet
V/C	volume-to-capacity
VELB	valley elderberry longhorn beetle
VMT	vehicle miles traveled
WB	westbound
WDRs	waste discharge requirements
WRDA	Water Resources Development Act
WSAFCA	West Sacramento Area Flood Control Agency
WSLIP or the program	West Sacramento Levee Improvements Program
YSAQMD	Yolo-Solano Air Quality Management District

Approach to the Final EIS/EIR

The Final EIS/EIR has been restructured from the Draft EIS/EIR to focus on the project-level actions. Please see the preceding Approach to the Final EIS/EIR and Executive Summary *for background and a more complete description of the changes to the Final EIS/EIR.*

Chapter 1
Introduction

The West Sacramento Area Flood Control Agency (WSAFCA) is proposing to reduce flood risk for the city of West Sacramento by incrementally improving the levees around the city in the form of early implementation projects (EIPs). This document provides project-level analysis for two EIPs, known as the CHP Academy and The Rivers EIPs.

The EIPs are proposed by WSAFCA under a framework known as the West Sacramento Levee Improvements Program (WSLIP). To protect human health and safety and prevent adverse effects on property and its economy, the City of West Sacramento (City), as part of WSAFCA, and in partnership with the California Department of Water Resources (DWR), embarked on a comprehensive evaluation of the condition of the levees protecting the city in 2006 (HDR, Inc. 2008). The evaluation was necessary to determine the level of flood protection provided by the existing levee system, identify the magnitude and severity of deficiencies, and propose potential levee improvements. The results of the comprehensive evaluation revealed several deficiencies that require substantial improvements to meet current flood protection standards.

Note: In this document, "city" (lowercase) refers to the area of West Sacramento while "City" (capitalized) refers to governmental entity of West Sacramento. "West Sacramento" is also used in some instances, typically referring to the geographic area.

In light of the flood risk to West Sacramento, the WSLIP was formed as a framework for planning, funding, and implementing EIPs under WSAFCA's sponsorship. It is anticipated that WSAFCA will pursue EIPs until USACE determines the Federal interest in a project being studied under the West Sacramento General Reevaluation Report (GRR), as described in 1.6.1.1.2. EIPs are being advanced by WSAFCA to more immediately address flood risk before the GRR is complete and projects under the GRR could be implemented.

To implement the proposed EIPs, WSAFCA is requesting permission from the U.S. Army Corps of Engineers (USACE) pursuant to Section 14 of the Rivers and Harbors Act of 1899 (Title 33 of the United States Code [USC], Section 408, [33 USC 408]), hereinafter referred to as Section 408, for the alteration of the Federal flood control project. USACE must grant permission for the EIPs pursuant to Section 408, triggering the requirement for USACE to comply with the National Environmental Policy Act (NEPA). A more detailed discussion of relevant laws, policies, plans, and regulations is included in Chapter 6, Compliance with Applicable Laws, Policies, and Plans and Regulatory Framework.

1.1 Document Purpose and Structure

1.1.1 Document Overview

This document is a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) and is intended to satisfy the requirements of NEPA and the California Environmental Quality Act (CEQA) for disclosing environmental effects and recommended mitigation measures related to a proposed action, and alternatives, prior to making a decision on project approval. Specifically, this document analyzes the CHP Academy and The Rivers EIPs to support a NEPA Record of Decision (ROD) and CEQA Notice of Determination (NOD). The Draft EIS/EIR included a program-level analysis for the WSLIP; however, the Final EIS/EIR is focused on the project-level actions for the EIPs only as described in the "Approach to the Final EIS/EIR and Executive Summary" and "Part 2, Responses to Comments." For certain resources, a program-level analysis more appropriately provides planning context for the project-level actions; therefore, the analysis of flood control and geomorphology, cumulative, and growth-inducing effects are examples where the analysis tends to be more programmatic to ensure that system-wide, watershed level effects of the project-level EIP actions are being considered such that an individual alteration of the Federal control project does not compromise the performance of the overall project (or have other broad environmental consequences).

The following information is provided in this section:

- document organization;
- background of NEPA and CEQA requirements;
- NEPA and CEQA lead agency roles;
- use of a combined document for NEPA and CEQA compliance;
- use of NEPA and CEQA terminology;
- resource analysis structure; and
- discussion of vertical datum used in this document.

1.1.2 Document Organization

This EIS/EIR is organized into the following sections:

Part 1. Final Environmental Impact Statement/ Final Environmental Impact Report

- Executive Summary
- List of Acronyms and Abbreviations
- Chapter 1, Introduction
- Chapter 2, Alternatives
- Chapter 3, CHP Academy EIP: Affected Environment and Environmental Consequences
- Chapter 4, The Rivers EIP: Affected Environment and Environmental Consequences
- Chapter 5, Growth-Inducing and Cumulative Effects

- Chapter 6, Compliance with Applicable Laws, Policies, Plans, and Regulatory Framework
- Chapter 7, References
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- Chapter 9, List of Recipients
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Part 2. Responses to Comments Received on the Draft EIS/EIR

- Chapter 1, Introduction
- Chapter 2, Master Responses
- Chapter 3, Federal, State, and Local Agency Comments
- Chapter 4, Non-Governmental Organization Comments
- Chapter 5, Comments from Individuals

Appendices

- Appendix A, Scoping Report
- Appendix B, Background Information on the WSLIP
- Appendix C, Background Information on Levee Vegetation Policy
- Appendix D, Flood Control and Geomorphic Conditions Technical Appendix
- Appendix E, Utility Assessment for Basin-Wide Problem Identification Report
- Appendix F, Air Quality and Climate Change Technical Appendix
- Appendix G, Vegetation and Wetlands Technical Appendix
- Appendix H, Correspondence Regarding Special-Status Species
- Appendix I, Public Health and Hazards: EDR Data Map Environmental Atlas
- Appendix J, Correspondence Regarding Cultural Resources

1.1.3 NEPA and CEQA Requirements

The Council on Environmental Quality's (CEQ's) regulations for implementing NEPA specify that a Federal agency preparing an EIS must consider the effects of the proposed action and alternatives on the environment; these include effects on ecological, aesthetic, historical, and cultural resources and economic, social, and health effects. Environmental effects are categorized as direct, indirect, and cumulative. An EIS also must discuss possible conflicts with the objectives of Federal, state, regional, and local land use plans, policies, or controls for the area concerned; energy requirements and conservation potential; urban quality; the relationship between short-term uses of the environment and long-term productivity; and irreversible or irretrievable commitments of resources. An EIS must identify relevant, reasonable mitigation measures not already included in the proposed action or alternatives that could avoid, minimize, rectify, reduce, eliminate, or compensate for the project's adverse environmental effects. (40 Code of Federal Regulations [CFR] 1502.14, 1502.16, and 1508.8.)

The CEQA Guidelines explain that the environmental analysis for an EIR must evaluate impacts associated with the project and identify mitigation for any potentially significant impacts. All phases of a proposed project, including construction and operation, are evaluated in the analysis. Section 15126.2 of the State CEQA Guidelines states:

> An EIR shall identify and focus on the significant environmental effects of the proposed project. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution, population concentration, and human use of the land (including commercial and residential development), health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services. The EIR shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected.

An EIR also must discuss inconsistencies between the proposed project and applicable general plans and regional plans (State CEQA Guidelines Section 15125[d]).

An EIR must describe any feasible measures that could minimize significant adverse impacts, and the measures are to be fully enforceable through permit conditions, agreements, or other legally binding instruments (State CEQA Guidelines Section 15126.4[a]). Mitigation measures are not required for effects that are found to be less than significant.

1.1.3.1 NEPA Lead Agency

USACE is preparing this EIS for the purposes of compliance with NEPA due to its authority over alteration to Federal project levees. That authority, pursuant to Section 14 of the Rivers and Harbors Act of 1899 (33 USC 408), is commonly referred to as “Section 408 approval,” and is the nexus for USACE’s responsibility for NEPA compliance. Through that Federal nexus, NEPA and CEQ’s NEPA implementing regulations require Federal agencies to evaluate the environmental impacts of a proposed Federal action. In this case, USACE’s role as the decision-making authority that would provide Section 408 approval to WSAFCA is the Federal action that triggers USACE’s designation as lead agency under NEPA. Furthermore, since WSAFCA’s EIPs are not USACE civil works projects, USACE’s responsibilities are limited to NEPA compliance, Section 408 approval, and consideration of future crediting based on the outcome of the GRR. USACE has no responsibilities for funding, design, or project implementation and construction.

1.1.3.2 CEQA Lead Agency

WSAFCA is the lead agency and implementing agency preparing this EIR for the purposes of compliance with CEQA. WSAFCA is a Joint Powers Authority created in 1994 through a Joint Exercise of Powers Agreement by the City, Reclamation District 900 (RD 900), and Reclamation District 537 (RD 537). WSAFCA was established to coordinate the planning and construction of flood protection facilities and to finance the local share of flood control projects. WSAFCA’s member agencies are responsible for the operations and maintenance of the detention basins, pump stations, and levees that protect the city.

Pursuant to Section 15126(d) of the State CEQA Guidelines, an EIR must describe and evaluate a reasonable range of alternatives that would feasibly attain most of the basic project objectives and would avoid or substantially lessen any significant impact of the project as proposed.

1.1.4 Application of NEPA and CEQA Principles and Terminology

NEPA and CEQA are similar in that both laws require the preparation of an environmental study to evaluate the environmental effects of proposed government activities. However, there are several differences between the two regarding terminology, procedures, environmental document content, and substantive mandates to protect the environment. For this environmental evaluation, the more rigorous of the two laws was applied in cases in which NEPA and CEQA differ.

Table 1-1 below compares the terminology of NEPA and CEQA for common concepts.

Table 1-1. Key to General NEPA and CEQA Terminology

NEPA Term	Correlating CEQA Term
Lead Agency	Lead Agency
Cooperating Agency	Responsible Agency
Environmental Impact Statement	Environmental Impact Report
Record of Decision	Findings
Preferred Alternative	Proposed Project
Project Purpose	Project Objectives
No Action Alternative	No Project Alternative
Affected Environment	Environmental Setting
Effect	Impact

In some cases in this document, both NEPA and CEQA terminology are used, as in Chapter 1 where the project purpose and need and project objectives are discussed. The terms *environmental consequences, environmental impacts,* and *environmental effects* are considered synonymous in this analysis, and *effects* is used for consistency.

Technical terms used in the EIS/EIR are typically defined in their first instance of use in the text. A list of acronyms and abbreviations precedes Chapter 1. An index follows Chapter 9.

1.1.5 Resource Analysis Structure

Chapters 3 and 4 contain the project-level analyses for the CHP Academy EIP and The Rivers EIP, respectively, following the structure below. It should be noted that the EIPs are analyzed independently under separate chapters for clarity and specificity.

- **Introduction.** This section introduces the scope of the resource analysis.
  - **Sources of Information.** This section lists the sources of information pertinent to the analysis of project impacts on this specific resource.
- **Affected Environment.** This section includes two sections, Regulatory Setting and Environmental Setting.

- **Regulatory Setting.** This section lists and describes laws, regulations and policies that affect the resource or the assessment of effects on the resource. Often the regulatory framework is the basis for the conclusion of the level of significance and therefore plays a crucial role in effect assessment.

- **Environmental Setting.** This section provides an overview of the physical environmental conditions in the area at the time of or prior to the publication of the Notice of Preparation that could be affected by implementation of the proposed alternatives in accordance with NEPA regulations (40 CFR 1502.15) and State CEQA Guidelines Section 15125.

- **Environmental Consequences.** This section describes the analysis of effects relating to each resource area for each of the alternatives in accordance with NEPA regulations (40 CFR 1502.16) and with State CEQA Guidelines Section 15126, 15126.2, and 15143.

  - **Assessment Methods.** This section describes the methods, models, process, procedures, data sources, and/or assumptions used to conduct the effect analysis. Where possible, effects are evaluated quantitatively. Where quantification is not possible, effects are evaluated qualitatively.

  - **Determination of Effects.** This section provides the criteria used in this document to define the level at which an effect would be considered significant in accordance with CEQA and adverse in accordance with NEPA. Significance criteria (sometimes called thresholds of significance) used in this EIS/EIR are based on the checklist presented in Appendix G of the State CEQA Guidelines; factual or scientific information and data; and regulatory standards of Federal, state, and local agencies. Under NEPA, preparation of an EIS is triggered if a Federal action has the potential to "significantly affect the quality of the human environment," which is based on the context and intensity of each potential effect. The significance thresholds used in this EIS/EIR also encompass the factors taken into account under NEPA to evaluate the context and the intensity of the effects of an action.

  - **Effects and Mitigation Measures.** To comply with NEPA and CEQA, the effects/impacts are considered and evaluated as to whether they are direct, indirect, or cumulative. Direct effects are those that are caused by the action and occur at the same time and place. Indirect effects are reasonably foreseeable consequences to the physical environment that may occur at a later time or at a distance from the project area. Because direct and indirect effects are often interrelated, typically there is no distinction made between the two in the effects discussion. Cumulative effects for all resource areas are combined and discussed in Chapter 5, Growth-Inducing and Cumulative Effects.

    The effects are listed numerically and sequentially throughout each section. An effect statement precedes the discussion of each effect and provides a summary of the effect topic. The numbering system provides a mechanism for tracking unique effects by resource area.

    Each effect is accompanied by a finding or conclusion, as required under NEPA and CEQA. Table 1-2 provides a key for relating the effect findings by relative severity (increasing in degree of adversity to the environment).

Table 1-2. Key to Effect Findings (by increasing adversity)

Finding
Beneficial
No Effect
Less than Significant
Significant
Significant and Unavoidable

For the purposes of the analyses in this document, the effect findings are defined more specifically below.

- **Beneficial.** This effect would provide benefit to the environment as defined for that resource.
- **No Effect.** This effect would cause no discernible change in the environment as measured by the applicable significance criterion; therefore, no mitigation would be required.
- **Less than Significant.** This effect would cause no substantial adverse change in the environment as measured by the applicable significance criterion; therefore, no mitigation would be required.
- **Significant.** This effect would cause a substantial adverse change in the physical conditions of the environment. Effects determined to be significant based on the significance criteria fall into two categories: those for which there is feasible mitigation available that would avoid or reduce the environmental effects to less-than-significant levels and those for which there is either no feasible mitigation available or for which, even with implementation of feasible mitigation measures, there would remain a significant adverse effect on the environment. Those effects that cannot be reduced to a less-than-significant level by mitigation are identified as significant and unavoidable, described below.
- **Significant and Unavoidable**. This effect would cause a substantial adverse change in the environment that cannot be avoided or mitigated to a less-than-significant level if the project is implemented. Even if the effect finding is still considered significant with the application of mitigation, the applicant is obligated to incorporate all feasible measures to reduce the severity of the effect.
- **Mitigation Measures.** Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant effects accompany each effect discussion. Similar to the effect descriptions, mitigation measures are listed numerically and sequentially throughout each section. A mitigation measure statement precedes the discussion of each measure and provides a summary of the measure topic. The numbering system provides a mechanism for tracking unique measures by resource area.

1.1.6 Elevation Datum Used in This Document

Elevations used in this document are referenced to the North American Vertical Datum of 1988 (NAVD 88) to the greatest extent feasible. It should be noted that many of the studies cited in the alternatives descriptions and analyses were originally conducted in the National Geodetic Vertical Datum of 1929 (NGVD 29) and have been converted where feasible. In some cases, such as where a figure has been borrowed from another study, the elevations have not been converted to preserve the integrity of the source study.

1.2 Regional Setting and Study Area

The regional setting of the EIPs and WSLIP framework is the Sacramento River Flood Control Project (SRFCP), beginning as far north as Redding, California, and extending south to the Sacramento–San Joaquin River Delta (Delta) (Figure 1-1). For the analysis of effects (direct, indirect, or cumulative), the regional context of the SRFCP is taken into consideration.

The study area refers to the city of West Sacramento itself and the lands within WSAFCA's boundaries, which encompass portions of the Sacramento River, the Yolo Bypass, the Sacramento Bypass, and the Sacramento Deep Water Ship Channel (DWSC). The flood protection system associated with these waterways consists of over 50 miles of levees in RD 900, RD 537, DWR's Maintenance Area 4, and the DWSC (Figure 1-2). These levees completely surround the city with the exception of intersecting waterways. The proposed EIP sites described and analyzed in this document are shown on Figure 1-2.

The city of West Sacramento is located in eastern Yolo County at the confluence of the American and Sacramento Rivers. The city lies within the natural floodplain of the Sacramento River, which bounds the city along the east. It is made up of reclaimed land protected from floods by levees and the Yolo and Sacramento Bypass systems. These bypasses divert floodflows around the city to the west. In addition to the area within the city limits (in Yolo County), the study area partially extends into Solano County on the extreme southwestern edge along the DWSC.

The DWSC and barge canal bisect the city into two subbasins, separating the developing Southport area from the more established neighborhoods of Broderick and Bryte to the north (City of West Sacramento 2000). The DWSC provides a navigable passageway for commercial shipping to reach the Port of West Sacramento (formerly Port of Sacramento) from the Pacific Ocean via the San Francisco Bay, Delta, and connecting waterways. The DWSC water surface elevation is directly influenced by changes in water levels in the Delta at the south end of the Yolo Bypass and is relatively insensitive to stage in the Sacramento River. The barge canal and lock system, formerly a Federal facility but now de-authorized, was constructed to provide a navigable, gated connection between the Port of West Sacramento and the Sacramento River, but no longer functions for navigability because the channel approaches have silted in from naturally deposited sediment and because a fixed roadway crossing precludes passage of any commercial vessel.

The area that would be improved by the EIPs—the city of West Sacramento—is the metropolitan area most downstream within the SRFCP, along with the city of Sacramento across the Sacramento River on the left bank. *Note: All levees, reaches, and landmarks are referred to using river navigation terminology. Left bank and right bank refer to locations when facing downstream in the direction of flow.* The downstream location of the study area is important relative to other flood risk reduction

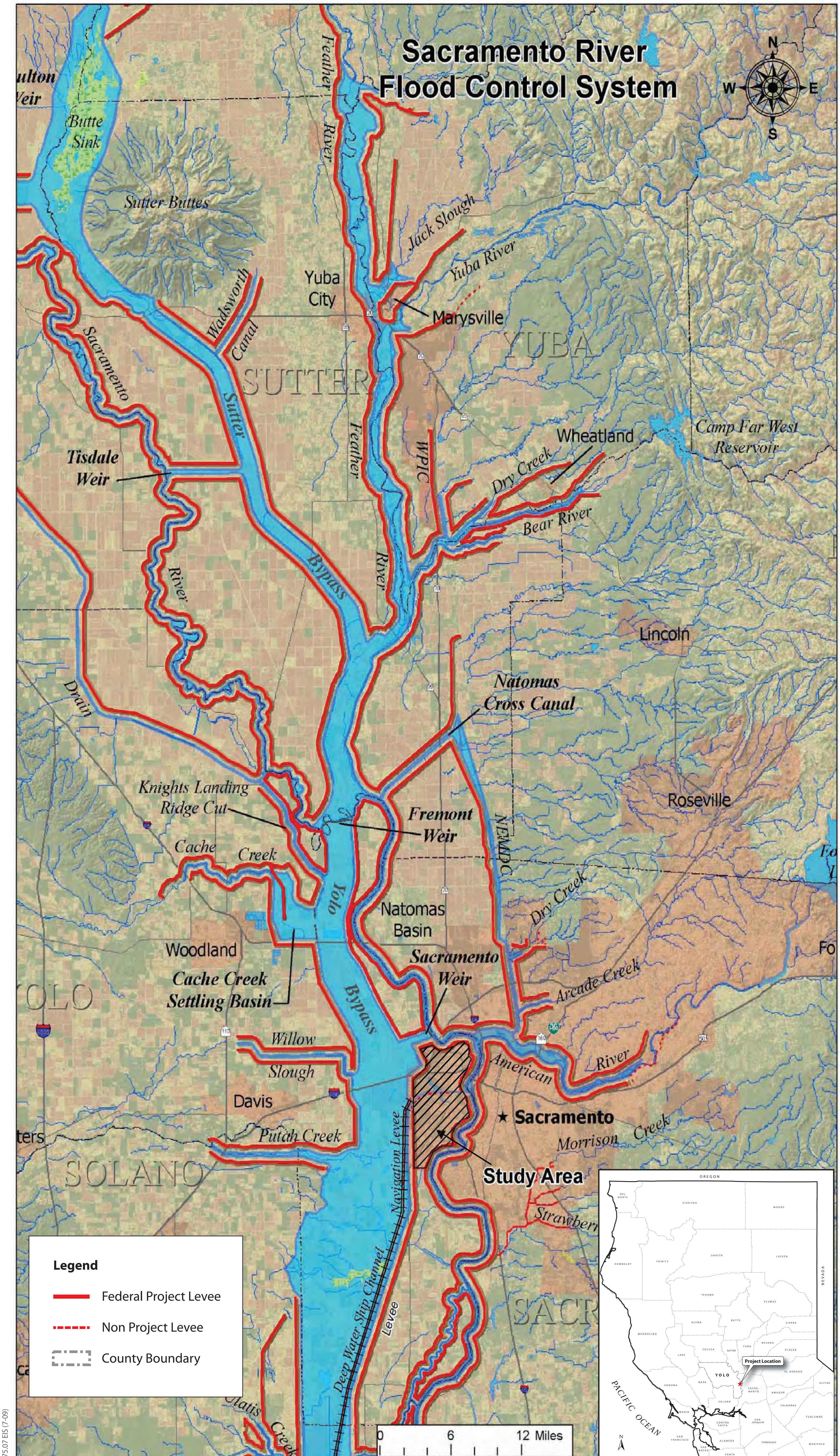

Figure 1-1
Sacramento River Flood Control Project and Regional Setting for the Study Area

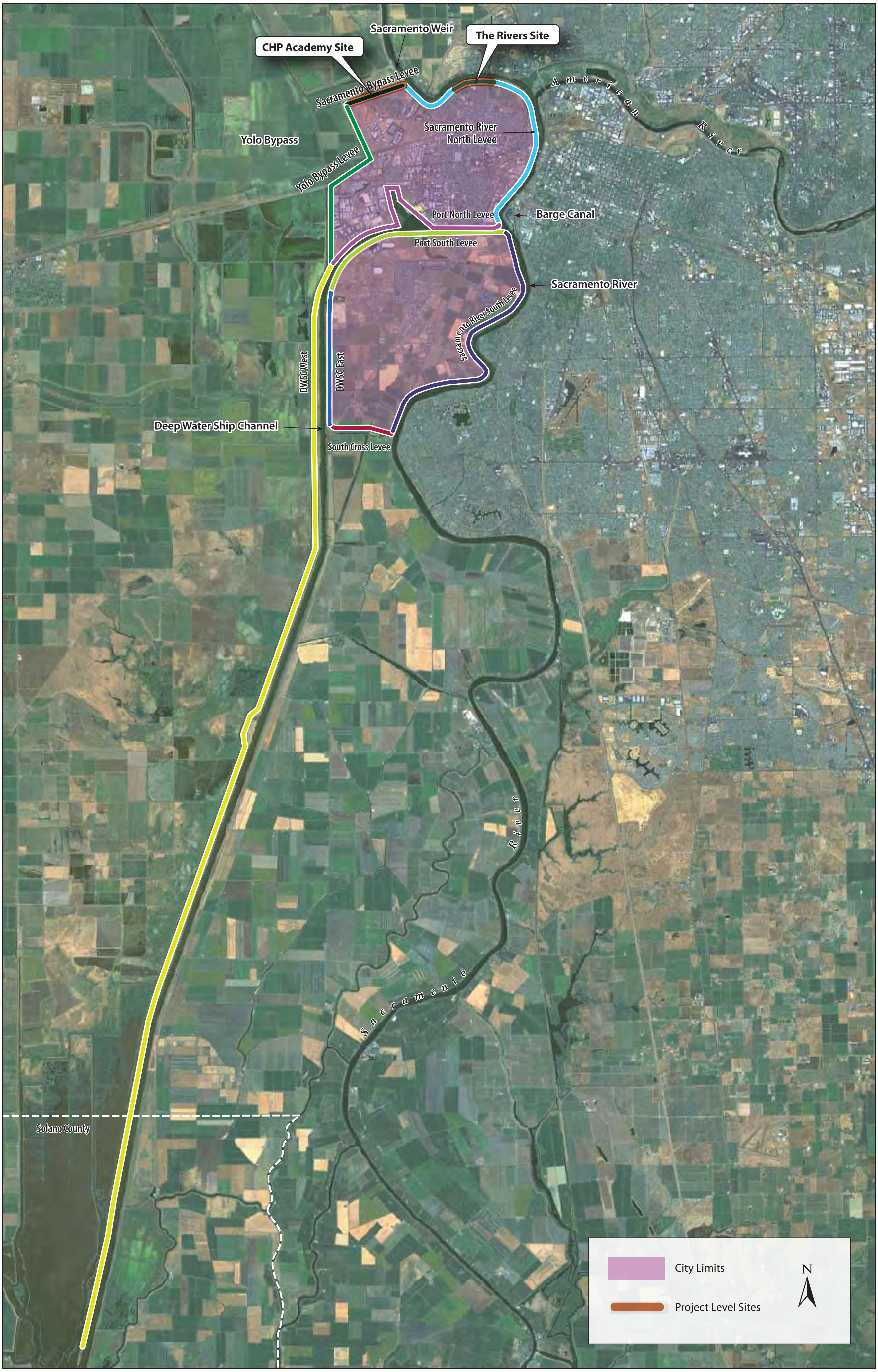

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Figure 1-2
Study Area

projects occurring upstream within the SRFCP, namely, the American River Common Features Project, Natomas Levee Improvement Program, projects undertaken by the Three Rivers Levee Improvement Authority, the Sutter Basin Project, and the Yuba Basin Project (Figure 1-3). These and other projects are described under Section 1.5, Related Actions, Programs, and Planning Efforts.

The EIP sites are depicted in ground-level photos (Figure 1-4 and Figure 1-5).

1.3 Purpose and Need

1.3.1 Purpose, Approach, and Objectives

WSAFCA's goal is to achieve a minimum of 200-year flood protection for the city by improving the levees protecting West Sacramento. A 200-year flood is a flood that has a 0.5% chance of occurring in any given year, or annual exceedance probability (AEP). The purpose of the EIPs is to incrementally implement improvements to meet that goal in manageable elements based on ability to address the levee deficiencies, available funding, minimizing environmental effects, and similar considerations.

Note: References in this document to level of flood protection (100-year or 200-year) are based on WSAFCA's deterministic approach (the current Federal Emergency Management Agency [FEMA] method). The USACE probabilistic approach is utilized to define system performance for the Section 408 analysis decision. Under either method, the purpose of the project is to substantially reduce the level of flood risk to WSAFCA's service area.

Additional information about defining and understanding flood risk can be found at the official website of the National Flood Insurance Program (NFIP) at: www.floodsmart.gov.

The approach to meet this purpose is to provide a comprehensive evaluation of the entire levee system that protects the city, develop recommended strategies for improvement, and provide a basis for partnerships with Federal and state agencies to implement improvements that meet the flood protection and compatible recreation and open space goals. The objectives under this purpose and approach are to:

- construct levee improvements as soon as possible to reduce flood risk as quickly as possible;
- construct improvements that are politically, socially, economically, and environmentally acceptable;
- provide recreation and open space elements for the city that are compatible with flood improvement actions;
- preserve and enhance riparian and other native habitats; and
- ensure continuing Federal assistance for levee repairs and maintenance.

1.3.2 Need for Action

Five needs have been identified for action.

- Study results from the comprehensive levee evaluation have shown that the levees protecting the city need improvements to reduce the current level of risk to human health and safety, property, and the adverse economic effect that serious flooding would cause.
- Study results further have shown that the levees in WSAFCA's area are deficient when compared against current Federal standards. Action is needed to bring them up to current standards in order to maintain eligibility for Federal emergency management assistance. Improvements are necessary to meet the Federal Emergency Management Agency's (FEMA's) minimum acceptable level of flood protection (commonly referred to as the 100-year flood) as specified by the National Flood Insurance Program (NFIP). (HDR, Inc. 2008.)

  FEMA's flood risk maps are currently being revised nationwide under a program called RiskMAP (mapping, assessment, and planning). Draft revised FEMA maps show that all or parts of West Sacramento may not meet 100-year flood standards. The WSLIP is intended to incrementally reduce risk to meet or exceed the FEMA standards.
- As required by Senate Bill (SB) 5 (signed by Governor Schwarzenegger in October 2007), the Central Valley Flood Protection Board (CVFPB) must adopt a Central Valley Flood Protection Plan (CVFPP) by July 1, 2012. The CVFPP will require a 200-year level of flood protection for urban areas by the year 2025. Levee improvements are necessary to meet that requirement.
- As a growing community, the City has recreation and open space needs and goals that are unmet. Surrounding waterways represent not only an element of flood risk but also great opportunity for water-based recreation and public open space. Flood protection improvement elements typically underlie or are adjacent to proposed recreation elements that are part of the City's planning documents. There is a need to provide West Sacramento residents with recreation elements that are compatible with flood protection improvements.
- As described in Section 1.2, WSAFCA's area is the downstream-most metropolitan area in the SRFCP. As other projects have been implemented or improvements are being planned to reduce risk and increase flood protection for upstream communities, there is concern that the performance of the SRFCP needs to be evaluated comprehensively to ensure that the individual projects are kept in balance, that effects among the projects are being evaluated, and that risk is not being transferred between communities. WSAFCA's study area represents an important subarea of the SRFCP and merits such study, heightened by West Sacramento's downstream location.

As discussed previously, in light of the flood risk to West Sacramento, WSAFCA is taking proactive measures to reduce risk and improve the level of flood protection for the city. Specifically, the EIPs are targeted to reduce risk and are proposed in sponsorship by WSAFCA in advance of USACE's project being studied under the West Sacramento GRR. In combination, the EIPs and actions under the GRR will address the deficiencies and needs discussed above.

Specific levee deficiencies at the CHP Academy EIP and The Rivers EIP sites are through-seepage, geometry, and under-seepage, along with short reaches of instability. Flood and recreation improvements implemented under the EIPs would assist in incrementally reducing local flood risk in the proximity of the projects by addressing these deficiencies.

State Plan of Flood Control

Lead Agency: DWR
Location: Central Valley
Goal: Guide flood management expenditures under Propositions 84 & 1E
Timeline: Complete Plan by 2014

Sacramento – San Joaquin River Basins Comprehensive Study

Lead Agency: USACE and DWR
Location: Central Valley
Goal: Flood damage reduction and ecosystem restoration
Phase: Study completed in 2002; laid groundwork for several current efforts, including State Plan of Flood Control

Sutter Basin Project

Lead Agency: USACE and SBFCA
Location: Sutter and Butte counties
Goal: Increase flood protection for communities in Sutter and Butte counties
Phase (Timeline): Feasibility Study and EIS (2011)

Natomas Levee Improvement Program

Lead Agency: SAFCA
Location: Natomas Area, Sacramento
Goal: Achieve 200-year flood protection for the Natomas Basin
Timeline: Construction of 100-year protection by 2011, 200-year protection by 2012

West Sacramento Levee Improvements Project

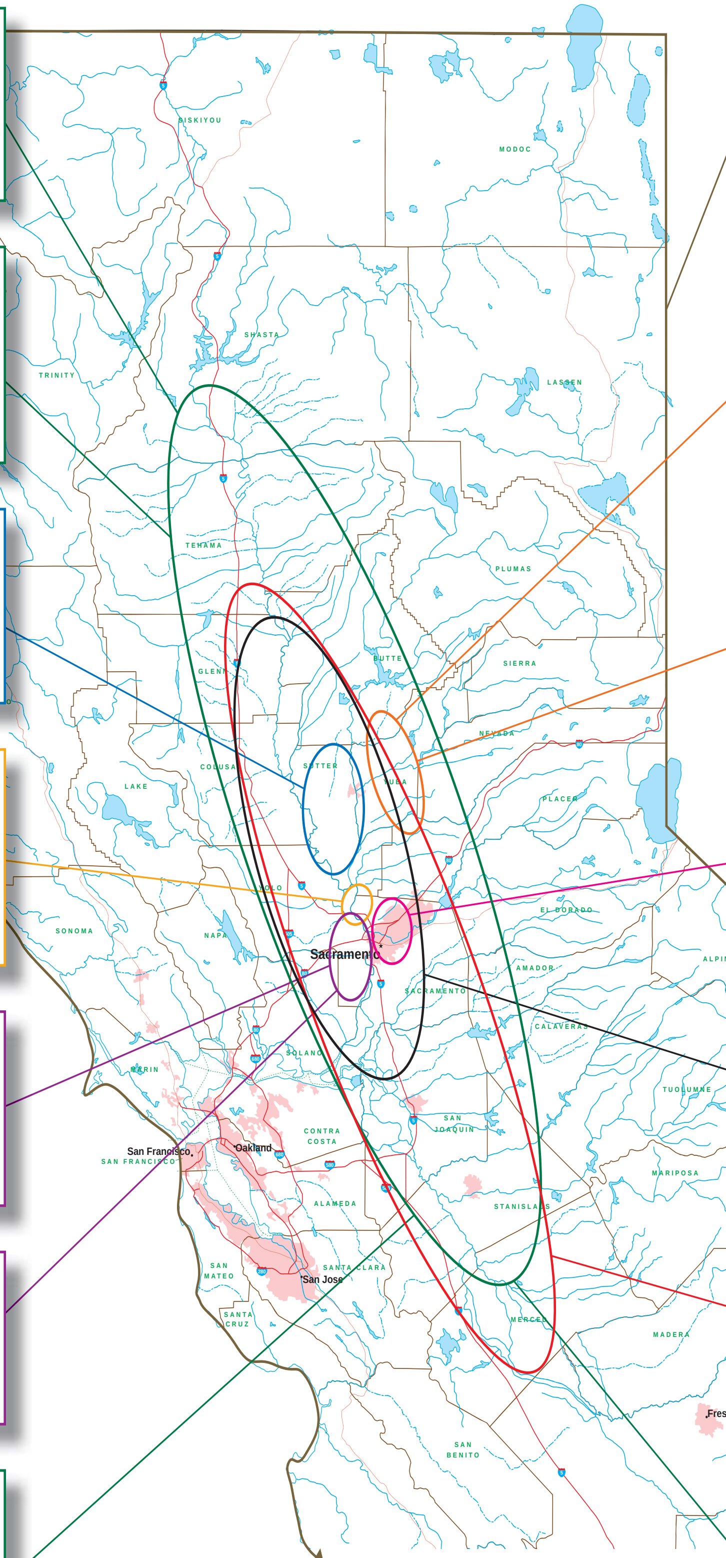
Lead Agency: USACE and WSAFCA
Location: West Sacramento
Goal: Achieve 200-year flood protection for the City of West Sacramento
Phase (Timeline): EIS/EIR (2010)

West Sacramento Project

Lead Agency: WSAFCA, USACE and DWR
Location: West Sacramento
Goal: Comprehensive analysis of the City's levee system
Phase (Timeline): GRR (2012)

Central Valley Flood Protection Plan

Lead Agency: DWR
Location: Central Valley and Sacramento-San Joaquin Delta
Goal: Develop strategies for comprehensive system-wide flood improvements
Timeline: Complete plan by 2012; complete protection measures by 2025



FloodSAFE

Lead Agency: DWR
Location: State-wide, but primarily Central Valley
Definition: Multi-faceted program to improve public safety through integrated flood management.
Timeline: Complete foundational objectives by 2025

Yuba Basin Project

Lead Agency: USACE, DWR and YCWA
Location: Yuba, Feather, Bear rivers Watershed
Goal: Increase flood protection for communities of Linda, Olivehurst, Arboga, Marysville, and unincorporated areas of Yuba County
Phase (Timeline): GRR (2010)

Three Rivers Levee Improvement Authority Projects

Lead Agency: Three Rivers Levee Improvement Authority
Location: Southern Yuba County
Goal: Increase flood protection for communities in southern Yuba County
Phase (Timeline): Construction of 200-year protection by 2010

American River Common Features Project

Lead Agency: USACE, DWR, and SAFCA
Location: Sacramento metropolitan area
Goal: Reduce flood risks for the City of Sacramento
Phase (Timeline): GRR (2010)

Sacramento River Bank Protection Project

Lead Agency: USACE and DWR
Location: SRFCP
Goals: Federal program to correct levee erosion issues
Phase (Timeline): Ongoing Phase II EIS (2011)

PL 84-99 Rehabilitation Assistance of Flood Control Works

Lead Agency: USACE and DWR
Location: Central Valley and Sacramento-San Joaquin Delta
Goals: Federal program to provide emergency levee repairs
Timeline: Ongoing

Levee Collaborative

Lead Agency: USACE and DWR
Location: Central Valley
Goals: Develop short- and long-term plans to achieve system-wide compliance with Corps standards for the State Flood System in the Central Valley
Timeline: Ongoing

ACRONYMS

WSAFCA - West Sacramento Area Flood Control Agency
USACE - U.S. Army Corps of Engineers
SBFCA - Sutter-Butte Flood Control Agency
DWR - Department of Water Resources
SAFCA - Sacramento Area Flood Control Agency
SRFCP - Sacramento River Flood Control Project
YCWA - Yuba County Water Agency

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Figure 1-3
Major Flood Risk Reduction Efforts in the Sacramento Valley

Looking west on the levee crown. Note fence, overhead utility lines, and trees at left, marking the boundary of the CHP Academy facility to the south. Sacramento Bypass is at right, north of the levee. Note concrete liner on the levee slope in right foreground.

Waterside slope of Sacramento Bypass Levee looking northwest. Note mature vegetation on bypass floor along horizon.

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Figure 1-4
Sacramento Bypass Levee

Looking west on the levee crown. Note DWR maintenance yard on horizon at left. Note Riverbank Road at extreme left and mature vegetation at right and on the horizon.

Looking eastward down Rivercrest Drive at The Rivers EIP site. Note vegetation to the right on the waterside, homes on top of the levee crown (Rivercrest Drive), and homes to the left at the landside toe.

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Figure 1-5
Sacramento River North Levee

To further demonstrate the need for action, details about West Sacramento's flood risk and the consequences of levee failure in West Sacramento are described in the Alternatives chapter. Some of the key infrastructure and facilities in West Sacramento that are at risk for flooding are listed in Table 1-3.

Table 1-3. Key Infrastructure and Facilities in West Sacramento

Linear Transportation Facilities	
Interstate 80	Union Pacific Railroad
Highway 50	Sierra Pacific Railroad
Water Supply and Treatment Facilities	
Water Treatment Plant	In-Line Booster Pump Station
Carlin Tank	Central Tank
Northeast Tank	Oak Street
PSIP Tank	Bridgeway Lakes II Tank
Southport Wells	
Sewer Collection Facilities (Pump Stations)	
Bryte	Jefferson
Northport	Industrial
South	Southport
Coke	Triangle
Largo	Bridgeway Island
Allen	Parlin
Storm System Facilities (Pump Stations)	
5th Street	Deerwood
Harbor	Lighthouse
Raley's	Riske Lane
Washington	Jefferson
Government and Quasi-Government Facilities	
U.S. Postal Service regional distribution center	California Highway Patrol (CHP) Academy
Port of West Sacramento	California State Library archive warehouse
City of West Sacramento City Hall	City of West Sacramento Police Station and Service Center
Fire Administration Office and Fire Stations	Public Works Corporation Yard
Petroleum and Agricultural Product Manufacture, Storage, and Distribution	
Shell Equilon	BP/Arco
Kinder Morgan	Ramos Fuel
Agrium	Valley Slurry Seal
Building Material Manufacture and Distribution	
Cemex	Pan Pacific Cement
Certainteed Windows	

Administrative Offices	
California Department of Water Resources	Raley's Grocery Stores headquarters
California Department of General Services	California State Teachers' Retirement System
Healthcare West	
Other Important Commercial Facilities	
Raley's Bakery	McKesson Drug
Greyhound maintenance facility	AT&T corporation yard
United Parcel Service regional distribution center	Pacific Gas & Electric printing facility
Siemens	Keebler Foods
Farmer's Rice Cooperative	MCI Worldcom
Clark Pacific	Netflix
KOVR Channel 13/Channel 31	Flowmaster
Tony's Fine Foods	Nor-Cal Beverage
Sports and Entertainment Facility (and disaster recovery center)	
Raley Field	

1.4 Project Background

The following background provides additional context for the objectives of, purpose of, and need for the WSLIP and proposed EIPs.

Beginning in 1989, several studies have been conducted by USACE, DWR, and WSAFCA to evaluate the condition of the various levees protecting the city. These studies have indicated that the levee system is deficient and that the consequences of levee failure from a major flood event would be significant.

Prompted by the studies, WSAFCA in cooperation with other agencies has undertaken several levee repair projects beginning in the early 1990s to quickly and incrementally address urgent levee deficiencies that pose serious flood risk. Detail on these projects is provided below under Local Flood Management History. Many of these repair projects were the result of deficiencies discovered during routine operations and maintenance inspections or during high-water events and repairs were performed on a case-by-case basis.

As a result of knowledge gained from its regional Comprehensive Study (the Sacramento–San Joaquin Rivers Comprehensive Study, also known as the Comp Study) initiated after the 1997 flood, USACE revised its levee criteria regarding through-seepage and under-seepage, problems known to exist within the WSAFCA levee system (U.S. Army Corps of Engineers and The Reclamation Board for the State of California 2002). As part of FEMA's map modernization program, levees must be reevaluated and re-certified using the revised criteria.

WSAFCA's levees have been evaluated according to these latest USACE criteria for stability, seepage, erosion, geometry, and levee height. Data collected from the evaluation show that much of the existing system does not provide protection from the 100-year flood event (the event having a 1%

chance of occurring in any given year), the commonly accepted minimum level of flood protection. In addition, an emergency preparedness mapping study analyzed two hypothetical levee failures and determined the rate and depth at which water would flood the city if a levee failure occurred in the studied reaches. This study predicted flooding depths that could exceed 10 feet associated with the 100-year flood event. (HDR, Inc 2008, 2009.)

In July 2006, the City, as part of WSAFCA, decided to take a proactive rather than reactive stance with respect to flood protection. At that time, FEMA was beginning the implementation of a Flood Insurance Rate Map (FIRM) modernization program that could lead to the city being mapped within the 100-year floodplain. This would make flood insurance mandatory for all federally guaranteed loans and restrict development that was expected to bear much of the cost of levee improvements. The city and WSAFCA concluded that it was necessary to perform a comprehensive evaluation of all of the levees protecting the city to determine more definitely its current level of flood protection, determine the magnitude and severity of any deficiencies, and develop recommended strategies for improvement.

In addition to these findings above, several other factors prompted WSAFCA and the City to embark on the WSLIP and seek improvements through the EIPs.

- The CVFPP will require 200-year flood protection for urban areas by the year 2025. The time and effort required to fully evaluate approximately 50 miles of levees, develop recommended strategies for improvement, and implement those improvements prompted action without further delay. In addition, in its General Plan, the City adopted a goal of achieving 200-year flood protection. (City of West Sacramento 2004.)
- The Federal authorization and appropriation process to approve funding and begin evaluation can be lengthy. Through the civil works process, a GRR is being conducted by USACE and their non-Federal and local sponsors for the West Sacramento Project. WSAFCA is serving as a local sponsor for this effort. This is more fully described in Section 1.5. (U.S. Army Corps of Engineers and Central Valley Flood Protection Board 2009). In light of these circumstances, WSAFCA launched the WSLIP in a parallel process with identifying smaller-scale improvements that may be candidates for EIPs to address urgent needs. See description of Central Valley Flood Protection Act below for further description of EIPs.
- In May 2007, WSAFCA sought a new annual parcel assessment from property owners to raise local funds for levee improvements and repairs. The majority of funding to improve the levees will be obtained through state and Federal assistance; however, local communities are required to pay for a portion of the overall costs. The property owners of the city recognized the flood risks and indicated their willingness to participate in improvements by voting to approve an annual parcel assessment in 2007. This funding source facilitated WSAFCA's advancement of the WSLIP.

1.4.1 Regional Flood Management History

The SRFCP was authorized by Congress in 1917. The SRFCP was the major project for flood control on the Sacramento River and its tributaries (Figure 1-1). It was sponsored locally by The Reclamation Board of the State of California (Reclamation Board, reauthorized in 2007 as the Central Valley Flood Protection Board [CVFPB]) and was the first Federal flood control project constructed outside the Mississippi River Valley. Currently, there are several major flood risk reduction projects being planned or implemented within the SRFCP area (Figure 1-3). Projects relevant to the EIPs are discussed in further detail under Section 1.5, Related Actions, Programs, and Planning Efforts, below.

Prior to European settlement in the mid-19th century, the floodplain of the Sacramento River in the 150 miles between the city of Redding and the Delta varied from 2 to 30 miles wide and annually covered more than 1 million acres. Low, discontinuous levees were built by individual landowners from the 1840s to the 1890s. Those levees concentrated floodflows and contributed to problems that were worsened by upstream hydraulic mining in the Sierra Nevada foothills in the late 1800s. With the authorization of the SRFCP, USACE and the State of California began managing the project as a "regional system," constructing improvements to approximately 1,100 miles of levees and creating bypasses and floodways.

Although the flood control structures have been extensively improved and upgraded since construction, the underlying foundation of most of the levees and channels pre-dates any state or USACE involvement and still retains the original materials that include dredged riverbed sands, soil, and organic matter. At the time of the SRFCP authorization in 1917, the areas being protected by the levees were primarily agricultural with minimal improved infrastructure such as railroads and highways. Many of these areas are now heavily urbanized and densely populated, including the city of West Sacramento.

The Federal government maintains oversight but has no ownership of or maintenance responsibilities for the Federal levee system, except for few select features that continue to be owned and operated by USACE. Considering these exceptions, the great majority of levees, channels, and related flood control structures are owned, operated, and maintained by local levee and reclamation districts (at the county and sub-county level) and the State of California. Most of the levee and reclamation districts existed prior to the SRFCP authorization in 1917 and have been carrying out maintenance responsibilities. Today, however, most of the levee districts are substantially underfunded and unable to maintain the system to meet current Federal standards. The levees surrounding the city are maintained by RDs 537 and 900 and DWR's Maintenance Area 4.

In recent decades, a number of evaluations of levee conditions, as well as repair and reconstruction efforts, have occurred. Some have been in specific response to damage resulting from particular flood events; others have been in response to general levee deterioration over time and deferred maintenance.

In 1986, 1995, and 1997, there were record flood stages in the Sacramento region. As a result, USACE evaluated the level of flood protection in the study area with updated hydrology and levee analysis. It was determined that the risk of flooding from the Sacramento River and its tributaries ranges from 1 in 25 (25-year) to more than 1 in 100 (100-year) each year (or 4% to 1% probability), depending on the location.

1.4.2 Local Flood Management History, Programs, and Activities

Consistent with much of the Sacramento Valley as described above, the levees protecting West Sacramento were initially constructed in the 1840s to 1890s. They later became part of the SRFCP authorized by Congress in 1917. These levees have been strengthened and maintained through several subsequent projects in partnership between USACE, the State of California, the City, and the agencies that maintain the levees.

As a result of the problems experienced during the 1986 flood, USACE initiated a system-wide evaluation of the levees comprising the SRFCP. Due to the large scale of the evaluation, the review was split into five phases. The first phase of this evaluation included West Sacramento and was documented through an initial appraisal report entitled *Sacramento Urban Area Levee Reconstruction Project, California* (May 1988). This phase included the review of approximately 110 miles of levee and recommended the repair of 34 miles. (U.S. Army Corps of Engineers and Central Valley Flood Protection Board 2009.)

The Sacramento Urban Area Levee Reconstruction Project Basis of Design (November 1989) recommended the repair of two reaches of levee protecting the city of West Sacramento. The first repair reach included two relatively small sites along the right bank of the Sacramento River (in the north part of West Sacramento). The second, and more significant, repair reach included approximately six miles of levee along the right bank of the Sacramento River extending from near the barge canal entrance downstream to the southern city limit. Construction began in November 1990 for the installation of berms to improve stability and manage seepage along both reaches. (U.S. Army Corps of Engineers and Central Valley Flood Protection Board 2009.)

The 1986 flood exposed structural problems and inability of the existing levees to provide critical flood protection to the urban area comprised of the Cities of Sacramento and West Sacramento. As a result, USACE, in cooperation with the State of California, initiated the study documented as the *Sacramento Metropolitan Area, California, Feasibility Report* (also known as the West Sacramento Project). This report was published in February 1992, and indicated the existing flood control system in the study area provided significantly less than a 100-year level of protection. The study went on to recommend a program of improvements which at the time were estimated to provide the city with a 400-year level of protection assuming implementation of a 200-year flood control dam on the American River; however, the recommended plan would provide at least a 150-year level of protection if this American River project element was not implemented. The repairs recommended by the study were authorized in the Water Resources Development Act (WRDA) of 1992 (Public Law [PL] 102-580); however, the 200-year flood control dam on the American River was never authorized by Congress. (U.S. Army Corps of Engineers and Central Valley Flood Protection Board 2009.)

Recent milestones in the flood management context of West Sacramento include the following activities.

- As described above, in 1992, USACE concluded that the levees along the Sacramento River and Yolo Bypass did not provide protection from a 100-year flood event.
- As described above, in 1993, a flood control project was completed as part of the Sacramento Urban Area Levee Reconstruction Project. This project placed a stability berm and related features to address through-seepage along the entire length of the Sacramento River levee bordering the Southport area (referred to in the study area as the Sacramento River South Levee).
- In 1994, the City and reclamation districts formed a Joint Powers Authority, WSAFCA, to coordinate, fund, and construct major flood protection improvements that were beyond the means of the individual entities (City of West Sacramento 2000).
- In 1995, WSAFCA formed an assessment district to fund the local cost share for the West Sacramento Project. This project was part of the Federal Sacramento Metropolitan Area Project authorized by the WRDA of 1996, as described above. The WSAFCA assessment funded

geotechnical and engineering investigations of the Sacramento River levees and the southern boundary cross levee in the Southport area (PB 2007). The West Sacramento Project was designed to provide the city with a greater than 200-year level of protection.

- During the 1997 record flood stage event, the levees surrounding the city sustained minor damage. As design work was nearing completion on the West Sacramento Project, under-seepage was noted along the Sacramento Bypass levee.
- In 1998, stability issues became apparent along a levee maintained by RD 537 just north of the Southern Pacific Railroad tracks.
- In 2002, the West Sacramento Project was substantially completed. This project involved raising more than 1 mile of the south levee of the Sacramento Bypass by up to 5 feet and raising 4.5 miles of the Yolo Bypass levee by up to 5.5 feet.
- In 2008, WSAFCA completed an EIP known as the I Street Bridge EIP. This EIP improved a critical section of levee in the redevelopment area along the riverfront of the city to reduce flood risk to public safety, private property, and public infrastructure. The EIP improved a 475-linear-foot reach of the Sacramento River North Levee to address the problems of through- and under-seepage. This EIP and Section 408 action was expeditiously completed by WSAFCA, the State of California, and USACE.

In addition to these activities, the City has enacted other policies and practices that are part of WSAFCA's overall flood management program to address flood risk, some of which are outlined below.

- The City has in place an Emergency Operations Plan, which addresses flood safety through a Flood Plan and Evacuation Plan. To ensure adequacy, conformance with state-of-the-art standards, and to account for growth, the Emergency Operations Plan is reviewed annually and a comprehensive update is conducted every 3 years or more frequently as needed. Based on this review and revision cycle, the Emergency Operations Plan addresses residual flood risk as flood improvements are implemented and as the population and built environment change within WSAFCA's planning area.
- As described previously, in May 2007, property owners in West Sacramento approved a new annual parcel assessment to provide funding for flood improvements, facilitating the WSLIP study.
- Also as of 2007, the City's municipal code (Chapter 15.50) requires new developments to provide 200-year protection or pay into an in-lieu fee program to fund WSAFCA's flood protection efforts.

1.4.3 Local Recreation Needs

The City, as a member agency of WSAFCA, is proposing recreation elements that are compatible with flood improvements to meet recreation needs. For example, the Sacramento River is central to the identity and image of the city, yet opportunities to enjoy it are hampered by lack of safe and accessible public access points. The city is also lacking developed facilities and infrastructure for dedicated off-street bikeways, environmental interpretation and education, fishing, boating, hiking, and other active and passive outdoor recreation experiences. This situation has been heightened by the recent growth of the local population, demographically influenced by young families and individuals oriented toward outdoor recreation.

The *City of West Sacramento Parks Master Plan* (Parks Master Plan) from 2003 identified several key recreation opportunities for the city that will enable its citizens and visitors to enjoy the resources provided by the Sacramento River and other waterways. Some of those opportunities include utilizing corridors along the Sacramento River, DWSC, turning basin, barge canal, and Yolo and Sacramento Bypasses. These corridors are an opportunity to develop pedestrian and non-motorized linkages that can be used for transportation as well as recreation (SmithGroup JJR 2003).

As part of its Parks Master Plan, the City performed a demand analysis to determine the community's need for certain services. Twelve demands were noted, two of which relate to the City's waterway corridors, summarized below.

- **Improved water access.** Residents value the water resources available in West Sacramento. They desire improved access to water-related recreation such as fishing, boating, swimming, and passive use (e.g., wildlife viewing and hiking).
- **Recreation corridors and trails.** The residents support corridors for bicycling, walking, and horseback riding.

Further substantiating the need for bicycle and pedestrian paths, the 1991 *West Sacramento Bicycle and Pedestrian Path Master Plan* (Callander Associates 1991) and Addendum (City of West Sacramento Parks and Community Services Department 1995) identified opportunities, constraints, and design standards for a citywide network of bicycle and pedestrian paths. The plan also described the City's understanding of these paths as more than a recreational resource; they also encourage bicycling and walking as alternatives to automobile transportation. The Parks Master Plan demand analysis found that the residents support construction of these corridors for bicycling, walking, and horseback riding.

Supported by the demand analysis, the City has established the following goals and objectives.

- Acquire and develop recreation corridors located along watercourses and railroad rights-of-way to link the park system and provide additional recreation opportunities.
- Locate new parks to take advantage of the city's natural resources, including the river and other watercourses.
- Provide improved river access for boating and fishing.
- Develop open space areas to protect significant wetlands and riparian forests, and to provide passive recreation opportunities.
- Facilitate bicycle and pedestrian travel as an alternative to automobile use.

1.5 Related Actions, Programs, and Planning Efforts

This section provides an overview of other flood management activities that comprise the regional planning context.

Sacramento Metropolitan Area, California, Feasibility Report (West Sacramento Project)

As introduced earlier in this chapter, the *Sacramento Metropolitan Area, California, Feasibility Report* (also known as the West Sacramento Project) was completed in 1992 and describes the results of studies of flood problems along the Sacramento River and Yolo Bypass from the Sacramento Weir downstream to an area just south of Freeport. The West Sacramento Project included plans for improving flood protection for the city of West Sacramento. The study area is located along the right bank of the Sacramento River in Yolo County, California. The West Sacramento Project was substantially completed in 2002. The project involved raising more than 1 mile of the south levee of the Sacramento Bypass by up to 5 feet and raising 4.5 miles of the Yolo Bypass levee by up to 5.5 feet. Two deficient sites remain under this project and are scheduled for completion by 2010.

West Sacramento General Reevaluation Report

The original West Sacramento Project of 1992, described above, studied only a small portion of the levees that provide flood protection for the city of West Sacramento. As introduced earlier in this chapter, presently, the USACE and WSAFCA are developing a GRR for West Sacramento levee improvements to assess the entirety of the levees protecting the city of West Sacramento in light of most recent criteria and knowledge regarding levee design.

USACE uses GRRs to present the results of a reevaluation of a previously completed study, using current planning criteria and policies, due to changed conditions and/or assumptions. The results may reaffirm the previous plan, reformulate and modify it, or find that no plan is currently justified. The results are documented in a GRR which, if recommended and supported, also serves as the decision document for a Federal action (U.S. Army Corps of Engineers and Central Valley Flood Protection Board 2009). NEPA analysis for the GRR will be separate from that for the EIPs, but the processes being closely coordinated for consistency and efficiency.

The primary objective of the West Sacramento GRR is to determine the extent of Federal interest in additionally reducing the flood risk within the study area while concurrently exploring opportunities to increase recreation and restore the ecosystem along the Sacramento River within the study area. USACE anticipates completion of the GRR in 2012.

In regard to the relationship between the WSLIP and the West Sacramento GRR, the EIPs which would be implemented by WSAFCA are scheduled to be initiated prior to the GRR authorization, with the expectation that the flood protection improvements that are constructed in advance of any Congressional action on the GRR will be found to be consistent with the recommendations contained in the GRR. On that basis, WSAFCA anticipates that the non-Federal costs incurred in implementation of the WSLIP improvements could be credited against the remaining non-Federal share of the cost of the project studied under the GRR. More specifically, requests for general credit for flood control under Section 104 of the WRDA of 1986 would allow the work conducted by WSAFCA and described in the GRR to be partially credited against the local cost sharing requirements of the West Sacramento Project GRR as long as the project features constructed are compatible with the USACE project. Because implementation of the improvements by WSAFCA does not immediately use Federal funds, it would not result in a commitment of Federal resources that would prejudice selection of a GRR alternative before a final decision on the GRR alternatives is made. In addition, the project-specific improvements considered in this EIS/EIR (the EIPs) are limited to a small portion of the overall flood protection system considered in the GRR. In summary, the WSLIP is being advanced by WSAFCA to facilitate EIPs that are intended to be consistent and compatible with the ultimate West Sacramento Project GRR.

Sacramento River Deep Water Ship Channel Project

The Sacramento River Deep Water Ship Channel Project was originally authorized by Congress and implemented by USACE in 1986. The project involved deepening the existing 46.5-mile DWSC from 30 feet to 35 feet and widening portions of the channel to improve navigational efficiency for movement of goods and safety. Construction was initiated in 1989, but work was suspended in 1990 because of a lack of local share funds to match Federal funds and issues related to unresolved infrastructure relocation. A portion of the channel was deepened to the authorized depth of 35 feet. In 2008, USACE, in coordination with the Port of West Sacramento, started the process of conducting a Limited Reevaluation Study and preparing a joint Supplemental Environmental Impact Statement and Subsequent Environmental Impact Report (SEIS/SEIR) to evaluate the action of resuming construction of navigational improvements to the DWSC. USACE anticipates releasing a draft study and SEIS/SEIR to the public in mid-2010. Construction is anticipated to start mid-2011 and be completed in fall 2013. The project is estimated to produce 6.4 million cubic yards of dredged material. The study and SEIS/SEIR will evaluate the feasibility and beneficial use of providing dredged material to local projects.

Sacramento Weir Sediment Removal Project

DWR removed approximately 38,600 cubic yards of accumulated sediment from the Sacramento Weir approach to restore its flow capacity (ongoing at the time of writing this EIS/EIR). The average depth of sediment removed is 4 feet with depths ranging from 2 to 5 feet along the length of the weir. After the sediment was removed, the invert elevation directly in front of the weir matches the weir apron elevation of 21.27 feet. The area of cut has an average width of 160 feet from the weir apron to the hinge point of the river bank and a length of approximately 2,100 feet (approximately 7.75 acres). The total area of disturbed ground, including in-channel and overbank haul paths and disposal area, is about 19.2 acres. The excavated sediment was placed along the landslide of the south levee of the Sacramento Bypass. The sediment was placed as fill on the existing stability berm on the levee toe. The sediment raised the existing stability berm approximately 6.3 feet for a 1-mile stretch.

Central Valley Flood Protection Act

The Central Valley Flood Protection Act, enacted in California in 2005, calls for the DWR to develop a CVFPP by January 1, 2012. The CVFPP will outline a comprehensive system-wide approach for the protection of lands currently protected from flooding by the SRFCP and the corresponding San Joaquin River watershed to the south. It also establishes a new standard of 200-year flood protection for urban areas in the Central Valley and requires this standard to be achieved by 2025.

The people of California also passed two bond measures that provide approximately $5 billion toward flood improvements to reduce flood risk, particularly to state-Federal levees protecting urban areas in the Central Valley. These levee improvements are expected to occur over the next 10 years with much of the bond money spent after the year 2012. However, there are urgent needs to improve inadequate flood protection in existing urban areas in advance of the overall comprehensive effort. These advance efforts are termed EIPs. EIPs will be implemented ahead of the comprehensive effort, yet be designed to ensure that they do not eliminate opportunity or prejudice flood risk-management alternatives that would provide regional or system-wide benefits. Local agencies and the state are identifying and planning EIPs in a parallel process to be compatible with comprehensive, system-wide studies.

Along with the requirement for increased flood protection by 2025, one of the objectives of the CVFPP is

> increasing the engagement of local agencies willing to participate in flood protection, ensuring a better connection between state flood protection decisions and local land use decisions (Draft Framework for Early Implementation Projects and Section 408 Approval).

In line with that objective, WSAFCA has proposed the EIPs.

Natomas Levee Improvements Program

As part of its long-term program to improve the Natomas Basin levee system, the Sacramento Area Flood Control Agency (SAFCA) proposes to continue waterside and landside levee-strengthening efforts, including levee raises, seepage remediation, increased bank protection, levee stabilization, and flattening of landside levee slopes under the Natomas Levee Improvements Program (NLIP), an EIP. These activities were evaluated in the following environmental documents.

- Local Funding Mechanisms for Comprehensive Flood Control Improvements in the Sacramento Area EIR (2007)
- Natomas Levee Improvements Program, Landside Improvements Project EIR(2007)
- Natomas Levee Improvements Program, Bank Protection Project EIR (2007)
- Natomas Levee Improvements Program, Landside Improvements Project- Phase 2 Project EIR (2008)
- Natomas Levee Improvements Program, Landside Phase 3 Levee Improvements Project EIS/EIR (2009)
- Natomas Levee Improvements Program, Landside Phase 4a Levee Improvements Project EIS/EIR (2009)

Specific elements are described below.

Natomas Levee Improvement Program Landside Improvements Project

SAFCA proposes to provide the Natomas Basin with at least a 100-year level of flood protection by the end of 2011 and ultimately a 200-year level of flood protection. Approximately 26 miles of levees surrounding the Natomas Basin require one or more forms of remediation to address the potential for failure in a 100-year or 200-year flood event. This will require improving conditions along the Natomas Cross Canal South Levee and the Sacramento River East Levee, American River North Levee, Natomas East Main Drain, and the Pleasant Grove Creek Canal. This is a four-phase construction program: Phase 1 occurred in 2008, Phase 2 in 2009 and 2010, and Phase 3 is scheduled for 2010 and 2011, and Phase 4 is scheduled for 2011.

Natomas Levee Improvement Program Waterside Improvements Project

SAFCA proposes to implement bank protection measures at nine sites along the left bank of the Sacramento River to allow FEMA to certify the levee and to meet SAFCA's 200-year flood protection goal. The project will address erosion and scour, which can threaten levee integrity and ultimately cause levee failure. SAFCA has determined that repair of both moderate and high risk sites is needed to ensure FEMA certification and meet SAFCA's goals. Approximately 8,500 linear feet of bankline have been identified for repairs at the nine proposed sites, which are located on the left bank of the Sacramento River between River Mile (RM) 69 (upstream of the confluence with the American River and 2 miles downstream of the Interstate 5 river crossing) and RM 79 (the confluence with the Natomas Cross Canal).

Sacramento River Flood Control System Evaluation

Following the flood of 1986, USACE and the State of California, along with local partners, completed a comprehensive evaluation of the Sacramento River Flood Control System and initiated a flood risk management program aimed at repairing, raising, and strengthening urban levees, among other activities. This effort, known as the Sacramento River Flood Control System Evaluation (commonly referred to System Evaluation) resulted in the repair of more than 70 miles of deficient levees. However, to date, not all the authorized repairs have been completed. Moreover, the completed repairs were built to less rigorous standards than current standards.

Sacramento–San Joaquin Rivers Comprehensive Study

Following the 1997 flood, the Sacramento-San Joaquin Comprehensive Study was initiated by the state and USACE to formulate comprehensive plans for flood risk reduction and environmental restoration. This study was unable to stimulate widespread public or political interest in flood risk reduction or environmental restoration activity beyond the ongoing urban levee improvement programs. The study did result in a new set of engineering criteria for the design and evaluation of urban levees and a greatly expanded scope and cost for the ongoing urban levee improvement efforts on the Sacramento and American Rivers. In addition, the adequacy of previous repairs was reviewed.

American River Common Features Project

To increase flood protection for the city of Sacramento, which is bordered by the left bank of the Sacramento River, the American River Common Features Project (Common Features) was authorized by Congress in the WRDA of 1996. This authorization called for strengthening the north and south levees of the American River and raising and strengthening the upper 12 miles of the left levee of the Sacramento River in the Natomas area, just north of the city of Sacramento. These improvements were considered *common features* of any comprehensive plan of flood protection for the Sacramento area that might ultimately be approved by Congress. In WRDA of 1999, the scope of the Common Features authorization was expanded to include raising portions of the north and south levees of the American River (including the Mayhew Levee), additionally strengthening portions of the north levee of the American River, and raising and strengthening the north and south levees of the Natomas Cross Canal in the Natomas area. In 2006, the Common Features authorization was deemed sufficient to cover improvements to the left levee of the Sacramento River near the Pioneer Reservoir and in the Pocket/Freeport area.

USACE is currently developing two post-authorization change studies. The Common Features GRR is reevaluating the previous Common Features project and identifying levee improvements needed to provide the city of Sacramento and the Natomas area to the north with at least a 200-year level of flood protection. The Natomas Post-Authorization Change Report documents the evaluation of features in the Natomas Basin only. Both are expected to be presented to Congress in 2010.

Sacramento River Bank Protection Project

USACE is responsible for implementation of the Sacramento River Bank Protection Project (Sac Bank) in conjunction with its non-Federal partner, CVFPB. The SRBPP is a continuing construction project authorized by Section 203 of the Flood Control Act of 1960. The purpose of this project is to provide protection to the existing levee and flood control facilities of the SRFCP. To date, work has been carried out in two phases, with a total of about 820,000 feet of river stabilized under the project. Phase I consisted of 435,000 feet and Phase II's original authorization included 405,000 feet. Current SRBPP work is being conducted under Phase II of its existing Federal authorization, with approximately 14,000 feet remaining to be constructed in 2009–2010. Projects within the WSAFCA service area are being evaluated under this program.

Flood Control and Coastal Storm Emergency Act

The Flood Control and Coastal Storm Emergency Act (PL 84-99) authorizes USACE to undertake activities including disaster preparedness, advance measures, emergency operations, rehabilitation of flood control works threatened or destroyed by flood, protection or repair of federally authorized shore protective works threatened or damaged by coastal storms, and provisions of emergency water due to drought or contaminated source. PL 84-99 establishes an emergency fund for emergency response preparations for natural disasters, for flood fighting and rescue operations, and for rehabilitation of flood control and hurricane protection structures. Under PL 84-99, an eligible flood protection system, such as the SRFCP, can be rehabilitated if damaged by a flood event. USACE has the responsibility to coordinate levee repair issues with interested Federal, state, and local agencies following natural disaster events where flood control works are damaged.

The state of California experienced a series of storms affecting federally authorized flood damage reduction projects between December 28, 2006, and January 9, 2007. High water elevations associated with these storms resulted in damage to levees along the Sacramento River and its tributaries. These damages included the development of boils at a site located along the right bank of the Sacramento River in RD 900. This site was located near Davis Road at RM 54.2. USACE, in cooperation with CVFPB, constructed a seepage berm at this site in 2007 under the general authority PL84-99. The 80-foot-wide by 200-foot-long seepage berm, consisting of drain rock encapsulated in geotextile fabric topped with levee fill, was placed at the landside toe of the levee over the area of reported boils.

1.6 Community Outreach, Agency Coordination, and Issues of Known Controversy

1.6.1 Community Outreach

USACE and WSAFCA have established a proactive multi-media outreach program to communicate the WSLIP. The approach to the outreach program has been to go beyond the guidelines and requirements of NEPA and CEQA for public noticing to ensure the affected community and other interested stakeholders are informed, engaged, and involved through an accessible, open, and transparent process. Thus far, the outreach program has included the following actions:

- four scoping meetings for the environmental document (two for the joint NEPA/CEQA document and two prior for CEQA only);
- publication of notices in local newspapers of major circulation;
- publication in the *Federal Register*;
- notification to the State Clearinghouse;
- posting NEPA notices on the USACE website;
- posting CEQA notices and project information on the City/WSAFCA website;
- publication of feature articles in the City Lights newsletter, distributed quarterly to all city residents for updates and information about City business;
- presentation and discussion of the status of the WSLIP at various public meetings for elected boards and commissions;
- direct mailing to residents within proximity of proposed construction activities;
- phone calls to public agencies;
- small-group meetings with interested stakeholders; and
- posting of notices in public places.

A more detailed accounting of the scoping process is provided in Appendix A.

As the proposed improvements and EIS/EIR are further developed, the outreach program will continue in a broad sense via the methods listed above and will expand through more targeted specific outreach to residents and businesses who might be more directly affected by construction or operation of the proposed improvements.

To date, the results of the outreach program have been very favorable, constructive, and supportive for the WSLIP. The tone and substance of the input has been consistent with the voter-approved assessment to fund the local share of the WSLIP. Comments received from the public have been considered to refine the project description and the environmental analysis.

Comments and responses received during the public comment period may be found in Part 2 of this document.

1.6.2 Agency Consultation and Coordination

Coordination with other Federal, State, Regional and Local Agencies

The EIPs have been planned in coordination and cooperation with numerous local, state, and Federal agencies. In Chapters 3 and 4, the regulatory setting for each respective resource describes the compliance with applicable Federal, state, regional and local laws and regulations, including consultation to date with various agencies. The following is a summary of those coordination efforts.

Resource Agency Coordination

Over the course of the project planning and environmental review for the EIPs, WSAFCA and USACE have coordinated informally with the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the California Department of Fish and Game (DFG).

Throughout 2008, 2009, and 2010, coordination has consisted of informal agency meetings, site visits, telephone calls, and electronic mail to discuss potential project effects on habitat and potential avoidance and minimization measures. Information was exchanged to apprise each resource agency of the EIP status and progress, and to request feedback. This coordination has continued through the Draft and Final EIS/EIR processes.

Native American Consultation

In January 2008, the Native American Heritage Commission (NAHC) was contacted to request a search of their Sacred Lands File. The NAHC staff responded in January 2008 with a list of Native American contacts for both Yolo and Solano Counties and the results of the sacred lands data base research that was negative for findings in the program corridor.

ICF Jones & Stokes staff sent letters to the Native American contacts on the lists provided by NAHC. The correspondence included a map depicting the program corridor, a brief description of the proposed program, and a request for the contacts to share any knowledge or concerns they may have regarding cultural resources in or adjacent to the study area. ICF Jones & Stokes received a letter response dated April 2008 from Mr. Marshall McKay, Tribal Chairman for the Rumsey Band of Wintun Indians. Mr. McKay's letter stated his gratitude for the letter notification about the proposed levee alternatives and that he was not aware of any sites of religious or cultural importance in the program corridor. Mr. McKay also stated that the Rumsey Indian Rancheria of Wintun would like to be notified of any cultural finds unearthed during construction actions.

1.6.2.2 CEQA Responsible and Trustee Agencies

This EIS/EIR will be used by Responsible and Trustee Agencies to determine the effects of the proposed action. Responsible Agencies are those that have a legal responsibility to approve the EIPs. These agencies are required to rely on the Lead Agency's environmental document in acting on whatever aspect of the project requires their approval but must prepare and issue their own findings regarding the project (CEQA Guidelines Section 15096). Trustee Agencies are those that have jurisdiction over certain resources held in trust for the people of California but do not have legal authority over approving or carrying out the project. Responsible and Trustee Agencies for the EIPs are presented in Table 1-4.

Table 1-4. Responsible and Trustee Agencies

Agency	Jurisdiction
Trustee Agency	
California Department of Fish and Game	Fish and wildlife Native plants designated as rare or endangered Game refuges Ecological reserves
State Lands Commission	State-owned "sovereign" lands
Responsible Agency	
California Department of Fish and Game	Fish and wildlife Native plants designated as rare or endangered Game refuges Ecological reserves
Office of Historic Preservation	Historic and cultural resources
Central Valley Flood Protection Board	Levee modifications
California Air Resources Board	Air quality
Regional Water Quality Control Board (#5)	Discharges to water bodies
California Department of Water Resources	State water and flood control interests

1.6.3 Issues of Known or Expected Controversy

NEPA requires that project proponents identify issues of known controversy that have been raised in the scoping process and throughout the development of the project. The Draft EIS/EIR yielded substantial comment for two primary issues, one regarding implementation of USACE levee vegetation policy (mostly as related to the description and analysis of the program), and concern over pedestrian recreation access to The Rivers community. In response, for the Final EIS/EIR, WSAFCA has refocused coverage on the EIPs only, has deferred pursuit of programmatic coverage, has analyzed multiple compliance mechanisms for USACE levee vegetation policy, and has dropped the installation of a pedestrian access gate at The Rivers as an element of the project. It is WSAFCA's intent to be responsive to public feedback in concept and in practice, as demonstrated through these refinements. Revisions to the Final EIS/EIR are presented in greater detail in the preceding *Approach to the Final EIS/EIR and Executive Summary.*

The following potentially controversial issues were disclosed in the Draft EIS/EIR and remain issues which may arise in the development and execution of the EIPs.

1.6.3.1 Construction-Related Effects

As the levee system in the study area is in close proximity to residential areas and other developed land uses, flood improvements proposed under the EIPs are likely to result in construction-related effects. These effects include those under the topics of public safety, noise, traffic, and air quality and are specifically described in Chapters 3 and 4. A specific discussion about impacts to residents is addressed under Socioeconomics and Community Effects in these chapters. This issue is of special concern at The Rivers, where residences will experience access inconveniences and disruption of services.

1.6.3.2 Property Take and Restricted Property Access

A specific subset of construction-related effects involves potential conflicts with private property underlying or near proposed improvements. In some cases there may be temporary property take in the form of construction easements to build the project; permanent take for construction, operations, or maintenance of the project; or temporary restrictions on access to private property. These effects are described under the land use sections in Chapters 3 and 4.

1.6.3.3 Restriction of Vegetation on Levees

USACE published technical guidance and reinforcement of policies restricting woody vegetation on Federal project levees. Implementation of such guidance has stirred controversy in the Sacramento region as cursory assessments have shown that much vegetation may require removal, resulting in effects on fish and wildlife habitat and social values like recreation and aesthetics. The EIPs would be subject to this guidance. The Draft EIS/EIR received substantial public comment on this issue and this Final EIS/EIR has been revised accordingly in direct response. This issue is further described in Chapter 2, Alternatives, and under the effects discussions for vegetation, fish, wildlife, visual resources, and recreation. Comments and responses regarding USACE levee vegetation policy may be found in Part II of this document. An overview of the revisions to the Final EIS/EIR may be found in the preceding *Approach to the Final EIS/EIR and Executive Summary* EIS/EIR

1.6.3.4 Climate Change and Sea-Level Rise

Global climate change and resultant sea-level rise are phenomena receiving international attention. These issues are further analyzed in the effects discussions in Chapters 4 and 5 under Air Quality and Climate Change.

Chapter 2
Alternatives

2.1 Introduction

This chapter describes the following elements:

- general information about alternatives, including the screening process;
- project-level description for two EIPs: CHP Academy EIP and The Rivers EIP; and
- environmental commitments incorporated into the project description to be considered in the environmental analysis for all action alternatives.

2.2 General Information about Alternatives

2.2.1 Approach to Alternatives

NEPA and CEQA generally require that an EIS and EIR (respectively) consider a range of alternatives that would attain most of the project purpose, need, and objectives while avoiding or substantially lessening project effects. A range of reasonable alternatives is analyzed to sharply define the issues and provide a clear basis for comparison among the options. The NEPA/CEQA analysis also must include an analysis of a no-action or no-project alternative.

Consistent with NEPA standards, alternatives are analyzed on an equal, non-preferential basis (i.e., there is no proposed project/preferred alternative) and at an equal level of detail. In describing and analyzing the EIPs under the WSLIP, flood and recreation improvements have been packaged into two project-level alternatives each for two project locations, in accordance with NEPA and CEQA.

2.2.2 Alternative Screening Process

Potential levee improvements considered by WSAFCA have undergone several stages of screening prior to proposal for action at the project level. The alternative screening process has included a pre-program screen, program-level screen, and project-level screen. The pre-program stage of screening is fairly coarse, simple, and qualitative whereas the project-level screening stage is more refined, intricate, and quantitative. The pre-program and program screening process is described in Appendix B, along with a complete description of the WSLIP alternatives at the programmatic level.

At the project level, screening criteria are applied to identify reach-specific improvements. As with the program-level screen, improvements are evaluated uniformly against a set of criteria, are compared to one another and no action, and the environmental analysis in this EIS/EIR is part of the project-level screen. The project-level criteria are focused on determining the most appropriate project proposal based on local context and deficiencies. Ultimately, an applicant-preferred alternative (as determined by WSAFCA) is formulated as informed by the screening criteria. The criteria for the WSLIP include the following elements:

- ability to meet the project objectives (i.e., address the deficiencies) to reduce risk;

- availability of funds;
- scalability of construction;
- real estate requirements;
- land use compatibility;
- permit requirements;
- environmental constraints;
- integration of multi-purpose objectives, such as delivery of recreation features that are compatible with flood improvements;
- evolving technical policy; and
- public feedback, including that discovered during the EIS/EIR process.

These same criteria were applied to select the I Street Bridge EIP completed in 2008, have been applied to the actions analyzed in this EIS/EIR, and would be used for prioritizing future projects.

2.3 No Action Alternative

2.3.1 Introduction to No Action

A no action alternative is required pursuant to NEPA, and a no project alternative is required for CEQA (for this EIS/EIR, collectively referred to as the No Action Alternative). The No Action Alternative serves as a benchmark against which the effects and benefits of the action alternatives are evaluated. The No Action Alternative consists of continuation of current conditions and operation and maintenance practices that reasonably would be expected to occur in the foreseeable future if the EIPs were not implemented based on current plans and consistent with available infrastructure and community services. The description of the No Action Alternative is below.

2.3.2 No Flood Improvements Implemented under the No Action Alternative

Under the No Action Alternative, WSAFCA would not implement flood improvements. The levees protecting the city would continue to require improvements to meet FEMA's minimum acceptable level of flood protection. In addition, the associated risk to human health and safety, property, and the adverse economic impact that serious flooding could cause would continue, and the risk of a catastrophic flood would remain high. Again, however, regular operations and maintenance of the levee system would continue as presently executed by the local maintaining entities.

Because of uncertainties in local, state, and Federal funding; future state and Federal authorization; and other approvals, it is not reasonable to predict construction of levee improvements in the foreseeable future within a reasonable timeframe (see below for further discussion). Therefore, for the purpose of evaluating impacts under the No Action Alternative, the EIS/EIR assumes no levee repair or strengthening would be implemented, the purpose and objectives would not be met, and flood risk would continue.

2.3.2.1 Future State or Federal Action

As these levees have known deficiencies, even if WSAFCA were not pursuing improvements, it is likely that USACE and/or the State of California would repair the levees around the city at some time in the future in order to meet Federal and/or state flood protection obligations associated with the Federal flood control system. As discussed in Chapter 1, the study area of the West Sacramento GRR overlaps and is similar to WSAFCA's planning area. The primary objective of the GRR is to determine the extent of Federal interest in reducing the flood risk within the study area while exploring opportunities to increase recreation and restore the ecosystem along the Sacramento River. The GRR was initiated in March 2009 and is expected to be presented to Congress for authorization in 2012. The earliest that Federal levee improvements would be constructed under the GRR is 2014.

Based on the criteria used by WSAFCA to screen the EIPs, it can be expected that the EIP actions are consistent with considered through the West Sacramento GRR process and would be implemented by USACE or the state. The environmental effects would in turn be the same as or similar to those as analyzed in this EIS/EIR. The GRR is subject to independent NEPA review.

Despite the likelihood of state- or Federal-led implementation of repairs, for the purpose of evaluating impacts under the No Action Alternative, the EIS/EIR assumes that the improvements would not occur. This assumption provides the most conservative approach for disclosure and comparison of potential effects. Again, as stated above, the No Action Alternative therefore assumes no levee repair or strengthening would be implemented, the purpose and objectives would not be met, and flood risk would continue.

2.3.2.2 Consequences of Levee Failure

Assuming that no levee repair or strengthening would occur under the No Action Alternative means that the West Sacramento levee system would remain or become more susceptible to failure as a result of identified deficiencies such as seepage, erosion, inadequate levee height, and slope instability. These conditions could cause portions of the levee system to fail, triggering widespread flooding, extensive damage to the city's existing residential, commercial, agricultural, and industrial structures, and potential loss of life and property. Extensive damage to utilities, roadways, major interstate transportation corridors, and other infrastructure systems would also likely occur. The water supply and sewage facilities would likely fail. Floodwaters would become contaminated by chemicals released from inundated vehicles, homes, industrial facilities, businesses, and equipment. The magnitude of the flood damage would depend upon the location of the levee breach, severity of the storm, and river flows at the time of a potential levee failure.

Flood depth maps prepared for West Sacramento indicate that under a 100-year flood event scenario, inundation levels would range from 1 foot to 15 feet, depending on the local elevation of the land surface. Figure 2-1 shows the ultimate estimated inundation depths for a 100-year flood event.

In 2006, two hypothetical levee failures were analyzed for West Sacramento utilizing 100-year water surface elevations and hydrology. This analysis was performed to assist the City in its flood emergency preparedness planning. One failure was located in the northern part of the city, on the Sacramento River North Levee, and the other was located in the Southport area, on the Sacramento River South Levee (failure locations are shown in Figures 2-2 and 2-3). (Wood Rodgers 2006.)

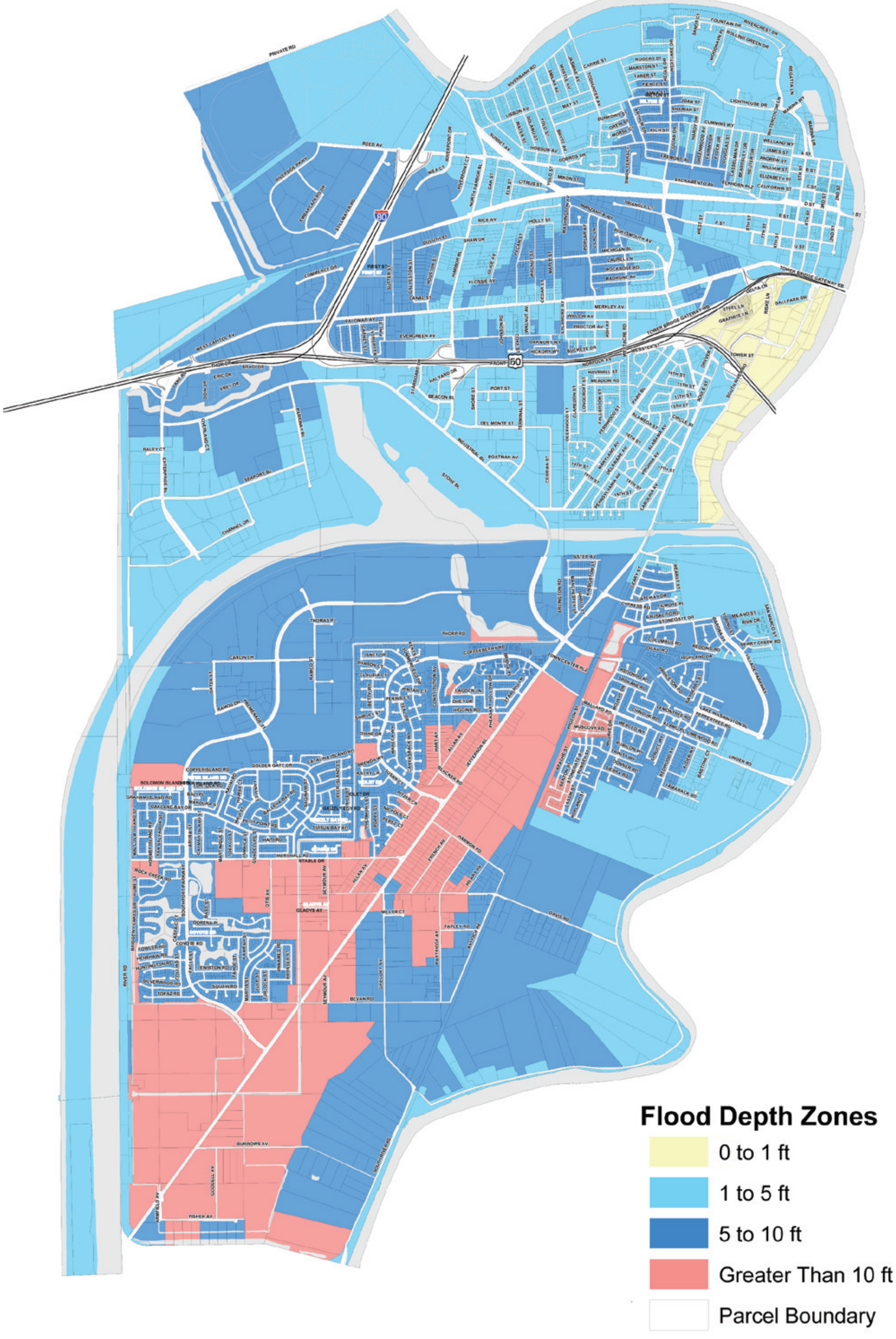
The analysis indicates that a levee failure on the Sacramento River North Levee during a 100-year event would flood the entire north area with at least 1 foot of water within 24 hours, at which point vehicular evacuation would become severely limited (a depth of 1 foot is regarded as impassable from the standpoint of vehicular traffic). Certain neighborhoods close to the levee failure would lose access to evacuation routes within three hours of levee failure. Figure 2-2 shows the estimated time to 1-foot inundation depths throughout the northern area. Within 3 days, floodwater depths would reach 3 to 10 feet, depending on land surface elevation (as shown in Figure 2-1). Floodwaters would flow from north to south, seeking the lowest topographical elevation, and eventually discharge into the DWSC. The study estimates that floodwaters would begin to spill into the DWSC less than 24 hours after the breach. Modeling indicates that the DWSC could absorb up to 20,000 cubic feet per second (cfs) in discharge flow from waters flooding the north area of the city before overtopping and flooding the Southport area. (Wood Rodgers 2006.)

A levee failure on the Sacramento River South Levee during a 100-year event would flood the entire Southport area with at least 1 foot of water within 24 hours. Jefferson Boulevard, the only vehicular evacuation route for Southport, would be inundated by 1 foot of water within 4 hours, making it impassable. Figure 2-3 shows the estimated time to 1-foot inundation depths throughout the Southport area. Inundation depth could reach 3 feet in 36 hours and 10 feet after three days (Figure 2-1). Floodwaters would flow from east to west, then turn south, collecting at the South Cross Levee. The maximum stage from the floodwater was estimated at elevation 24.57 feet. The elevation at the top of the South Cross Levee is 24.07 feet. If the South Cross Levee were overtopped, further flooding would occur downstream of the city of West Sacramento. (Wood Rodgers 2006.)

Levee failure and subsequent flooding of the city of West Sacramento would affect the entire city, jeopardizing lives, and would cause substantial damage to structures, contents, and other property such as landscaping and automobiles. As of 2005, a population of 40,439 was living in 15,448 housing units within the city (Sacramento Area Council of Governments 2008a and 2008b). All of these residents could be displaced by a catastrophic flood event. Additionally, the city is home to 30,655 jobs (Sacramento Area Council of Governments 2008c), 734 commercial and industrial structures, 46 public structures and 27 park facilities, which would all be affected by a flood event (HDR, Inc. 2009). Environmental and agricultural resources could also sustain major damage in a flood event; 22.6% of the land area within the city is either farmland or open space (City of West Sacramento 2009). If a catastrophic flood event occurred resulting in inundation up to 15 feet, land damages are estimated to be $237,763,648 and structural damages could be up to $1,750,118,102 (PB 2007). These values are based on the 100-year event.

A flood event could cause severe public health hazards as well. Flooding in the city could upset and spread stored hazardous materials, creating hazardous conditions for the public and the environment. Flood damage to homes and other structures could render them dangerous, due to structural damage as well as contamination. Additionally, the floodwaters and ponds left behind could provide a wide breeding ground for mosquitoes and other disease vectors. Effects to the water supply system could be particularly severe in a flood event, and could leave residents and businesses without a reliable water supply for a significant amount of time, as a single break in a water delivery pipe or main could contaminate the entire city's water supply. A major flood event could also result in substantial stress or disruption to the region's emergency response capacity, hospital services, and other critical lifelines of West Sacramento.

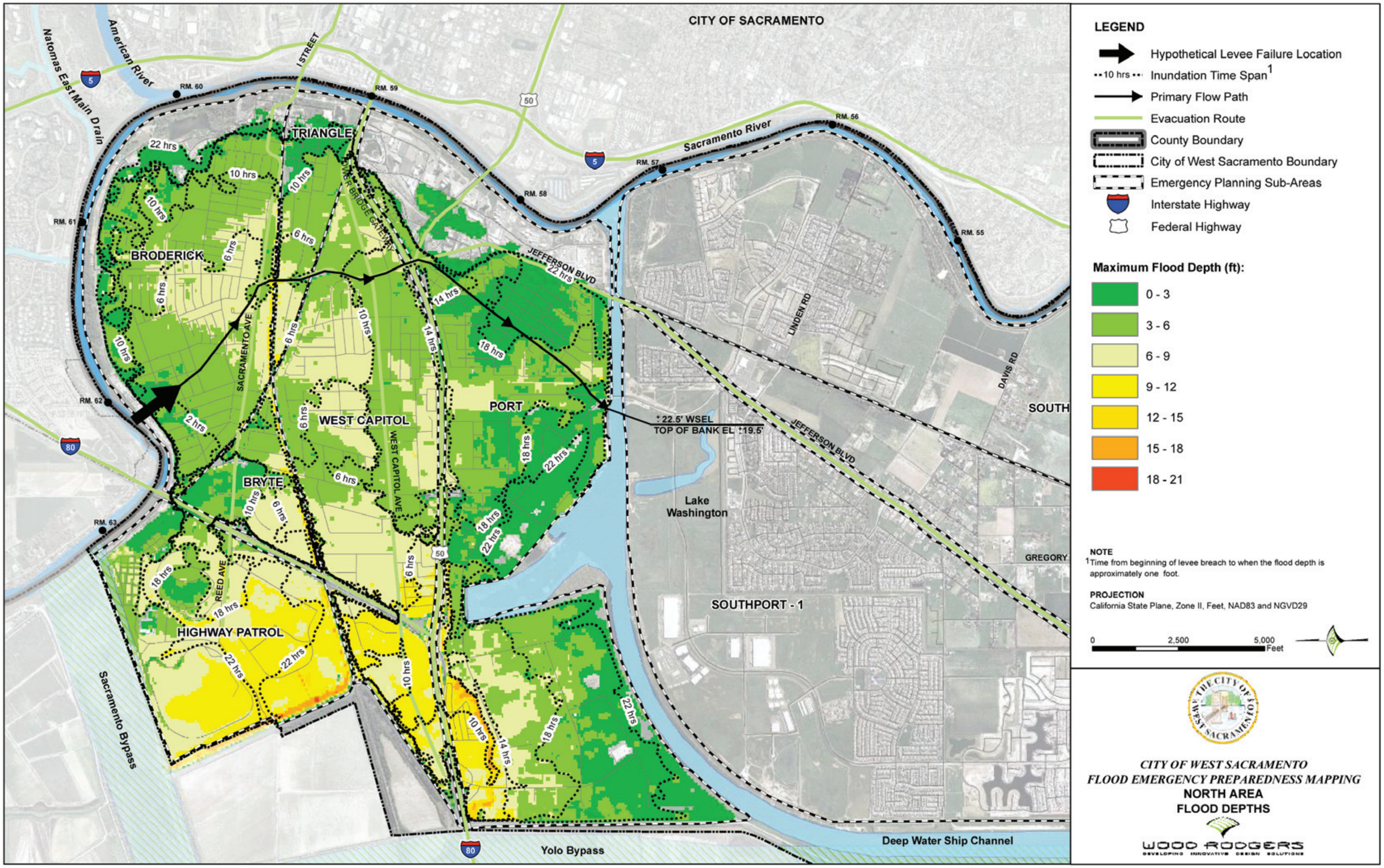
During the recovery period after a flood event, West Sacramento residents would require temporary housing, and displacement of many or all occupants would occur while levees, buildings, and other



Source: PB, 2007. Final Engineer's Report. Prepared for the City of West Sacramento and the West Sacramento Area Flood Control Agency for parcel assessment purposes. July.

00875.07 EIS (11-09)

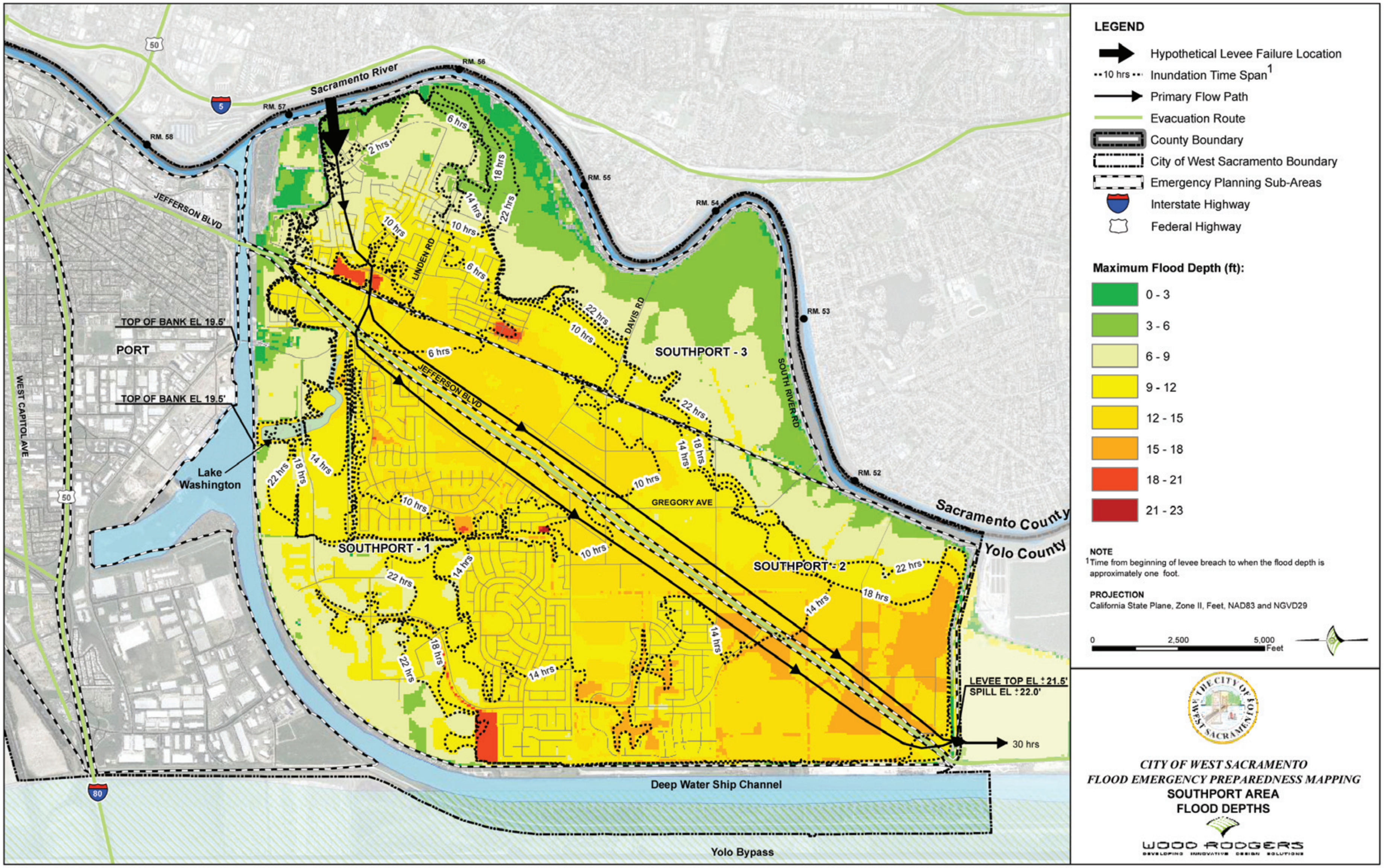
Figure 2-1
100-Year Flood Event
Estimated Flood Depths



00875.07 EIS (11-09)

Source: Wood Rodgers, 2006. Flood Emergency Preparedness Mapping. Prepared for the City of West Sacramento. November.

Figure 2-2
100-Year Flood Event
Estimated Time to One-Foot Inundation Depth—North Area



Source: Wood Rodgers, 2006. Flood Emergency Preparedness Mapping. Prepared for the City of West Sacramento. November.

00875.07 EIS (11-09)

Figure 2-3
100-Year Flood Event
Estimated Time to One-Foot Inundation Depth—Southport Area

infrastructure were repaired. Businesses, social services, and other employers occupying affected structures would be forced to relocate. The potential number of displaced residents (over 40,000) and businesses (over 30,000 jobs) is so large that the demand for temporary quarters would likely exceed the available supply of vacant buildings surrounding the West Sacramento area. Thus, many displaced residents and businesses may be forced to relocate to areas a considerable distance from West Sacramento, resulting in substantial intermediate-term and long-term economic impacts on the West Sacramento area and its people. These impacts include changes in employment numbers and patterns, business and personal incomes, tax revenues, and regional economic activity.

A flood event in West Sacramento would also disrupt state and interstate highway, rail, and shipping traffic, causing long-term effects on the region's and the state's economy and ability to move people and goods. West Sacramento has one of the most comprehensive transportation networks on the west coast. Its central geographic location and extensive north-south and east-west highway access has made it a major distribution center. High volumes of truck and passenger traffic pass through the city on Interstate 80 and US-50/Business 80 every day, with truck traffic transporting approximately $63 billion worth of cargo annually through West Sacramento (HDR Engineering 2009). Major transcontinental rail lines passing through the city provide commercial and passenger rail service to all parts of the nation, and the Port of West Sacramento runs domestic and international shipping services (City of West Sacramento 2009). Approximately 9.3 million tons of rail freight valued at approximately $5 billion travels through West Sacramento annually (HDR Engineering 2009). Flooding of this transportation and distribution infrastructure would cut off major statewide and interstate transportation corridors.

Examples of critical facilities for government and commerce in West Sacramento that would be affected by a flood event are the CHP Academy, regional distribution centers for the U.S. Postal Service and United Parcel Service, Raley Field, offices for the California Department of General Services and California State Teachers' Retirement System, the Port of West Sacramento, wastewater treatment facilities, Interstate 80, US-50, and numerous other government and commercial buildings and infrastructure. Other critical facilities and infrastructure are listed in Chapter 1 in Table 1-4.

2.3.3 Relationship of Flood Map Modernization to No Action

Further complicating the future no action scenario is the national flood map modernization process. FEMA is in the process of reevaluating the level of flood protection provided by the levee system protecting the city. The city is currently designated as falling under Zone X, meaning it has less than a 1% chance of flooding in any given year (100-year flood protection). If the city were remapped out of Zone X and into an A, AE, AR, or A-99 Zone, flood insurance would become mandatory for all citizens and businesses that hold Federally guaranteed mortgage loans. In addition, Federal and state regulations would prevent or constrain further development in the city, which may further delay levee improvement funding because a flood improvement development fee is incurred for new development.

A change in the flood hazard designation for West Sacramento would interrupt the preferred regional "blueprint" for future growth through 2035 adopted by the Sacramento Area Council of Governments (SACOG) and Valley Vision in 2004. SACOG envisions that West Sacramento would be the fastest growing city in the greater Sacramento region in the coming decades because of its proximity to Sacramento's urban core and its many opportunities for reinvestment. SACOG's blueprint anticipates that more than 40,000 new dwelling units and over 50,000 new jobs will be established in West Sacramento by 2050. With a change in flood hazard designation, these 40,000 new dwelling units and the commercial and industrial developments associated with 50,000 new jobs would need to be redirected to other areas in the region over the next four decades (Sacramento Area Council of Governments 2004).

2.3.4 Levee Vegetation Policy and No Action

The Draft EIS/EIR had described that the No Action Alternative would result in the removal of non-compliant vegetation. The rationale for this position had been that WSAFCA would risk Federal de-certification of its levees and would risk ineligibility for Federal assistance if the USACE standards were not complied with, subject to periodic inspection. It was further assumed that WSAFCA's member agencies would avoid these circumstances by ensuring compliance, meaning full vegetation removal as the worst-case scenario from an environmental analysis perspective.

Further, the Draft EIS/EIR described that a possible mechanism for compliance with the policy is a variance or exemption authorized by USACE, and noted that USACE was at that time developing implementation guidance for variances. Since the development of the Draft EIS/EIR, such guidance was published for review and comment, and a conditional variance was issued for an element of the Natomas Levee Improvements Program (NLIP), a program across the Sacramento River and upstream from the WSAFCA's planning area sponsored by Sacramento Area Flood Control Agency (SAFCA).

Finally, the Draft EIS/EIR described the efforts of the Interagency Flood Management Collaborative. This group is facilitated by DWR and is a monthly forum among DWR, USACE, USFWS, NMFS, California Department of Fish and Game (DFG), local agencies, and other resource and regulatory agencies to discuss flood management issues with an environmental focus. Closely coordinated with this group, the California Levees Roundtable (Roundtable) formed in 2007 to address vegetation issues affecting the levee system in the Central Valley. The Federal, state, and local member agencies, including USACE and CVFPB, agreed to work together to draft a phased, system-wide levee vegetation plan, with short- and long-term elements. The vegetation plan transitioned into the *California's Central Valley Flood System Improvement Framework* (Framework), adopted on March 26, 2009.

The Framework functions as short-term guidance before the comprehensive Central Valley Flood Protection Plan is ready in 2012. The Central Valley Flood Protection Plan is intended to, among other objectives, provide a long-term solution to those aspects of the system not in accordance with current engineering standards, including non-compliant vegetation. During development of the Framework, USACE created several basic tenets to help integration of vegetation requirements for the short and long term to maintain Public Law (PL) 84-99 eligibility. The tenets acknowledge the complex issues facing the flood control system in addition to vegetation, clarify areas of short-term flexibility in compliance with USACE levee vegetation policy, and address long-term compliance at a broad scale.

To date, USACE has agreed that the flood system will continue to be eligible for Federal levee rehabilitation assistance in the event of a flood if the state is demonstrating positive progress and meeting the milestones in achieving the Framework's short-term goals and maintenance objectives. In an April 2, 2010, letter to the CVFPB, USACE's Director of Civil Works stated, "the Framework Agreement will continue to be the guiding document as DWR continues to develop its long-term plan to resolve vegetation issues; a plan we understand will be finalized and provided to the USACE in July 2012" (Stockton pers. comm.).

In light of these circumstances, the Final EIS/EIR description of the No Action Alternative is revised to reflect multiple possible future scenarios. At this time, it is considered too speculative to adopt and consider a single one of these future scenarios as the sole or most likely outcome. Therefore, this document acknowledges and analyzes the following conditions in regard to the USACE levee vegetation policy as it relates to the No Action Alternative for the actions under consideration:

- full application of USACE levee vegetation policy, as detailed in Engineering Technical Letter 1110-2-571, Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures (ETL), meaning prohibition and removal of woody vegetation within the levee prism or within 15 feet of the landside or waterside levee toes (the scenario described and analyzed in the Draft EIS/EIR);
- no application of the ETL; assuming the continued existence into the future of the vegetation conditions at the time of the analysis;
- application of the interim guidance for USACE levee vegetation policy from the Framework process, meaning trees within the levee prism on the landside slope, upper 20 feet of the waterside slope, or within 10 feet of the landside toe must be trimmed up five feet above the ground (or 12 feet above the crown road) and thinned; and
- application of a possible variance, such as the variance issued for Natomas Levee Improvement Program (NLIP) under USACE's draft variance policy, meaning removal of trees within the levee prism on the landside slope or within the landside operations and maintenance corridor, and allowance of trees within the levee prism on the waterside slope based on demonstration of not affecting the critical levee prism.

Appendix C provides additional technical background and compliance information regarding USACE levee vegetation policy.

2.3.5 Recreation under No Action

The No Action Alternative would also delay implementing elements of the Parks Master Plan, Bicycle and Pedestrian Path Master Plan, and the Sacramento Riverfront Master Plan (SRMP). The recreation corridors proposed in these plans include bike and pedestrian trails that lie on top of the levees and other recreation features that occupy the waterside and landside of the levees. It is possible or even likely that funds would not be expended to construct some or all of these features prior to the levee improvement construction activities.

2.4 Introduction to Project Alternatives

At this time, WSAFCA is proposing the CHP Academy EIP and The Rivers EIP. These sites have both had observed past performance issues, with evidence of seepage at both sites (and possible boils at The Rivers). Table 2-1 provides an overview of the deficiencies and upgrades proposed at these sites for flood management. Recreation improvements are also proposed.

Table 2-1. CHP Academy and The Rivers EIP Alternatives Overview

EIP	Program Component	Applicant-Preferred Alternative	Alternative B
CHP Academy	Flood	Slurry cutoff wall and waterside slope flattening	Stability berm with interior drain, and relief wells
	Recreation	Paved bike trail	Paved bike trail
The Rivers	Flood	Slurry cutoff wall (conventional and DSM) and landside slope flattening	Deep sheet pile wall and landside slope flattening
	Recreation	Paved bike trail, paved pedestrian trail, paved landing, landside levee embankment ramps	Paved bike trail, paved pedestrian trail, paved landing, landside levee embankment ramps

2.5 CHP Academy EIP Alternatives

2.5.1 Introduction

The CHP Academy EIP area is approximately 6,500 feet long and is located on the Sacramento Bypass Levee, (Figure 2-4). The easternmost 1,200 feet of the waterside slope of the levee (adjacent to the weir) is lined with a concrete cap. This concrete cap prevents the levee from eroding when the weir is open and water is allowed to enter into the Sacramento Bypass from the Sacramento River. A stability berm and an interior drain system installed as part of the West Sacramento Project in 1999 runs the length of the levee on the landside. Deficiencies at this site are through-seepage, geometry, and under-seepage, along with short reaches of instability. The purpose of implementing treatments at the CHP Academy site is to address these deficiencies to achieve a minimum of 200-year flood protection at the site (0.5% AEP), which would ultimately help reduce flood risk for the entire city of West Sacramento.

2.5.2 CHP Academy Alternatives Screening

WSAFCA considered a range of alternatives that would address the deficiencies at the CHP Academy site. The improvement alternatives were narrowed as listed below.

- Alternative 1: slope flattening, slurry cutoff wall
- Alternative 2: slope flattening, seepage/stability berm
- Alternative 3: stability berm with interior drain, relief wells

As introduced earlier in Section 2.2.2, WSAFCA established and applied nine criteria to qualitatively evaluate the alternative improvements and eliminate those alternatives that did not adequately meet the criteria. The criteria are below.

- **Meet the Project Objectives to Reduce Risk**—The objective of the project is to alleviate through- and under-seepage concerns on this portion of the levee, as well as stability and geometry. Alternatives that provide the greatest reduction in subsurface water pressure (measured as the exit gradient of water moving through the soil) and improve slope stability

Flood Control Improvements

Station Interval	APA Levee Treatments	Alt B Levee Treatments
2+20 to 18+00	Waterside slope flattening	Stability berm, interior drain, and relief wells
18+00 to 64+00	Waterside slope flattening and slurry cutoff wall	Stability berm, interior drain, and relief wells

Figure 2-4
The CHP Academy EIP Applicant Preferred Alternative and Alternative B

and geometry relative to current levee standards are the most favored. Evidence of seepage has been observed at this site during previous high-water events.

- **Availability of Funds**—Levee repairs are necessary throughout the Sacramento River watershed. Federal and state monies as well as local matching monies must be spent thoughtfully to enable all the necessary levee improvements to be constructed. The preferred alternative would allow WSAFCA to implement the action through existing revenue sources without a cost-sharing partner or through demonstrating compatibility and creditability with state and Federal funding sources.

- **Scalability of Construction**—The scalability of an alternative refers to the ability of the design and construction documents to be increased or decreased if issues arise with contract financing or an unstable construction bid climate. Alternatives such as cutoff walls or seepage berms that can be partially constructed, as funds allow, are more desirable than setback levees or relief well systems that are not compatible with partial construction techniques. Alternatives that facilitate the ability to connect future adjacent improvements to the selected site without significant rework or cost are favored.

- **Real Estate Requirements**—An alternative that requires large land acquisition from private owners, such as a setback levee, is potentially cost prohibitive. Real estate acquisition may also present challenges with public and political acceptance. Temporary construction easements would not create as many issues as the need for permanent easements or fee-title acquisition. Alternatives requiring little to no additional flood protection easement are favored.

- **Land Use Compatibility**—The future land use of the areas on or adjacent to the proposed levee improvements should be taken into consideration. If known projects exist or have been approved by the City along the affected levee reach, alternatives should be evaluated with consideration of the degree to which they disrupt or interfere with such land uses. Alternatives that do not require modification to existing land-use plans adjacent to the site are favored.

- **Permit Requirements**—Permit requirements can greatly influence how soon an alternative can be implemented and flood protection can be provided. Projects that do not require numerous complex Federal, state, or local authorizations are favored.

- **Environmental Constraints (such as biological and cultural resources)**—Locations along the river support habitat critical to threatened or endangered species such as the valley elderberry longhorn beetle or the giant garter snake. In addition, the river corridor has a rich history of human use and contains cultural resources significant to that history. The environmental review and permitting process for effects to these types of resources can be lengthy and delay construction of improvements. Therefore, alternatives that avoid effects to these resources are preferable.

- **Integration of Multiple Objectives**—Propositions 50 and 84 include the goals of integrating multiple objectives to address a range of public policy priorities, leverage funding, integrate and coordinate projects, and achieve economies of scale. The community benefits from the coordination of levee improvements with other planned projects as it would enable the City to realize other goals in concert with flood protection goals and provide potential economies of scale, while minimizing disruption. Alternatives that facilitate realization of other objectives within the project area are favored.

- **Evolving Technical Policy**—The risks associated with evolving technical policy are also considered. Future policy may require seismic stability of levees or vegetation-free zones that vary from current conditions. These may also eventually lead to stricter design guidelines for levee construction protecting highly urbanized areas. The potential effects of this evolving policy are included in the consideration of alternatives. Alternatives that have low risk of major reinvestment based on any foreseeable change in acceptance criteria are favored.

In some cases, an alternative may partially meet a criterion while another meets it more fully. For this reason, the designations of more favorable (MF) and less favorable (LF) were applied to each criterion for each alternative. Table 2-2 below provides the results of the criteria evaluation.

Table 2-2. Evaluation of CHP Academy EIP Alternatives

Evaluation Criteria	Alternative 1 (slope flattening, slurry cutoff wall)	Alternative 2 (slope flattening, seepage/stability berm)	Alternative 3 (stability berm with interior drain, relief wells)
Meet the Project Objective to Reduce Risk	MF	MF	MF
Availability of Funds	LF	LF	LF
Scalability of Construction Project	MF	LF	LF
Real Estate Requirements	MF	LF	LF
Land-Use/Project Compatibility	MF	LF	LF
Permit Requirements	LF	LF	LF
Environmental Constraints	MF	LF	LF
Integration of Multiple Objectives	MF	LF	LF
Evolving Technical Policy	MF	MF	MF

Alternative 1 appears to be the most favorable levee improvement strategy based on this qualitative evaluation of various potential levee repair alternatives for the CHP Academy site. Repairing this site through the installation of a slurry cutoff wall requires the smallest temporary and permanent footprint for implementation. The estimated costs of constructing the improvements for all the alternatives are $5 million to $10 million. However, the reduced footprint of Alternative 1 will likely result in reduced real estate acquisition (and costs) and environmental impacts. Further, the installation of a soil-bentonite cutoff wall is compatible with the recreation features planned by the City for this location. Based on these considerations Alternative 1 is the proposed levee improvement strategy for the CHP Academy site.

Alternatives 2 and 3 appear to be the least favorable alternatives. Both of these alternatives require the installation of a seepage and/or stability berm. In most cases, berms require some amount of additional real estate to implement. The acquisition of additional real estate often results in increased projects costs as well as additional environmental impacts associated with the removal of vegetation and other habitat. For Alternative 2, the considerable amount of additional real estate required would affect the functionality of the CHP Academy located immediately adjacent to this reach of levee, and for this reason the alternative is not carried forward. For Alternative 3, the installation of relief wells would require water quality permitting, increased operation and maintenance costs, and has the potential to impact operations of the pump station located near the site.

Based on the screening process, two of the alternatives were developed for the CHP Academy EIP to be carried forward for study in the EIS/EIR. Table 2-3 provides detail for the levee stationing and treatments proposed for each alternative. The alternatives (in addition to no action) are identified below.

- **CHP Academy Applicant-Preferred Alternative (APA).** The installation of a slurry cutoff wall combined with slope flattening (Alternative 1, above).
- **CHP Academy Alternative B.** The construction of a seepage berm with an interior drain combined with relief wells (Alternative 3, above).

The proposed recreation improvements are the same for both the CHP Academy APA and CHP Academy Alternative B. Chapter 4 of this EIS/EIR includes an analysis of the effects of the CHP Academy APA, CHP Academy Alternative B, and the No Action Alternative. A detailed description of both the flood and recreation improvements follows the alternative screening discussion.

Table 2-3. CHP Academy EIP Flood Improvement Alternatives

EIP	Station Ranges		Deficiencies	APA Levee Treatments	Alt B Levee Treatments
CHP Academy EIP (2+20 to 64+78)	2+20	18+00	Geometry	Waterside slope flattening	Stability berm with interior drain and relief wells
	18+00	60+00	Through-seepage, under-seepage, stability, geometry	Slurry cutoff wall and waterside slope flattening	Stability berm with interior drain and relief wells
	60+00	64+00	Through-seepage, stability, geometry	Slurry cutoff wall and waterside slope flattening to weir	Stability berm with interior drain and relief wells

Source: Bourgeois pers. comm.

2.5.3 CHP Academy Flood Improvement Alternatives

2.5.3.1 CHP Academy Applicant-Preferred Alternative—Slurry Cutoff Wall and Waterside Slope Flattening

The CHP Academy APA consists of a combination of a slurry cutoff wall and slope flattening. To address under- and through-seepage concerns, a slurry cutoff wall varying in depths from 25 to 80 feet deep below the degrade elevation is proposed. The slope flattening treatment is proposed to alleviate geometry deficiencies. The waterside slope would be flattened to a 2.5:1 slope shifting the levee prism 10 to 20 feet landward (pending USACE approval based on engineering analysis to support a slope steeper than 3:1). Improvements constructed on the landside of the levee may consist of reconstructing the landside stability berm, interior drain and toe drain system. All alternatives would occur within the construction limits which are bounded on the landside by the CHP Academy property fence. The 1,200 linear feet of concrete cap on the waterside slope adjacent to the weir would be demolished and removed before slurry cutoff wall and slope flattening construction and replaced after construction is complete. The staging area for equipment is an approximate 6.50-acre area within the bypass and adjacent to the levee. The southern boundary of the construction limit of work is the CHP Academy fence line; therefore, the CHP Academy property would not be affected by construction for the CHP Academy APA. The levee treatments and phases of construction are described in more detail below. The phase of construction, necessary equipment, and estimated duration for each phase are presented at the end of the discussion in Table 2-4.

Treatments

Slurry Cutoff Wall

An 80-foot-deep by 3-foot-wide slurry cutoff wall is proposed to be constructed from station 18+00 to station 52+00 and a 25-foot-deep by 3-foot-wide slurry cutoff wall is proposed to be constructed from station 52+00 to station 64+00 (Figure 2-4). The levee would be degraded and then the conventional slot trench method would be used to construct the wall. Production rates for a convention slot trench cutoff walls vary based on methodology, equipment, depth, substrate, and other factors. Generally, the production rate for a conventional slot trench slurry cutoff wall is 40 to 50 linear feet per 8-hour shift. The WSAFCA design team has considered the methodology, equipment, depth, substrate, length, and other factors to determine the construction estimates for the cutoff wall. These estimates may be found in Table 2-4.

Mixing areas would be located at the staging area. The mixing area would be used to prepare the soil-bentonite mixture and supply bentonite-water slurry. The mixing area would be contained by installing erosion control materials in accordance with the stormwater pollution prevention plan (SWPPP) to avoid dispersal of inadvertently spilled mixing materials. Vertical clearance of about 40 feet would be needed for the excavator boom. Horizontal clearance of about 30 feet beyond the levee crest may be required for excavator swing when loading dump trucks. Dump truck trips would haul material between the excavator and the mixing area along the levee.

Slope Flattening

To flatten the waterside slope, the waterside slope would be trimmed and reshaped to a 2.5:1 slope the full length of the site. After slope flattening, the levee crown would be a minimum of 20 feet wide, and the levee prism would shift 10 to 20 feet landward. The existing waterside hingepoint would move landward and the waterside toe would remain in the same place. On the landside, an interior drain and sub-surface drainage canal presently run the length of the Sacramento Bypass Levee. The drainage canal runs along the landside berm toe and captures water that daylights from an existing interior drain. This drainage canal flows to the westernmost end of the Sacramento Bypass Levee to a pump station that pumps the water over the levee into the bypass. Improvements constructed on the landside of the levee may consist of reconstructing the landside stability berm, interior drain, and toe drain system. All alternatives would occur within the construction limits which are bounded on the landside by the CHP Academy property fence. No permanent fill of wetlands or waters of the United States is proposed. Embankment fill material excavated to flatten the slope would be transported to the staging area and, if suitable, reused.

Construction Details

Construction Staging

As depicted on Figure 2-4, an approximate 10-acre area within the bypass would be used for staging construction activities and provide space to house construction equipment and materials before and during construction activities.

Temporary Facilities and Access Provisions

To facilitate project construction, earthen ramps would be constructed to allow equipment in the bypass to facilitate access between the levee crown and staging area. The earthen ramps would be removed when construction is complete.

Protection of Biological Resources

WSAFCA representatives met with representatives of USFWS and CDFG at the CHP Academy EIP site in December 2009 and with USFWS in July 2010 to discuss acceptable measures for the protection of special-status species and sensitive habitats. During these coordination meetings, measures to protect wetlands, Great Valley mixed riparian forest, VELB, giant garter snake, and Swainson's hawk, were discussed and have been included as part of the CHP Academy EIP. Those measures include protective K-rail fencing, orange construction fencing, exclusion fencing, and on-site biological monitors (Figure 2-5). See Sections 3.7, Vegetation and Wetlands, and 3.9, Wildlife, for descriptions of land cover types where these species may exist and of the potential effects of this project on these species. Protective measures that will be implemented as part of the CHP Academy EIP are as follows:

Install Protective Barrier Fencing

The construction specifications will require that WSAFCA retain a qualified biologist to identify sensitive biological resources (e.g., special-status species, riparian habitat, wetlands, and elderberry shrubs) adjacent to the construction zone that are to be avoided during construction. Fencing will include K-rail concrete barriers, orange construction fencing, and exclusion fencing. Barrier fencing type and placement as it relates to each habitat and species is provided below (see Figure 2-5)

Before construction, the contractor will work with the project engineer and a resource specialist to identify the barrier fencing locations and will place stakes around the sensitive biological resources to indicate their locations. The protected area will be clearly identified on the construction drawings. The fencing will be installed at least 20 feet from each sensitive biological resource (where feasible) and will be in place before construction activities are initiated. The fencing will be maintained by WSAFCA or its contractor throughout the duration of the construction period. If the fencing is removed, damaged, or otherwise compromised during the construction period, construction activities will cease until the fencing is replaced.

Great Valley Mixed Riparian Forest, Depressional Wetland, and Pond

Great Valley mixed oak riparian forest, a depressional wetland, and a pond occur on the northern boundary of the project parallel and at the toe of the levee. K-rail fencing will be installed the entire length of this section of the project site to avoid any construction disturbance. This measure will also provide protection for giant garter snake, as discussed in further detail below.

Valley Elderberry Longhorn Beetle

Two elderberry shrubs occur in the study area. One elderberry shrub (EB 146) occurs in the northwestern area of the project site within the Sacramento Bypass, adjacent to an existing maintenance road (approximately 30 feet wide) used for levee maintenance and patrolling activities. Grading activities are proposed to occur down the levee slope to the toe of the levee, approximately 30 feet from the shrub. Hauling activities may occur adjacent to the shrub, but outside the dripline. The other shrub (EB 177) is in the southeast corner of the project area approximately 15 feet from the proposed construction limits, beneath a large oak tree. Neither shrub is expected to be removed or disturbed. Elderberry shrub survey results are shown in Section 3.9, Wildlife, Table 3.9-3, and the locations of these shrubs are shown in Section 3.9, Wildlife, Figure 3.9-1.

The following measures will be implemented as part of the CHP Academy EIP to avoid and minimize effects on VELB:

- Before ground disturbance, all construction personnel will participate in a USFWS-approved worker environmental awareness program. A qualified biologist approved by the USFWS will inform all construction personnel about the life history of VELB and the importance of its host shrub, the elderberry. Proof of this instruction will be submitted to the USFWS.
- For shrub EB 146, 100 feet of concrete barriers (K-rails) will be installed along the maintenance road in front of the shrub (50 feet west and 50 feet east of the shrub). Beyond the concrete barrier, temporary orange construction fencing (4-foot-high commercial- quality woven polypropylene) will be installed to completely surround the shrub and form a 20-foot construction buffer on the north, east, and west sides of the shrub. For shrub EB 177, a 20-foot temporary orange construction fence buffer will be installed around the shrub and any adjacent vegetation that requires protection (see Figure 2-5). Within buffer areas, signs will be posted along fencing for the duration of construction. The signs will contain the following information:

  > This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.

- Buffer area fences around elderberry shrubs/clusters will be inspected weekly by a qualified biologist during ground-disturbing activities and monthly after ground-disturbing activities until project construction is complete or until the fences are removed, as approved by the biological monitor and the resident engineer. The biological monitor will be responsible for ensuring that the contractor maintains the buffer area fences around elderberry shrubs throughout construction. Biological inspection reports will be provided to the project lead and USFWS.
- WSAFCA will ensure that the project site will be watered down as necessary to prevent dust from becoming airborne and accumulating on elderberry shrubs in and adjacent to a project site.

Giant Garter Snake

Giant garter snakes have the potential to use aquatic habitat in the study area, including depressional wetland and open water areas. Upland areas adjacent to these aquatic habitats could also be used by giant garter snakes for basking, cover, and refuge areas.

WSAFCA will implement the following measures to avoid and minimize effects on giant garter snake and their habitat:

- To reduce the likelihood of snakes entering these areas during construction activities, WSAFCA will install exclusion fencing along the depressional wetland and open water areas (areas within 200 feet of suitable habitat) (Figure 2-5). The exclusion fencing will be installed during the active period for giant garter snakes (May 1 to October 1) to reduce the potential for direct loss of the species during this activity. The fencing will consist of 3- to 4-foot-tall erosion fencing buried at least 6 to 8 inches below ground level. The fencing will ensure that giant garter snakes

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Figure 2-5
CHP Academy EIP
Protection Fencing Map

are excluded from the construction area and that suitable upland and aquatic habitat is protected throughout construction. To ensure that construction equipment and personnel do not affect aquatic habitat for giant garter snake outside the construction corridor, a combination of K-rail fencing and orange barrier fencing will be erected (in addition to the exclusion fencing) to clearly define the aquatic habitat to be avoided.

- A USFWS-approved biologist will conduct a preconstruction survey in suitable habitat no more than 24 hours before construction. Prior to construction each morning, construction personnel will inspect exclusion and orange barrier fencing to ensure they are both in good working order. If any snakes are observed within the construction area during this inspection or at any other time during construction the project biologist will be contacted to survey the site for snakes. The project area will be re-inspected and surveyed whenever a lapse in construction activity of 2 weeks or more has occurred. If a snake (believed to be a giant garter snake) is encountered during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed.
- Vegetation clearing within 200 feet of the banks of potential giant garter snake aquatic habitat will be limited to the minimum area necessary. Avoided giant garter snake habitat within or adjacent to the project area will be flagged and designated as an environmentally sensitive area, to be avoided by all construction personnel.
- The movement of heavy equipment within 200 feet of the banks of potential giant garter snake aquatic habitat will be confined to designated haul routes to minimize habitat disturbance.
- Before ground disturbance, all construction personnel will participate in a USFWS-approved worker environmental awareness program. A qualified biologist approved by the USFWS will inform all construction personnel about the life history of giant garter snakes and the importance of both aquatic and upland habitat areas. Proof of this instruction will be submitted to the USFWS.

Swainson's Hawk

Swainson's hawks are known to nest in and adjacent to the study area, and project construction within this reach could affect Swainson's hawk, either directly or through habitat modification.

To avoid and minimize effects on Swainson's hawk, WSAFCA representatives coordinated with DFG representatives during a field visit in December 2009, to discuss measures that would avoid and reduce potential effects to Swainson's hawk. WSAFCA will implement the following measures to avoid effects to Swainson's hawk:

- Before ground disturbance, all construction personnel will participate in a CDFG-approved worker environmental awareness program. A qualified biologist will inform all construction personnel about the life history of Swainson's hawk and the importance of nest sites and foraging habitat.
- Install construction barrier fencing (described in Chapter 2, The Rivers EIP Alternatives) to delineate the construction area and protect sensitive resources.
- A breeding season (generally February 1-August 31) survey for nesting migratory birds will be conducted for all trees and shrubs located within 500 feet (0.25 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys will be completed during at least two of the following survey periods: January 1 to March 20, March 20 to April 5, April 5 to

April 20, and June 10 to July 30 with no fewer than three surveys completed in at least two survey periods, and with at least one of these surveys occurring immediately prior (within 48 hours) to project initiation (Swainson's Hawk Technical Advisory Committee 2000). The results of the surveys will be submitted to DFG. Other migratory bird nest surveys can be conducted concurrent with Swainson's hawk surveys. If the biologist determines that the area surveyed does not contain any active migratory bird nests, construction activities, including vegetation removal or pruning of trees and shrubs, can commence without any further mitigation.

- If active nests are found, WSAFCA will maintain a 0.25-mile buffer or other distance determined appropriate through consultation with DFG, between construction activities and the active nest(s) until young have been determined to have fledged. In addition, a qualified biologist (experienced with raptor behavior) will be present on-site (daily) during construction activities occurring during the breeding season to watch for any signs of stress. If nesting birds are observed to exhibit agitated behavior indicating that they are experiencing stress, construction activities will cease until a qualified biologist, in consultation with DFG, determines that young have fledged the active nest.
- To avoid removing or disturbing any active Swainson's hawk nests, other special-status bird nests, or non-special-status migratory bird nests, tree and shrub removal will be conducted during the non-breeding season (generally September 1 through January 31) or after a qualified biologist determines that fledglings have left an active nest.

Demolition and Vegetation Removal

Demolition and vegetation removal would be performed for levee improvement construction. Vegetation clearing activities would consist of removing the larger woody vegetation such as trees and shrubs. Grubbing activities consist of removing roots and stripping activities consist of excavating approximately one foot of organic material from the levee surface. A stand of trees on the waterside of the levee (in the bypass), approximately 20 feet from the levee toe, would be pruned for construction equipment clearance. Demolition activities include demolition and removal of the 1,200-linear-foot-long concrete liner along the waterside slope of the levee (adjacent to the weir). The concrete debris would be hauled off site to an appropriate disposal location within 20 miles of the site.

Levee Degradation

Prior to slurry wall and slope flattening construction, approximately two-thirds of the levee crown would be degraded to provide a 60- to 80-foot working platform. Approximately 89,000 cubic yards would be degraded or excavated and hauled from the project site and disposed of at a permitted site within 20 miles of the project site. Following completion of the slurry cutoff wall, approximately 79,600 cubic yards of suitable levee construction embankment fill material may be transported from a permitted source approximately 10 miles away from the project site to restore the levee crown to its original elevation.

Materials Reuse and Importation

Materials imported to the project site would include water, bentonite, cement, incidental construction support materials, aggregate base rock, hydroseed, and about 79,600 cubic yards of embankment fill material to replace poor levee material. Embankment fill material excavated to construct levee improvements would be evaluated for reuse. Embankment fill material deemed suitable for reuse would be used to rebuild the levee. Embankment fill material of poor quality would be hauled off site to a permitted disposal site within 20 miles of the project site.

Post-Construction Operation and Maintenance

The only permanent facility associated with the project would be the new levee footprint itself. After construction completion, the levee and staging areas and levee slopes would be hydroseeded for erosion protection and to prevent colonization of exotic vegetation. Access roads adjacent to the levee would be restored to preexisting conditions.

Typical O&M activities (as described in Appendix B) would include the following actions:

- vegetation maintenance up to four times a year by mowing or applying herbicide;
- slope reconditioning up to once a year by dozing and track-walking the levee slopes;
- patrol road reconditioning up to once a year by placing, spreading, grading, and compacting aggregate base or substrate; and
- visual inspection as needed by driving on and observing from the patrol road.

Construction Schedule

The CHP Academy APA would be constructed during the 2011 construction season (typically April 15 to November 1). The project is expected to be completed within 130 days. Table 2-4 shows specific durations and equipment required for each phase of construction.

Constraints, which may include contract award delays due to permitting, early or late season rain, the presence of nesting raptors, and equipment shortages, have the potential to suspend the construction of the project before the start of the flood season (November 1) in 2011. The CHP Academy APA construction contract would allow the contractor to construct on a 24-hours-per-day/7-days-per-week (24/7) work schedule to complete the construction of the improvements before the flood season in order to manage the risk of delay due to the constraints described above. The construction schedule described in the section below lists both the standard 10-hour-per-day/5-days-per-week work schedule and the 24/7 condensed work schedule. Either of these schedules may be used for the project.

Table 2-4. CHP Academy APA: Construction Schedule Options

Phase of Flood Improvements Construction	Required Equipment	Standard Duration (Days)	24/7 Duration (Days)
Mobilization	N/A	1	0.4
Clearing and grubbing	A bulldozer, dump trucks, and an excavator	9	3.75
Concrete removal	A loader, dump trucks, and excavators	7	3
Levee degrade	A bulldozer, dump trucks, and an excavator	26	11
Slope flattening	A bulldozer, dump trucks, and an excavator	5	2
Slurry wall construction	Bulldozers, a long reach track hoe, a loader, and rough terrain forklift, 3-4 dump trucks, excavator, compactor, maintainer and water truck	29	12
Embankment fill placement	Bulldozers, dump trucks, an excavator, a compactor, a maintainer, and a water truck	27	11.25
Concrete placement	Concrete trucks and a crane	24	10
Roadway reconstruction	Dump trucks, a skip loader, a blade, a sheepsfoot compactor, a distributor, an asphalt paver, a pneumatic compactor, and a roller compactor	2	0.8
Demobilization	N/A	2	0.8
Total Days:		**130**	**55**

Source: Bourgeois pers. comm.

2.5.3.2 CHP Academy Alternative B—Stability Berm, Interior Drain, and Relief Wells

The treatments proposed under Alternative B at the CHP Academy EIP (CHP Academy Alternative B) consist of the construction of an interior drain within the levee, a stability berm on the landside of the levee, and the installation of relief wells (Figure 2-4). The interior drain and relief wells would alleviate seepage, and the stability berm would address geometry deficiencies. The first 1,200 linear feet of concrete cap on the waterside slope adjacent to the weir would be demolished, removed, and hauled off site for disposal before construction and replaced after construction. The staging area for equipment would be located in an approximately 10-acre area adjacent to the Sacramento Bypass Levee within the bypass. The southern boundary of the construction limit of work is the CHP Academy fence line; therefore, the CHP Academy property would not be affected by construction for the CHP Academy APA. The treatments and phases of construction are described in more detail below. The phase of construction, equipment necessary and estimated duration for each phase are presented at the end of the discussion in Table 2-5.

Treatments

Stability Berm and Interior Drain

A reinforced stability berm would replace the existing landside stability berm. The existing stability berm would be excavated the entire length of the reach within the project area. Approximately 11,000 cubic yards would be degraded and hauled from the project site and disposed of at a permitted site within 20 miles of the project. Construction of the interior drain would occur after excavation and removal of the existing stability berm. A 1.5-foot-thick base layer of drain rock would be placed at the levee toe, extending roughly 15 feet into the levee foundation. An additional drain layer, approximately 1.5 feet thick, would extend upward and into the core of the levee at a 2:1 slope from the end of the base layer to the approximate elevation of the design flood. A layer of geotextile material would then be placed over the additional drain layer and imported embankment fill material would be placed on top of the drain layer to rebuild the levee.

After completion of the interior drain, the stability berm would be rebuilt. The height of the stability berm would be two-thirds the height of the levee and extend the entire length of the project site. Dump trucks would transport 7,000 cubic yards of embankment fill material to the stability berm site. Motor graders would spread the material evenly and a sheepsfoot roller would compact the material. The footprint of the new stability berm would be the same as the existing landside stability berm.

Currently, a drainage canal runs along the landside berm toe and captures water that daylights from an existing interior drain. This drainage canal flows to the westernmost end of the Sacramento Bypass Levee to a pump station that pumps the water over the levee into the bypass. This drainage canal may be temporarily affected by construction but would be rebuilt to its original specification after interior drain installation. The drainage canal would continue to capture seeping water and direct it to the pump station.

Relief Wells

After the construction of the stability berm and interior drain, relief wells would be constructed 15 feet from the berm toe. Relief wells would be used to address under-seepage.

Approximately 20 to 40 relief wells would be constructed using soil-boring equipment to drill a hole vertically through the fine-grained blanket layer (sand) into the coarse-grained aquifer layer (gravel) beneath. Pipe casings and gravel/sand filters would be installed to allow water to freely flow to the ground surface, relieving the pressure beneath the clay blanket without transporting fine materials to the surface, which can undermine the levee foundation. The water would collect in a v-ditch and flow to the existing drainage ditch to be pumped back into the bypass by the existing pump station at the westernmost end of the Sacramento Bypass Levee.

Relief wells would be spaced in 50- to 100-foot intervals, dependent upon the amount of under-seepage, and extend to depths of 100 to 120 feet. Areas for relief well construction would be cleared, grubbed, and stripped. During relief well construction, a typical well-drilling rig is used to drill to the required depth and construct the well (including well casing, gravel pack material, and well seal) beneath the ground surface. The drill rig likely would be an all-terrain, track-mounted rig that could access the well locations from the levee toe.

Construction Details

Construction Staging

As depicted on Figure 2-4, an approximately 10-acre area within the bypass would be used for staging construction activities and to provide space to house construction equipment and materials before and during construction activities. There is an existing elderberry shrub 20 feet from the staging area. Staging and construction activities would remain 20 feet away from the elderberry shrub and it would not be disturbed by construction or staging activities.

Temporary Facilities and Access Provisions

To facilitate project construction, earthen ramps would be constructed to allow equipment in the bypass to facilitate access between the levee crown and staging area. The earthen ramps would be removed when construction is complete.

Protection of Biological Resources

The protection of biological resources for CHP Academy Alternative B would be the same as that described above for the APA.

Demolition and Vegetation Removal

Demolition and vegetation removal would be performed for levee improvement construction. Clearing activities would consist of removing the larger vegetation such as trees and shrubs. Grubbing activities would consist of removing roots and stripping activities would consist of excavating approximately a foot of organic material from the levee surface. A stand of trees on the waterside of the levee, approximately 20 feet from the levee toe, would be pruned for construction access. This phase of construction would also include demolition and removal of the 1,200-linear-foot-long concrete liner along the waterside slope of the levee adjacent to the weir. The concrete debris would be hauled off site to an appropriate disposal location.

Materials Reuse and Importation

Materials imported to the project site would include water, drain rock, geotextile material, aggregate base rock, well casing, sand and gravel, concrete, a drain pipe, hydroseed, and about 7,000 cubic yards of embankment fill material to replace poor levee material. Embankment fill material excavated to construct levee improvements would be evaluated to determine if it is suitable for reuse. Any of the embankment fill material deemed suitable for reuse would be used to rebuild the levee. Embankment fill material of poor quality would be hauled to a permitted disposal site.

Post-Construction Operation and Maintenance

After construction of the seepage berm, interior drain, and relief wells, the staging areas and levee slopes would be hydroseeded for erosion protection and to prevent colonization of exotic vegetation. Access roads adjacent to the levee would be restored to preexisting conditions.

The interior drain, stability berm, and relief wells and associated lateral drains would be the permanent facilities resulting from the project. Inspection of the relief wells would be required at least annually, and observation of flow from the wells would be required during high river stages. The wells would be test-pumped every 2 years, and the discharge water from those tests would be trucked off site to a central disposal, if necessary. The drainage ditch would be maintained to allow free flow of water. Piezometers, also called monitoring wells, would be installed between each relief well to allow monitoring of groundwater levels to ensure the wells are relieving the pressure within the aquifer.

Construction Schedule

The goal of the project is to complete the CHP Academy Alternative B in 2011. The project is expected to be completed within 67 days. All flood improvement construction and staging would take place during the typical construction season (April 15 to November 1). Table 2-5 shows specific durations and equipment required for each phase of construction.

Constraints, which may include contract award delays due to permitting, early or late season rain, the presence of nesting raptors, and equipment shortages, have the potential to suspend the construction of the project before the start of the flood season (November 1) in 2011. The CHP Academy Alternative B construction contract would allow the contractor to construct on a 24-hours-per-day/7-days-per-week (24/7) work schedule to complete the construction of the improvements before the flood season in order to manage the risk of delay due to the constraints described above. The construction schedule described in the section below lists both the standard 10-hour-per-day/ 5-days-per-week work schedule and the 24/7 condensed work schedule. Either of these schedules may be used for the project.

Table 2-5. CHP Academy Alternative B: Construction Schedule Options

Phase of Flood Improvements Construction	Required Equipment	Standard Duration (Days)	24/7 Duration (Days)
Mobilization	N/A	2	0.8
Clearing and grubbing	A bulldozer, dump trucks, and an excavator	4	1.6
Excavate stability berm	A loader, dump trucks, and excavators	5	2
Install stability berm and interior drain system	Bulldozers, dump trucks, an excavator, a sheep foot compactor, a maintainer, and a water truck	31	13
Install relief wells	Drill rig and crane	22	9
Roadway reconstruction	Dump trucks, a skip loader, a blade, a sheepsfoot compactor, a distributor, an asphalt paver, a pneumatic compactor, and a roller compactor	2	0.8
Demobilization	N/A	3	1.25
Total Days:		**67**	**29**

Source: Bourgeois pers. comm.

2.5.4 CHP Academy Recreation Improvements

The CHP Academy recreation improvements would consist of a paved trail on the levee crown the entire length of the site (6,500 feet). The paved trail would be designed in compliance with USACE and CVFPB standards. Details of the recreation improvement components are described below.

2.5.4.1 Paved Bike Trail

- The trail alignment is proposed atop the existing aggregate base access roads currently used for flood control maintenance and operations (Figure 2-4).
- The paved bike trail would be approximately 12 feet wide with a 2-foot-wide compacted aggregate base shoulder on either side of the trail to match the grade. Asphalt within the 12-foot-wide section would be 2 to 8 inches thick with a 4- to 8-inch-thick base.

2.5.4.2 Access and Signage

- Removable access controls (bollards) would be installed at the entrance of the Sacramento Bypass Levee.
- Permanent safety signs would be installed at select trail access points and at periodic intervals along the trails to inform users that the trail serves as a levee maintenance road and to instruct them to watch for patrolling vehicles. These signs would also inform users that portions of the trail are subject to flooding and that trail damage and related safety hazards could occur during the flooding season.

2.5.4.3 Construction Details

Construction staging and parking would be limited to areas that been selected for construction staging for the flood improvements. All recreation improvement construction and staging would take place during the typical construction season (April 15 to November 1). Construction of the bicycle/pedestrian trails would consist of compacting, paving, and striping the existing graded levee top. Recreation improvement construction is expected to be completed within 25 days.

Grasses and other native vegetation approved by USACE and CVFPB would be planted after project construction to stabilize soils and reduce runoff from temporary disturbance areas.

Table 2-6 lists the types of construction equipment that may be used to construct the recreation improvements of the CHP Academy EIP.

Table 2-6. CHP Academy EIP Recreation Improvements

Phase of Recreation Improvement Construction	Required Equipment	Standard Duration (Days)
Mobilization	N/A	2
Grading	Scraper, wheel loader, motor grader, dump truck, steel wheel loader, and water truck	8
Install pathways and signs	Dump truck, asphalt paver, asphalt sealer, striping truck, small front loader, skid steer loader and small roller	12
Demobilization	N/A	3
Total Days:		**25**

Operation and Maintenance

The bikeway and all related facilities would be maintained by the City. The City would be responsible for checking trails and conducting trail repairs at the end of the flood season and as needed. Maintenance of the bike trail would include sweeping, pavement repair, removal of obstacles, mowing and trimming, periodic asphalt overlays, and repair of associated facilities.

2.5.5 Environmental Commitments for CHP Academy EIP

As described and detailed in Section 2.7, environmental commitments are measures incorporated as part of the project description, meaning they are proposed as elements of the proposed action and are to be considered in conducting the environmental analysis and determining effects and findings. WSAFCA would implement the environmental commitments described in Section 2.7 as part of the CHP Academy. They are to be incorporated as part of any adopted project and tracked along with any mitigation triggered by a finding of significance to ensure implementation.

2.6 The Rivers EIP Alternatives

2.6.1 Introduction

The Rivers EIP area is approximately 4,500 feet long and is located on the Sacramento River North Levee, just north of the confluence of the Sacramento and American Rivers, including part of The Rivers residential development (Figure 2-6). Deficiencies at this site include geometry, stability, through-seepage, and under-seepage.

Please note: In the Draft EIS/EIR, The Rivers EIP site is presented as 4,500 feet in length in the alternatives description, as well as the affected environment and effects analyses for all the resource areas. Through further engineering analysis and technical review, it was determined that other alternative measures to address under-seepage merited further consideration in the eastern portion of the project reach along Rivercrest Drive (see Figure 2-6). Therefore, this portion of the reach was withdrawn from the proposed EIP at this time and has been deferred for further study. The proposed project length under The Rivers EIP is now 3,035 feet. The affected environment descriptions and effects analyses for all the resource areas for the Final EIS/EIR remain the same as in the Draft EIS/EIR at the originally proposed length of 4,500 feet, except vegetation and wildlife. USACE has consulted with USFWS and NMFS under ESA regarding effects on vegetation and wildlife. To more accurately represent the likely actual effects on these resources in the EIS/EIR, and for consistency between the EIS/EIR and the permitting documents, the effects analyses for these resources have been revised to reflect the presently proposed shorter project length.

The eastern approximately 1,465 feet of the original study reach no longer part of the proposed project will continue to be evaluated by WSAFCA for possible future and separate EIP action, but most likely will be deferred for study by USACE under the on-going West Sacramento Project GRR (described further in Chapter 1). Existing conditions and current risk levels will continue for the remainder of the reach, however it is anticipated that improvements to this reach will be implemented under the West Sacramento GRR or another EIP, as described in Relationship to WSAFCA and USACE Activities in the Approach to this Final EIS/EIR.

Bryte Park/Riverbank Elementary School and The Rivers residential development are located south of The Rivers EIP. The DWR maintenance yard is located directly west of the site. A leaking underground storage tank for gasoline and diesel was discovered and removed from the DWR maintenance yard in 1994. Monitoring and sampling of groundwater and soil at and in the vicinity of the site of contamination began in September 2001 with the intent to explore the extent of the fuels-impacted groundwater and provide data on risk to sensitive receptors. A small portion of the plume is located within the footprint of western end of the project site (see Section 3.2, Water Quality and Groundwater Resources). DWR has created a work plan with the Regional Water Quality Control Board (RWQCB) to continue to monitor the site, which includes the installation of additional monitoring wells in 2009 and 2010. During flood improvement construction, WSAFCA would coordinate with DWR and RWQCB to ensure that construction does not conflict with the current remediation efforts.

The purpose of implementing treatments at The Rivers site is to achieve a minimum of 200-year flood protection at the site (0.5% AEP), which would ultimately help reduce flood risk for the entire city of West Sacramento.

2.6.2 The Rivers Alternatives Screening

WSAFCA considered a range of alternatives that would address the deficiencies at The Rivers site. The improvement alternatives were narrowed as listed below.

- Alternative 1: slope flattening, slurry cutoff wall
- Alternative 2: slope flattening, seepage/stability berm
- Alternative 3: slope flattening, sheet pile wall

As introduced earlier in Section 2.2.2 and detailed in Section 2.5.2, WSAFCA established and applied nine criteria to qualitatively evaluate the alternative improvements and eliminate those alternatives that did not adequately meet the criteria. The criteria are re-listed below, reflecting the site-specific objective at The Rivers while the other criteria are the same for the two candidate EIPs.

- Meet the Project Objectives to Reduce Risk—The objective of the project is to alleviate through- and under-seepage concerns on this portion of the levee, as well as stability and geometry issues. Alternatives that provide the greatest reduction in subsurface water pressure (measured as the exit gradient of water moving through the soil) and improve slope stability and geometry relative to current levee standards are the most favored. Evidence of seepage (possible boils) has been observed at this site during previous high-water events.
- Availability of Funds
- Scalability of Construction
- Real Estate Requirements
- Land Use Compatibility
- Permit Requirements
- Environmental Constraints (such as biological and cultural resources)
- Integration of Multiple Objectives
- Evolving Technical Policy

In some cases, an alternative may partially meet a criterion while another meets it more fully. For this reason, the designations of more favorable (MF) and less favorable (LF) were applied to each criterion for each alternative. Table 2-7 below provides the results of the criteria evaluation.

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Flood Control Improvements

Station Interval	APA Levee Treatments	Alt B Levee Treatments
70+00 to 90+00	DSM cutoff wall and landside slope flattening	Deep sheet pile wall and landside slope flattening
90+00 to 116+00	Slurry cutoff wall and landside slope flattening	Sheet pile wall and landside slope flattening

N

0 125 250 500 Feet

Figure 2-6
The Rivers EIP Applicant Preferred Alternative and Alternative B

Table 2-7. Evaluation of The Rivers EIP Alternatives

Evaluation Criteria	Alternative 1 (slope flattening, slurry cutoff wall)	Alternative 2 (slope flattening, seepage/stability berm)	Alternative 3 (slope flattening, sheet pile wall)
Meet the Project Objective to Reduce Risk	MF	MF	MF
Availability of Funds	MF	LF	LF
Scalability of Construction Project	MF	LF	MF
Real Estate Requirements	MF	LF	MF
Land-Use/Project Compatibility	MF	LF	MF
Permit Requirements	MF	LF	MF
Environmental Constraints	MF	LF	LF
Integration of Multiple Objectives	MF	LF	MF
Evolving Technical Policy	MF	MF	MF

Alternatives 1 and 3 appear to be the most favorable levee improvement strategies based on this evaluation of various potential levee repair alternatives for The Rivers site. Repairing this site through the installation of either form of seepage cutoff barrier requires the smallest temporary and permanent footprint for implementation. This reduced footprint will likely result in reduced real estate acquisition. The preliminary cost opinions developed for Alternative 1 and Alternative 3 identified similar costs to implement either (approximately $15million to $25 million). However, two factors distinguish Alternative 1 as the preferred strategy. First, a comparison of preliminary cost opinions developed for these alternatives identified Alternatives 1 and 3 as the least expensive to implement. Alternative 2 would require additional costs associated with real estate acquisition. Second, the noise and/or vibration associated with the installation of sheet pile panels in Alternative 3 may not be compatible with the close proximity of residences along a portion of this site. As a result, Alternative 1 is the proposed levee improvement strategy for The Rivers site.

Alternative 2 appears to be the least favorable alternative. This alternative requires the installation of a seepage and/or stability berm. In most cases, berms require some amount of additional real estate to implement. The acquisition of additional real estate often results in increased project costs as well as additional various potential environmental impacts. At this site, the installation of a seepage/stability berm would likely affect several residences, roads, and school facilities. Therefore, this alternative has not been carried forward for further consideration.

Based on the screening process, two of the alternatives were developed for The Rivers EIP to be carried forward for study in the EIS/EIR. Table 2-8 provides detail for the levee stationing and treatments proposed for each alternative. The alternatives (in addition to no action) are identified below.

- **The Rivers APA.** The installation of a slurry cutoff wall combined with landside slope flattening (Alternative 1, above).
- **The Rivers Alternative B.** The installation of a sheet pile wall combined with landside slope flattening (Alternative 3, above).

The proposed recreation improvements are the same for both The Rivers APA and The Rivers Alternative B. Chapter 5 of this EIS/EIR includes an analysis of the effects of The Rivers APA, The

Rivers Alternative B, and the No Action Alternative. A detailed description of both alternatives and the recreation improvements follows the alternatives screening discussion below.

Table 2-8. The Rivers EIP Flood Improvement Alternatives

EIP	Station Ranges		Deficiencies	APA Levee Treatments	Alt B Levee Treatments
The Rivers (70+00 to 116+00)	70+00	90+00	Through-seepage, under-seepage, stability, geometry	DSM cutoff wall and landside slope flattening	Deep sheet pile wall and landside slope flattening
	90+00	116+00	Through-seepage, under-seepage, stability, geometry	Slurry cutoff wall and landside slope flattening	Sheet pile wall and landside slope flattening

Source: Nordvik pers. comm.

2.6.3 The Rivers Flood Improvement Alternatives

2.6.3.1 The Rivers Applicant-Preferred Alternative—Slurry Cutoff Wall and Landside Slope Flattening

The Rivers APA would be a combination of slurry cutoff wall and landside slope flattening, which would address through-seepage, under-seepage, stability, and geometry deficiencies. The staging area would be located on the levee at the western end of the project site. There are 11 residences located on top of the levee and 4 residences adjacent to the landside toe of the levee encroaching on the levee operation and maintenance area. The treatments and phases of construction are described in more detail below.

Please note: In the Draft EIS/EIR, The Rivers EIP site is presented as 4,500 feet in length in the alternatives description. The proposed project is now 3,035 feet in length (see Introduction, above).

Treatment

Slurry Cutoff Wall

A 3-foot-wide slurry cutoff wall would be constructed from station 70+00 to station 90+00 up to a depth of 135 feet below degrade elevation using the DSM method of construction (Figure 2-6). The DSM method uses a crane-supported set of two to four mixing augers (typically 36 inches in diameter) set side by side. These augers are drilled through the levee crown and foundation to the required depth (capable of a maximum depth of about 200 feet). As the augers are inserted and withdrawn, a cement-bentonite grout is injected through the augers and mixed with the native soil. An overlapping series of mixed columns is drilled to create a continuous slurry cutoff wall panel.

An excavator would manipulate injector return spoils near the DSM rig, and transport trucks would be used to haul spoils to an appropriate disposal area. A crane would be used for in-place sampling of DSM material and also for loading bentonite into the batch plant hopper. A mobile batch plant (diesel-powered) is required near each DSM rig at the work area to prepare the cement-bentonite grout. The grout is transported to the DSM rig through flexible hoses. The batch plant would require a pad of 50 by 100 feet within the staging area. Hauling at the work area would include scraper runs along the levee to the staging area and cement and bentonite deliveries to the batch plant.

A 3-foot-wide slurry cutoff wall would be constructed using the conventional slot trench method from station 90+00 to 116+00. Mixing areas would be located at the staging area. The mixing area would be used to prepare the soil-bentonite mixture and supply bentonite-water slurry. Vertical clearance of about 40 feet would be needed for the excavator boom. Horizontal clearance of about 30 feet beyond the levee crest may be required for excavator swing when loading dump trucks. Dump truck trips would haul material between the excavator and the mixing area along the levee.

Production rates for cutoff walls vary based on methodology, equipment, depth, substrate, and other factors. The cutoff walls for The Rivers EIP will be constructed using both DSM and conventional slot trench methods. Generally, the production rate for DSM and conventional slot trench can vary from approximately 20 to 30 linear feet and 40 to 50 linear feet, respectively per 8-hour shift. The WSAFCA design team has considered the methodology, equipment, depth, substrate, length, and other factors to determine the construction estimates for the cutoff walls. These estimates may be found in Table 2-9. Construction of the cutoff walls for The Rivers EIP will occur consecutively.

Slope Flattening

The existing landside slope of the levee is steep and requires flattening to meet appropriate slope stability and levee geometry requirements. After levee degrade and the completion of the slurry wall installation, both the waterside and landside slopes would be rebuilt and graded to create a 3:1 slope. The landside toe location would remain unchanged.

Construction Details

Demolition and Vegetation Removal

The first phase of construction would consist of road demolition and clearing, grubbing, and stripping the levee surface. The roadway on the levee crown, Rivercrest Drive, would be dismantled before starting levee degradation. Asphalt debris from road demolition work would be hauled off site to an appropriate disposal location.

Demolition and vegetation removal would be performed for levee improvement construction. Clearing activities would consist of removing the larger vegetation such as trees and shrubs. Grubbing activities would consist of removing roots and stripping activities would consist of excavating approximately a foot of organic material from the levee surface. Approximately 37 trees on the waterside of the levee would be removed because they fall within the construction footprint. It has been determined that the remaining waterside trees outside the disturbance footprint are not within the theoretical levee prism or vegetation-free zone and are in compliance with the USACE levee vegetation guidance.

Levee Degradation

Along the entire length of levee (4,500 feet) approximately one-third (6 feet) of the levee crown would be degraded to provide a 60- to 80-foot working platform. Approximately 58,000 cubic yards would be degraded and hauled from the project site and disposed of at a permitted site within 20 miles of the project site. Following completion of the slurry cutoff wall and slope flattening construction, approximately 92,000 cubic yards of suitable levee embankment fill material would be transported from a permitted source 10 miles away from the project site to restore the levee crown to its original elevation.

Materials Reuse and Importation

Materials imported to the project site would include water, bentonite, cement, incidental construction support materials, aggregate base rock, asphalt, hydroseed, and about 92,000 cubic yards of embankment fill material. Embankment fill material excavated to construct levee improvements would be evaluated to determine its suitability for reuse. Any of the embankment fill material deemed suitable for reuse would be used to rebuild the levee. Embankment fill material of poor quality would be hauled to a permitted disposal site. Following completion of the slurry cutoff wall and slope flattening construction, approximately 92,000 cubic yards of suitable levee embankment fill material would be transported from a permitted source 10 miles away from the project site to restore the levee crown to its original elevation.

Temporary Facilities and Access Provisions

To facilitate project construction, earthen ramps would be improved to allow equipment access between the levee crown and staging area. Access would be limited to construction traffic only. Temporary construction easements may be required to lawfully secure access to the areas affected by construction. Riverbank Road, Fountain Road, and a small length of River Crest Road would be closed during construction, up to the duration of the project as noted below under Construction Schedule. Road lane closures would be addressed in Chapter 4.

Protection of Biological Resources

WSAFCA representatives met with representatives of USFWS and CDFG at The Rivers EIP site in December 2009 and representatives of USFWS and NMFS on July 2010 to discuss acceptable measures for the protection of special-status species. During these coordination meetings, measures to protect sensitive habitats, VELB and Swainson's hawk were discussed and have been included as part of the Rivers EIP. Those measures include protective K-rail fencing and orange construction fencing (Figure 2-7). See the Wildlife section (3.9) for descriptions of land cover types where these species may exist and the potential effects of this project on these species. Protective measures that will be implemented as part of the Rivers EIP are as follows:

Install Protective Barrier Fencing

The construction specifications will require that WSAFCA retain a qualified biologist to identify sensitive biological resources (e.g., special-status species, elderberry shrubs) adjacent to the construction zone that are to be avoided during construction. Fencing will include K-rail concrete barriers and orange construction fencing. Type and placement as it relates to species is provided below (See Figure 2-7)

Before construction, the contractor will work with the project engineer and a resource specialist to identify the barrier fencing locations and will place stakes around the sensitive biological resources to indicate their locations. The protected area will be clearly identified on the construction specifications. The fencing will be installed at least 20 feet (where feasible) from each sensitive biological resource and will be in place before construction activities are initiated. The fencing will be maintained by WSAFCA or its contractor throughout the duration of the construction period. If

Figure 2-7
The Rivers EIP
Protection Fencing Map

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the fencing is removed, damaged, or otherwise compromised during the construction period, construction activities will cease until the fencing is replaced.

Valley Elderberry Longhorn Beetle

In the study area, elderberry shrubs occur in the Sacramento River riparian corridor adjacent to the project construction limit. Shrub survey results are shown in Section 3.9, Wildlife, Table 3.9-3, and Figure 3.9-1. A total of 22 shrubs or shrub clusters are located within 100 feet of the project construction limit.

The following measures will be implemented to avoid and minimize effects on VELB:

- Protective buffer areas will be created for elderberry shrub clusters by the installation of approximately 1500 feet of K-rail fencing along the edge of the construction zone (see Figure 2-7). In the eastern portion of the project area, there are shrubs that lie within existing tree canopy. To protect these shrubs and avoid potentially damaging existing trees, an approximate 80-foot semi-circle of orange construction fencing will be installed adjacent to the construction zone in this portion of the study area (See Figure 2-7). Within buffer areas, signs will be posted along fencing for the duration of construction. The signs will contain the following information:

  > This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.

- Buffer area fences around elderberry shrubs/clusters will be inspected weekly by a qualified biologist during ground-disturbing activities and monthly after ground-disturbing activities until project construction is complete or until the fences are removed, as approved by the biological monitor and the resident engineer. The biological monitor will be responsible for ensuring that the contractor maintains the buffer area fences around elderberry shrubs throughout construction. Biological inspection reports will be provided to the project lead and USFWS.
- WSAFCA will ensure that the project site will be watered down as necessary to prevent dust from becoming airborne and accumulating on elderberry shrubs in and adjacent to a project site.

Swainson's Hawk

Swainson's hawks are known to nest in and adjacent to the study area, and project construction within this reach could affect Swainson's hawk, either directly or through habitat modification.

To avoid and minimize effects on Swainson's hawk, the following measures will be implemented:

- A breeding season (generally February 1-August 31) survey for nesting migratory birds will be conducted for all trees and shrubs located within 500 feet (0.25 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys will be completed during at least two of the following survey periods: January 1 to March 20, March 20 to April 5, April 5 to April 20, and June 10 to July 30 with no fewer than three surveys completed in at least two survey periods, and with at least one of these surveys occurring immediately prior (within 48 hours) to project initiation (Swainson's Hawk Technical Advisory Committee 2000). The results of the surveys will be submitted to DFG. Other migratory bird nest surveys can be conducted concurrent with Swainson's hawk surveys. If the biologist determines that the area surveyed does not contain any active migratory bird nests, construction activities, including vegetation removal or pruning of trees and shrubs, can commence without any further mitigation.

- If active nests are found, WSAFCA will maintain a 0.25-mile buffer or other distance determined appropriate through consultation with DFG, between construction activities and the active nest(s) until young have been determined to have fledged. In addition, a qualified biologist (experienced with raptor behavior) will be present on-site (daily) during construction activities occurring during the breeding season to watch for any signs of stress. If nesting birds are observed to exhibit agitated behavior indicating that they are experiencing stress, construction activities will cease until a qualified biologist, in consultation with DFG, determines that young have fledged the active nest.
- To avoid removing or disturbing any active Swainson's hawk nests, other special-status bird nests, or non-special-status migratory bird nests, tree and shrub removal will be conducted during the non-breeding season (generally September 1 through January 31) or after a qualified biologist determines that fledglings have left an active nest.

Utility Modifications

There are several utilities within the levee prism, including water, electricity, telephone, gas, and sanitary sewer lines; a storm drain; and two utility holes. According to CVFPB requirements, utilities are not allowed within the official levee prism (defined by a 20-foot width along the crown and 3:1 slope ratio landside and waterside). The top portion of a levee that falls outside the official levee prism is called freeboard. Utilities are allowed to be placed within the freeboard portion of a levee. Currently, utilities exist within the levee prism and must be relocated. All of the existing utilities within The Rivers project area (including those outside the levee prism) may be relocated and would be temporarily out of service during relocation activities.

Road Reconstruction

After levee improvements are completed, road reconstruction would occur at Rivercrest Drive. An aggregate base course would be installed and compacted. Lastly, asphalt would be added and compacted.

Construction Schedule

The goal of the project is to complete The Rivers improvements in 2011. The project is expected to be completed within 147 days. All flood improvement construction and staging would take place during the typical construction season (April 15 to November 1). Table 2-9 shows the phases of construction, equipment requirement, and duration.

Constraints, which may include contract award delays due to permitting, early season rain, the presence of nesting raptors, and equipment shortages, have the potential to suspend the construction of the project before the start of the flood season (November 1) in 2011. The Rivers APA construction contract would allow the contractor to construct on a 24/7 work schedule to complete the construction of the improvements before the flood season in order to manage the risk of delay due to the constraints described above. The construction schedule described in the section below lists both the standard 10-hour-per-day/5-days-per-week work schedule and the 24/7 condensed work schedule. Either of these schedules may be used for the project.

Table 2-9. The Rivers APA: Construction Schedule Options

Phases of flood improvement construction	Required Equipment	Standard Duration (Days)	24/7 Duration (Days)
Mobilization	N/A	4	1.7
Roadway demolition	Bulldozers, dump trucks, a loader, and an excavator	2	0.8
Clearing and grubbing	A bulldozer, dump trucks, and an excavator	6	2.5
Levee degrade	A bulldozer, dump trucks, and an excavator	27	11.25
Slope flattening	A bulldozer, dump trucks, and an excavator	7	3
Slurry wall construction	A bulldozer, a long reach track hoe, a loader, a dump truck, and a rough terrain forklift	21	8.75
DSM wall construction	A delivery truck, a crane with augers, a loader, and a rough terrain forklift	44	18.3
Fill placement	Bulldozers, dump trucks, an excavator, a compactor, a maintainer, and a water truck	31	0.3
Roadway reconstruction	Dump trucks, a skip loader, a blade, a sheepsfoot compactor, a distributor, an asphalt paver, a pneumatic compactor, and a roller compactor	2	0.8
Demobilization	N/A	3	1.25
Total Days:		**147**	**61.35**

Source: Nordvik pers. comm.

Residents within the Immediate Vicinity of Construction

There are approximately 15 residences within the immediate vicinity of construction activities. During some periods of time, construction activities would be directly adjacent to their homes. In addition, the proposed utility modifications would result in the temporary disruption of service (water, communications, electricity, gas, and sanitary sewer) during construction. Disruptions in service would be up to four hours per episode for electrical, communications, and gas and up to eight hours per episode for water and sanitary sewer. Access by auto and by foot will be maintained, subject to detour and periodic closure (less than four hours). WSAFCA would provide assistance for residents to relocate during construction activities and provide compensation to residents for reasonable rent and living expenses incurred due to relocation. In accordance with the Uniform Relocation Assistance and Real Property Acquisition Act, residents would be provided with decent, safe, and sanitary housing. In addition, WSAFCA would provide onsite security to ensure the protection of the resident's homes and contents during relocation.

Post-Construction Riparian Mitigation

The construction activities associated with The Rivers APA may result in the loss of approximately 0.9 acre (37 trees with a cumulative diameter breast height (dbh) of 897 inches) of Great Valley valley oak riparian forest, a sensitive natural community, located within the project disturbance footprint (i.e., the construction zone). Out of the 37 trees with a cumulative DBH of 897, there are 14 trees (cumulative dbh of 280) that meet the criteria of protected trees under the City of West Sacramento's Tree Ordinance. WSAFCA has identified on-site areas (adjacent to the levee) that are outside the USACE vegetation-free zone and proposes to integrate compensation for riparian resources (including those deemed as protected by the city's ordinance) on-site. WSAFCA will compensate for the loss of riparian habitat to ensure no-net loss of habitat functions and values. Compensation ratios will be finalized based on detailed site-specific information and determined through additional coordination with the appropriate local, state and Federal agencies during the permitting and consultation process. To provide context, a 1:1 mitigation ratio would result in the replacement of 0.9 acres, or 897 plantings; a 2:1 ratio would result in the replacement of 1.8 acres, or 1794 plantings.

As part of the project, WSAFCA will develop a revegetation plan to be prepared by a qualified restoration ecologist and reviewed by appropriate agencies (including CDFG and CVFPB), prior to the removal of existing riparian vegetation. WSAFCA has identified approximately 2.17 acres of open grassland and 3.81 acres of interspersed understory as potential mitigation areas within the project study area (see Figure 2-8). The riparian mitigation plan will include the following measures.

- The revegetation plan will specify the planting stock appropriate for each riparian land cover type for the on-site mitigation areas. The plan will employ the most successful techniques available at the time of planning. Success criteria will be established as part of the plan.
- WSAFCA will monitor and maintain the plantings as necessary for 5 years, including weed removal, irrigation, and herbivory protection. WSAFCA will submit annual monitoring reports of survival to the regulatory agencies issuing permits related to habitat effects, including DFG, USACE, NMFS, and USFWS and the City's tree administrator. Replanting will be necessary if success criteria are not met and replacement plants will subsequently be monitored and maintained to meet the success criteria. The riparian habitat mitigation will be considered successful when the sapling trees established meet the success criteria, the habitat no longer requires active management, and vegetation is arranged in groups that, when mature, replicate the area, natural structure, and species composition of similar riparian habitats in the region.

Implementation of the on-site mitigation plan will occur after construction of flood and recreation improvements. It will require approximately 20 individuals and the use of light duty trucks. Prior to planting, understory will be hand-cleared so to protect existing sensitive vegetation. Once the on-site mitigation area is cleared of understory, irrigation piping will be installed at the on-site mitigation areas as a support system for the plants in their juvenile state. This irrigation system will receive its water from the existing DWR facility located at the western end of the project site, or equivalent existing source. Irrigation will be utilized for up to the first three years for plant establishment and be removed once plants become sufficiently established to thrive and grow independently.

Post-Construction Operation and Maintenance

After construction of slurry wall and slope flattening, the staging areas and levee slopes would be hydroseeded for erosion protection and to prevent colonization of exotic vegetation.

The only permanent facility would be the improved levee, subject to typical O&M as described under the CHP Academy APA above.

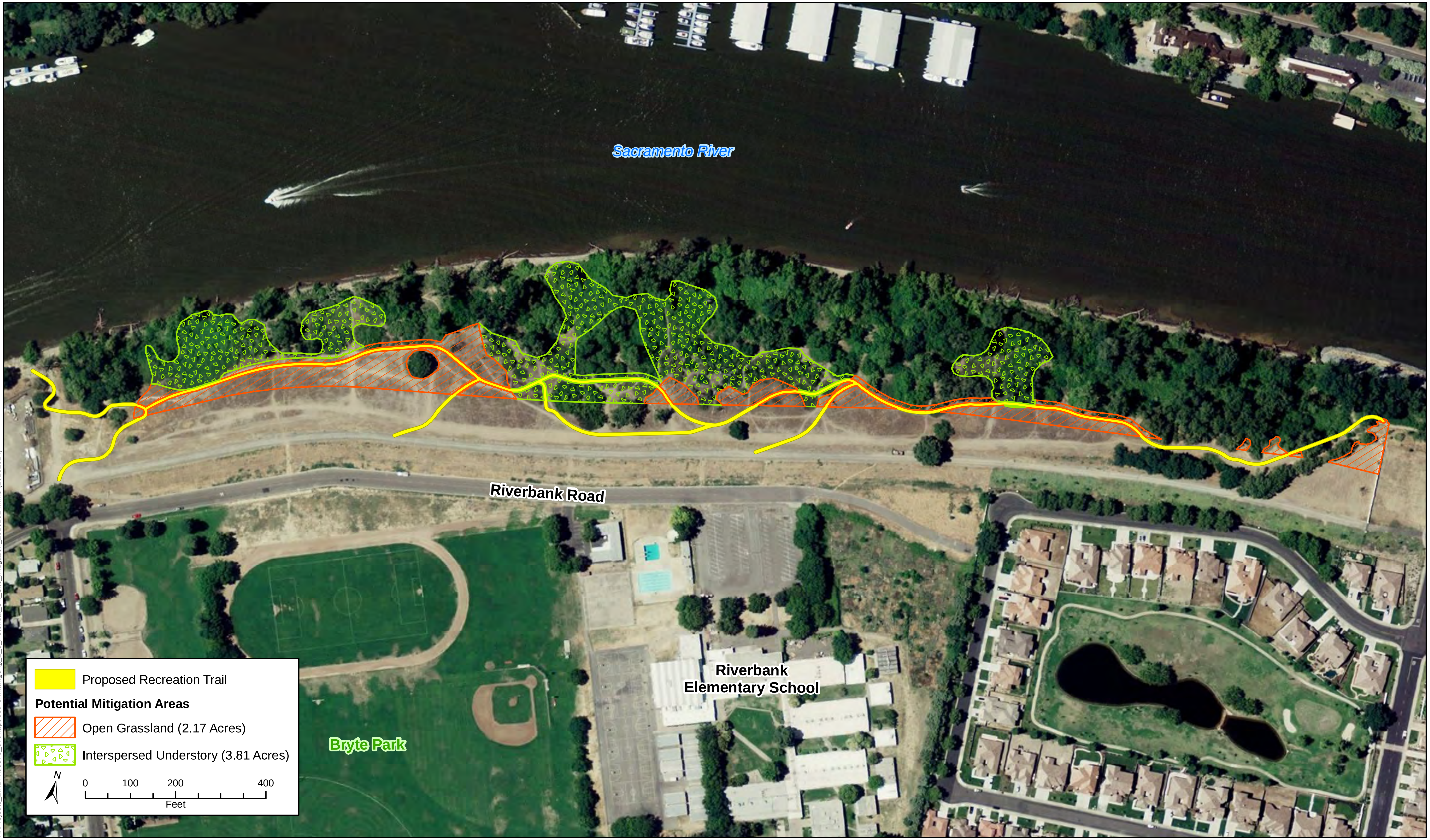

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Figure 2-8
The Rivers
Potential On-Site Mitigation

2.6.3.2 The Rivers Alternative B—Sheet Pile Wall and Landside Slope Flattening

The treatments proposed under Alternative B at The Rivers EIP consist of the installation of a deep sheet pile wall and landside slope flattening. A staging area of approximately 3.22 acres would be located in the northwestern corner of the project site. The treatments and phases of construction are described in more detail below.

Treatment

Sheet Pile Wall

A trench would be excavated along the sheet pile alignment to allow the pile to be driven to the proposed grade (below the existing levee grade). A driving template fabricated from structural steel would be placed to control the alignment as the sheet pile is installed. A hydraulic or pneumatically operated pile driving head attached to a crane would drive the sheet pile into the levee crown to the desired depth (up to 135 feet). An additional crane or excavator would be used to facilitate staging of the materials. The conditions of the site, driving pressure, hydrostatic loads, and corrosion considerations would determine the thickness and configuration of the sheet piles. If conditions indicate that corrosion is an issue the sheet piles can be coated, oversized to provide additional thickness as a corrosion allowance, and/or provided with a cathodic protection system.

Slope Flattening

The existing landside slope of the levee is steep and requires flattening to meet appropriate slope stability and levee geometry requirements. The waterside slope would be trimmed and reshaped to a 2.5:1 slope the full length of the site (pending USACE approval based on engineering analysis to support a slope steeper than 3:1). The landside toe would remain at the same point.

Construction Details

Demolition and Vegetation Pruning and Removal

The first phase of construction would consist of road demolition and clearing, grubbing, and stripping the levee surface. The roadway on the levee crown, Rivercrest Drive, would be dismantled before starting levee degradation. Asphalt debris from road demolition work would be hauled off site to an appropriate disposal location.

Demolition and vegetation removal would be performed for levee improvement construction. Clearing activities would consist of removing the larger vegetation like trees and shrubs. Grubbing activities would consist of removing roots and stripping activities would consist of excavating approximately a foot of organic material from the levee surface. Approximately 37 trees on the waterside of the levee would be removed because they fall within the construction disturbance footprint. It has been determined that the remaining waterside trees outside the disturbance footprint are not within the theoretical levee prism or vegetation-free zone and are therefore not proposed for removal. Approximately 11,000 cubic yards of material would be excavated and hauled off site to an appropriate disposal location during the clearing and grubbing phase of construction.

Materials Reuse and Importation

Materials imported to the project site would include water, cement, incidental construction support materials, aggregate base rock, asphalt, sheet pile walls, hydroseed, and about 55,000 cubic yards of new embankment fill material to replace poor quality levee material. Embankment fill material excavated to construct levee improvements would be evaluated to determine if it is suitable for reuse. Any of the embankment fill material deemed suitable for reuse would be used to rebuild the levee. Embankment fill material of poor quality would be hauled off site to a permitted disposal site.

Temporary Facilities and Access Provisions

To facilitate project construction, earthen ramps would be improved to allow equipment access between the levee crown and staging area. Temporary construction easements may be required to lawfully secure access to the areas affected by construction. Riverbank Road, Fountain Road, and a small length of River Crest Road would be closed during construction.

Protection of Biological Resources

The protection of biological resources for the Rivers Alternative B would be the same as those described for Rivers APA above.

Utility Modifications

There are several utilities within the levee prism, including water, electricity, telephone, gas, and sanitary sewer lines; a storm drain; and two utility holes. According to CVFPB requirements, utilities are not allowed within the official level prism (defined by a 20-foot width along the crown and 3:1 slope ratio landside and waterside). The top portion of a levee that falls outside the official levee prism is called freeboard. Utilities are allowed to be placed within the freeboard portion of a levee. Currently, utilities are placed within the levee prism and must be relocated. All of the existing utilities within The Rivers project area may be relocated and would be temporarily out of service during relocation activities.

Road Reconstruction

After levee improvements are completed, road reconstruction would occur at Rivercrest Drive. An aggregate base course would be installed and compacted. Lastly, asphalt would be added and compacted within the new road alignment.

Construction Schedule

The goal of the project is to complete The Rivers EIP improvements in 2011. The project is expected to be completed within 57 days. All flood improvement construction and staging would take place during the typical construction season (April 15 to November 1). Table 2-10 shows specific durations and equipment required for each phase of construction.

Constraints, which may include contract award delays due to permitting, early season rain, the presence of nesting raptors, and equipment shortages, have the potential to suspend the construction of the project before the start of the flood season (November 1) in 2011. The Rivers Alternative B construction contract would allow the contractor to construct on a 24/7 work schedule to complete the construction of the improvements before the flood season in order to manage the risk of delay due to the constraints described above. The construction schedule described in the section below lists both the standard 10-hour-per-day/5-days-per-week work schedule and the 24/7 condensed work schedule. Either of these schedules may be used for the project.

Table 2-10. The Rivers Alternative B: Construction Options

Phase of flood improvements construction	Required Equipment	Standard Duration (Days)	24/7 Duration (Days)
Mobilization	N/A	4	1.7
Roadway demolition	Dump trucks, loaders, bulldozers, and an excavator	2	0.8
Clearing and grubbing	A bulldozer, dump trucks, and an excavator	6	2.5
Slope flattening	A bulldozer, dump trucks, and an excavator	23	9.6
Sheet pile wall	A long bed truck, cranes, and an impact hammer	18	7.5
Roadway reconstruction	Dump trucks, skip loader, water truck, motor grader, sheepsfoot compactor, distributor, asphalt paver, pneumatic paver, and roller compactor	2	0.8
Demobilization	N/A	2	0.8
Total Days:		**57**	**23.7**

Source: Nordvik pers. comm.

Residents within the Immediate Vicinity of Construction

There are approximately 30 to 40 residences in the vicinity of the construction area. During some periods of time, construction activities would be directly adjacent to their homes. In addition, the proposed utility modifications would result in the temporary disruption of service (water, communications, electricity, gas, and sanitary sewer) during construction. Disruptions in service would be up to four hours per episode for electrical, communications, and gas and up to eight hours per episode for water and sanitary sewer. Access by auto and by foot will be maintained, subject to detour and periodic closure (less than four hours). WSAFCA would provide assistance for residents to relocate during construction activities and provide compensation to residents for reasonable rent and living expenses incurred due to relocation. In accordance with the Uniform Relocation Assistance and Real Property Acquisition Act, residents would be provided with decent, safe, and sanitary housing. In addition, WSAFCA would provide onsite security to ensure the protection of the resident's homes and contents during relocation.

Post-Construction Riparian Mitigation

Post-construction riparian mitigation activities for the Rivers Alternative B would be the same as those described for Rivers APA above.

Post-Construction Operation and Maintenance

After construction of the sheet pile wall and slope flattening, the staging areas and levee slopes would be hydroseeded for erosion protection and to prevent colonization of exotic vegetation.

The only permanent facility would be the improved levee, subject to typical O&M as described under the CHP Academy APA above.

2.6.4 The Rivers Recreation Improvements

As stated earlier in this chapter, the trails would be designed in compliance with USACE and CVFPB standards. The recreation improvements proposed at The Rivers EIP are listed below:

- a paved bicycle/pedestrian levee crown trail;
- landside levee embankment ramps adjacent to Todhunter Avenue and the DWR maintenance facility;
- a paved pedestrian trail meandering parallel to the levee crown trail, leading to one landing near the river;
- a semi-circular paved landing;
- updated access controls along levee crown pathway (fencing, bollards, or turnstiles); and
- interpretive and safety signage.

The recreation improvements components are described in greater detail below.

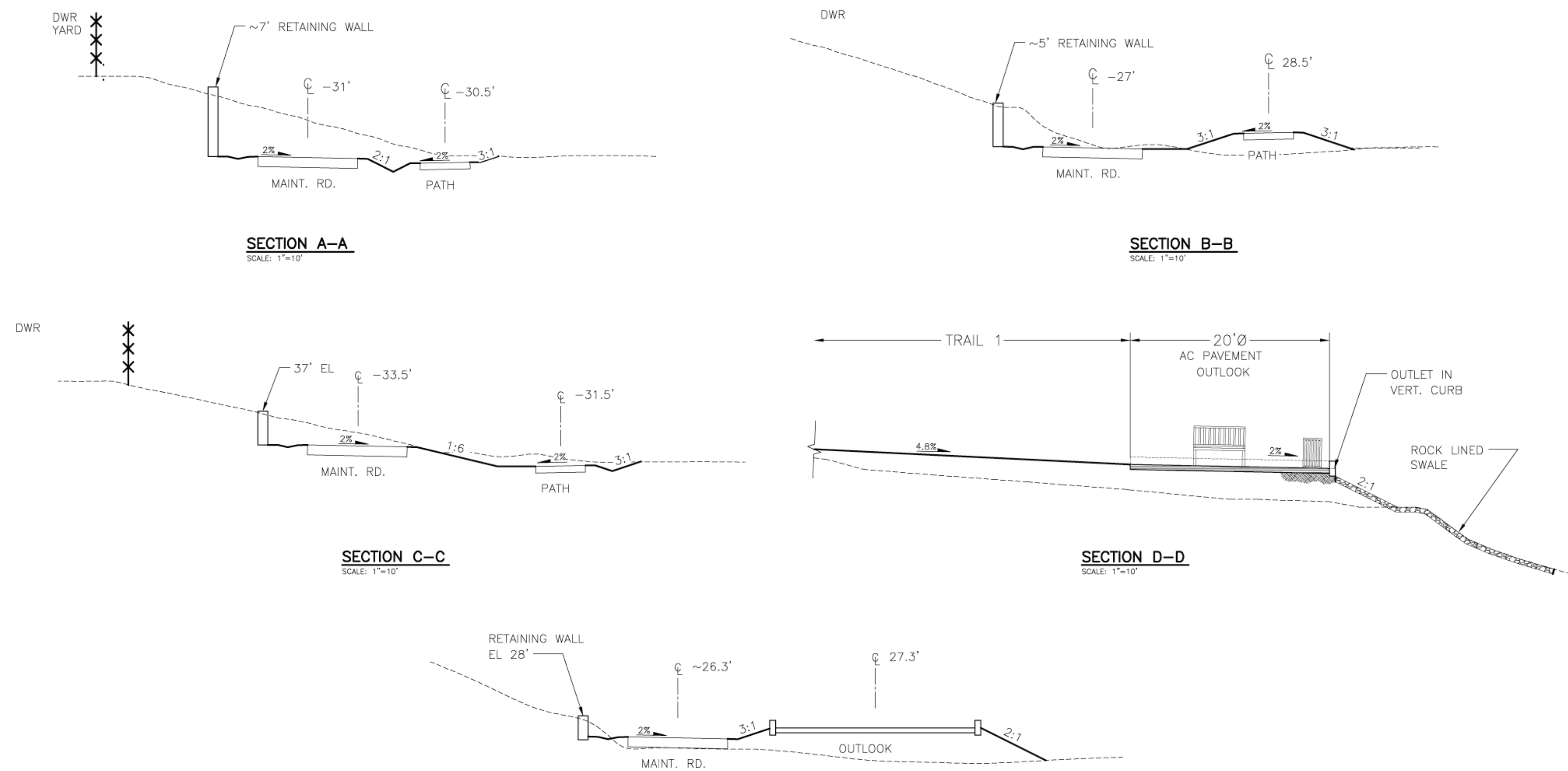
2.6.4.1 Paved Bicycle Trail and Levee Embankment Ramps

- The alignment of the levee crown bicycle/pedestrian trail is proposed atop the existing aggregate base access road that is currently used for flood control maintenance and operations.
- The paved bicycle/pedestrian path would be a minimum of 12 feet wide with a 2-foot-wide compacted aggregate base shoulder on either side of the trail to match the grade. Asphalt within the paved section would be 2 to 8 inches thick with a 4- to 8-inch thick base.
- Ramp construction would involve grading to provide a smooth transition between the bike trail and the connecting trail or roadway, at a slope in compliance with the Americans with Disabilities Act (ADA) and implementing regulations.
- A retaining wall may be necessary and is proposed to maintain existing slope while accommodating the trail per ADA compliance near the western edge of the project. The wall would be modular pre-cast concrete block (i.e., gravity type) and vary in exposed height from 2 to 7 feet by 140 linear feet.

See Figure 2-9 for conceptual cross sections of the trail.

2.6.4.2 Paved Pedestrian Trail

- The paved pedestrian paths would be 6 feet wide with a 2-foot- wide compacted aggregate base shoulder on either side of the trail to match the grade. Asphalt within the paved section would be 2 to 8 inches thick with a 4- to 8-inch thick base.
- The design of recreation improvements would be such that there would be no direct effects on elderberry shrubs, all improvements would occur above the ordinary high water mark (OHWM), and no more than 0.5 acre of riparian vegetation would be affected during the improvement construction.



Source: HDR Engineering

Figure 2-9
Trail Details for The Rivers

2.6.4.3 Access and Signage

- Permanent safety signs would be installed at select trail access points and at periodic intervals along the trails to inform users that the trail serves as a levee maintenance road and to instruct them to watch for patrolling vehicles. These signs would also inform users that portions of the trail are subject to flooding and that trail damage and related safety hazards could occur during the flooding season. Two interpretive signs describing the geographic and biological significance of the site would be installed along the trail.

2.6.4.4 Semicircular Paved Landing

- A paved landing, semi-circular in shape with a 20-foot diameter, would be located on the western end of the site along the waterside berm. The landing would provide an open view of the river and act as the terminus of the paved pedestrian pathway. The landing would include manufactured benches and trash receptacles.

See Figure 2-10 for a detail of the landing.

2.6.4.5 Construction Details

Construction staging and parking would be limited to the same areas designed for flood improvement staging. Construction of the bicycle/pedestrian trails would consist of compacting, paving, and striping the existing graded levee top. These effects are described in Chapter 5. Grasses and other native vegetation approved by USACE and CVFCB would be planted after project construction to stabilize soils and reduce runoff from temporary disturbance areas. All recreation improvement construction and staging that affects the performance and operation of the levee would take place during the typical construction season (April 15 to November 1). Recreation improvement construction is expected to be completed within 30 days.

Table 2-11 lists phases of construction and types of construction equipment that may be used to construct the proposed recreation improvements.

Table 2-11. The Rivers EIP Recreation Improvements

Phase of recreation improvement construction	Required Equipment	Standard Duration (Days)
Mobilization	N/A	2
Clearing and pruning	Scraper, wheel loader, motor grader, dump truck, steel wheel loader, and water truck	5
Grading	Scraper, wheel loader, motor grader, dump truck, steel wheel loader, and water truck	8
Install pathways and landing	Dump truck, asphalt paver, asphalt sealer, striping truck, small front loader, skid steer loader and small roller	12
Install levee embankment ramp	Bulldozers, dump truck, compactor, maintainer, asphalt paver, asphalt sealer, striping truck, small front loader, skid steer loader and small roller	
Demobilization	N/A	3
Total Days:		**30**

2.6.4.6 Operation and Maintenance

The bikeway and all related facilities would be maintained by the City. The City would be responsible for checking trails and conducting trail repairs at the end of the flooding season and as needed. Maintenance of the bike trail would include sweeping, pavement repair, removal of obstacles, mowing and trimming, periodic asphalt overlays, and repair of associated facilities.

2.6.5 Environmental Commitments for The Rivers EIP

As described and detailed in Section 2.7, environmental commitments are measures incorporated as part of the project description, meaning they are proposed as elements of the proposed action and are to be considered in conducting the environmental analysis and determining effects and findings. WSAFCA would implement the environmental commitments described in Section 2.7 as part of The Rivers EIP. They are to be incorporated as part of any adopted project and tracked along with any mitigation triggered by a finding of significance to ensure implementation.

2.7 Environmental Commitments

Environmental commitments are measures incorporated as part of the project description, meaning they are proposed as elements of the proposed action and are to be considered in conducting the environmental analysis and determining effects and findings. The purpose of environmental commitments is to reflect and incorporate best practices into the project that avoid, minimize, or offset potential environmental effects. *Note: The term* mitigation *is specifically applied in this EIS/EIR only to designate measures required to reduce environmental effects triggering a finding of significance.* These best practices tend to be relatively standardized and compulsory; they represent sound and proven methods to reduce the potential effects of an action. The rationale behind including environmental commitments is that the project proponent commits to undertake and implement these measures as part of the project in advance of effect findings and determinations in good faith to improve the quality and integrity of the project, streamline the environmental analysis, and demonstrate responsiveness and sensitivity to environmental quality. Environmental commitments apply to each and all improvements other than the No Action Alternative.

To avoid and minimize construction-related effects, WSAFCA would implement the following environmental commitments to reduce or offset short-term, construction-related effects. Measures have been developed for each of the topics below, to be applied to both the CHP Academy and The Rivers EIPs resource analyses.

2.7.1 Raptors

For construction between March 1 and August 1, WSAFCA will perform preconstruction surveys to determine whether raptors are nesting or roosting at or adjacent to staging or construction areas. In the event nesting or roosting raptors are identified, WSAFCA will coordinate with DFG to identify measures to ensure raptors are not adversely affected. These measures may include implementation of suitable buffers and phasing of construction.

Source: HDR Engineering

Figure 2-10
Paved Landing Details for The Rivers

2.7.2 USACE Levee Vegetation Guidance

In complying with the USACE levee vegetation guidance, WSAFCA will, to the greatest extent possible, avoid and minimize the removal of vegetation that provides habitat for endangered species. Where conflicts may arise between the USACE levee vegetation guidance and compliance with the City's policies to protect trees and riparian vegetation, coordination between the appropriate parties will be conducted to discuss a mutually agreeable approach to achieve compliance, and/or to decide to pursue a variance from the USACE.

2.7.3 Protected Trees and Riparian Trees

WSAFCA will comply with the City's Tree Preservation Ordinance requirements and will implement the following measures.

- Protect heritage trees that occur in the vicinity of the project site and outside the construction area by installing protective fencing. Protective fencing will be installed along the edge of the construction area (including temporary and permanent access roads) where construction will occur within 20 feet of the dripline of an oak or native tree 6 inches or more in diameter at 4.5 feet above the ground (as determined by a qualified biologist or arborist).
- Provide signs along the protective fencing at a maximum spacing of one sign per 100 feet of fencing stating that the area is environmentally sensitive and that no construction or other operations may occur beyond the fencing.
- Retain a certified arborist to perform any necessary pruning of oak or native trees along the construction area, in accordance with International Society of Arboriculture standards.
- Prepare tree and riparian habitat mitigation and monitoring plans. Potential mitigation areas will be evaluated by a qualified restoration ecologist, biologist, or certified arborist to determine their suitability to support the target native tree species.

2.7.4 Invasive Plant Species Prevention

WSAFCA or its contractors will implement one or more of the following actions to avoid and minimize the spread or introduction of invasive plant species. In addition, WSAFCA will coordinate with the Yolo County Agricultural Commissioner to ensure that the appropriate BMPs are implemented for the duration of the construction of proposed projects.

- Clean construction equipment and vehicles in a designated wash area prior to entering and exiting the project site.
- Educate construction supervisors and managers about the importance of controlling and preventing the spread of invasive plant infestations.
- Treat small, isolated infestations with eradication methods that have been approved by or developed in conjunction with the Yolo County Agricultural Commissioner to prevent and/or destroy viable plant parts or seeds.
- Minimize surface disturbance to the greatest extent feasible to complete the work.
- Use native, non-invasive species or non-persistent hybrids in erosion-control plantings to stabilize site conditions and prevent invasive plant species from colonizing.

- Use erosion control materials that are weed-free or contain less than 1% weed seed.
- One year after construction, conduct a monitoring visit to ensure that no new occurrences have established.

2.7.5 Stormwater Pollution Prevention Plan

Because ground disturbance for each project would be greater than 1 acre, WSAFCA will obtain coverage under the U.S. Environmental Protection Agency's (EPA's) National Pollutant Discharge Elimination System (NPDES) general construction activity stormwater permit. The Central Valley RWQCB administers the NPDES storm water permit program in Yolo County. Obtaining coverage under the NPDES general construction activity permit generally requires that the project applicant prepare a SWPPP that describes the best management practices (BMPs) that will be implemented to control accelerated erosion, sedimentation, and other pollutants during and after project construction. The SWPPP will be prepared prior to commencing earth-moving construction activities.

The specific BMPs that will be incorporated into the erosion and sediment control plan and SWPPP will be site-specific and will be prepared by the construction contractor in accordance with the California RWQCB Field Manual. However, the plan likely will include, but not be limited to, one or more of the following standard erosion and sediment control BMPs.

- **Timing of construction**. The construction contractor will conduct all construction activities during the typical construction season to avoid ground disturbance during the rainy season.
- **Staging of construction equipment and materials**. To the extent possible, equipment and materials will be staged in areas that have already been disturbed.
- **Minimize soil and vegetation disturbance**. The construction contractor will minimize ground disturbance and the disturbance/destruction of existing vegetation. This will be accomplished in part through the establishment of designated equipment staging areas, ingress and egress corridors, and equipment exclusion zones prior to the commencement of any grading operations.
- **Stabilize grading spoils**. Grading spoils generated during the construction will be temporarily stockpiled in staging areas. Silt fences, fiber rolls, or similar devices will be installed around the base of the temporary stockpiles to intercept runoff and sediment during storm events. If necessary, temporary stockpiles may be covered with an appropriate geotextile to increase protection from wind and water erosion.
- **Install sediment barriers**. The construction contractor may install silt fences, fiber rolls, or similar devices to prevent sediment-laden runoff from leaving the construction area.
- **Stormwater drain inlet protection**. The construction contractor may install silt fences, drop inlet sediment traps, sandbag barriers, and/or other similar devices.
- **Permanent site stabilization**. The construction contractor will install structural and vegetative methods to permanently stabilize all graded or otherwise disturbed areas once construction is complete. Structural methods may include the installation of biodegradable fiber rolls and erosion control blankets. Vegetative methods may involve the application of organic mulch and tackifier and/or the application of an erosion control seed mix. Implementation of a SWPPP will

substantially minimize the potential for project-related erosion and associated adverse effects on water quality.

2.7.6 Temporary Visual Barriers between Construction Zones and Residences

WSAFCA or the contractor will install fencing (such as chain link with slats or fencing made of windscreen material) or other structures where determined appropriate to obstruct undesirable views of construction activities from residences' backyards and front yards that abut the project sites. The fencing will be approximately 7 feet high to help maintain the privacy of residents.

2.7.7 Noise-Reducing Construction Practices

WSAFCA will require the construction contractor to follow noise-reducing construction practices such that noise from construction does not exceed applicable City noise ordinance limits or, at a minimum, implements measures to reduce noise to acceptable levels. Measures that can be used to limit noise may include but are not limited to the following actions:

- locating equipment as far as practical from noise-sensitive uses,
- using sound control devices such as mufflers on equipment,
- using equipment that is quieter than standard equipment,
- using noise-reducing enclosures around noise-generating equipment, and
- provide for temporary relocation if noise will exceed acceptable levels for an extended duration (as discussed below).

2.7.8 Property Acquisition Compensation for Loss of Business, and Temporary Resident Relocation Plan

Several of the improvements proposed may require land acquisition and may require removal of residences to accommodate the expanded footprint of the levee system. Permanent land acquisition may be necessary for implementation of adjacent levee raises, full levee raises, relief wells, seepage berms, slope flattening, stability berms, and setback levees. In addition, sufficient land will need to be acquired to establish an appropriate maintenance corridor at the landside toes of all improved levees. Permanent acquisition, relocation, and compensation services will be conducted in compliance with Federal and state relocation laws, which are the Uniform Act of 1970 (42 USC 4601 *et seq.)* and implementing regulation, 49 CFR Part 24; and California Government Code Section 7267 *et seq.* These laws require that appropriate compensation be provided to displaced landowners and tenants, and that residents be relocated to comparable replacement housing.

In some cases, construction of levee improvements may result in temporary disruption of utilities (water, telephone, electricity, gas, and sanitary sewer) or loss of vehicle or pedestrian access could occur for durations too lengthy for convenient day-to-day living and/or construction-related noise may occur outside City ordinance limits. During some periods of time, construction activities may be directly adjacent to homes. In these cases, WSAFCA will provide assistance for residents to temporarily relocate during construction activities and provide compensation to residents for reasonable rent and living expenses incurred due to relocation. WSAFCA will develop a Temporary

Resident Relocation Plan to guide temporary relocation services and compensation. The Temporary Resident Relocation Plan will, at a minimum, serve the following functions:

- outline the process for providing notice of relocation,
- provide guidelines for relocation services and compensation,
- ensure that 24-hour security for vacated homes is provided,
- provide for temporary occasional access of vacated homes by residents (for long-duration construction periods, and
- ensure all compensation and relocation activities are conducted in compliance with Federal and state relocation laws, which are identified above.

2.7.9 Traffic Control and Road Maintenance Plan

WSAFCA, in coordination with relevant City and county public works departments, will develop and implement traffic control plan(s) for the proposed project.

A traffic control plan describes the methods of traffic control to be used during construction. All on-street construction traffic will be required to comply with the local jurisdiction's standard construction specifications. The plan will reduce the effects of construction on the roadway system in the project area throughout the construction period. Construction contractors will follow the standard construction specifications of affected jurisdictions and obtain the appropriate encroachment permits, if required. The conditions of the encroachment permit will be incorporated into the construction contract and will be enforced by the agency that issues the encroachment permit.

Road closures may be of varying duration, measured in hourly periods or up to several weeks in some instances. Proposed lane closures during the a.m. and p.m. commuting hours will be coordinated with the appropriate jurisdiction and minimized during the morning and evening peak traffic periods. Commuters will be notified of the construction schedule to help avoid potential disruptions. Standard construction specifications also typically limit lane closures during commuting hours. Lane closures will be kept as short as possible and detour signage, if detours are available, will be posted around construction sites. Advance notice signs of upcoming construction activities will be posted at least 1 week in advance so that road and rail users are able to avoid traveling through the construction area during these times or at least aware of inconveniences.

Safe pedestrian and bicyclist access, if any exists on the current roadway, will be maintained in or around the construction areas at all times. Construction areas will be secured as required by the applicable jurisdiction to prevent pedestrians and bicyclists from entering the work site, and all stationary equipment will be located as far away as possible from areas where bicyclists and pedestrians are present. WSAFCA will notify and consult with emergency service providers to maintain emergency access and facilitate the passage of emergency vehicles on city streets.

WSAFCA will provide adequate parking for construction trucks, equipment, and construction workers within the designated staging areas throughout the construction period. If inadequate space for parking is available at a given work site, WSAFCA will provide an off-site staging area and, as needed, coordinate the daily transport of construction vehicles, equipment, and personnel to and from the work site.

WSAFCA will also coordinate with the Washington Unified School District during the development of the traffic control plan to ensure that adequate staff parking, student pickup and drop-off areas, and emergency services access routes are available at Riverbank Elementary School during construction.

The traffic control plan will also include the information listed below.

- A street layout showing the location of construction activity and surrounding streets to be used as detour routes, including special signage.
- A tentative start date and construction duration period for each phase of construction.
- The name, address, and emergency contact number for those responsible for maintaining the traffic control devices during the course of construction.

Additionally, the traffic control plan will include the stipulations listed below.

- Access for driveways and private roads will be maintained, except for brief periods of construction, in which case property owners will be notified.
- Traffic controls may include flag persons wearing Occupational Safety and Health Administration-approved vests and using a Stop/Slow paddle to warn motorists of construction activity.
- Access to transit services will be maintained and public transit vehicles will be detoured.
- Contractors will be informed in writing of appropriate routes to and from construction sites, and weight and speed limits for local roads used to access construction sites. All such written notifications will be submitted to the City of West Sacramento Planning Department.

WSAFCA will assess damage to roadways used during construction and will repair all potholes, fractures, or other damages.

2.7.10 Coordination to Ensure Minimal Overlap in Disturbances to Traffic during Construction

WSAFCA will coordinate with the City prior to starting any construction activities to determine if any other projects would disrupt traffic or require detours affecting the same roads. If so, WSAFCA will modify haul routes, timing, or otherwise work with the City and other project proponents to minimize cumulative disruptions to roadways.

2.7.11 Coordination of Construction Periods with Railroad Service Officials

WSAFCA will coordinate directly with railroad officials, including Union Pacific Railroad, Amtrak, Sierra Northern Railway, and Burlington Northern Santa Fe, regarding the timing of temporary railroad closures and/or removals as necessary during project implementation. WSAFCA will ensure minimization of any disruption to service by utilizing the most recent and available construction methods to expedite activities. Because the temporary loss of service along some railroads could result in financial loss for various companies that use the rail lines, WSAFCA will ensure that the appropriate entities are compensated for monetary losses attributed to the reduction in rail service.

2.7.12 Coordination of Construction Periods with CHP

WSAFCA will coordinate directly with CHP regarding the timing and nature of construction activities near the CHP Academy in order to achieve the following objectives:

- ensure training and other activities are not affected by construction, and
- ensure safety and security is not compromised in any way,

2.7.13 Notification of Construction Area Closure

WSAFCA will ensure that the contractor posts notice of construction activities and intended days of construction area closure at least 30 days in advance of closures in and near formal recreation facilities. The contractor will post notice of construction activities and closures at least 10 days in advance in all other areas. Notice should be posted adjacent to access roads, and signs will be at least 3 square feet in size and provide a contact for questions regarding project construction. WSAFCA also will ensure that the construction area is fenced off to keep members of the public out of harm's way.

2.7.14 Bentonite Slurry Spill Contingency Plan (Frac-Out Plan)

Before excavation begins, WSAFCA will ensure the contractor will prepare and implement a bentonite slurry spill contingency plan (BSSCP) for any excavation activities that use pressurized fluids (other than water). If the contactor prepares the plan, it will be subject to approval by USACE, NMFS, and WSAFCA before excavation can begin. The BSSCP will include measures intended to minimize the potential for a frac-out (short for "fracture-out event") associated with excavation and tunneling activities; provide for the timely detection of frac-outs; and ensure an organized, timely, and "minimum-effect" response in the event of a frac-out and release of excavation fluid (i.e., bentonite). The BSSCP will require, at a minimum, the following measures.

- If a frac-out is identified, all work will stop, including the recycling of the bentonite fluid. In the event of a frac-out into water, the location and extent of the frac-out will be determined, and the frac-out will be monitored for 4 hours to determine whether the fluid congeals (bentonite will usually harden, effectively sealing the frac-out location).
- NMFS, DFG, and the RWQCB will be notified immediately of any spills and will be consulted regarding clean-up procedures. A Brady barrel will be on site and used if a frac-out occurs. Containment materials, such as straw bales, also will be on site prior to and during all operations and a vacuum truck will be on retainer and available to be operational on site within notice of 2 hours. The site supervisor will take any necessary follow-up response actions in coordination with agency representatives. The site supervisor will coordinate the mobilization of equipment stored at staging areas (e.g., vacuum trucks) as needed.
- If the frac-out has reached the surface, any material contaminated with bentonite will be removed by hand to a depth of 1-foot, contained, and properly disposed of, as required by law. The drilling contractor will be responsible for ensuring that the bentonite is either properly disposed of at an approved Class II disposal facility or properly recycled in an approved manner.
- If the bentonite fluid congeals, no other actions, such as disturbance of the streambed, will be taken that will potentially suspend sediments in the water column.

- The site supervisor has overall responsibility for implementing this BSSCP. The site supervisor will be notified immediately when a frac-out is detected. The site supervisor will be responsible for ensuring that the biological monitor is aware of the frac-out, coordinating personnel, response, cleanup, regulatory agency notification and coordination to ensure proper clean-up, disposal of recovered material, and timely reporting of the incident. The site supervisor will ensure all waste materials are properly containerized, labeled, and removed from the site to an approved Class II disposal facility by personnel experienced in the removal, transport, and disposal of drilling mud.
- The site supervisor will be familiar with the contents of this BSSCP and the conditions of approval under which the activity is permitted to take place. The site supervisor will have the authority to stop work and commit the resources (personnel and equipment) necessary to implement this plan. The site supervisor will ensure that a copy of this plan is available (on site) and accessible to all construction personnel. The site supervisor will ensure that all workers are properly trained and familiar with the necessary procedures for response to a frac-out, prior to commencement of excavation operations.

2.7.15 Spill Prevention, Control, and Counter-Measure Plan

A spill prevention, control, and counter-measure plan (SPCCP) is intended to prevent any discharge of oil into navigable water or adjoining shorelines. WSAFCA or its contractor will develop and implement an SPCCP to minimize the potential for and effects from spills of hazardous, toxic, or petroleum substances during construction and operation activities. The SPCCP will be completed before any construction activities begin. Implementation of this measure will comply with state and Federal water quality regulations. The SPCCP will describe spill sources and spill pathways in addition to the actions that will be taken in the event of a spill (e.g., an oil spill from engine refueling will be immediately cleaned up with oil absorbents). The SPCCP will outline descriptions of containments facilities and practices such as doubled-walled tanks, containment berms, emergency shut-offs, drip pans, fueling procedures and spill response kits. It will also describe how and when employees are trained in proper handling procedure and spill prevention and response procedures.

WSAFCA will review and approve the SPCCP before onset of construction activities and routinely inspect the construction area to verify that the measures specified in the SPCCP are properly implemented and maintained. WSAFCA will notify its contractors immediately if there is a non-compliance issue and will require compliance.

The Federal reportable spill quantity for petroleum products, as defined in 40 CFR 110, is any oil spill that:

- violates applicable water quality standards,
- causes a film or sheen on or discoloration of the water surface or adjoining shoreline, or
- causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.

If a spill is reportable, the contractor's superintendent will notify WSAFCA, and WSAFCA will take action to contact the appropriate safety and cleanup crews to ensure that the SPCCP is followed. A written description of reportable releases must be submitted to the Central Valley RWQCB. This submittal must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases will be documented on a spill report form.

2.7.16 Implementation of Measures to Maintain Surface Water Quality and Groundwater Quality

If an appreciable spill has occurred and results determine that project activities have adversely affected surface or groundwater quality, a detailed analysis will be performed by a registered environmental assessor or professional engineer to identify the likely cause of contamination. This analysis will conform to American Society for Testing and Materials (ASTM) standards and will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, the WSAFCA and its contractors will select and implement measures to control contamination, with a performance standard that surface water quality and groundwater quality must be returned to baseline conditions.

2.7.17 Monitoring of Turbidity in Adjacent Water Bodies

WSAFCA or its contractor will monitor turbidity in the adjacent water bodies, where applicable criteria apply, to determine whether turbidity is being affected by construction and ensure that construction does not affect turbidity levels, which ultimately increase the sedimentation loads.

The Basin Plan contains turbidity objectives for the Sacramento River. Specifically, the plan states that where natural turbidity is between 5 and 50 Nephelometric turbidity units (NTUs), turbidity levels may not be elevated by 20% above ambient conditions. Where ambient conditions are between 50 and 100 NTUs, conditions may not be increased by more than 10 NTUs.

WSAFCA or its contractor will monitor ambient turbidity conditions upstream during construction. Monitoring will continue approximately 200 feet downstream of construction activities to determine whether turbidity is being affected by construction. Grab samples will be collected at a downstream location that is representative of the flow near the construction site. If there is a visible sediment plume being created from construction, the sample should represent this plume. Monitoring should occur hourly when construction encroaches into the Sacramento River. If construction does not encroach into the river, the monitoring should occur once a week on a random basis.

If turbidity limits exceed Basin Plan standards, construction-related earth-disturbing activities will slow to a point that results in alleviating the problem. WSAFCA will notify the Central Valley RWQCB of the issue and provide an explanation of the cause.

2.7.18 Soil Supply Protection Measures

WSAFCA's first choice for fill or borrow material will be from a local commercial quarry or other permitted source. In the event that material is desired from a source that is not presently permitted, for reasons such as quality, proximity, or volume available, WSAFCA will implement soil supply protection measures.

- One such measure will be maximizing on-site use through gradation, placement, and treatment.
- Another measure will be the preservation and replacement of topsoil at borrow sites, so that they could be continued to be used for their current use or otherwise returned to their pre-

project condition. As part of borrow operations, the upper 12 inches of topsoil would be set aside and replaced after project construction in each construction season. After the project is completed, the borrow site would be re-contoured and reclaimed.

- If potential borrow sites are identified within a 10,000-foot Airport Critical Zone, management of the grasslands created by borrow operations would be consistent with the Airport's *Wildlife Hazard Management Plan* (Sacramento County Airport System 2007).
- An additional measure would be independent environmental documentation and regulatory compliance, as required. Specific regulations related to soil resources are detailed in Section 3.3.2.1.

2.7.19 Notification of Excavation or Dewatering near Groundwater Plume

To ensure coordination with remediation efforts for a known plume of groundwater contamination in The Rivers EIP project area, WSAFCA or its contractor will notify DWR's project manager, Brent Lamkin (brentl@water.ca.gov or 916.323.8925), 14 days prior to excavation or dewatering activities in the area near the groundwater plume. The location of the plume is documented in this document in Section 4.2, page 4.2-16, and Figure 4.2-1.

Chapter 3

CHP Academy EIP: Affected Environment and Environmental Consequences

This chapter provides the affected environment and environmental consequences for the CHP Academy EIP. The baseline environmental conditions assumed in the preparation of this chapter consist of the existing physical environment as of January 28, 2009, when WSAFCA published the Notice of Preparation (NOP) to prepare an EIR with the State Clearinghouse. USACE published a Notice of Intent (NOI) to prepare an EIS in the *Federal Register* on January 27, 2009. The chapter contents are listed below.

- Section 3.1 Flood Control and Geomorphic Conditions
- Section 3.2 Water Quality and Groundwater Resources
- Section 3.3 Geology, Seismicity, Soils, and Mineral Resources
- Section 3.4 Transportation and Navigation
- Section 3.5 Air Quality and Climate Change
- Section 3.6 Noise
- Section 3.7 Vegetation and Wetlands
- Section 3.8 Fisheries and Aquatic Resources
- Section 3.9 Wildlife
- Section 3.10 Land Use and Agriculture
- Section 3.11 Socioeconomic and Community Effects
- Section 3.12 Environmental Justice
- Section 3.13 Visual Resources
- Section 3.14 Recreation
- Section 3.15 Utilities and Public Services
- Section 3.16 Public Health and Environmental Hazards
- Section 3.17 Cultural Resources

Section 3.1

Flood Control and Geomorphic Conditions—CHP Academy Early Implementation Project

3.1.1 Introduction

This section describes the affected environment for hydrologic, hydraulic, geomorphic, and flood control conditions, including the regulatory setting associated with these conditions, the effects on flood control and geomorphic conditions that would result from the proposed project, and the mitigation measures that would reduce these effects.

Implications of the CHP Academy EIP for flood control and geomorphic conditions are also addressed under Section 3.2, Water Quality and Groundwater Resources; Section 3.3, Geology, Seismicity, Soils, and Mineral Resources; Section 3.7, Vegetation and Wetlands; and Section 3.8, Fisheries and Aquatics.

The key sources of data and information used in the preparation of this chapter are listed below.

- *Historic Sediment Loads in the Sacramento–San Joaquin Delta*, California Department of Water Resources, October 1994
- *Assessment of Sediment Budget of Sacramento–San Joaquin Delta*, Northwest Hydraulic Consultants, 2003
- *North Delta Sedimentation Study,* Northwest Hydraulic Consultants, prepared for California Department of Water Resources, March 2006
- *Surficial Geologic Mapping and Geomorphic Assessment*, California Department of Water Resources Urban Levees, West Sacramento, California, William Lettis & Associates, April 2007
- *West Sacramento Levees System: Problem Identification Report, Erosion Assessment and Treatment Alternatives*, Draft for Review, Northwest Hydraulic Consultants, prepared for HDR, Inc./Jones & Stokes, September 2007
- *West Sacramento Levee Evaluation Project, Administrative Draft, Problem Identification Report*, HDR, Inc., prepared for the City of West Sacramento, January 2008
- *West Sacramento Levee Evaluation Program, Administrative Draft, Alternatives Analysis,* HDR, Inc., November 2009
- *Hydraulics Report for the City of West Sacramento* Levee Alternatives Analysis, MBK Engineers, March 28, 2007
- *Evaluating the Effects of the Sacramento River West Levee Setback at Oak Hall Bend,* MBK Engineers, April 18, 2007
- *Summary Report on Hydraulic Impacts of the West Sacramento Levee Improvement Project (Draft),* MBK Engineers, June 22, 2009
- *Hydraulic Impact Analysis of Cumulative Development in Sacramento River Corridor Floodway,* MBK Engineers, June 27, 2005

- *Report on Effects of Projected Sea-Level Change on West Sacramento Levee Improvement Project Design*, MBK Engineers, November 20, 2009

The following document is included as Appendix D of this document.

- *(Draft) Summary Report on Hydraulic Impacts of the West Sacramento Levee Improvement Project*, MBK Engineers, June 22, 2009

3.1.2 Affected Environment

This section describes the affected environment for hydrologic, hydraulic, geomorphic, and flood control issues in the CHP Academy EIP project area, including regulatory and environmental settings.

3.1.2.1 Regulatory Setting

3.1.2.1.1 Federal

The following Federal policies related to hydrologic, hydraulic, geomorphic, and flood control issues may apply to implementation of the CHP Academy EIP.

National Flood Insurance Program

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were intended to reduce the need for large, publicly funded flood control structures and disaster relief by restricting development on floodplains. The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to subsidize flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA issues Flood Insurance Rate Maps (FIRMs) for communities participating in the NFIP. These maps delineate flood hazard zones in the community. These maps are designed for flood insurance purposes only and do not necessarily show all areas subject to flooding. The maps designate lands likely to be inundated during a 100-year storm event and elevations of the base flood. They also depict areas between the limits affected by 100-year and 500-year events and areas of minimal flooding. These maps often are used to establish building pad elevations to protect new development from flooding effects. The locations of FEMA-designated floodplains in the project area are included in the Environmental Setting discussion below.

Requirements for Federal Emergency Management Agency Certification

For guidance on floodplain management and floodplain hazard identification, communities turn to FEMA guidelines, as defined in 44 Code of Federal regulations (CFR) 59 through 77. In order for a levee to be recognized by FEMA under the NFIP, the community must provide evidence demonstrating that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood (1% or 100-year flood) exists. These specific requirements are outlined in 44 CFR 65.10, Mapping of Areas Protected by Levee Systems, and are summarized below.

Levee height. Riverine levees must provide a minimum freeboard (the height of the top of a levee above a given level of water in a river) of 3 feet above the water-surface level of the base flood. An additional 1 foot above the minimum is required within 100 feet of either side of structures (such as bridges) riverward of the levee or wherever the flow is constricted. An additional 0.5 foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, also is required.

Closures. All openings must be provided with closure devices that are structural parts of the system during operation and designed according to sound engineering practice.

Embankment protection. Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability.

Embankment and foundation stability. Engineering analyses that evaluate levee embankment stability must be submitted to FEMA. The analyses provided shall evaluate expected seepage during loading conditions associated with the base flood and shall demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability.

Settlement. Engineering analyses must be submitted that assess the potential and magnitude of future losses of levee height as a result of levee settlement and demonstrate that freeboard will be maintained within the minimum standards.

Interior drainage. An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and, if the average depth is greater than 1 foot, the water-surface elevation(s) of the base flood.

Operation plans. For a levee system to be recognized, a formal plan of operation must be provided to FEMA. All closure devices or mechanical systems for internal drainage, whether manual or automatic, must be operated in accordance with an officially adopted operational manual, a copy of which must be provided to FEMA.

Maintenance plans. For levee systems to be recognized as providing protection from the base flood, they must be maintained in accordance with an officially adopted maintenance plan. All maintenance activities must be under the jurisdiction of a Federal or state agency, an agency created by Federal or state law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance. The plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. At a minimum, maintenance plans must specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.

U.S. Army Corps of Engineers Levee Design Criteria

A majority of the levees included in the West Sacramento basin are federally authorized and fall within the jurisdiction of the U.S. Army Corps of Engineers (USACE). The levee evaluation for the project area conforms to the engineering criteria established by USACE for the assessment and repair of levees. The USACE technical criteria in the following bullet list should be used as guidance unless noted otherwise.

- Overtopping of Flood Control Levees and Floodwalls (Publication ETL 1110-2-299, August 22, 1986)
- Structural Design of Closure Structures for Local Flood Protection Projects (Publication EM 1110-2-2705, March 31, 1994)
- Design of Coastal Revetments, Seawalls, and Bulkheads (Publication EM 1110-2-1614, June 30, 1995)
- Design Guidance on Levees (Publication ETL 1110-2-555, November 30, 1997)
- Conduits, Culverts, and Pipes (Publication EM 1110-2-2902, March 31, 1998)
- Guidelines on Ground Improvement for Structures and Facilities (Publication ETL 1110-1-185, February 1, 1999)
- Engineering and Design for Civil Works Projects (Publication ER 1110-2-1150, August 31, 1999)
- Design and Construction of Levees (Publication EM 1110-2-1913, April 30, 2000)
- Geotechnical Investigations (Publication EM 1110-1-1804, January 1, 2001)
- USACE CESPK Levee Task Force, Recommendations for Seepage Design Criteria, Evaluation and Design Practices (2003)
- Slope Stability (Publication EM 1110-2-1902, October 31, 2003)
- Geotechnical Levee Practice (Publication SOP EDG-03, June 28, 2004)
- Engineering and Design—Design Guidance for Levee Underseepage (Publication ETL 1110-2-569, May 1, 2005)
- Quality Management (Publication ER 1110-1-12, September 30, 2006)
- Engineering Technical Letter (ETL) 1110-2-571 Guidelines For Landscape Planting And Vegetation Management At Levees, Floodwalls, Embankment Dams, and Appurtenant Structures

Sacramento River Flood Control Project Levee Height Requirements

As specified in the Design Memorandum, Volume I of II for the Sacramento River Flood Control Project, California, Mid-Valley Area, Phase III (U.S. Army Corps of Engineers 1996) and the Operation and Maintenance Manual for Channel and Levees, Sacramento River Deep Water Ship Channel Project (U.S. Army Corps of Engineers 1963), the following minimum levee height (freeboard) requirements apply to the various reaches[1].

- Sacramento River Levee: 3 feet
- Sacramento Bypass Levee: 6 feet
- Yolo Bypass Levee: 6 feet
- DWSC Levees, Port North Levee, and Port South Levee: 6 feet for the DWSC where it is adjacent to the Yolo Bypass and 3 feet for the Port (Turning Basin and Barge Canal).

[1] The freeboard requirements listed are for the Sacramento River Flood Control Project, specifically the 1957 profiles for Sacramento River, the Sacramento Bypass, and the Yolo Bypass, and the design elevations in referenced in U.S. Army Corps of Engineers (1963) for the DWSC, Port North, and Port South Levees.

Executive Order 11988 Floodplain Management

Executive Order 11988 addresses floodplain issues related to public safety, conservation, and economics. The order generally requires Federal agencies constructing, permitting, or funding actions meet the following requirements:

- avoid incompatible floodplain development,
- be consistent with the standards and criteria of the NFIP, and
- restore and preserve natural and beneficial floodplain values.

Section 401 of the Clean Water Act and State Regulations in Title 23 California Code of Regulations

This regulation establishes requirements for all dredging activities for navigable waters of the State of California.

Code of Federal Regulations, Title 40, Part 131, Water Quality Standards

This regulation establishes requirements for water quality, including activities related to in-channel construction, dredging, and long-term effects resulting in sediment transport and scouring.

Public Law 84-99 Delta Specific Standard

This Federal law specifies, among other findings, minimum standards to which the rehabilitation and construction of levees in the Delta should be constructed.

Section 408

This Federal law is covered in more detail in Chapter 1, Introduction, and Chapter 6, Compliance with Applicable Laws, Policies, Plans, and Regulatory Framework.

3.1.2.1.2 State

The following state policies related to hydrologic, hydraulic, geomorphic, and flood control issues may apply to implementation of the CHP Academy EIP.

Central Valley Flood Protection Board

The Central Valley Flood Protection Board (CVFPB) (formerly the California Reclamation Board) of the State of California regulates the modification and construction of levees and floodways in the Central Valley defined as part of the Sacramento Valley and San Joaquin Valley flood control projects. Rules promulgated in Title 23 of the California Code of Regulations (CCR) (Title 23, Division 1, Article 8 [Section 111 through 137]) regulate the modification and construction of levees to ensure public safety. The rules state that existing levees may not be excavated or left partially excavated during the flood season, which is generally November 1 through April 15 for the Sacramento River and Sacramento Bypass.

Title 23, CCR §§ 6 and 7 stipulate permitting authority to the Central Valley Flood Protection Board. Section 6(a) outlines the need to obtain a permit from the CVFPB for "Every proposal or plan of work, including the placement, construction, reconstruction, removal, or abandonment of any landscaping, culvert, bridge, conduct fence, projection, fill, embankment, building….that involves cutting into the levee wholly or in part within any area for which there is an adopted plan of flood control, must be approved by the board prior to the commencement of work." Section 7(a) requires that "Prior to submitting an encroachment permit application to the board, the application must be endorsed by the agency responsible for maintenance of levees within the area of the proposed work…."

The following CVFPB guidance has been followed during the levee evaluation:

> The California Reclamation Board has primary jurisdiction approval of levee design and construction. The Reclamation Board standards are found in Title 23, Division 1, Article 8 (Sections 111 through 137) of the California Code of Regulations (CCR), and constitute the primary state standard. Section 120 of the CCR directs that levee design and construction be in accordance with the USACE's Engineer Manual EM 1110-2-1913, Design and Construction of Levees. This document is the primary federal standard applicable to this project, as supplemented by additional prescriptive standards contained in Section 120 of the CCR. These additional standards prescribe minimum levee cross-sectional dimensions, construction material types, and compaction levels.

Delta Protection Act of 1992

This act declares that the basic goals of the state for the Delta are, among other findings, to improve flood protection, and therefore to ensure an increased level of public health and safety, by structural and non-structural means.

Safe, Clean, Reliable Water Supply Act

This act declares that the basic goals of the state for the Delta are, among other findings, to protect the integrity of the state's water supply system from catastrophic failure attributable to earthquakes and flooding.

3.1.2.1.3 Local

The following local policies and agencies related to hydrologic, hydraulic, geomorphic, and flood control issues may apply to implementation of the CHP Academy EIP.

Yolo County

The Health and Safety Element of the 2030 Countywide General Plan for Yolo County (Yolo County 2009) contains goals, policies, and actions aimed at reducing the risk of flooding within the county. Any violation of these goals, policies, and actions would constitute a significant effect.

Goals

GOAL HS-2: Flood Hazards. Protect the public and reduce damage to property from flood hazards.

Policies

Policy HS-2.2: Ensure and enhance the maintenance and integrity of flood control levees.

Policy HS-2.3: Actively update and maintain policies and programs to ensure consistency with state and Federal requirements.

Actions

Action HS-A5: Require a minimum of 100-year flood protection for new construction, and strive to achieve 200-year flood protection for unincorporated communities where such levels of protection are not provided, require new development to adhere to the requirements of state law and the County Flood Damage Prevention Ordinance.

Action HS-A14: Require a minimum 50-foot setback for all permanent improvements from the toe of any flood control levee.

Action HS-A16: Support the efforts of levee maintenance districts with efforts to secure state and federal funding for geotechnical studies of levees and implementation of associated improvements.

Action HS-A17: Encourage flood hazard reduction projects along the Sacramento River to be consistent with the guidelines of the Sacramento River Corridor Floodway Management Plan.

Action HS-A18: Coordinate with local, state, and federal agencies to define existing and potential flood problem areas, including the possible effects associated with global climate change, and to maintain and improve levees and other flood control features.

Action HS-A19: Develop a detailed maintenance and funding plan for levees under County control, to ensure that levee safety is maintained.

Action HS-A20: Support and encourage responsible agencies to site new levees or major rehabilitation of levees at a distance from the river and from existing levees, where feasible. This would provide a degree of redundancy in the system, increase the land available for habitat and flood storage, reduce operation and maintenance costs, and help to ensure the integrity of the structures.

Action HS-A22: Ensure that the upgrade, expansion, or construction of any flood control levee demonstrates that it will not significantly divert flood water or increase flooding.

Action HS-A24: Improve the county's classification within the Federal Emergency Management Agency Community Rating System.

Action HS-A29: Pursuant to Section 8201 of the State Water Code, develop local plans for flood protection, including analysis of financing options to construct and maintain any needed improvements, to address how 100-year floodplain protection for each community may be provided. Those communities that are economically disadvantaged shall have priority in developing flood protection plans. The cities shall be consulted in development of the plans, which shall be consistent with the Central Valley Flood Protection Plan.

City of West Sacramento

The Central Valley Flood Protection Plan (CVFPP) requires 200-year flood protection by the year 2025. The time and effort required to fully evaluate approximately 50 miles of levees, and develop recommended strategies for improvement, and implement those improvements prompted action without further delay. In addition, within its General Plan, the City adopted a goal of achieving 200-year flood protection.

The City of West Sacramento is a member of WSAFCA and has land use authority within WSAFCA's planning area. There is concern regarding structural development on levees and resultant effects on flood management operations and maintenance. To ensure that such development has appropriate land use controls, there are two controls in process by the City. One such control is the updated floodplain management ordinance, which is a substantial and robust revision of an existing ordinance from 1994. The ordinance has two major elements: (1) City review of development proposals within a designated levee protection zone, including and adjacent to the levee corridor, with the explicit purpose of ensuring the proposed development's compatibility with flood protection, and (2) a requirement of adherence to flood-smart building codes in FEMA-designated Special Flood Hazard Areas . This ordinance will be implemented with stronger enforcement measures.

The other such control in process is the update of the City's General Plan. The update will codify land use designations and development policies with consideration of floodplain restrictions and flood operations and management zones (with appropriate compatible uses).

Furthermore, the Health and Safety Section of the City of West Sacramento General Plan, Policy Document (City of West Sacramento 1990) contains goals and policies aimed at reducing the risk of flooding within the county. Any violation of these goals and policies would constitute a significant effect.

Goals

Goal B: To prevent loss of life, injury, and property damage due to flooding.

Policies

Policy 1: The City shall continue to participate in the National Flood Insurance Program. To this end, the City shall ensure that local regulations are in full compliance with standards adopted by the Federal Emergency Management Agency.

Policy 6: Construction of storm drainage improvements shall be required, as appropriate, to prevent flooding during periods of heavy rainfall.

Policy 8: The City shall cooperate with area reclamation districts and other responsible agencies in the maintenance and improvement of levees and drainage channels.

Policy 9: The City shall support state and federal legislation which provides funding for the construction of flood control improvements in urbanized areas.

Policy 10: The City shall discourage uses that promote the erosion or structural deterioration of levees.

West Sacramento Area Flood Control Agency

WSAFCA is proposing the CHP Academy EIP to improve the Sacramento Bypass levee, a levee in Yolo County that protects the city of West Sacramento. WSAFCA is a Joint Powers Authority created in 1994 through a Joint Exercise of Powers Agreement by the City, Reclamation District (RD) 900, and RD 537. WSAFCA was established to coordinate the planning and construction of flood protection facilities and to finance the local share of flood control projects. WSAFCA is responsible for the operations and maintenance of the detention basins, pump stations, and levees that protect the city.

WSAFCA Freeboard Requirements for West Sacramento Levee System

WSAFCA has no minimum freeboard requirements. Because the intent of the CHP Academy EIP is to meet Corps levee design requirements and to provide protection for the 200-year flood event, WSAFCA uses the minimum freeboard requirements set forth by USACE.

3.1.2.2 Environmental Setting

This section discusses the environmental setting related to hydrologic, hydraulic, geomorphic, and flood control issues in the CHP Academy EIP project area (Figure 3.1-1). For more detailed information about this resource, including climate, regional hydrology and geomorphic conditions, levee stability and levee height evaluations, see Appendix D, West Sacramento Levee System Environmental Setting and Summary of Study Results.

The CHP Academy project area incorporates the entire 6,500 feet of the southern Sacramento Bypass Levee. The project area exhibits through-seepage and geometry deficiencies. Under-seepage and stability deficiencies are also present in smaller pockets over the site.

3.1.2.2.1 Regional Hydrology

The Sacramento River drainage basin upstream of the American River confluence encompasses approximately 23,500 square miles. The monthly minimum, average, and maximum mean daily flows on the Sacramento River near Verona (upstream of the American River) and at Freeport (downstream of the American River) are presented in Table 3.1-1. The West Sacramento basin extends past the American River watershed. The Sacramento River at Freeport gage more closely reflects the actual project flow around the southern end of the West Sacramento Levee System.

Table 3.1-1. Monthly Mean Daily Flow Statistics for Sacramento River at Verona and Sacramento River at Freeport for 1990 through 2008

	Sacramento River at Verona Station 11425500			Sacramento River at Freeport Station 11447650		
	Minimum	Average	Maximum	Minimum	Average	Maximum
January	6,460	29,888	95,600	6,560	34,311	113,000
February	6,200	34,008	76,300	6,030	39,647	94,100
March	7,730	31,811	80,700	8,300	36,793	99,500
April	3,920	22,552	73,600	4,340	26,786	91,800
May	3,870	19,199	69,600	4,640	23,511	88,600
June	3,590	16,028	60,500	6,120	19,810	70,500
July	3,830	15,051	28,400	7,030	18,434	44,500
August	4,890	14,582	22,800	7,230	16,669	26,400
September	7,350	13,525	24,700	8,150	15,188	28,600
October	4,820	9,449	18,900	5,100	11,065	23,600
November	5,230	10,239	30,700	5,530	11,912	34,800
December	5,600	19,452	73,700	6,250	22,289	96,400

Source: U.S. Geological Survey 2009. Available: <http://waterdata.usgs.gov/nwis/sw>
Notes: Flow in cubic feet per second from January 1, 1990 to February 8, 2009

Yolo and Sacramento Bypass Reaches (Yolo Bypass Levee, Sacramento Bypass Levee, and Deep Water Ship Channel West Levee—Reaches 5, 6, and 9C)

Flows in the Yolo Bypass come from several different sources. Floodflows from Sutter Bypass and the Sacramento River enter the Yolo Bypass over the Fremont Weir when the stage in the Sacramento River reaches 29.7 feet in the National Geodetic Vertical Datum of 1929 (NGVD29). Water also enters the Yolo Bypass from the west side tributaries—Knights Landing Ridge Cut, Cache Creek (Cobble Weir), Willow Slough Bypass, and Putah Creek—and from the Sacramento Weir. The gates of the Sacramento Weir are opened when stages exceed 27.5 feet (NGVD29) at the I Street Bridge: the weir operates infrequently. Various documents describe the relative importance of these sources of floodflows (Yolo Bypass Working Group 2001; Natural Heritage Institute 2003).

The California Department of Water Resources (DWR) has maintained a gage at Lisbon Weir, along the Yolo Bypass Levee, since 1935. Water levels at this gage are tidally influenced and fluctuate between 3 and 7 feet stage (USACE datum) or between 0.5 and 4.5 feet NGVD 29, at low water. Flood stage at the gage is 11.5 feet (9 feet NGVD 29); above this elevation water is no longer contained in the Toe Drain and the Yolo Bypass starts to inundate. The Yolo Bypass floods about 3 out of 5 years, on average, and the annual duration of flooding ranges from zero to 135 days.

The maximum stage recorded at the Lisbon Weir was 24.9 feet NGVD 29 in February 1986. The maximum stage in January 1997, 24.6 feet, was slightly lower than in 1986, but the maxima in these two years are several feet higher than in the other years of record (Jones & Stokes 2006). Water surface elevations in these years were only 2 to 3 feet below the top of the Yolo Bypass levee (U.S. Army Corps of Engineers 2006). Since 1997, USACE has raised levee elevations along the upper portion of the Yolo Bypass Reach and in the Sacramento Bypass by up to 5 feet.

Based on the DWSC West Levee sections in Appendix D of Northwest Hydraulic Consultants (2007a), a typical elevation for the berm on the Yolo Bypass side of the levee near the Lisbon gage is 15 to 20 feet NGVD 1929. Based on the mean daily water surface elevation duration curve for Lisbon gage (Northwest Hydraulic Consultants 2007a), stage exceeds this elevation only 2 or 3% of the time, indicating that high water levels that result in wave attack on the levee occur only infrequently.

MBK Engineers provided average cross-sectional velocities in the Yolo Bypass from their UNET model. These velocities varied from 2 to 4 feet/second despite the large cross-sectional area in the bypass. Velocity data at the Lisbon Gage, which is close to the levee, show maximum velocities of about 2.5 feet/second. Velocities vary considerably across the sections and may be higher where flows accelerate around obstacles, around bends, or where the section narrows. (Northwest Hydraulic Consultants 2007a)

3.1.2.2.2 Geomorphic Conditions

Geomorphic Characteristics

Because of the low topographic position and proximity to the confluence of the Sacramento and American Rivers, the West Sacramento area has been subjected to repeated inundation by floodwaters during late Holocene time, and consequently is underlain by relatively thick alluvial deposits. The surface and subsurface distributions of sandy and clayey deposits are a function of former river alignments on the landscape, and present-day geomorphic processes adjacent to the river channels (i.e., flooding and deposition). In brief, the primary geomorphic features and associated surficial geological map units in the project area include abandoned paleochannels,

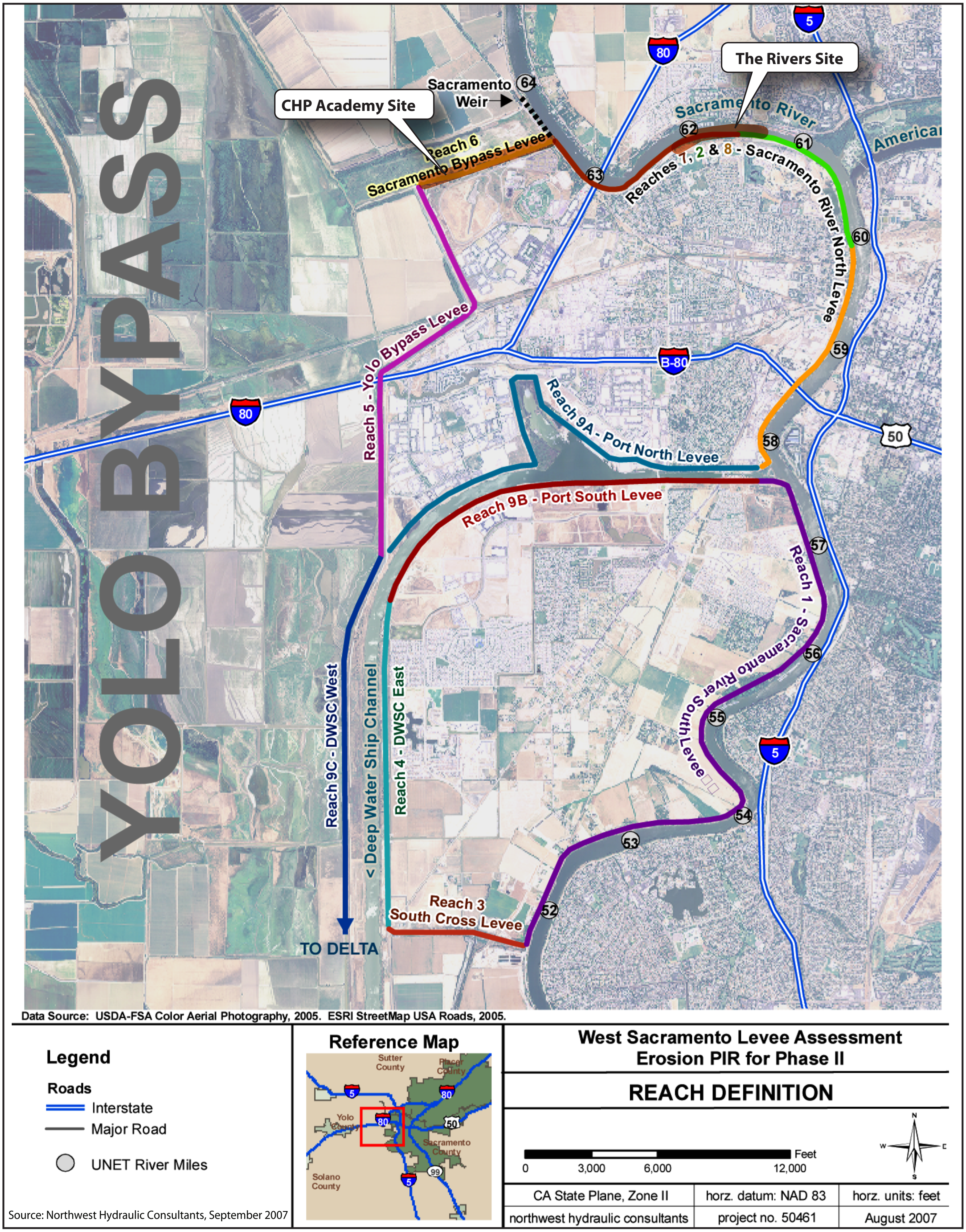


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Figure 3.1-1
Reach Definition

meander scroll deposits, crevasse splay and overbank flood deposits, flood basin deposits, and other features commonly associated with large, active river systems. (William Lettis & Associates 2007)

The current geomorphology of the West Sacramento area is characteristic of Delta waterways. All waterways are bordered by levees. Channel alignments are preserved by ongoing levee maintenance and instream dredging. The Sacramento River in the vicinity of West Sacramento is characterized by a low gradient and typical low-velocity flow and is composed almost entirely of deep flatwater with a sand bed. River stage is controlled by dam and weir release upstream and is subject to diurnal tidal fluctuation. Very little sediment is stored in bars, and the bank-building process typical of lowland alluvial rivers no longer occurs. The channel width varies but averages approximately 750 feet. For a complete review of the historic geomorphology of the Delta region, refer to the North *Delta Sedimentation Study* (Northwest Hydraulic Consultants 2006).

All geomorphic information described below (descriptions of hydraulic geometry, levee and bank geometry, and channel morphology) is derived and summarized from Northwest Hydraulic Consultants (2007a). The overall goals of this report were to (1) identify those sites in the West Sacramento area where erosion occurs and without intervention may significantly compromise the flood performance and integrity of the levee system, (2) assess the risk of erosion at these sites and determine whether repairs are required for FEMA certification, and (3) provide feasibility or concept level erosion protection alternatives for those sites where protection is required for certification.

Levee and Bank Geometry

Sacramento and Yolo Bypass Levees (Reaches 5 and 6)

The levees in the Sacramento and Yolo Bypass are part of the original Federal project levee built in the early 20th century. Kleinfelder (2007) indicates that this levee originally was constructed by clamshell dredge with the local flood basin deposits. Table 3.1-2 summarizes construction undertaken to upgrade the levees in the mid-20th century, as shown in The Supplement to Standard Operation and Maintenance Manual for the Sacramento River Flood Control Project Unit No.116, from 1955.

The Yolo and Sacramento Bypass levees also have been upgraded since the 1950s, most recently in 1998 and 1999 by USACE when the levee crests were raised a maximum of 5 feet, damage from the 1997 flood repaired, and rock revetment added for wave and velocity erosion protection (Northwest Hydraulic Consultants 2007a). The revetment slumped in February 1998 and again at two sites near the Interstate 80 Bridge in January 2006. The revetment failures appear to result from slumping of saturated clays in the levee and foundation materials, resulting in failure of the revetment. Repairs of these failures are underway by DWR (Northwest Hydraulic Consultants 2007a). Levee soils are assumed to be similar to those along the DWSC West Levee (Kleinfelder 2007)[2].

[2] Northwest Hydraulic Consultants had not received or reviewed a geotechnical data report for these levee sections since submittal their 2007a report.

Table 3.1-2. Historic Construction to Bring Levees Built by Local Interests to Project Standards

Job Order	Date	Location	Description
W-1105-eng-2940	October 1941	East levee of Yolo Bypass, Sacramento Bypass to the Southern Pacific Railroad	Enlargement of the east levee
W-1105-eng-892	March 1932	East levee of Yolo Bypass from S.P.R.R. to the Yolo Causeway	Enlargement of the east levee
W-1105-eng-2927	November 1940	East levee of Yolo Bypass from Yolo Causeway downstream 0.3 mile	East levee reconstructed
W-1105-eng-1294	November 1934	East levee of Yolo Bypass from the Yolo Causeway south to the south boundary of RD 900	Enlargement of the east levee

Source: Northwest Hydraulic Consultants 2007a

Existing Bank Protection

There is no formal inventory of bank protection works along the Yolo and Sacramento Bypass levees; however, most of both levees are protected by revetment. As discussed above, revetment was placed on the upper end of the Yolo Bypass east levee and the south Sacramento Bypass levee in the late 1990s. Revetment covers about 540 feet around the pump station outlet in the Sacramento Bypass, consisting of quarry rock with a median size of about 9 inches and a maximum size of 12 inches. The portion of the Sacramento Bypass Levee directly below the Sacramento Weir is lined with concrete.

Structures

An outfall from a pump station is located on the Sacramento Bypass levee at Station 1+50. The outfall is protected with rock riprap, and erosion was not observed the outfall location.

3.1.2.2.3 Levee Deficiency Analysis

Section 4 of HDR, Inc. (2008a) includes the geotechnical assessment of the existing levees with regard to seepage, slope stability, and seismic vulnerabilities[3]. The information provided in HDR, Inc. (2008a) is derived from two reports: *West Sacramento Levee System Problem Identification and Alternative Analysis: Volume 1—Geotechnical Problem Identification Solano and Yolo Counties, California* (Kleinfelder 2007), and *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento* Region (URS 2007).

Data collection included 323 borings drilled with standard penetration tests and soundings made using cone penetration test equipment along the levees within the basin. Approximate stationing endpoints have been determined by URS (2007) and Kleinfelder (2007) based on similar soil characteristics within the endpoints. Deficiencies identified within the approximate stationing endpoints do not indicate the entire stretch of levee contains said deficiency; rather, a deficiency has been identified within the endpoints (HDR 2008a).

[3] Seismic vulnerabilities are discussed in Chapter 6, Geology, Seismicity, Soils, and Mineral Resources.

Levee Seepage Analysis

Engineering analysis evaluating levee seepage along the Sacramento Bypass Levees has been performed by URS (2007), and the findings were presented in their report titled *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento Region* (URS 2007). URS (2007) performed their seepage analysis using water surface elevations that are different from the water surface elevations used in this chapter as determined by MBK Engineers (2007) and assumed a no-flow boundary at the center of the river (HDR 2008a).

Table 3.1-3 shows the seepage summary of the Sacramento Bypass Levees as completed by URS (2007) and Kleinfelder (2007) and compiled by HDR, Inc. (2008). Exit gradients of 0.5 or greater for under-seepage require mitigation according to the USACE, and areas where through-seepage has been observed or projected based on soil conditions require mitigation.

Kleinfelder (2007) performed the engineering analysis evaluating levee seepage along the Sacramento Bypass Levees and presented their findings in a report titled *West Sacramento Levee System Problem Identification and Alternative Analysis: Volume 1—Geotechnical Problem Identification Solano and Yolo Counties, California* (Kleinfelder 2007). Kleinfelder performed their analysis using the water surface elevations determined by MBK Engineers (2007) and assumed a total head boundary at the center of the river.

Although the Sacramento River North Levee has a significant amount of under-seepage, the other reaches (including the Sacramento Bypass) have much less extensive under-seepage problems. See Table 3.1-4 and Figure 4 of HDR, Inc. (2008b) for additional information.

Table 3.1-3. Seepage Summary

	Through-seepage		Under-seepage	
Approximate Stationing	100-Year Event	200-Year Event	100-Year Event	200-Year Event
Sacramento Bypass Levee				
0+00 to 40+50				
40+50 to 57+50	✓	✓	✓	✓
57+50 to 64+78	✓	✓		

Source: HDR, Inc. 2008a.(a compilation of data from URS 2007 and Kleinfelder 2007)

Table 3.1-4. Reach Summary

	Seepage, 200-Year Event		Stability, 200-Year Event		
Approximate Stationing	Through Seepage	Under Seepage	Steady State	Rapid Drawdown	Seismic
Sacramento Bypass Levee					
0+00 to 40+50				N	
40+50 to 57+50	X	X	X	N	X
57+50 to 64+78	X		X	N	X

Source: HDR, Inc. 2008b
N = No Analysis; X = Deficiency; Blank Cell = No Deficiency

Levee Slope Stability Assessment

URS (2007) completed an engineering evaluation of levee slope stability and the effect of rapid drawdown for the Sacramento Bypass Levee and presented their findings in the report titled *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento Region* (URS 2007). As with the levee seepage analysis described above, URS (2007) used water surface elevations that are different from the water surface elevations determined by MBK Engineers (2007) in their analysis of slope stability[4]. Rapid drawdown calculations have been completed only for the 100-year event as recommended to URS by their Independent Consulting Board (HDR 2008a).

The slope stability results as completed by URS (2007) for the Sacramento Bypass Levees are shown in Table 3.1-5.

Kleinfelder (2007) performed the engineering analysis evaluating levee slope stability and the effect of rapid drawdown along the Sacramento Bypass Levees and presented their findings in a report titled *West Sacramento Levee System Problem Identification and Alternative Analysis: Volume 1—Geotechnical Problem Identification Solano and Yolo Counties, California* (Kleinfelder 2007). Kleinfelder (2007) performed their analysis using the water surface elevations determined by MBK Engineers (2007).

The slope stability findings as completed by Kleinfelder (2007) are also shown in Table 3.1-5.

In brief, the Sacramento Bypass Levee has significant steady state stability deficiencies. See Figure 5 of HDR, Inc. (2008b) for additional information.

Table 3.1-5. Slope Stability Summary

	Steady State		Rapid Drawdown	
Approximate Stationing	100-Year Event	200-Year Event	100-Year Event	200-Year Event
Sacramento Bypass Levee				
0+00 to 40+50			✓	N
40+50 to 57+50		✓		N
57+50 to 64+78	✓	✓	✓	N
Source: HDR, Inc. 2008a (a compilation of data from URS 2007 and Kleinfelder 2007)				

Levee Geometry Evaluation

To evaluate the crown width and side slopes of the levees in the project area, HDR, Inc. (2008a) generated topography data by means of Light Detection and Ranging (LIDAR) using the North American Vertical Datum of 1988 (NAVD 88).

In brief, most of the levees in the West Sacramento area, including in the CHP Academy project area, have a geometry deficiency, and it is typically an over-steepened waterside slope that is the primary problem (HDR 2008b).

USACE requires that levees have a maximum steepness of 3:1 (H:V) waterside slopes and 3:1 (H:V) landside slope. The design criteria for the CHP Academy EIP conform with these requirements,

[4] Sections of the northern reaches have not been completed to date by URS; these sections will be completed in their final report projected to be issued at a later time.

unless site- specific conditions permit otherwise (and USACE approval is granted based on engineering analysis to support a slope steeper than 3:1). Crown widths for primary levees are to be a minimum of 20 feet. For the CHP Academy EIP, it is proposed that the waterside slope would be trimmed and reshaped to a 2.5:1 slope the full length of the site (pending USACE approval). Refer to Appendix B in HDR, Inc. (2008a) for tables identifying sections of the levees that do not meet the design criterion. Appendix D in HDR, Inc. (2008a) contains LIDAR cross sections that have been used to evaluate levee geometry. Also refer to Figure 9 of HDR, Inc. (2008b), which shows the approximate locations where a geometry deficiency has been identified.

For a complete summary of levee deficiencies, refer to Chapter 1, Introduction.

3.1.2.2.4 Flooding

Levees along the Sacramento River and other waterways provide flood control for the city of West Sacramento and conveyance for waters from upstream to the Delta. High winter flows can stress levees and berms. Longer flood durations can contribute to levee seepage and potentially structural levee failure. Flood water surface elevations also can exceed levee heights and cause overtopping and partially controlled flooding of the protected areas behind the levee. Overtopped levees may maintain structural integrity and would not be considered failed levees. However, the erosive forces that occur during overtopping eventually may cause a structural failure and uncontrolled flooding in the protected areas behind the levee. To maintain the integrity of the flood control system, locations with the potential for failure have been and are being identified and remedied.

MBK Engineers (2007, 2008a, and 2008b) has developed water surface profiles for use in this analysis. Their reports describe and present the results of a hydraulic analysis that was made to determine 1/100 and 1/200 AEP (commonly referred to as 100-year and 200-year) water surface elevations in the surrounding waterways, as well as the potential worst case flood depth for the South Cross Levee. The MBK version of the Comprehensive Study Sacramento River UNET model adopted for the Natomas Levee Improvement Program was used for this analysis. This adopted version is capable of modeling anticipated levee breaks or of allowing levee overtopping without failures. UNET is a one-dimensional unsteady open-channel flow model with the ability to simulate exchange of flow over levees with storage areas. The MBK UNET model results were a maximum composite of simulations made using hydrologic data for two storm centering scenarios: Sacramento River at latitude of Sacramento and Feather River at Shanghai Bend. In addition, the American River peak flow in the 100-year flood was 145,000 cfs, the current FEMA condition; in the 200-year flood the peak flow was 160,000 cfs, the expected future peak flow.

The resulting maximum water surface elevation profiles (for the 1/100 and 1/200 AEPs), the approximate tops of the levees, and the original 1957 Flood Control Project design floodplain for the Sacramento River and Sacramento Bypass are provided in Figures 3.1-2 through 3.1-5 and Table 3.1-6, below.

Table 3.1-6. Computed Maximum Water Surface Elevations

Reach	Comp Study River Mile	Maximum Water Surface Elevation (feet NAVD 88)		Note
		1/100 AEP [1]	1/200 AEP [2]	
Sacramento River	63.44	35.47	36.57	West Sacramento city limit
Sacramento River	62	35.47	36.67	
Sacramento River	60.5	35.47	36.67	American River
Sacramento River	59.695	35.17	36.37	I Street Bridge
Sacramento River	58	34.67	36.37	
Sacramento River	56	33.57	34.77	
Sacramento River	54	32.57	33.77	
Sacramento River	51.75	31.47	32.67	West Sacramento city limit
Sacramento Bypass	1.68	34.97	36.17	Downstream of Sacramento Weir
Sacramento Bypass	1.3	33.57	34.87	
Sacramento Bypass	0.93	33.27	34.37	
Sacramento Bypass	0.56	32.77	33.97	Yolo Bypass east levee
Yolo Bypass	44.8	32.27	33.47	West Sacramento city limit
Yolo Bypass	43.49	31.87	32.97	Willow Slough
Yolo Bypass	43.24	31.67	32.87	SPRR Bridge
Yolo Bypass	42.96	31.57	32.67	Interstate 80
Yolo Bypass	42	31.37	32.47	
Yolo Bypass	40	30.57	31.67	
Yolo Bypass	39.33	30.27	31.37	Putah Creek
Yolo Bypass	38.4	29.67	30.77	West Sacramento city limit
Yolo Bypass	36	28.57	29.57	
Yolo Bypass	34	27.67	28.77	
Yolo Bypass	32	26.57	27.67	
Yolo Bypass	30	25.27	26.37	
Yolo Bypass	28	23.07	24.27	
Yolo Bypass	26	21.67	22.97	
Yolo Bypass	24	21.37	22.67	
Yolo Bypass	23	20.37	21.57	
Deep Water Ship Channel	41.70	19.07	20.27	Carlin Drive (extended)
Deep Water Ship Channel	40.72	19.07	20.27	Marshall Road
Deep Water Ship Channel	39.79	19.07	20.27	Bevan Road
Deep Water Ship Channel	38.46	19.07	20.27	West Sacramento city limit

Source: MBK Sacramento River UNET hydraulic model simulations documented in *Supplemental Report for the City of West Sacramento Levee Alternatives Hydraulic Analysis—Draft,* December 4, 2008

[1] Assumes levees overtop without failing; existing conditions and operations

[2] Assumes levees overtop without failing; urban levees have three feet of freeboard on 1/200 AEP water surface; non-urban levees satisfy SRFCP design freeboard requirements; Folsom Dam Joint Federal Project in place

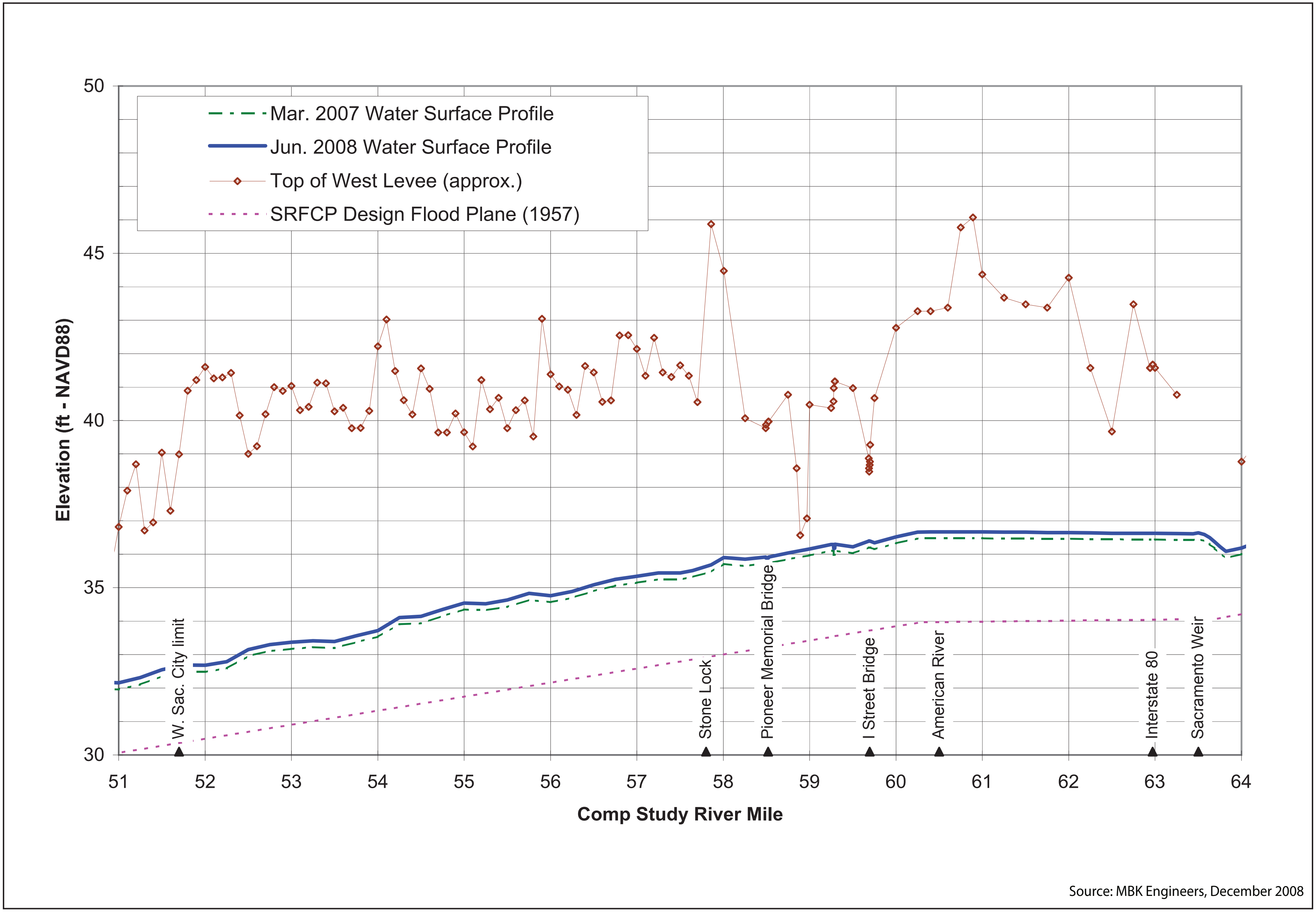

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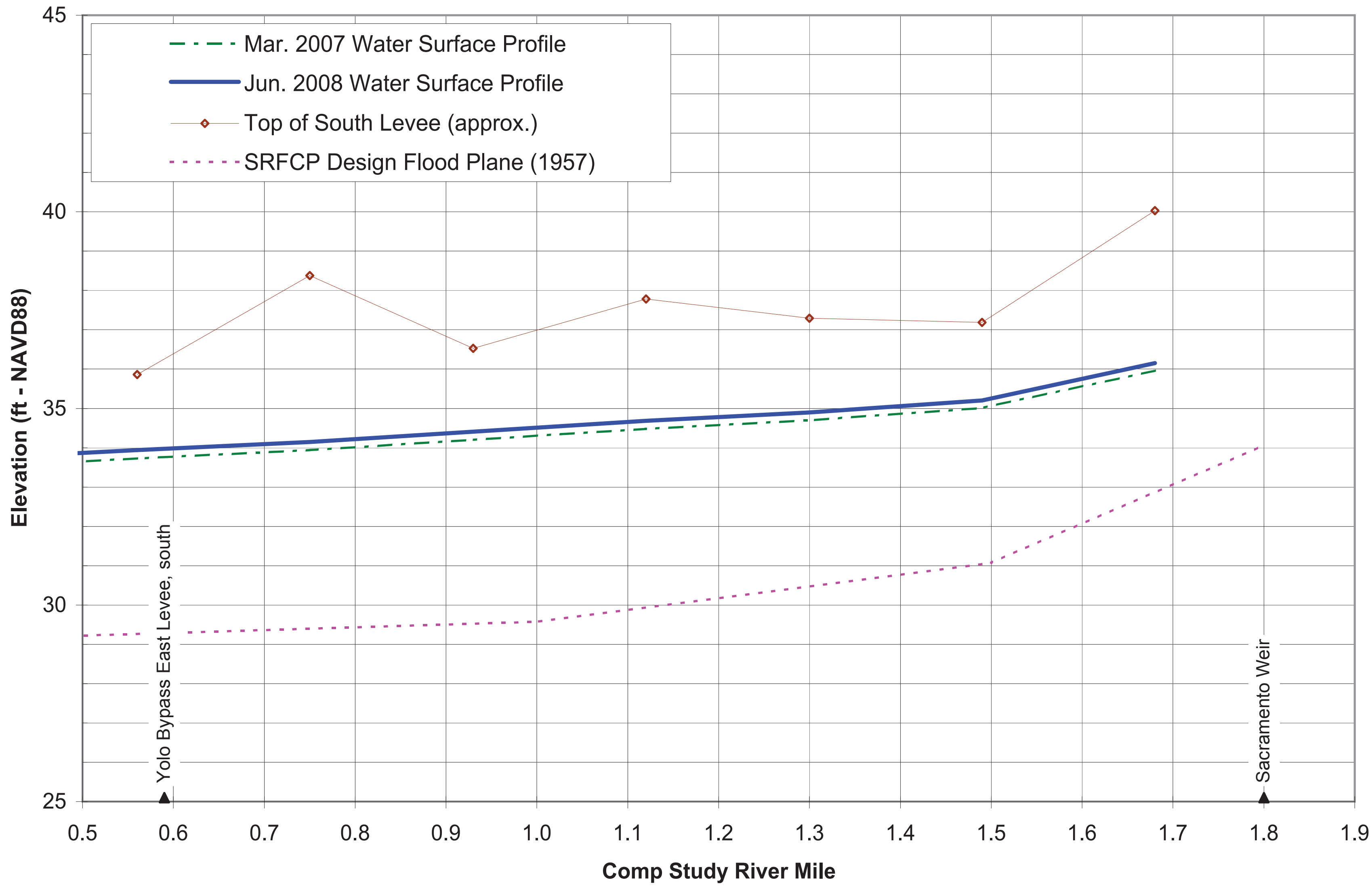
Figure 3.1-2
Maximum Water Surface Elevation, Sacramento River



Source: MBK Engineers, December 2008

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Figure 3.1-3
Maximum Water Surface Elevation, Sacramento Bypass

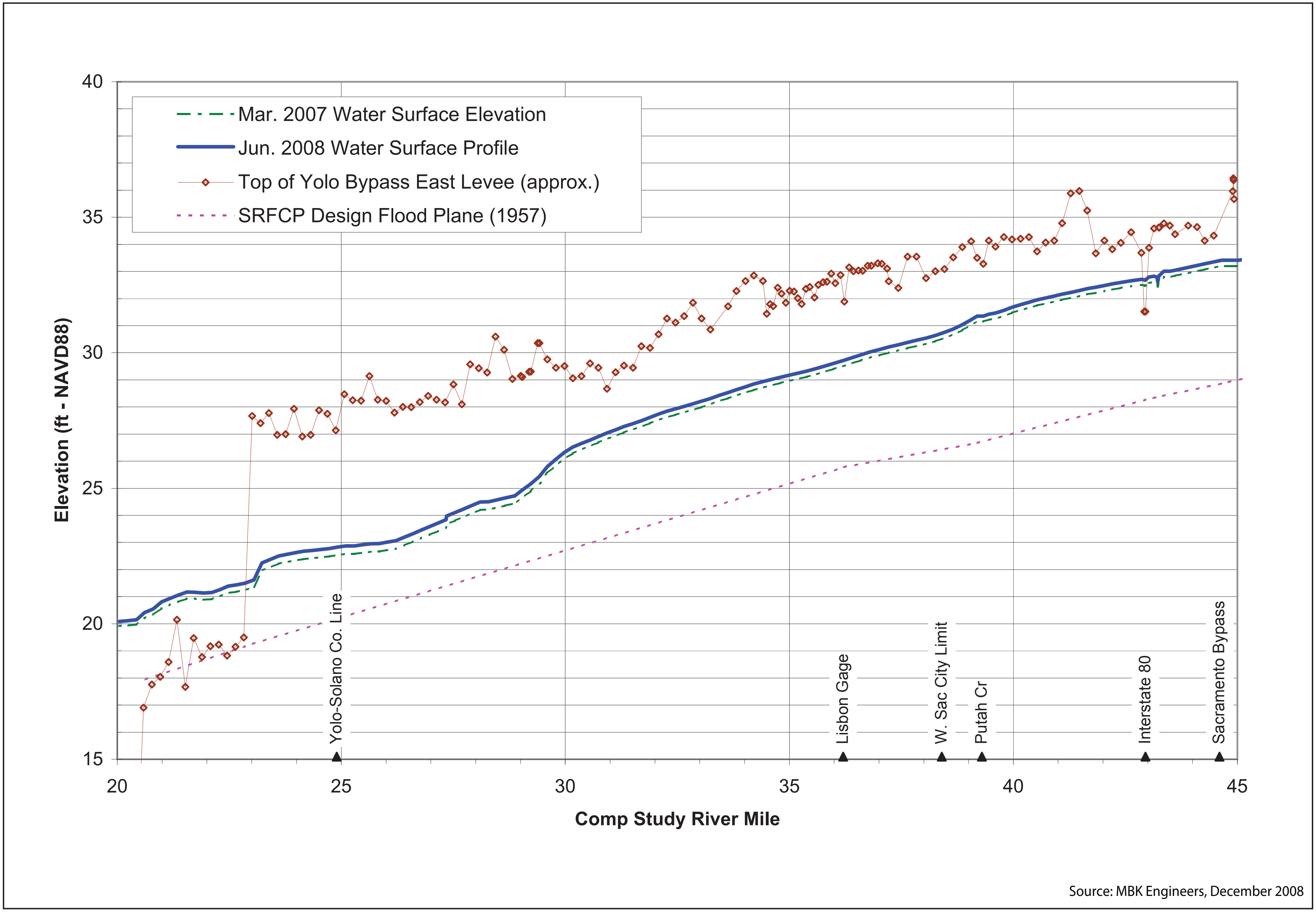

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Figure 3.1-4
Maximum Water Surface Elevation, Yolo Bypass

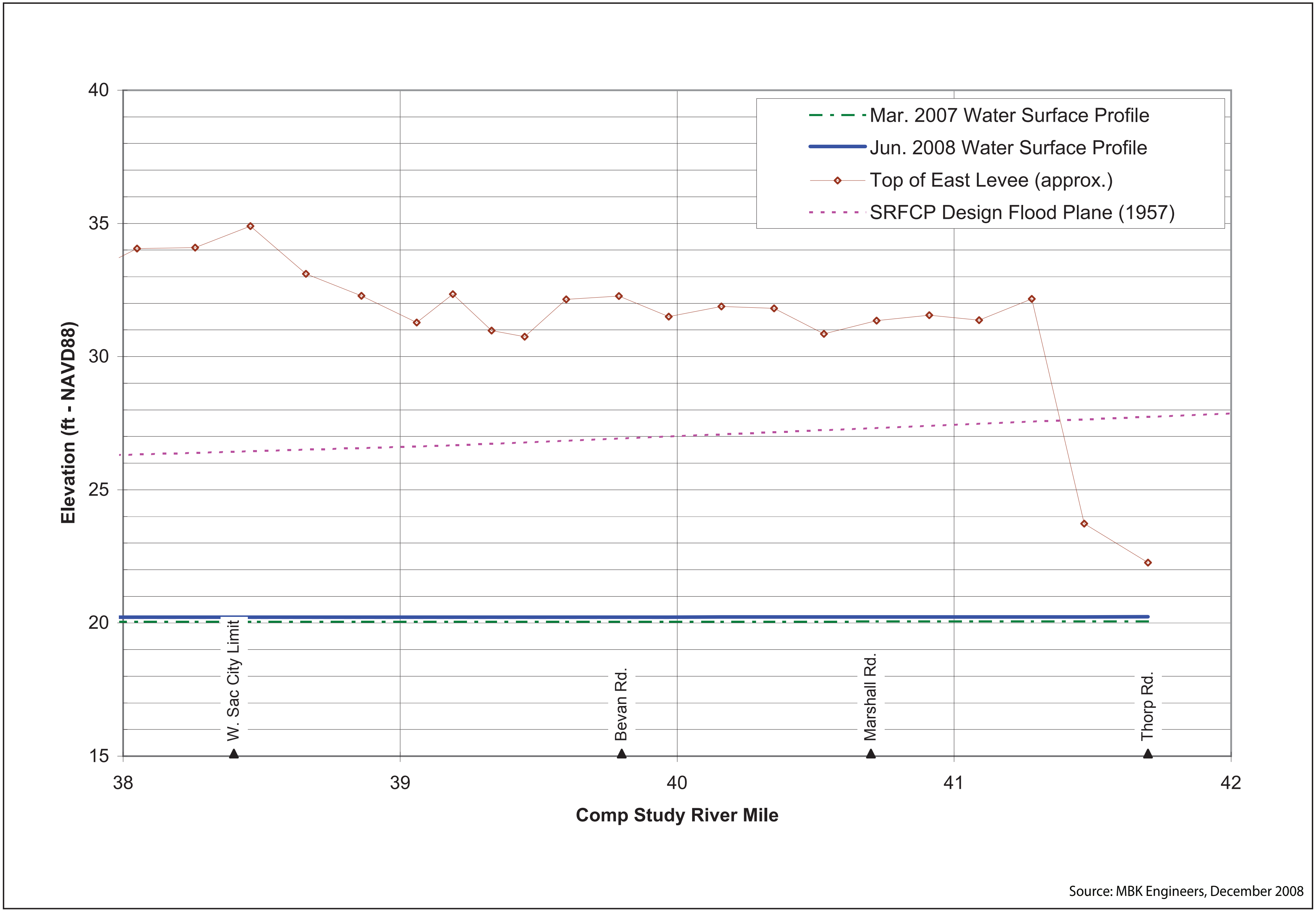

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Figure 3.1-5
Maximum Water Surface Elevation, Sacramento River Deep Water Ship Channel

The MBK UNET model indicates no levee overtopping will occur along the Sacramento River or the Sacramento Bypass for the 100-year or the 200-year design floodflows. More information is provided in MBK Engineers' *Hydraulics Report for the City of West Sacramento Levee Alternatives Analysis* (2007) and Northwest Hydraulic Consultant's *West Sacramento Levees System: Problem Identification Report, Erosion Assessment and Treatment Alternatives, Draft for Review* (2007a).

Refer to Appendix D for a description of flood elevations and levee height evaluation by reach and for a complete description of modeling of hydraulic effects.

Flood Elevations and Levee Height Evaluation

As described in Section 4.3 of HDR, Inc. (2008a), the hydraulic models developed by MBK Engineers for 100-year and 200-year water surface flood conditions along the Sacramento River, DWSC, Sacramento Bypass, and Yolo Bypass have been used to assess levee conditions. Elevations have been presented in NAVD 88.

Freeboard is the additional levee height above the *adopted floodplain* (U.S. Army Corps of Engineers 1963), or as MBK Engineers 2008a, b) has phrased it, the *design water surface*. For the Sacramento River Flood Control Project, the adopted flood plane is the *project design floodplain* shown in the 1957 profiles.

Results from the hydraulic models have been used to assess levee height adequacy as compared to Federal and local agency criteria. All criteria must be considered, as policies are not consistent from agency to agency. As previously discussed in the Regulatory Setting section, the freeboard criteria as provided by the relevant agencies are summarized below.

- **FEMA**. Riverine levees must provide a minimum freeboard of 3 feet above the water-surface level of the base flood. An additional 1 foot above the minimum is required within 100 feet either side of structures (such as bridges) riverward of the levee or wherever the flow is constricted. An additional 0.5 foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, is also required.
- **USACE.** Sacramento Bypass Levee: 6 feet
- **WSAFCA**. WSAFCA has no minimum freeboard requirements; rather, it uses the minimum freeboard requirements set forth by USACE.

Sacramento Bypass Levee

Figure 3.1-3 (MBK Engineers 2008a, b) shows the design water surface elevation profiles for the 1/100 and 1/200 AEPs, the approximate top of the South Levee, and the original Federal Project Design Flood Plain from 1957 for the Sacramento Bypass Levee. As shown on the figure, the water surface elevation for the Sacramento Bypass Levee ranges between 33.13 and 34.94 feet (NAVD 88) for the 100-year flood and between 33.94 and 36.15 feet for the 200-year flood on the Sacramento River.

Figure 3.1-6 (HDR, Inc. 2008a) shows the existing crown versus the requirements of 5.57 (NAVD 88) feet of freeboard above the 100-year and 200-year water surfaces[5]. As shown on the graph, there is

[5] Note that FEMA has a 3-foot freeboard requirement, but USACE has a 6-foot requirement for the Sacramento Bypass Levee.

adequate levee height on the Sacramento Bypass Levee to provide at least 5.57 (NAVD 88) feet of freeboard over both the 100-year and 200-year water surfaces (HDR, Inc. 2008a).

Federal Emergency Management Agency Mapping Efforts

Based on the FEMA FIRMs, the locations of the designated floodplains in the West Sacramento area are shown on Figures 3.1-7 and 3.1-8, and are summarized below.

Federal Emergency Management Agency Parcel # 0607280005B City of West Sacramento, last updated 1995

The northern border of this area is the Sacramento Bypass and the southern border is near the Port of Sacramento. The eastern border is the toe drain on the west side of the DWSC, and the western border is the Sacramento River (Figure 3.1-7).

This residential-industrial area in the middle of the map is zoned by FEMA as being protected from the 1% chance of a 100-year flood by levee, dike, or other structures subject to possible failure of overlapping during longer floods. The Sacramento River, the toe drain, and the area northwest of the Interstate 80 / U.S. Highway 50 area on the western end of the FEMA map are designated as Zone AE. The water areas of the Port of Sacramento and Lake Washington are defined as Zone A.

Federal Emergency Management Agency Parcel # 0607280010B City of West Sacramento, last updated 1995

The northern border of the parcel map is the DWSC near the Port of Sacramento, the southern border is Riverview, the eastern border is the Sacramento River, and the western border is the toe drain on west side of the DWSC (Figure 3.1-8).

The residential area between the DWSC on the west and the Sacramento River to the east are considered by FEMA to be protected from the 1% chance (100-year) flood by levee, dike, or other structures subject to possible failure of overlapping during longer floods.

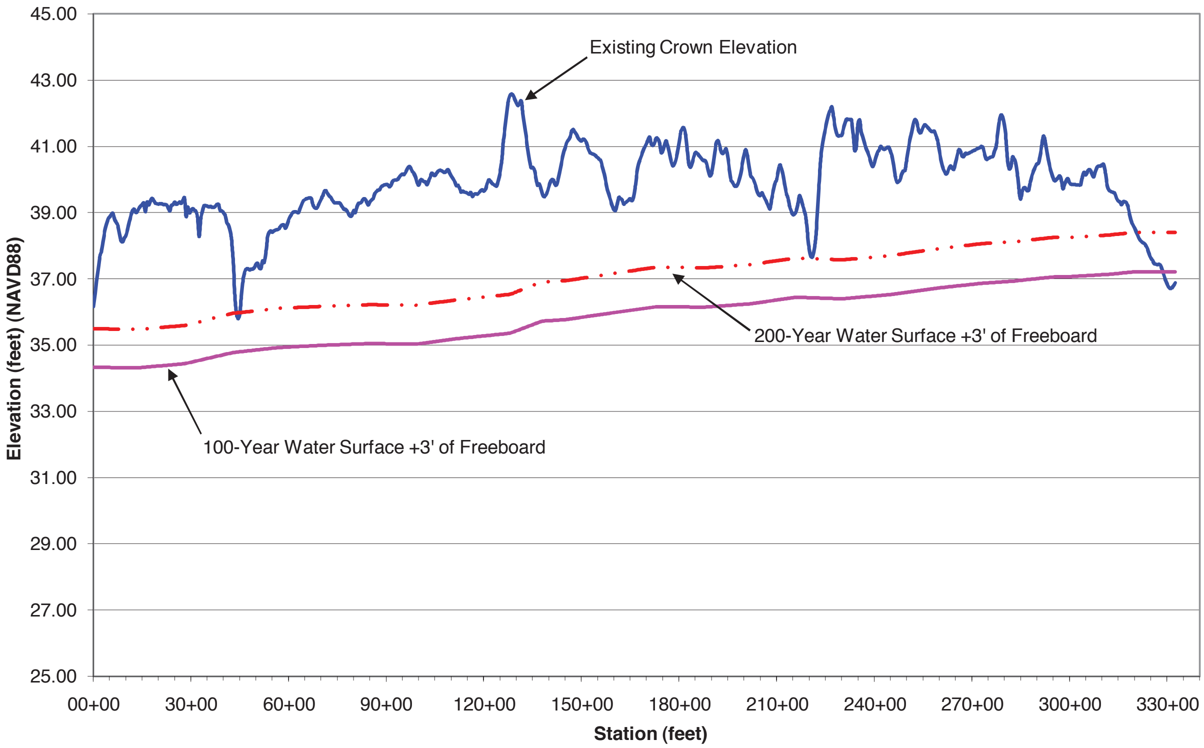
The Sacramento River on the eastern portion of the map is zoned as AE or Base Flood Elevations have been determined. The toe drain on the west end of the map is also zoned as AE. The DWSC, Lake Washington, and the other unknown pond in the northern portion of the FEMA map are in Zone A.

3.1.2.2.5 Past Sea-Level Rise

MBK Engineers (2009b) applied the USACE sea-level rise guidance (U.S. Army Corps of Engineers 2009b) to the WSLIP area in order to determine the effects of potential sea-level rise on West Sacramento basin. Since the sea-level rise analysis is in support of the pre-existing project design, many of the points in the USACE policy guidance do not apply, particularly those which refer to the comparison of project alternatives. The MBK Engineers (2009b) report uses the procedure for calculating sea-level rise that is identified in the USACE guidance, and applies that procedure to the proposed project design.

Analysis of Historic Mean Sea Level Change

As described in the MBK Engineers (2009b) report, the nearest tide station with sufficient period of record (40+ years recommended) is the National Oceanic and Atmospheric Administration (NOAA)



Source: HDR, Inc., January 2008

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Figure 3.1-6
Freeboard Evaluation of Sacramento River West South Levee

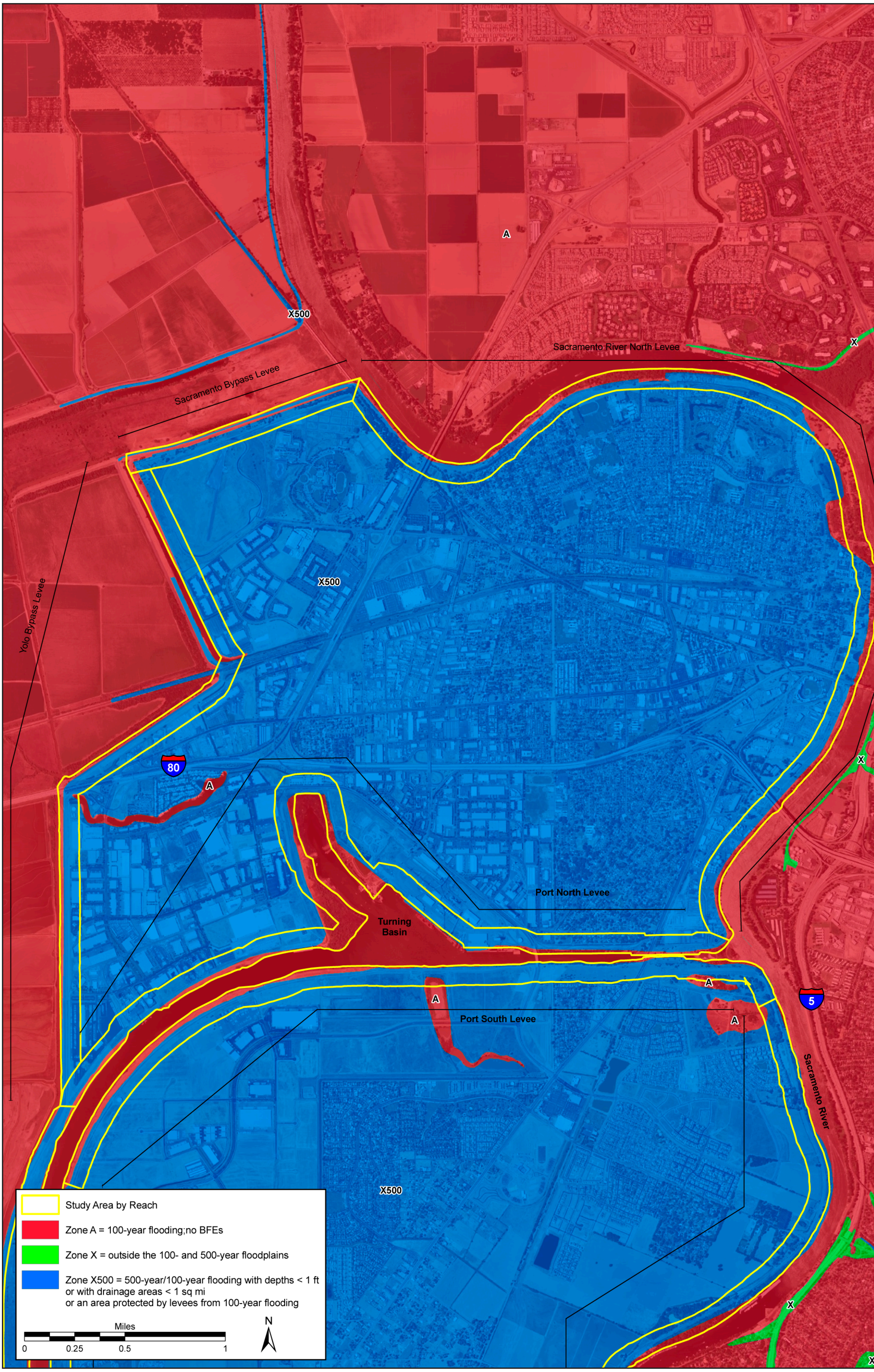

Figure 3.1-7
Federal Emergency Management Agency Parcel # 0607280005B

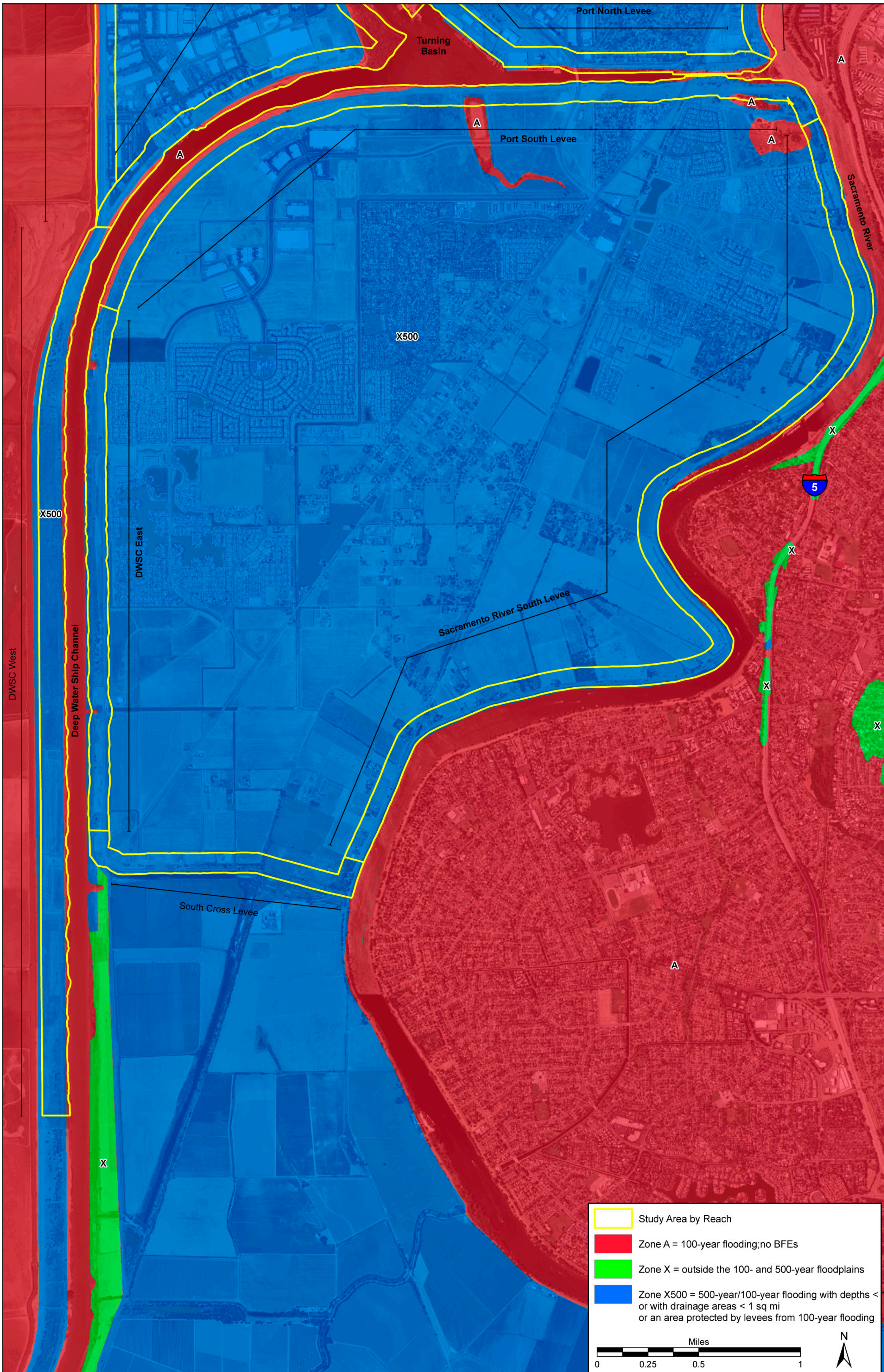

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Figure 3.1-8
Federal Emergency Management Agency Parcel # 0607280010B

station 9414290 at San Francisco, CA. Tidal records for this station have been maintained back to the 1850s.

The NOAA Center for Operational Oceanographic Products and Services (CO-OPS) has analyzed the historic mean sea level for this site, which has been shown to be increasing at a rate of 2.01 millimeters per year (California Climate Change Center 2009 as cited in MBK Engineers 2009b).

3.1.3 Environmental Consequences

This section describes the environmental consequences relating to hydrologic, hydraulic, geomorphic, and flood control conditions for CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.1.3.1 Assessment Methods

Assessment of environmental effects associated with hydrology, hydraulics, geomorphology, and flood control issues was based on the following:

- MBK Engineers (2009) quantitative modeling of the West Sacramento basin,
- MBK Engineers (2007) quantitative modeling of the effects of Sacramento River West Levee Setback at Oak Hall Bend,
- MBK Engineers (2005) hydraulic analysis of the effects of potential cumulative development in the Sacramento River corridor floodway between Verona and Courtland on flood stages and flows,
- an evaluation of existing conditions of project-area levees and projected incision and scour estimates in the adjacent waterways,
- qualitative assessments of sedimentation/scour potential based on existing Federal and state channel hydraulic design standards and guidelines, and
- professional judgment.

3.1.3.2 Determination of Effects

The criteria used for determining the significance of an effect on hydrology, hydraulics, geomorphology, and flood control are based on NEPA standards, Appendix G of the State CEQA Guidelines (Environmental Checklist) and standards of professional practice.

Effects on hydrologic or geomorphic conditions may be considered significant if implementation of an alternative would:

- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off site;
- substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site;

- place within a 100-year flood hazard area structures that would impede or redirect floodflows; or
- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

Effects on flood control may be considered significant if implementation of an alternative would:

- significantly raise flood stage elevations;
- increase the frequency and duration of inundation of lands; or
- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee.

An effect on the levee system is considered significant if an alternative would substantially increase any of the following:

- seepage,
- levee settlement,
- wind erosion,
- bank erosion or bed scour,
- sediment deposition, or
- subsidence of land adjacent to levees.

In addition, an effect on the levee system is considered significant if an alternative would substantially decrease any of the following:

- levee stability,
- inspection, maintenance, or repair capabilities,
- current level of levee slope protection,
- emergency response capabilities,
- channel conveyance capacity, or
- the ability of the levees to withstand seismic forces.

3.1.4 Effects and Mitigation Measures

Effects related to mean sea level change are only addressed in the No Action Alternative because the West Sacramento basin is relatively insensitive to the rates of sea-level rise. Of all the scenarios analyzed, only the high sea-level rise rate 100 years after the project is constructed shows greater than one-tenth of a foot stage increase in the Sacramento River, Yolo Bypass, or Sacramento Bypass in the West Sacramento basin.

3.1.4.1 No Action Alternative

The No Action Alternative represents the continuation of the existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. Current levee operations and maintenance activities would continue, but there would be no change in the geomorphic and flood control regimes relative to existing conditions.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability or geometry issues would continue. Failure of the Sacramento Bypass Levee, depending on the magnitude of the event, could cause catastrophic flooding. In summary, those effects could include excessive saturation and weakening of all of the city's levees, reducing levee integrity and resulting in an even greater risk of levee collapse, failure and further flooding and damage. Additionally, proposed levee strengthening projects in upstream areas may transfer flood risk to the study area if the Sacramento Bypass Levee remains below current engineering standards while other upstream levees are improved to meet or exceed current standards. However, given the uncertainty of the occurrence or magnitude of such an event, potential effects on geomorphic and flood control conditions cannot be quantified based on available information. Compliance with future vegetation policy enforcement on the Sacramento Bypass Levee would not have any noteworthy effects on the geomorphic and/or flood control regimes of the Sacramento Bypass.

3.1.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on hydrologic, hydraulic, geomorphic, and flood control issues. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
FC-1: Alteration of the Existing Drainage Pattern of the Site or Area	Significant	Less than significant	FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design
FC-2: Decrease in Through- and Under-Seepage	Beneficial	N/A	N/A
FC-3: Transfer of Seepage to Upstream or Downstream Levees	Less than significant	N/A	N/A
FC-4: Increase in Levee Slope Stability	Beneficial	N/A	N/A

Effect FC-1: Alteration of the Existing Drainage Pattern of the Site or Area

Implementation of slope flattening will involve earthwork on the landward side of the levee. The new material on the landside could alter surface runoff patterns. Because interference with drainage could cause or exacerbate local flooding, this effect may be significant. The implementation of Mitigation Measure FC-MM-1 would reduce this effect.

Mitigation

Mitigation Measure FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design

WSAFCA and their primary contractors for engineering design and construction will ensure that the following measures are implemented to avoid significant effects associated with disruption of local drainage systems.

During project design, project engineers will coordinate with owners and operators of local drainage systems and landowners served by the systems to evaluate pre- and post-project drainage needs and design features to remediate any project-related substantial drainage disruption or alteration in runoff that would increase the potential for local flooding. If substantial alteration of runoff patterns or disruption of a local drainage system could result from a project feature, a drainage study will be prepared as part of project design. The study will consider the design flows of any existing facilities that would be crossed by project features and develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction. If no drainage facilities (e.g., ditches, canals) would be affected, but project features would have a substantial significant effect on runoff amounts and/or patterns, new drainage systems will be included in the design of project alternatives to ensure that the project would not result in new or increased local flooding. Any necessary features to remediate project-induced drainage problems will be constructed before the project is completed or as part of the project, depending on site-specific conditions.

Effect FC-2: Decrease in Through and Under-Seepage

Through- and under-seepage has the potential to weaken levee foundations. The implementation of a slurry cutoff wall would reduce or eliminate the potential for seepage. Slurry cutoff walls create walls of impermeable material that act as a barrier to water moving laterally through a levee, greatly reducing or eliminating the potential for through-seepage. Implementation of a slurry wall would result in beneficial effects on flood conditions in the study area.

Effect FC-3: Transfer of Seepage to Upstream or Downstream Levees

Installation of a slurry cutoff wall at the CHP Academy project area may have a slight effect on the potential for seepage to occur through levee sections immediately upstream or downstream, as a result of the redirection of hydraulic force. However, the change in hydrologic conditions resulting from this treatment is not expected to result in a substantial increase in seepage through or under adjacent levees because any upstream or downstream levee will be engineered appropriately to an equal level of protection. Incremental improvements to the system will be made over a period of years and these improvements would reduce or eliminate any seepage problems.

This alternative is also not expected to have an effect on upstream or downstream water surface elevations because the height of the levee would not be increased and current seepage rates do not contribute to substantial reductions in channel flows or water surface elevations. This effect would be less than significant.

Effect FC-4: Increase in Levee Slope Stability

The proposed slope flattening would repair and reshape slopes that are too steep and do not meet current standards. This would result in an increase in levee slope stability and a beneficial effect for geomorphic and flood conditions.

3.1.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on hydrologic, hydraulic, geomorphic, and flood control issues.

Effect	Finding	With Mitigation	Mitigation Measure
FC-1: Alteration of the Existing Drainage Pattern of the Site or Area	Significant	Less than significant	FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design
FC-4: Increase in Levee Slope Stability	Beneficial	N/A	N/A
FC-5: Redirection of Under-Seepage	Beneficial	N/A	N/A

Effect FC-1: Alteration of the Existing Drainage Pattern of the Site or Area

Implementation of slope flattening would involve earthwork on the landward side of the levee. The new material on the landside could alter surface runoff patterns. Because interference with drainage could cause or exacerbate local flooding, this effect may be significant. The implementation of Mitigation Measure FC-MM-1, as described above under CHP Academy APA, would reduce this effect to less than significant.

Effect FC-4: Increase in Levee Slope Stability

The construction of a stability berm on the landside of the Sacramento Bypass Levee would act as a buttress to stabilize the slope of the levee. Stabilizing slopes would increase levee slope stability and have a beneficial effect on flood control conditions.

Effect FC-5: Redirection of Under-Seepage

The proposed relief wells and interior drain would provide pathways to safely capture and release under-seepage and reduce the potential for under-seepage to weaken levee foundation soils via piping or sand boils. These project elements would create beneficial effects on geomorphic and flood conditions in the project area.

Section 3.2

Water Quality and Groundwater Resources— CHP Academy Early Implementation Project

3.2.1 Introduction

This section describes the affected environment for water quality and groundwater resources, including the regulatory setting associated with water quality and groundwater resources, the effects on water quality and groundwater resources that would result from the proposed project, and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below:

- *Central Valley Regional Water Quality Control Board Water Quality Control Basin Plan* (2007)
- List of water quality constituents obtained from the California Data Exchange Center website (California Data Exchange Center 2009)
- *Yolo County General Plan* (Yolo County 2002)
- *City of West Sacramento General Plan Policy Document* (City of West Sacramento 2004)

3.2.2 Affected Environment

This section described the affected environment for water quality and groundwater resources in the CHP Academy EIP project area, including the regulatory and environmental settings.

3.2.2.1 Regulatory Setting

3.2.2.1.1 Federal

The following Federal regulations related to water quality and groundwater resources may apply to the CHP Academy EIP.

Clean Water Act

The State Water Resources Control Board (State Water Board) is the state agency with primary responsibility for implementing the Federal Clean Water Act (CWA), which establishes regulations relating to water resource issues. Typically, all regulatory requirements are implemented by the State Water Board through nine regional water quality control boards (RWQCBs) established throughout the state. The Central Valley RWQCB is responsible for regulating discharges to the Sacramento River and its tributaries.

The CWA is the primary Federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. It operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit. Permit review is the CWA's primary regulatory tool. The following sections provide additional details on specific sections of the CWA.

Section 404: Permits for Fill Placement in Waters and Wetlands

CWA Section 404 regulates the discharge of dredged and fill materials into "waters of the United States," which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. Project proponents must obtain a permit from the U.S. Army Corps of Engineers (USACE) for all discharges of dredged or fill material into waters of the United States before proceeding with a proposed activity. Before any actions that may affect surface waters are implemented, a delineation of jurisdictional waters of the United States must be completed, following USACE protocols, to determine whether the project area contains wetlands or other waters of the United States that qualify for CWA protection. These areas include:

- sections within the ordinary high water mark (OHWM) of a stream, including non-perennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned; and
- seasonal and perennial wetlands, including coastal wetlands.

Wetlands are defined for regulatory purposes as areas "inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3, 40 Code of Federal Regulations [CFR] 230.3).

Applicants must obtain a permit from USACE for all discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed activity. As stated by the Counsel for the U.S. Environmental Protection Agency's (EPA's) January 19, 2001, determination in response to the Solid Waste Agency of Northern Cook County *v.* U.S. Army Corps of Engineers ruling, non-navigable, isolated waters may not be regulated by USACE. As part of the wetland delineation and verification process, USACE will determine whether the wetlands in the project area are isolated and therefore not regulated under Section 404.

USACE may issue either an individual permit evaluated on a case-by-case basis or a general permit evaluated at a program level for a series of related activities. General permits are pre-authorized and are issued to cover multiple instances of similar activities expected to cause only minimal significant environmental effects. Nationwide permits (NWPs) are a type of general permit issued to cover particular fill activities. Each NWP specifies particular conditions that must be met for the NWP to apply to a particular project. Potential waters of the United States in the project area are under the jurisdiction of USACE's Sacramento District.

Compliance with Section 404 requires compliance with several other environmental laws and regulations. USACE cannot issue an individual permit or verify the use of a general permit until the requirements of the National Environmental Policy Act (NEPA), the Federal Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) (see Section 3.17, Cultural Resources) have been met. In addition, USACE cannot issue or verify any permit until a water quality certification or a waiver of certification has been issued pursuant to CWA Section 401.

Certain activities are exempt from the Section 404 permitting process:

- farming, ranching, and forestry activities that are considered normal and ongoing (as of 1985 conditions), such as plowing, harvesting, and minor drainage of upland areas to waters of the United States;
- construction and maintenance of stock ponds and irrigation ditches;
- maintenance of drainage ditches;
- construction of temporary sedimentation basins in upland areas;
- construction and maintenance of farm, forest, and mining roads in accordance with best management practices (BMPs); and
- other activities regulated by an approved program of BMPs authorized by CWA Section 208(b)(4).

Section 404 permits may be issued for only the least environmentally damaging practical alternative (i.e., authorization of a proposed discharge is prohibited if there is a practical alternative that would have fewer significant effects and lacks other significant consequences). Section 404 may apply to the proposed project if construction would occur within waters of the United States.

Section 402: Permits for Discharge to Surface Waters

CWA Section 402 regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by EPA. In California, the State Water Board is authorized by EPA to oversee the NPDES program through the RWQCBs (see related discussion in this section under Porter-Cologne Water Quality Control Act). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits.

Construction Activities

Most construction activities that disturb 1 acre of land or more are required to obtain coverage under the NPDES General Permit for Construction Activities (General Construction Permit), which requires the applicant to file a notice of intent (NOI) to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP). The SWPPP includes a site map and a description of proposed construction activities, along with a demonstration of compliance with relevant local ordinances and regulations, and an overview of the BMPs that would be implemented to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. Permittees are further required to conduct annual monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants. The City will need to file an NOI with the Central Valley RWQCB to obtain the General Construction Permit before any construction activities begin.

Dewatering Activities

While small amounts of construction-related dewatering are covered under the General Construction Permit, the Central Valley RWQCB has also adopted a General Order for Dewatering and Other Low Threat Discharges to Surface Waters (General Dewatering Permit). This permit applies to various categories of dewatering activities and likely would apply to the proposed project, if construction required dewatering in greater quantities than that allowed by the General Construction Permit and discharged the effluent to surface waters. The General Dewatering Permit contains waste discharge limitations and prohibitions similar to those in the General Construction Permit. To obtain coverage, the applicant must submit an NOI and a pollution prevention and monitoring program (PPMP) to the Central Valley RWQCB. The PPMP must include a description of the discharge location, discharge characteristics, primary pollutants, receiving water, treatment systems, spill prevention plans, and other measures necessary to comply with discharge limits. A representative sampling and analysis program must be prepared as part of the PPMP and implemented by the permittee, along with recordkeeping and quarterly reporting requirements during dewatering activities. For dewatering activities that are not covered by the General Dewatering Permit, an individual NPDES permit and waste discharge requirements (WDRs) must be obtained from the Central Valley RWQCB. However, the amount of dewatering needed for the proposed project likely would fall under the General Dewatering Permit because excavation activities associated with construction of the project elements such as the slurry cutoff walls and sheet pile walls may reach the groundwater table.

Section 401: Water Quality Certification

Under CWA Section 401, applicants for a Federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a Federal component and may affect the quality of the state's waters (including projects that require Federal agency approval, such as the issuance of a Section 404 permit) also must comply with Section 401. The City will obtain a Section 401 certification or waiver from the Central Valley RWQCB.

Section 303: Impaired Waters

California adopts water quality standards to protect beneficial uses of state waters as required by CWA Section 303 and the Porter-Cologne Water Quality Control Act of 1969. Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop a list of water quality-limited segments. In California, the State Water Board develops the list of water quality-limited segments; EPA approves each state's list. Waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. Section 303(d) also establishes the total maximum daily load (TMDL) process to guide the application of state water quality standards.

3.2.2.1.2 State

The following policies or agencies related to water quality and groundwater resources may apply to the CHP Academy EIP.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, passed in 1969, articulates with the CWA. It established the State Water Board and divided the state into nine regions, each overseen by an RWQCB. The State Water Board is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, although much of its daily implementation authority is delegated to the RWQCBs, which are responsible for implementing CWA Sections 402 and 303(d). In general, the State Water Board manages both water rights and statewide regulation of water quality, while the RWQCBs focus exclusively on water quality within their regions.

Central Valley Regional Water Quality Control Board

The Central Valley RWQCB is responsible for implementing its Water Quality Control Plan (Basin Plan) (2007) for the Sacramento River and its tributaries. The Basin Plan identifies beneficial uses of the river and its tributaries and water quality objectives to protect those uses. Numerical and narrative criteria are contained in the Basin Plan for several key water quality constituents, including dissolved oxygen (DO), water temperature, trace metals, turbidity, suspended material, pesticides, salinity, radioactivity, and other related constituents.

The methods the Central Valley RWQCB uses to implement the Basin Plan criteria include issuing WDRs to any entity that discharges to a surface water body and does not meet certain water quality criteria such as those related to sediment. The WDR/NPDES permit also serves as a federally required NPDES permit (under the CWA) and incorporates the requirements of other applicable regulations.

Basin Plans and Water Quality Objectives

The Porter-Cologne Water Quality Control Act provides for the development and periodic review of basin plans that designate beneficial uses of California's major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters. Beneficial uses represent the services and qualities of a water body (i.e., the reasons the water body is considered valuable), while water quality objectives represent the standards necessary to protect and support those beneficial uses. Basin plans are implemented primarily by using the NPDES permitting system to regulate waste discharges so that water quality objectives are met (see discussion of the NPDES system under CWA above). Basin plans are updated every 3 years and provide the technical basis for determining WDRs and taking enforcement actions. The Central Valley RWQCB Basin Plan was last updated in 2007.

Water Quality Objectives by Region

The RWQCBs have set water quality objectives for all surface waters in their respective regions (including the Sacramento River basin) for the following substances and parameters: ammonia, bacteria, biostimulatory substances, chemical constituents, color, DO, floating material, oil and grease, potential of hydrogen (pH), pesticides, radioactivity, salinity, sediment, settleable material, suspended material, tastes and odors, temperature, toxicity, and turbidity.

State Implementation Plan

In 1994, the State Water Board and EPA agreed to a coordinated approach for addressing priority toxic pollutants in inland surface waters, enclosed bays, and estuaries of California. In March 2000, the State Water Board adopted a state implementation plan (SIP) for priority toxic pollutant water quality criteria contained in the California Toxics Rule (CTR). EPA promulgated the CTR in May 2000. The SIP also implements National Toxics Rule (NTR) criteria and applicable priority pollutant objectives in the basin plans. In combination, the CTR and NTR and applicable basin plan objectives, existing RWQCB beneficial use designations, and SIP compose water quality standards and implementation procedures for priority toxic pollutants in non-ocean surface waters in California, such as the Sacramento River.

3.2.2.1.3 Local

The following local policies related to water quality and groundwater resources may apply to the implementation of the CHP Academy EIP.

City of West Sacramento General Plan

The City is in the process of updating the *City of West Sacramento General Plan* adopted in 1990. The Natural Resources section of the existing general plan contains a number of goals and polices related to water quality.

Goal A: To protect water quality in the Sacramento River, Sacramento Deep Water Ship Channel, Lake Washington, and the area's groundwater basin.

Policies

1. The City shall prohibit the establishment of any new septic systems within areas where City sewer and water service are available within one air mile and shall require that new septic tank installation elsewhere be limited to one acre or larger parcels.
2. The City shall seek the elimination of existing septic tanks in urbanized areas.
3. The City shall not approve new development that has a significant potential for adversely affecting water quality in the Sacramento River, the Deep Water Ship Channel, Lake Washington, or the area's groundwater basin.
4. The City shall regularly monitor water quality in City wells for evidence of toxics, saltwater intrusion, and other contaminants.
5. The City shall utilize the CEQA process to identify and avoid or mitigate potential groundwater pollution problems resulting from new commercial and industrial development.
6. The City shall support efforts on a county, regional, or statewide basis to reduce runoff of toxic agricultural chemicals into the Sacramento River.
7. The City shall implement measures to minimize the discharge of sediment into its watercourses.
8. The City shall continue to encourage responsible state agencies to prohibit the discharge of saltwater ballast into the Deep Water Ship Channel.

Yolo County General Plan

The *Yolo County General Plan* is also in the process of being updated, and a draft revised general plan is available on the County website. The Conservation and Open Space Element contains goals on polices in regard to water resources. The following goal and polices are included in the *Yolo County General Plan*:

Goal CO-5: Water Resources. Ensure an abundant, safe, and sustainable water supply to support the needs of existing and future generations.

Policy CO-5.6. Improve and protect water quality for municipal, agricultural, and environmental uses.

Policy CO-5.7. Support mercury regulations that are based on good science and reflect an appropriate balancing of sometimes competing public values including health, food chain, reclamation and restoration of Cache Creek, sustainable and economically viable Delta agriculture, necessary mineral extraction, flood control, erosion control, water quality, and habitat restoration.

Policy CO-5.8. Support efforts to reduce the accumulation of methyl mercury in fish tissue in Cache Creek and the Delta, as well as the consumption of fish with high levels of methyl mercury.

Policy CO-5.12. Support the integrated management of surface and groundwater, stormwater treatment and use, the development of highly treated wastewater, and desalinization where feasible.

Policy CO-5.17. Require new development to be designed such that nitrates, lawn chemicals, oil, and other pollutants of concern do not impair groundwater quality.

Policy CO-5.21. Encourage the use of water management strategies, biological remediation, and technology to address naturally occurring water quality problems such as boron, mercury, and arsenic.

Policy CO-5.22. Work with other agencies and non-profit organizations to provide educational and technical assistance programs to encourage farmers to adopt agricultural methods that improve water quality.

Policy CO-5.23. Support efforts to meet applicable water quality standards for all surface and groundwater resources.

Policy CO-5.24. Pursue funding to remediate historic mines and other sources of mercury contamination on the Cache Creek watershed.

3.2.2.2 Environmental Setting

The following considerations are relevant to surface water quality and groundwater resources in the proposed CHP Academy EIP project area. The CHP Academy EIP project area is adjacent to the Sacramento River and involves work within the Sacramento Bypass.

3.2.2.2.1 Surface Water Quality

Water management operations at Shasta Dam and other flow-regulating facilities substantially influence the flow regime of the Sacramento River. Water quality dynamics also have been influenced by the operation of these flow-regulating facilities. The water quality of the Sacramento River is good to excellent, with relatively cool water temperatures, low biochemical oxygen demand (BOD), medium to high DO, and low mineral and nutrient content. In general, the surface water quality of the Sacramento River is representative of agricultural return flows, urban runoff, and natural sedimentation from scouring.

CWA Section 303(d) establishes the TMDL process to assist in guiding the application of state water quality standards. It requires the states to identify streams in which water quality is impaired (i.e., affected by the presence of pollutants or contaminants) and to establish the TMDL—the maximum quantity of a particular contaminant that a water body can assimilate without experiencing adverse effects. The 303(d) list breaks up the Sacramento River into four sections: Keswick Dam to Cottonwood Creek, Cottonwood Creek to Red Bluff, Red Bluff to Knights Landing, and Knights Landing to the Delta. All sections of the Sacramento River are listed on the 303(d) list for unknown toxicity, and the Knights Landing to the Delta section is listed for mercury. Mercury is primarily a legacy of gold mining.

The following sections discuss specific contaminants of concern in relation to the implementation of the project on the Sacramento River.

Total Suspended Sediment and Turbidity

Total suspended sediment (TSS) is indicative of upstream scouring, bank erosion, and agricultural return flow transporting and depositing sediment. Sediment is considered a pollutant by the Central Valley RWQCB and can transport other contaminants such as phosphorus, and hydrophobic contaminants such as organochlorine pesticides. Data were downloaded from the U.S. geological Survey (USGS) web site from 1997 to 2007 for the Sacramento River at Freeport. Note that more recent flow data (2007 to 2009) are available; however, there are no matching TSS data available for this more recent time frame. Therefore, the most recent available data (2007 to 2009) were used to calculate sediment loads. Monthly average data points are presented in Table 3.2-1. The average January flow on the Sacramento River from 1997 to 2007 is 41,414 cubic feet per second (cfs), and the average loading of sediment during January is equal to 11,670 (conversion factor*TSS*flow/ton) tons per day.

Although sedimentation is a natural part of the flow regime for rivers, the Central Valley RWQCB also considers it a pollutant. Excessive sedimentation from construction practices such as placement of riprap on levees or constructing slurry cutoff walls can smother filter-feeding organisms and cause other serious water quality related issues.

Turbidity is another indicator of how much sedimentation is in the water and is measured using an optical light probe. Turbidity is measured in nephelometric turbidity units (NTUs). The Basin Plan states that where ambient turbidity is between 5 and 50 NTUs, projects shall not increase turbidity on the Sacramento River by more than 20% above the ambient conditions. Furthermore, if the ambient diurnal variation in turbidity fluctuates in and out of the 5 and 50 NTUs threshold, the Basin Plan states that averaging periods can be applied to data to determine compliance. For example, during the summer months the Sacramento River turbidity may be less than 50 NTUs, and during the winter months the turbidity may be more than 50 NTUs because the higher flow rate causes more river scouring. Thus, monthly average was calculated using hourly California Data Exchange Center (CDEC) data and is presented in Table 3.2-1 below. Where the ambient turbidity is between 50 and 100 NTUs, a project must not exceed 10 NTUs above ambient conditions. This threshold would apply to the months of January and February (Table 3.2-1).

The project would need to comply with the above-stated thresholds for turbidity. However, it is important to note that these thresholds may not be the same during the construction period because the turbidity data presented in Table 3.2-1 are averaged out over only about 1.5 years, and conditions might change.

Table 3.2-1. Monthly Average Total Suspended Solids and Turbidity on the Sacramento River at Freeport from 1997 to 2007

Month	Discharge (cfs)[1]	TSS (mg/L)[1]	TSS Load (tons)	Turbidity (NTU)[2]
January	41,414	104	11,670	64
February	44,084	83	9,839	68
March	39,586	70	7,476	15
April	28,552	51	3,946	11
May	25,152	48	3,279	12
June	21,461	30	1,741	17
July	20,432	37	2,019	21
August	18,235	27	1,332	9
September	16,121	29	1,266	10
October	11,950	29	940	6
November	13,612	24	868	8
December	25,105	81	5,463	12

Sources:

1 U.S. Geological Survey data: <www.usgs.gov>

2 California Data Exchange Center data: <http://cdec.water.ca.gov>

Notes:

Flow and TSS data are from the USGS and are presented as monthly average from 1997 to 2007. Turbidity data are from CDEC from March 2007 to January 2009 and also are presented as a monthly average. Turbidity data are from the Sacramento River at Hood, a few river miles downstream from the USGS station

Dissolved Oxygen, Temperature, Electrical Conductivity, and pH

DO is a critical component for all forms of aquatic life. It also can be highly variable and subject to large oscillations in short time periods. With calm waters and low flows, water bodies can thermally stratify, causing deeper zones to have very low DO concentrations. Additionally, high levels of nutrient loading can cause algal blooms. These blooms can cause large swings in DO levels as the algae populations fluctuate in size, producing oxygen while growing and consuming it while decaying. When DO concentrations fall below certain limits, the resulting low-DO zones can act as a barrier to fish migration and potentially adversely affect spawning success. In extreme cases, persistent low concentrations of DO can result in mortality of benthic organisms and other less-mobile aquatic species. The Basin Plan objective for DO in the Sacramento River from the I Street Bridge to the Delta is 7.0 milligrams per liter (mg/L) (Central Valley Regional Water Quality Control Board 2007). The Sacramento River DO concentrations near Hood from 2003 to 2009 are typically 10 mg/L during the storm season and 8 mg/L or more during the dry season when flow is lower (Table 3.2-2).

Water temperature is a critical constituent from the standpoint of aquatic life. The Basin Plan objective requires that the Sacramento River temperature not exceed 68°F from Hamilton City to the I Street Bridge in Sacramento during periods when temperature increases would be detrimental to the fishery. In addition, the Basin Plan objective for temperature also requires that it not deviate more than 5°F from ambient river temperature (Central Valley Regional Water Quality Control Board 2007). During the summer months of July and August, the temperature of the Sacramento at

Hood was approximately 71°F (Table 3.2-2). However, this location is downstream of the I Street Bridge, and with the cold water inflow of the American River, the I Street Bridge temperature may be within Basin Plan standards. While an unlikely scenario, excessive sedimentation in large quantities could affect the temperature of the Sacramento River.

The concentration of hydrogen ion activity in water is reported on a pH scale from 0 to 14. If a solution measures less than 7, it is considered acidic. If a solution measures more than 7, it is considered basic, or alkaline. If a solution measures 7, it is considered neutral. Many biological functions can occur only within a narrow range of pH values. The Basin Plan objective for pH is between 6.5 and 8.5. Furthermore, discharges cannot result in changes of pH that exceed 0.5. The monthly average pH of the Sacramento River from 2003 to 2009 remained stable throughout the year (Table 3.2-2). Construction materials such as concrete or other chemicals could affect the pH of the Sacramento River if a discharge were to occur.

Electrical conductivity (EC) is a measure of the degree to which a given water sample conducts an electrical current. The amount of total dissolved solids (TDS) in water is related directly to EC (i.e., high EC is an indicator of high TDS). TDS and EC are general indicators of salinity and are regulated under the Basin Plan. Basin Plan objectives for EC on the Sacramento River are 340 microSiemens per centimeter (μS/cm). It is clear in Table 3.2-2 that monthly average EC levels in the Sacramento River remain below this threshold.

Table 3.2-2. Monthly Average Physical Data for the Sacramento River at Freeport from 2003 to 2009

Month	Temperature (°F)	pH (Standard)	DO (mg/L)	EC (μs/cm)
January	48.7	7.5	10.5	170
February	50.9	7.4	10.1	170
March	55.3	7.5	9.7	154
April	58.3	7.4	9.6	138
May	64.3	7.4	8.6	145
June	68.8	7.3	8.2	139
July	71.1	7.3	7.9	134
August	71.0	7.4	7.8	156
September	67.9	7.5	8.0	166
October	62.5	7.2	8.6	145
November	55.9	7.4	8.9	186
December	49.5	7.4	10.2	186

Source: California Data Exchange Center data: <http://cdec.water.ca.gov/>

Groundwater Resources Quality

The California Department of Water Resources (DWR) delineates groundwater basins throughout California under the state's Groundwater Bulletin 118. The CHP Academy EIP is located in the Sacramento Valley Groundwater Basin, Yolo Sub-basin (Basin No. 5-21.67). The total surface area of the Yolo Sub-basin is 256,000 acres. The Yolo Sub-basin is bounded on the east by the Sacramento River, on the west by the Coast Range, on the north by Cache Creek, and on the south by Putah Creek. The sub-basin is roughly bisected by an anticlinal structure, but otherwise it is gently sloping from west to east with elevations ranging from 400 feet at the base of the Coast Range, to close to sea level near the eastern portion of the sub-basin (California Department of Water Resources 2004).

Younger alluvium in the sub-basin consists of flood basin deposits and recent stream channel deposits. Flood basin deposits occur along the eastern margin of the sub-basin. The deposits consist of silts and clay, but along the eastern portion of the sub-basin, the interbedded deposits are connected with deposits of the Sacramento River. Older alluvium generally consists of loose to moderately compacted silt, silty clay, sand, and gravel deposited in alluvial fans during the Pliocene and Pleistocene (California Department of Water Resources 2004).

The anticlinal structure, which is expressed at the surface as the Dunnigan Hills and Plainfield Ridge, impedes subsurface flow from east to west. Subsurface groundwater outflow sometimes occurs from the Yolo Sub-basin into the Solano Sub-basin to the south. Subsurface outflow and inflow also may occur beneath the Sacramento River (California Department of Water Resources 2004).

Groundwater levels in the sub-basin are affected by periods of drought, a result of increased groundwater pumping and less surface water recharge. However, data indicate that the recovery of the aquifer is fast during wet years. Data indicate that long-term trends do not show any significant groundwater decline (California Department of Water Resources 2004). However, there are localized groundwater depressions in the vicinity of the Davis, Woodland, and Dunnigan/Zamora areas. Past studies have shown that the Yolo Sub-basin is subject to overdraft; however, the completion of Indian Valley Reservoir in 1976 provided a significant amount of surface water deliveries to be blended with groundwater in the urbanized areas located in the sub-basin (California Department of Water Resources 2004).

Many studies have been conducted to determine the groundwater storage capacity of the sub-basin. Several of these studies refer to Scott and Scalmanini in their 1975 report, *Investigations of Groundwater Resources, Yolo County*. Groundwater storage capacity for the Yolo Sub-basin can be estimated at 6,455,940 acre-feet for the depths between 20 and 420 feet. Based on the Scott report, groundwater storage in the Yolo Sub-basin in 1974 was estimated at 6,074,220 acre-feet (California Department of Water Resources 2004).

Groundwater quality in the sub-basin is characterized as a sodium magnesium, calcium magnesium, or magnesium bicarbonate type. The quality is considered good for both agricultural and municipal uses, despite the elevated hardness in the basin. The hardness is generally above 180 mg/L calcium carbonate ($CaCO_3$). Selenium and boron are found in high concentrations locally (California Department of Water Resources 2004). TDS range from 107 parts per million (ppm) to 1,300 ppm and average 574 ppm based on Title 22 data obtained from public supply wells (California Department of Water Resources 2004). Localized impairments include elevated concentrations of boron (as high as 2 to 4 ppm) in groundwater along Cache Creek and the Cache Creek Settling Basin area, increased levels of selenium present in groundwater supplies for the city of Davis, and localized areas of nitrate contamination (California Department of Water Resources 2004).

3.2.2.3 Environmental Consequences

This section describes the environmental consequences relating to surface water and groundwater quality for the proposed CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.2.2.4 Assessment Methods

This evaluation of surface water quality and groundwater quality is based on professional standards and information obtained from the Central Valley RWQCB, State Water Board, and DWR.

The key effects were identified and evaluated based on the environmental characteristics of the CHP Academy EIP project area and the magnitude, intensity, and duration of activities related to the construction of this project.

3.2.2.5 Determination of Effects

For this analysis, an effect pertaining to surface water quality and groundwater quality was considered significant under NEPA and CEQA if it would result in any of the following environmental effects, which are based on NEPA standards, State CEQA Guidelines Appendix G (14 CCR 15000 *et seq.),* and standards of professional practice:

- violate water quality standards or waste discharge requirements,
- substantially deplete groundwater supplies or interfere substantially with ground water recharge,
- substantially degrade water quality, or
- alter regional or local hydrology resulting in substantial increases in erosion or sedimentation.

3.2.3 Effects and Mitigation Measures

3.2.3.1 No Action Alternative

For water quality and groundwater resources, the No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to water quality such as earthmoving that result in increased turbidity, or incidental releases of construction-related contaminants would occur. Therefore, there would be no effect on surface or groundwater quality or resources attributable to the implementation of the No Action Alternative.

However, without levee improvements, there is the continued risk of levee failure and continuing under seepage and loss of levee foundation soils would be expected to continue. If a levee overtopping or breach were to occur, floodwaters could be pumped back over levees or recede back through the levee breach into the Sacramento River, DWSC, or the Yolo or Sacramento Bypasses. Flooded areas may contain contaminants from stored chemicals, septic systems, and flooded vehicles—all of which would be released into floodwaters and subsequently contaminate the Sacramento River and the Delta surface waters and potentially soil and groundwater. These contaminants would likely exceed acceptable established water quality standards and impair beneficial uses of the Sacramento River and Delta, including downstream drinking water intakes. A catastrophic levee failure could result in collapse of miles of levee slopes and alteration of regional and local hydrology that would result in substantial increases in erosion and sedimentation. Loss of eroded levee foundation and eroded topsoil from inundated areas would increase turbidity and total dissolved solids in the Sacramento River and ultimately, the Delta; again, impairing beneficial uses. Furthermore, if a levee breach were to occur, emergency construction and repair activities would be implemented without the use of best management practices and could result in the release of hazardous construction materials such as oil and other petroleum related products.

3.2.3.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on water quality and groundwater resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids	Less than significant	N/A	
WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials	Less than significant	N/A	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality
WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation	Significant	Less than significant	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering

Effect WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids

The proposed project would involve earth-moving activities (i.e., degrading the levee prior to slurry wall construction and slope flattening) that could cause sedimentation and erosion in adjacent water bodies. The development of a SWPPP, an environmental commitment (see Section 2.7 of Chapter 2, Alternatives, for a full description) included as part of this proposed project would reduce the likelihood that this effect would occur, or reduce the effect should it occur. This commitment includes the development of a SWPPP prior to beginning construction. Site-specific erosion control measures would be developed as part of a SWPPP, a requirement of the NPDES General Construction Permit. A SWPPP typically contains, but is not limited to, the following BMPs:

- **Timing of construction.** Conduct earthwork during the typical construction season.
- **Staging of construction equipment and materials.** Stage construction equipment and materials on the landside of the subject levee reaches. To the extent possible, stage equipment and materials in areas that already have been disturbed.
- **Soil and vegetation disturbance.** Minimize ground and vegetation disturbance during construction by establishing designated equipment staging areas, ingress and egress corridors, spoils disposal and soil stockpile areas, and equipment exclusion zones prior to the commencement of any grading operations.
- **Grading spoils.** Stockpile soil and grading spoils on the landside of the subject levee reaches, and install sediment barriers (e.g., silt fences, fiber rolls, straw bales) around the base of

stockpiles to intercept runoff and sediment during storm events. If necessary, cover stockpiles with geotextile fabric to provide protection against wind and water erosion.

- **Sediment barriers.** Install sediment barriers on graded or otherwise-disturbed slopes as needed to prevent sediment from leaving the project site and entering nearby surface waters.
- **Site stabilization.** Install native plant materials to stabilize cut and fill slopes and other disturbed areas once construction is complete. Plant materials may include an erosion control seed mixture or shrub and tree container stock. Temporary structural BMPs, such as sediment barriers, erosion control blankets, mulch, and a mulch tackifier, may be installed as needed to stabilize disturbed areas until vegetation becomes established.

Effect WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials

Project actions may involve storage, use, or discharge of toxic and other harmful substances near water bodies (or in areas that drain to these water bodies, e.g., the Sacramento River). Construction activities would involve the use of heavy equipment, cranes, compactors, and other construction equipment that uses petroleum products (e.g., fuels, lubricants, hydraulic fluids, coolants). All of these materials may be toxic to fish and other aquatic organisms. An accidental spill or inadvertent discharge of these materials could affect the water quality of the river or water body.

There are three environmental commitments included as part of this project that would reduce the effect of such a release should it occur or reduce the likelihood that a release would occur. These environmental commitments include the development of the SWPPP, spill prevention, control, and countermeasures plan (SPCCP), and a bentonite slurry spill contingency plan (BSSCP). Typical elements of the SWPPP are described above under Effect WQ-1, above. All three environmental commitments are described in detail in Section 2.7 of Chapter 2, Alternatives, and are summarized below. All plans would be developed prior to the commencement of construction activities.

An SPCCP is intended to prevent any discharge of oil into navigable water or adjoining shorelines. WSAFCA or its contractor will develop and implement an SPCCP to minimize the potential for and effects from spills of hazardous, toxic, or petroleum substances during construction and operation activities. The SPCCP will be completed before any construction activities begin. Implementation of this measure will comply with state and Federal water quality regulations. The SPCCP will describe spill sources and spill pathways in addition to the actions that would be taken in the event of a spill (e.g., an oil spill from engine refueling would be immediately cleaned up with oil absorbents). The SPCCP will outline descriptions of containments facilities and practices such as doubled-walled tanks, containment berms, emergency shut-offs, drip pans, fueling procedures and spill response kits. It will also describe how and when employees are trained in proper handling procedure and spill prevention and response procedures.

A BSSCP is typically developed for activities that involve the use of bentonite materials (e.g., the construction of slurry walls). The BSSCP is intended to minimize the potential for a frac-out associated with excavation and tunneling activities, provide for timely detection of frac-outs, and ensure and “minimum-effect” response in the event of a frac-out and release of excavation fluid (i.e., bentonite used for the construction of slurry walls).

Release of contaminants into adjacent water bodies could result in significant effects. Adherence to these environmental commitments and the implementation of Mitigation Measure WQ-MM-1 should spills occur would reduce this effect to less than significant.

Mitigation

Mitigation Measure WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality

If an appreciable spill has occurred and results determine that project activities have significantly affected surface or groundwater quality, a detailed analysis will be performed by a registered environmental assessor or professional engineer to identify the likely cause of contamination. This analysis will conform to American Society for Testing and Materials (ASTM) standards in conjunction with other relevant regulations, such as U.S. EPA's Resource Conservation and Recovery Act (RCRA) guidance, the California Department of Public Health Services Safe Drinking Water Act, and county environmental health regulations. The analysis will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, WSAFCA and its contractors will select and implement measures to control contamination, with a performance standard that surface water quality and groundwater quality must be returned to baseline conditions.

Effect WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation

Trenching and excavation associated with the construction of slurry walls may reach a depth that could expose the water table, in which case an immediate and direct path to the groundwater basin would become available for contaminants to enter the groundwater system. Primary construction-related contaminants that could reach groundwater include increased sediment, oil and grease, and hazardous materials.

In addition, while dewatering of the construction area (e.g., trenches dug for slurry wall construction that may be filled with groundwater) is not expected to occur, if it became necessary, it could result in the release of contaminants to surface or groundwater.

The implementation of the CHP Academy EIP is not expected to require digging or trenching at depths where groundwater aquifers utilized for drinking water occur. If trenching activities were to incidentally reach a groundwater aquifer utilized for drinking water, the slurry wall material is relatively benign and would not remain in a liquid state long enough to allow for significant lateral movement within the aquifer.

As discussed in Section 3.16, Public Health and Environmental Hazards, prior to all construction activities, WSAFCA will complete Phase I and, if necessary, Phase II Environmental Site Assessment Investigations that will include analysis of soil and/or groundwater samples for the potential contamination sites that have not yet been covered by previous investigations. If hazardous substances are found, WSAFCA or its contractor will implement required measures for the proper transport and disposal of such materials in accordance with the appropriate local, state, and Federal laws and regulations.

Effects on groundwater and drinking water quality from operation and construction could be significant. The proposed project would adhere to environmental commitments of the SWPPP, the

SPCCP, and the BSSCP, as summarized above under Effects WQ-1 and WQ-2. Adherence to environmental commitments of the SWPPP, SPCCP, and the BSSCP and the implementation of Mitigation Measures WQ-MM-1 and WQ-MM-2 would reduce this effect to less than significant.

Mitigation

Mitigation Measure WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality

Mitigation Measure WQ-MM-2: Implement Provisions for Dewatering

Before discharging any dewatered effluent to surface water, WSAFCA or its contractors will obtain a Low Threat Discharge and Dewatering NPDES permit from the Central Valley RWQCB. Depending on the volume and characteristics of the discharge, coverage under the Central Valley RWQCB's NPDES General Construction Permit or General Dewatering Permit is possible. As part of the permit, the permittee will design and implement measures as necessary so that the discharge limits identified in the relevant permit are met. For example, if dewatering is needed during the construction of the slurry wall, then the Low Threat Discharge and Dewatering NPDES permit would require proper disposal of the water. As a performance standard, these measures will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable. Implemented measures may include the retention of dewatering effluent until particulate matter has settled before it is discharged, use of infiltration areas, and other BMPs. Final selection of water quality control measures will be subject to approval by WSAFCA.

WSAFCA will verify that coverage under the appropriate NPDES permit has been obtained before allowing dewatering activities to begin. WSAFCA or its agent will perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained. WSAFCA will notify its contractors immediately if there is a non-compliance issue and will require compliance.

3.2.3.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on water quality and groundwater resources. A description of the effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids	Less than significant	N/A	
WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials	Less than significant	N/A	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality
WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation	Significant	Less than significant	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering

Effect WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids

Effects on surface water quality from excessive turbidity or total suspended solids would be the same for Alternative B as for the CHP APA, above, For Alternative B, the earth-moving activities that would cause such an effect are associated with slope flattening and stability berm construction Environmental commitments remain the same. This effect is considered less than significant. No mitigation is required.

Effect WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials

The effects described under the CHP APA, above, also apply to Alternative B. However, Alternative B would not require the implementation of a BSSCP because no slurry wall construction is involved in Alternative B. Adherence to the other environmental commitments and the implementation of Mitigation Measure WQ-MM-1 should spills occur would reduce this effect to less than significant. No further mitigation is required.

Effect WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation

Trenching and excavation associated with the construction of the interior drain, stability berm and relief wells may reach a depth that could expose the water table, in which case an immediate and direct path to the groundwater basin would become available for contaminants to enter the groundwater system. Primary construction-related contaminants that could reach groundwater include increased sediment, oil and grease, and hazardous materials.

In addition, while dewatering of the construction area (e.g., trenches dug for slurry wall construction that may be filled with groundwater) is not expected to occur, if it became necessary, it could result in the release of contaminants to surface or groundwater.

The implementation of Alternative B is not expected to require digging or trenching at depths where groundwater aquifers utilized for drinking water occur. Therefore, no effects on drinking water would occur. As discussed in Section 3.16, Public Health and Environmental Hazards, prior to all construction activities, WSAFCA will complete Phase I and, if necessary, Phase II Environmental Site Assessment Investigations that will include analysis of soil and/or groundwater samples for the potential contamination sites that have not yet been covered by previous investigations. If hazardous substances are found, WSAFCA or its contractor will implement required measures for the proper transport and disposal of such materials in accordance with the appropriate local, state, and Federal laws and regulations.

Effect on groundwater and drinking water quality from operation and construction could be significant. The proposed project would adhere to environmental commitments of the SWPPP, and the SPCCP, as summarized above under CHP APA, Effects WQ-1 and WQ-2. Adherence to environmental commitments of the SWPPP and the SPCCP, and the implementation of Mitigation Measures WQ-MM-1 and WQ-MM-2 would reduce this effect to less than significant.

Section 3.3
Geology, Seismicity, Soils, and Mineral Resources—CHP Academy Early Implementation Project

3.3.1 Introduction

This section describes the regulatory and environmental setting for geology, seismicity, soils, and mineral resources; the effects on geology, soils, and mineral resources that would result from the proposed project; and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- Maps and reports prepared by the USGS, California Geological Survey, Natural Resources Conservation Service, and the California Division of Mines and Geology
- *Yolo County General Plan* (Yolo County 2002)
- *City of West Sacramento General Plan* (City of West Sacramento 2004a)
- *Problem Identification Report* (HDR, Inc. on behalf of the City of West Sacramento 2008)

3.3.2 Affected Environment

This section describes the affected environment for geology, seismicity, soils, and mineral resources in the CHP Academy EIP project area, including the regulatory and environmental setting.

3.3.2.1 Regulatory Setting

3.3.2.1.1 State

The following state policies related to geology, seismicity, soils, and mineral resources may apply to the implementation of the CHP Academy EIP.

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code [PRC] Section 2621 *et seq.*), originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, giving legal weight to terms such as *active*, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned, and construction along or across faults is strictly regulated if they are sufficiently active and well defined. A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during the Holocene

Epoch (considered present time and defined for purposes of the act as approximately the last 11,000 years). A fault is considered well defined if its trace can be clearly identified by a trained geologist at the ground surface or in the shallow subsurface using standard professional techniques, criteria, and judgment. (Hart and Bryant 1997)

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act: the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped seismic hazard zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within seismic hazard zones until appropriate site-specific geologic and geotechnical investigations have been carried out and measures to reduce potential damage incorporated into the development plans.

California Building Standards Code

The State of California's minimum standards for structural design and construction are given in the California Building Standards Code (CBSC) (24 CCR). The CBSC is based on the Uniform Building Code (UBC) (International Code Council 1997), which is used widely throughout the United States (generally adopted on a state-by-state or district-by-district basis). For the CBSC, the UBC has been modified for California conditions with numerous, more detailed, or more stringent regulations. The CBSC requires that "classification of the soil at each building site shall be determined when required by the building official" and that "the classification shall be based on observation and any necessary test of the materials disclosed by borings or excavations."

In addition, the CBSC states that "the soil classification and design-bearing capacity shall be shown on the [building] plans, unless the foundation conforms to specified requirements." The CBSC provides standards for various aspects of construction, including excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with California law, certain aspects of the proposed project would be required to comply with all provisions of the CBSC.

California Surface Mining and Reclamation Act

The Surface Mining and Reclamation Act of 1975 (SMARA) (PRC Sections 2710–2719) is the principal legislation addressing mineral resources in California. SMARA was enacted in response to land use conflicts between urban growth and essential mineral production. Its stated purpose is to provide a comprehensive surface mining and reclamation policy that will encourage the production and conservation of mineral resources while ensuring that:

- significant environmental effects of mining are prevented or minimized;
- mined lands are reclaimed and residual hazards to public health and safety are eliminated; and

- consideration is given to recreation, watershed, wildlife, aesthetic, and other related values.

SMARA governs the use and conservation of a wide variety of mineral resources, although some resources and activities are exempt from its provisions, including excavation and grading conducted for farming, construction, or recovery from flooding or other natural disaster.

SMARA provides for the evaluation of an area's mineral resources using a system of mineral resource zone (MRZ) classifications that reflect the known or inferred presence and significance of a given mineral resource. The MRZ classifications are based on available geologic information, including geologic mapping and other information on surface exposures, drilling records, and mine data; and socioeconomic factors such as market conditions and urban development patterns. The MRZ classifications are defined as follows.

- **MRZ-1**: Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- **MRZ-2:** Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists.
- **MRZ-3:** Areas containing mineral deposits, the significance of which cannot be evaluated from available data.
- **MRZ-4:** Areas where available information is inadequate for assignment into any other MRZ.

The State of California is responsible for mineral resources zoning under SMARA, but SMARA implementation and enforcement authority rests with the local jurisdiction and is carried out through the county or city land use planning process and codes. Yolo County's SMARA implementing regulations are contained in Chapter 3 of Title 10 of the County Code. Solano County's SMARA implementing regulations are contained in Chapter 29 of the County Code.

3.3.2.1.2 Local

The following local policies related to geology, seismicity, soils, and mineral resources may apply to the implementation of the CHP Academy EIP.

Yolo County

The Health and Safety Element of the *Draft 2030 Countywide General Plan* for Yolo County (Yolo County 2008) contains goals, policies, and actions aimed at reducing the risk of geologic or seismic hazards in the county. Any violation of these goals, policies, and actions would constitute a significant effect.

Goals

Goal HS-1 Geologic and Seismic Hazards: Protect the public and reduce damage to property from earthquakes and other geologic hazards.

Policies

Policy HS-1.1: Regulate land development to avoid unreasonable exposure to geologic hazards.

Policy HS-1.2: All development and construction proposals shall be reviewed by the County to ensure conformance to applicable building standards.

Policy HS-1.3: Require environmental documents prepared in connection with CEQA to address seismic safety issues and to provide adequate mitigation for existing and potential hazards identified.

Actions

Action HS-A1: Require a geotechnical analysis for construction in areas with potential geological hazards and/or for purposes of environmental analysis. Recommendations of the geotechnical analysis shall be implemented.

Action HS-A2: Rely upon the most current and comprehensive geological hazard mapping available in the evaluation of potential seismic hazards associated with proposed new development.

Action HS-A3: Continue to participate in the Yolo County Subsidence Network and implement its recommendations.

City of West Sacramento General Plan

In 1990, the City of West Sacramento adopted the *City of West Sacramento General Plan*. The plan was last revised and adopted on December 8, 2004. The *City of West Sacramento General Plan* outlines goals and policies related to natural resources within the study area. The following objectives, policies, and implementation procedures are relevant to the study area.

Health and Safety

Goal A: To prevent loss of life, injury, and property damage due to geologic and seismic hazards.

Policy

1. The City shall require preparation of geotechnical reports and impose appropriate mitigation measures to ensure, within the limits of technical and economic feasibility, that new structures are able to withstand the effects of seismic activity, including liquefaction.
2. Underground utilities, particularly water and natural gas mains, shall be designed to withstand seismic forces.
3. The City shall require post-earthquake building replacement, reconstruction, and rehabilitation to conform to the latest City code requirements.

Grading and Erosion Control Ordinances

Many counties and cities have grading and erosion control ordinances. These ordinances are intended to control erosion and sedimentation caused by construction activities. A grading permit typically is required for construction-related projects in West Sacramento. As part of the permit, the project applicant usually must submit a grading and erosion control plan, project vicinity and site maps, and other supplemental information. Standard conditions in the grading permit include an extensive list of BMPs similar to those contained in a stormwater pollution protection plan (SWPPP).

The City's relevant regulations can be found in the Municipal Code, Title 15 (City of West Sacramento 2004b). Chapter 15.08 establishes standards and procedures for grading and excavation to minimize hazards to life and limb; protect against erosion; maintain the natural environment; and protect the safety, use, and stability of public rights-of-way and drainage channels. It ensures that projects approved under this chapter will be free from harmful effects of runoff, including inundation and erosion, and that neighboring and downstream properties will be protected from drainage problems resulting from new developments. It also ensures proper restoration of vegetation and soil systems disturbed by grading or fill activities authorized under this chapter. It is intended through this chapter to maintain an attractive and healthy landscape and to control against dust and erosion and their consequent effects on soil structure and water quality.

3.3.2.2 Environmental Setting

This section discusses the environmental setting related to soil characteristics, mineral resources, and seismic hazards for the CHP Academy EIP.

3.3.2.2.1 Study Area

Regional Physiographic Setting of the Study Area

The study area is located in the southern portion of the Sacramento Valley within the northern portion of California's Great Valley Geomorphic Province. The Great Valley is a narrow, elongated topographic depression that is approximately 450 miles long and 40 to 70 miles wide. The basin is bordered by the Sierra Nevada plutonic complex to the east and the California Coast Ranges to the west, and the Klamath and Cascade Mountains to the north. The Sacramento Valley contains thousands of feet of accumulated fluvial, overbank, and fan deposits resulting from erosion of these surrounding ranges. The sediments vary from a thin veneer at the edges of the valley to 50,000 feet in the west-central portion and are estimated to be about 8,000 feet thick in the study area. (Northwest Hydraulic Consultants 2007)

The Sacramento River is the main drainage of the region flowing generally south from the Klamath Mountains to its discharge point into the Suisun Bay in the San Francisco Bay Area. In the Sacramento area the Sacramento and American Rivers have been confined by human-made levees since the turn of the 19th century. In the study area, these levees generally were constructed on Holocene age (less than 11,000 years old) alluvial and fluvial deposits deposited by the current and historic Sacramento River and its tributaries. (Kleinfelder 2007)

Geology and Topography

The surface and subsurface distributions of sandy and clayey deposits in the CHP Academy EIP project area are a function of former river positions on the landscape, present-day geomorphic processes adjacent to the river positions on the landscape, and present-day geomorphic processes adjacent to the river channel (i.e., flooding and deposition) (William Lettis & Associates 2007). Helley and Harwood (1985) compiled previous regional studies of the quaternary geology of the Sacramento Valley. Previous geologic mapping in the West Sacramento study area generalized the surficial deposits as Quaternary alluvium (Qa) proximal to the modern river channel and undifferentiated Quaternary basin (Qb) deposits away from the modern river channel. Helley and Harwood (1985) differentiate basin deposits from alluvium on the basis of composition, including only those deposits that are finer-grained and frequently organic-rich, and suggests these deposits were distal deposits where energy conditions were much lower. Both of these map units are considered Holocene age.

Geologic mapping indicates that the Sacramento Bypass Levee is underlain by a combination of alluvium and basin deposits (Helley and Harwood 1985) and buried sandy crevasse splay deposits (William Lettis & Associates 2007).

Mapping by Helley and Harwood (1985) indicates the entire Sacramento River South Levee is underlain by alluvium and basin deposits. Mapping by Helley and Harwood (1985) also indicates the entire DWSC East and West Levees and Port North and South Levees are underlain by basin deposits with the exception of the Port North Levee Stations 242+00 to 263+57.24 and Port South Levee Stations 1045+00 to 1134+00, which are underlain by peat deposits (Qp) and Stations 996+00 to 1000+00 and 1038+00 to 1045+00 which are underlain by stream channel deposits (Qsc). Peat deposits are decomposing organic deposits with minor inclusions of clay and silt. Stream channel deposits are recent and historic. Alluvial deposits within the active river channel, generally consisting of unconsolidated sand, gravel, and silt. Other quaternary sediments exposed near West Sacramento in smaller inclusions are described as (Kleinfelder 2007):

- undivided older alluvium deposits (Qal): undivided gravel, sand, and silt deposited during the Holocene and Pleistocene;
- Modesto formation (upper and lower member) (Qmu and Qml): unconsolidated, unweathered to slightly weathered gravel, sand, silt, and clay (the stream channel, alluvial, basin, and peat deposits lie conformably above this unit); and
- Riverbank formation (upper and lower member) (Qru and Qrl): unconsolidated but compact to semi-consolidated, dark brown to red gravel, sand, and silt with some clay.

The Qru/Qrl and the Qmu/Qml deposits represent ancestral river channels and alluvial fans. These semi-consolidated to unconsolidated deposits are characterized by localized paleochannels and lateral and vertical stratigraphic complexity related to past fluvial processes and buried paleo-topography. These formations are mantled by unconsolidated deposits of Holocene age that comprise most of the surficial geologic deposits within the West Sacramento area. Deposits laid down by the Sacramento River between the mid- to late 1800s probably were derived from hydraulic mining debris. (William Lettis & Associates 2007)

3.3.2.2.2 Soils

The CHP Academy EIP project area comprises two distinct soil map units as identified by the USDA Conservation Service (U.S. Department of Agriculture Soil Conservation Service 1972): Lang sandy loam, deep, and Sycamore silt loam (Figure 3.3-1). These soil types are characterized in Table 3.3-1. The under-seepage deficiencies identified at the CHP Academy project area are caused primarily by the presence at depth of coarse, permeable soils (sands and gravels) that translate hydraulic pressure during flood stage beneath the levees and destabilize them. In other words, the coarse-textured soil material common to the Lang and Sycamore soil series found at the CHP Academy project area facilitates seepage pathways, which compromise levee integrity.

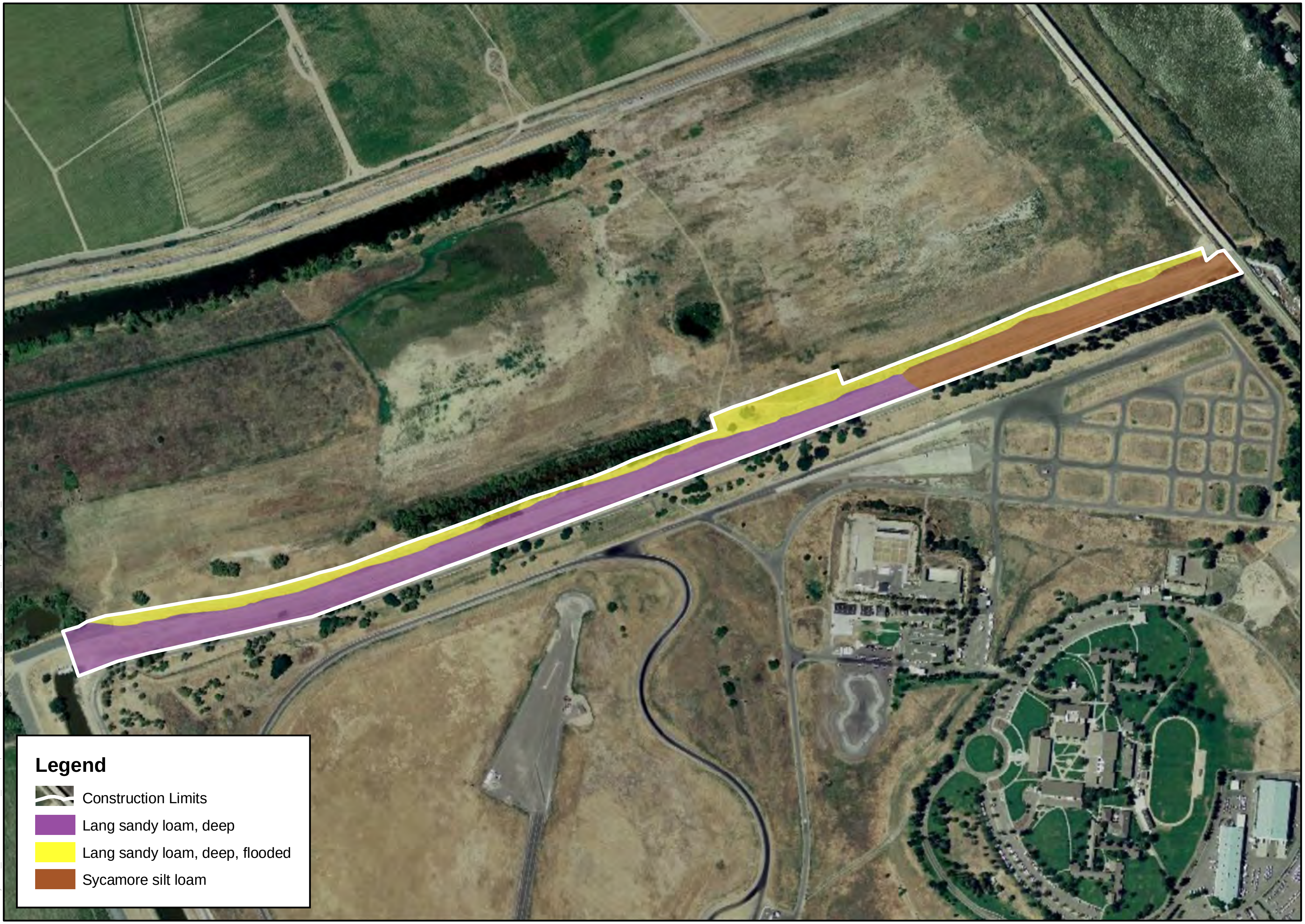

Figure 3.3-1
Soil Types at the CHP Academy Early Implementation Site

Table 3.3-1. Soils in the Study Area

Soil Series Name	Reach	Depth (inches)	USDA Texture	Color	Shrink-Swell Potential	Hydrologic Group	Erosion Hazard	Runoff
Lang sandy loam, deep (Lb)	Sacramento Bypass 6	0–13	Sandy loam and loamy fine sand	Pale brown	Low at 0 to 40 inches, High at 40 to 60 inches	B, drained; C, undrained	None to slight	Very slow
		13–19	Loamy fine sand	Mottled light brownish-gray to brownish-yellow				
		19–40	Fine sand to loamy fine sand	Light brownish gray				
		40–60	Clay to heavy clay	Pale brown				
Sycamore silt loam (So)	Sacramento Bypass 6	0–14	Silty clay loam or silt loam	Grayish brown	High	C	None to slight	Very slow
		14–30	Silty clay loam	Mottled light yellowish-brown				
		30–60	Loam	Pale olive				

Sources: Andrews 1972; Bates 1977.

3.3.2.2.3 Mineral Resources

No commercial mining operations are known to have occurred in West Sacramento. Most of the area is classified as MRZ-1 by the California Division of Mines and Geology, which indicates no significant mineral deposits are present. The portion of the West Sacramento area that borders the Sacramento River (and henceforth the study area vicinity) is classified as MRZ-3, which means aggregate deposits of undetermined significance occur there. Lands classified as MRZ-1 or MRZ-3 are not affected by state policies pertaining to the maintenance of access to regionally significant mineral deposits under the California Surface Mining and Reclamation Act of 1975.

3.3.2.2.4 Seismic Hazards

Seismic hazards refer to earthquake fault ground rupture and ground shaking (primary hazards), as well as liquefaction and earthquake-induced slope failure (secondary hazards). Localized ground shaking and liquefaction are the most significant seismic hazards in Yolo County (Yolo County 1983).

Primary Seismic Hazards—Surface Fault Rupture[1] and Groundshaking

The project area is located in a region of California characterized by low seismic activity. The UBC recognizes no active seismic sources in the project vicinity (International Conference of Building Officials 1997), and no active faults are known to cross the project area. The project area is located within UBC Seismic Hazard Zone 3. The Zone 3 designation indicates that earthquakes in the region

[1] *Surface fault rupture* is a rupture at the ground surface along an active fault, caused by earthquake or creep activity.

have the potential to make standing difficult and to cause stucco and some masonry walls to fall. Structures must be designed to meet the regulations and standards associated with Zone 3 hazards.

Three pre-Quaternary faults/fault zones are located within an approximately 20-mile radius of the study area. The Willows fault zone runs northwest to southeast of the study area; the East Valley fault runs to the west of the study area; and the Midland fault zone runs to the southeast of the study area (City of West Sacramento Department of Community Development 1990; Jennings 1994). None of these faults/fault zones are within an Alquist-Priolo Special Studies Zone (Hart and Bryant 1997). The active fault nearest to the study area is the Dunnigan Hills fault, which is 30 miles to the northwest (City of West Sacramento Department of Community Development 1990; Jennings 1994). This fault is within an Alquist-Priolo Special Studies Zone (Hart and Bryant 1997). The critical earthquake for West Sacramento would originate at the nearest point of the Midland fault zone or the Dunnigan Hills fault (City of West Sacramento Department of Community Development 1990).

Based on a probabilistic seismic hazard map that depicts the peak horizontal ground acceleration values exceeded at a 10% probability in 50 years (California Geological Survey 2003, Cao et al. 2003), the probabilistic peak horizontal ground acceleration values for the study area are 0.1 to 0.2g (where g equals the acceleration speed of gravity). As a point of comparison, probabilistic peak horizontal ground acceleration values for the San Francisco Bay Area range from 0.4g to more than 0.8g. This indicates that the ground-shaking hazard in the study area is low. Farther to the west, the ground shaking hazard increases, coinciding with the increase in abundance of associated faults and fault complexes (California Geological Survey 2003; Cao et al. 2003).

Additionally, URS evaluated northern reaches of the basin for seismic vulnerability and liquefaction of the levees in the report *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento Region,* dated September 2007.

Preliminary seismic evaluations have been completed in the form of two reports; *West Sacramento Levee System Problem Identification and Alternative*

Analysis: Volume 1—Geotechnical Problem Identification Solano and Yolo Counties, California completed by Kleinfelder (September 2007) and *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento Region* completed by URS (November 2007) for DWR. Data collection included 323 borings drilled with SPTs and soundings made using CPTs along the levees within the basin. Approximate stationing endpoints have been determined by URS and Kleinfelder based on similar soil characteristics within the endpoints (HDR, Inc. 2008).

Liquefaction

Poorly consolidated, water-saturated fine sands located within 30 to 50 feet of the surface typically are considered the most susceptible to liquefaction. Soils and sediments that are not water-saturated and that consist of coarser or finer materials are generally less susceptible to liquefaction (California Division of Mines and Geology 1997).

URS performed a liquefaction-triggering analysis to evaluate whether any levee or underlying foundation materials potentially would liquefy during the considered earthquake events. Criteria for susceptibility to liquefaction included soil type, liquid limit, plasticity index, water content, and fines content. If the material was considered to be susceptible to liquefaction, steps were completed to further evaluate the liquefaction potential of the material considering the earthquake loading. In contrast, if the plasticity of the material was high enough to preclude liquefaction, the material was classified as non-liquefiable, irrespective of the earthquake loading (URS 2007). The Sacramento Bypass may exhibit liquefaction during a seismic event (HDR, Inc. 2008a).

3.3.3 Environmental Consequences

This section describes the environmental consequences relating to geology, seismicity, soils, and mineral resources for the proposed CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.3.3.1 Assessment Methods

Evaluation of the geology, seismicity, and soils effects in this section is based on the information provided by technical maps, reports, and other documents that describe the geologic, seismic, and soil conditions of the study area. This information was then compared to the type and location of proposed flood and recreation alternatives to determine whether effects would occur.

3.3.3.2 Determination of Effects

Criteria for determining the significance of effects related to geology, soils, and mineral resources were developed based on the environmental checklist form in Appendix G of the State CEQA Guidelines (14 CCR 15000 *et seq.*). An effect related to geology, soils, and seismicity was considered significant if it would:

- expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the state geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42);
  - strong seismic ground shaking;
  - seismic-related ground failure, including liquefaction; or
  - landslides;
- result in substantial soil erosion or the loss of topsoil;
- be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial risks to life or property;
- have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater;
- result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or

- result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

3.3.3.2.1 Effect Assumptions

The following assumptions were made regarding project effects on geology, seismicity, and soils in the study area.

- Fill or borrow material would be obtained from a quarry or other authorized (i.e., permitted) location.
- WSAFCA would conform to the latest CBSC standards, city and county standards, and National Pollutant Discharge Elimination System (NPDES) requirements.
- There are no active faults, potentially active faults, or Alquist-Priolo Earthquake Fault Zones located in or adjacent to the study area.

3.3.4 Effects and Mitigation Measures

3.3.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects involving direct ground-disturbing activities or changes to flood control facilities that could result in changes in geology, seismicity, soils, or mineral resources would occur. Therefore, there would be no construction-related effects on these resources attributable to implementation of the No Action Alternative.

Without levee alternatives, there is the continued risk of levee failure and continuing underseepage and loss of levee foundation soil would be expected to continue. If a levee overtopping or breach were to occur, floodwaters would likely erode topsoil which could either be pumped back into the Sacramento River, DWSC, or the Yolo or Sacramento Bypasses, or recede back through the levee breach. A catastrophic levee failure could result in the collapse of miles of levee slopes, alteration of regional and local hydrology, and a substantial increase in erosion and sedimentation. This condition would cause severe damage to local soils, areas of scour holes, and eroded and unstable landforms. Moreover, subsequent flooding could occur prior to levee repair that would result in additional erosion and loss of topsoil. It is assumed that these effects would be significant; however, given the uncertainty of the occurrence or magnitude of such an event, the effects cannot be quantified based on available information.

Furthermore, the beneficial effects attributable to project implementation such as improved levee stability and decrease of levee bank erosion would not be realized under the No Action Alternative.

3.3.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on geology, seismicity, soils, and mineral resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
GEO-1: Effects on Levee Stability	Beneficial	N/A	N/A
GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction	Less than significant	N/A	N/A
GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance	Less than significant	N/A	N/A
GEO-4: Structural Damage and Injury from Development on Expansive Soils	Significant	Less than significant	GEO-MM-1: Implement the Corrective Actions Identified as Part of a Project-Specific Geotechnical Report

Effect GEO-1: Effects on Levee Stability

The proposed slope flattening would improve the stability of the Sacramento Bypass Levee by further reducing seepage and the potential for seepage-related failures by reducing hydrostatic exit gradients, creating more stable slopes, and reducing erosion. Therefore, this effect would be beneficial.

Effect GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction

Based on available knowledge of fault location and locations of earthquake epicenters, the risk of groundshaking in the study area is low. Nonetheless, a large earthquake on a nearby fault could cause groundshaking in the study area, which could result in liquefaction or associated ground failure, such as lateral spreading or differential settlement, which could in turn result in structural loss, injury, and death.

The Sacramento Bypass levee contains soils that may be subject to liquefaction. Implementation of the proposed CHP Academy APA would not substantially alter the composition of the subject levees or foundation soils or increase their susceptibility to liquefaction. The CHP Academy APA does propose the construction of a slurry cutoff wall to reduce seepage and increase flood control that might sustain damage from groundshaking or liquefaction and endanger people during a seismic event.

However, the potential for failure of this structure from groundshaking would depend on the degree of levee saturation during an earthquake. A high level of saturation would likely only occur during a major flood event. The probability that a large regional earthquake would occur during a major flood event is relatively low, but such coincidence is not impossible. Nonetheless, because of the relative small likelihood of such coincidental events, and because the expected magnitude of groundshaking from large regional earthquakes is relatively low in the study area, the potential for failure or damage of the slurry cutoff wall is considered to be less than significant. No mitigation is required.

Effect GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance

The grading, trenching, and other earthwork that would be conducted during construction of the CHP Academy APA would result in substantial ground and vegetation disturbance. These disturbances would increase the hazard of erosion and could temporarily increase erosion and sedimentation rates above existing levels. Because most of the earthwork would be conducted on and immediately adjacent to the levee, accelerated erosion and sedimentation resulting from construction-related ground and vegetation disturbance would not result in the loss of appreciable quantities of topsoil resources. In addition, most ground-disturbing activities would occur during the typical construction season, when conditions are generally dry, further reducing the potential for construction-related erosion.

Site-specific measures that would control erosion would be described in more detail in the SWPPP, which is included in the environmental commitments of the proposed project, described in further detail in Section 2.7 of Chapter 2, Alternatives, and summarized in Section 3.2, Water Quality and Groundwater Resources. The SWPPP is a requirement of the NPDES General Construction Permit.

With this project-level action, erosion and sediment-related effects would be less than significant. No mitigation is required.

Effect GEO-4: Structural Damage and Injury Resulting from Development on Expansive Soils

According to the soil survey for Yolo County, moderate to high shrink-swell potential (soil expansiveness) exists in the study area within the Sacramento Bypass Levee reaches. Additionally, expansive soil and sediments were encountered at various depths below the levees in the study area during geotechnical investigations (Kleinfelder 2007). Expansive soils have the potential to compromise the structural integrity of the proposed slurry cutoff wall.

As previously discussed, WSAFCA would require the preparation of a preliminary soil report based on soil borings and, if expansive or weak soils are documented on site, a soils investigation detailing corrective action. These corrective actions likely would prevent structural damage. This effect would be significant, but implementation of Mitigation Measure GEO-MM-1 would reduce this effect to less than significant.

Mitigation

Mitigation Measure GEO-MM-1: Implement the Corrective Actions Identified as Part of a Project-Specific Geotechnical Report

WSAFCA will implement special engineering techniques identified in a project-specific geotechnical report, which may include using reinforced steel and drainage control devices, and/or over-excavating and backfilling with non-expansive soil. WSAFCA or its contractor will select one or more of the recommended measures in consultation with a qualified engineer and the WSAFCA engineer before construction activities begin.

3.3.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on geology, seismicity, soils, and mineral resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
GEO-1: Effects on Levee Stability	Beneficial	N/A	N/A
GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction	Less than significant	N/A	N/A
GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance	Less than significant	N/A	N/A
GEO-4: Structural Damage and Injury from Development on Expansive Soils	Significant	Less than significant	GEO-MM-1: Implement the Corrective Actions Identified as Part of a Project-Specific Geotechnical Report

Effect GEO-1: Effects on Levee Stability

The proposed stability berm, interior drain, and relief wells would improve the stability of the Sacramento Bypass Levee by further reducing seepage and the potential for seepage-related failures by reducing hydrostatic exit gradients, creating more stable slopes, and reducing erosion. Therefore, this effect would be beneficial.

Effect GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction

This effect is the same as that described under the CHP Academy APA, above, except that the structures that may sustain damage are a stability berm, interior drain, and relief wells. The effect is considered less than significant. No mitigation is required.

Effect GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance

This effect is the same as that described under the CHP Academy APA, above. This effect is considered less than significant. No mitigation is required.

Effect GEO-4: Structural Damage and Injury Resulting from Development on Expansive Soils

The effect and mitigation measure are the same as that described under the CHP Academy APA, above. The effect is considered less than significant with the implementation of mitigation measure GEO-MM-1, also described above.

Section 3.4
Transportation and Navigation—CHP Academy Early Implementation Project

3.4.1 Introduction

This section describes the affected environment for transportation and navigation, the regulatory setting associated with transportation and navigation, the effects on transportation and navigation that would result from the proposed project and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below:

- *City of West Sacramento General Plan*, revised December 2004
- *City of West Sacramento General Plan Background Report*, revised June 2000
- *City of West Sacramento Bicycle and Pedestrian Path Master Plan 1995*

3.4.2 Affected Environment

This section describes the affected environment for transportation and navigation in the CHP Academy EIP project area, including the regulatory and environmental settings.

3.4.2.1 Terminology

The following are definitions of key traffic and transportation terms used in this section.

- **Level of service (LOS)**: A scale used to determine the operating quality of a roadway segment or intersection based on volume-to-capacity (V/C) ratios or average delay experienced by vehicles on the facility. The levels range from A to F, with LOS A representing free-flow traffic and LOS F representing severe traffic congestion. Agencies adopt LOS standards that define the level of operations that are acceptable within their jurisdiction.
- **V/C ratio**: The number of vehicles that travel on a transportation facility divided by the vehicular capacity of that facility (the number of vehicles the facility was designed to convey).
- **Delay**: The additional travel time experienced by a vehicle or traveler because of inability to travel at optimal speed and/or stops due to congestion or traffic control.
- **Average daily traffic (ADT)**: Average traffic volume on the roadway section during a typical 24-hour day.
- **Annual average daily traffic (AADT)**: AADT is the total traffic volume for the year divided by 365 days.
- **Peak Hour:** This is an estimate of the peak hour traffic at all points on the state highway system.

- **Back and Ahead**: Back AADT, Peak Month, and Peak Hour usually represent traffic south or west of the count location. Ahead AADT, Peak Month, and Peak Hour usually represent traffic north or east of the count location.

Table 3.4-1 summarizes the ranges of V/C values and typical driving conditions for each LOS.

Table 3.4-1. Level of Service Definitions for Urban Streets

LOS	Intersection	Roadways
A	Uncongested operations, all queues clear in a single signal cycle. V/C = 0.00–0.60	Free flow, vehicle unaffected by other vehicles in traffic stream.
B	Uncongested operations, all queues clear in a single signal cycle. V/C = 0.61–0.70	Higher speed range of stable flow. Volume 50% of capacity or less.
C	Light congestion; occasional back-ups on critical approaches. V/C = 0.71–0.80	Stable flows with volumes not exceeding 75% of capacity.
D	Significant congestion of critical approaches, but intersection functional. Cars required to wait though more than one cycle during short peaks. No long queues formed. V/C = 0.81–0.90	Upper end of stable flow conditions. Volumes do not exceed 90% of capacity.
E	Severe congestion with some long-standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersections upstream of critical approaches. V/C = 0.91–1.00	Unstable flow at roadway capacity. Operating speeds 25 to 30 miles per hour (mph) or less.
F	Total breakdown; stop-and-go traffic operation. V/C > 1.00	Stop-and-go with operating speeds less than 30 mph.

Source: City of West Sacramento 2000.

3.4.2.2 Regulatory Setting

3.4.2.2.1 Federal

The following Federal policies related to transportation and navigation may apply to the implementation of the CHP Academy EIP.

River and Harbors Appropriation Act of 1899

The River and Harbors Appropriation Act of 1899 addresses activities that involve the construction of dams, bridges, dikes, and other structures that cross any navigable water; that place obstructions to navigation outside established Federal lines; and that excavate from or deposit material in such waters. Such activities require permits from the U.S. Army Corps of Engineers (USACE). Navigable waters are defined in Section 329.4 as:

> Those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the water body, and is not extinguished by later actions or events which impede or destroy navigable capacity.

In the USACE Sacramento District, navigable waters of the United States in the project vicinity that are subject to the requirements of the River and Harbors Appropriation Act include Sacramento

River, American River, the Deep Water Ship Channel (DWSC), and all waterways in the Sacramento–San Joaquin drainage basin affected by tidal action (U.S. Army Corps of Engineers 2003). Sections of the River and Harbors Act applicable to the proposed project are summarized below.

Section 9

Section 9 (33 United States Code [USC] 401) prohibits the construction of any dam or dike across any navigable water of the United States in the absence of Congressional consent and approval of the plans by the Chief of Engineers and the Secretary of the Army. Where the navigable portions of the water body lie wholly within the limits of a single state, the structure may be built under authority of the legislature of that state, if the location and plans or any modification thereof are approved by the Chief of Engineers and by the Secretary of the Army.

Section 10

Section 10 (33 USC 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters, is unlawful unless the work has been authorized by the Chief of Engineers.

3.4.2.2.2 Local

The following local policies related to transportation and navigation may apply to the implementation of the CHP Academy EIP.

City of West Sacramento General Plan

Cities and counties use various criteria to determine acceptable LOS on their roadway systems. The Transportation and Circulation Element of the *City of West Sacramento General Plan* contains the following policy that may apply to the proposed project.

Goal A: To create and maintain a roadway network which will ensure the safe and efficient movement of people.

Policy 2: The City shall endeavor to maintain a Level of Service “C” on all streets within the city**,** except at intersections and on roadway segments within one-quarter mile of a freeway interchange or bridge crossing of the Deep Water Ship Channel [DWSC], barge canal, or Sacramento River, where a Level of Service “D” shall be deemed acceptable (City of West Sacramento 2004).

Table 3.4-2 quantifies the acceptable ADT of urban streets for corresponding LOS and roadway width.

Table 3.4-2. LOS Criteria for Roadway Segments

Facility Type	No. of Lanes	Maximum ADT per LOS A	B	C	D	E
Residential	2	600	1,200	2,000	3,000	4,500
Residential collector with access	2	1600	3,200	4,800	6,400	8,000
Residential collector without access	2	6,000	7,000	8,000	9,000	10,000
Arterial, low access control (4+ stops/mile, many driveways, 25–35 mph)	2	9,000	10,500	12,000	13,500	15,000
	4	18,000	21,000	24,000	27,000	30,000
	6	27,000	31,500	36,000	40,500	45,000
Arterial, moderate access control (2–4 stops/mile, few driveways, 35–45 mph)	2	10,800	12,600	14,400	16,200	18,000
	4	21,600	25,200	28,800	32,400	36,000
	6	32,400	37,800	43,200	48,600	54,000
Arterial, high access control (1–2 stops/mile, no driveways, 45–55 mph)	2	12,000	14,000	16,000	18,000	20,000
	4	24,000	28,000	32,000	36,000	40,000
	6	36,000	42,000	48,000	54,000	60,000
Rural, 2-lane highway	2	2,400	4,800	7,900	13,500	22,900
Rural, 2-lane road, 24–36 feet, paved, shoulder	2	2,200	4,300	7,100	12,200	20,000
Rural, 2-lane road, 24–36 feet, paved, no shoulder	2	1,800	3,600	5,900	10,100	17,000

Source: City of West Sacramento 2006.

Policy 8: On-street truck parking shall be prohibited where such parking restricts adequate sight distances or otherwise poses a potentially hazardous situation.

Policy 10: The City shall attempt to confine truck traffic to designated truck routes. The City shall consider the additional weight and turning requirements of trucks in selecting truck routes.

Goal G: To promote pedestrian and bicycle travel as alternatives to automobile use.

Policy 1: The City shall create and maintain a safe and convenient system of pedestrian and bicycle pathways which encourages walking or bicycling as an alternative to driving.

Policy 3: Bicycle routes shall emphasize paths separated from vehicle traffic to the maximum extent possible, but shall also include bicycle lanes within public streets; bikeways may, however, be combined with pedestrian and vehicle routes, where appropriate.

Policy 4: The City shall limit on-street bicycle routes to those streets where the available roadway width and traffic volumes permit safe coexistence of bicycle and motor vehicle traffic.

Policy 7: To the extent practicable, bicycle and pedestrian pathways shall be included within open space areas and adjacent to waterways.

3.4.2.3 Environmental Setting

This section discusses the environmental setting related to transportation and navigation in the CHP Academy EIP project area.

3.4.2.3.1 Roadways

Existing freeways within or near the project area are described below.

- **Interstate 80 (I-80)** is a major freeway that runs northeast to southwest at the southeastern edge of the project area. I-80 heads toward Reno to the east and San Francisco to the west. The freeway runs above the Sacramento River North Levee, and would not be affected by the proposed project.
- **Highway 50 (US 50)** is a major highway that runs east to west, south of the project area. US 50 heads towards Carson City to the east and merges with I-80 on the western side of West Sacramento as it heads towards San Francisco.

Table 3.4-3 shows the Back and Ahead AADT for the highway segments that would be most affected by project-related traffic.

Table 3.4-3. AADT for Highways in the CHP Academy Project Area

Highway	Segment	Back AADT	Ahead AADT
I-80	Junction with Route 50	145,000	85,000
I-80	Junction with Route 84 (Reed Avenue)	85,000	90,000
I-80	West El Camino Avenue Interchange	90,000	87,000
US 50	Junction with Route 80	–	85,000
US 50	Harbor Boulevard Interchange	85,000	116,000

Source: California Department of Transportation 2009

The major arterial streets that serve the project area or that may be affected by project implementation are:

- **Reed Avenue/Sacramento Avenue/C Street (SR 84)** runs east-west between I-80 near the western City Limits and the I Street Bridge at the Sacramento River. The roadway width varies between two and four lanes. Reed Avenue is classified under the LOS Criteria for Roadway Segments as a four-lane arterial with moderate access control.
- **North Harbor Boulevard** runs north-south parallel to the Sacramento River North Levee and crosses the easternmost end of the Sacramento Bypass Levee before continuing over the Sacramento Bypass. In the section of the road adjacent to the project area, Harbor Boulevard is a two-lane road. Harbor Boulevard is classified as a two-lane arterial with moderate access control.

Local roads that run adjacent to or along the crest of the project area levees include Tule Jake Road and various roadways that are part of the CHP Academy EIP project area. Tule Jake Road is a gravel road that runs along the crest of the Sacramento Bypass Levee and is accessible to maintenance vehicles only. The roads on the CHP Academy EIP project area are used for training and would not be affected by project implementation. Table 3.4-4 shows the ADT, peak-hour traffic, and LOS for these major roadways.

Table 3.4-4. ADT, Peak-Hour Traffic, and LOS for Major Roadways in the CHP Academy Project Area

Street	Limits	ADT	AM Peak	PM Peak	LOS	Count Year
North Harbor Boulevard	Riverbank Road to Reed Avenue	4,529	467	484	A	2007
North Harbor Boulevard	City Limits to Riverbank Road	4,801	354	484	A	2007
Reed Avenue	Riverside Parkway to Sunset Avenue	15,930	1,036	1,229	A	2005

Source: City of West Sacramento 2007.

According to the City's LOS standards, all three haul route segments that lie within or near the project area have a LOS of A.

3.4.2.3.2 Parking

On-street parking in the project area is limited to the shoulder of North Harbor Boulevard and gravel area at the entrance to Tule Jake Road. The City does not have any public parking lots in or near the project area. Construction projects are subject to off-street parking standards as defined in the City's Zoning Ordinance (City of West Sacramento 2000).

3.4.2.3.3 Railroads

The Union Pacific Railroad runs parallel to North Harbor Boulevard on the western side of the street (adjacent to Sacramento River North Levee). The railroad runs southeast to northwest, and crosses the eastern end of the Sacramento Bypass Levee as it runs from the City to Woodland (City of West Sacramento 2009b).

3.4.2.3.4 Transit Facilities

Yolo Bus 240, which runs from West Sacramento to Sacramento, runs along Reed Avenue, south of the project area. No other transit facilities are located within the project area (Yolo county Transportation District 2009).

3.4.2.3.5 Bikeways

Bicycle facilities are currently available in the project vicinity. Major arterial roads and several minor arterial roads throughout the city have bike lanes or bike-accessible shoulders. Bike-accessible areas that run adjacent to or on top of levees in the project vicinity include North Harbor Boulevard (Sacramento River North Levee) (City of West Sacramento 2009a).

3.4.2.3.6 Airports

Airports in the area include Sacramento International Airport, Sacramento Executive Airport, Mather Airport, and Franklin Field. Sacramento International Airport is Sacramento County-owned and is located approximately 7 miles north of the city, between Sacramento and Woodland along I-5. The Executive Airport is owned by Sacramento County and is located 1.5 miles to the east of the city, within the city of Sacramento. Mather Field is a military airfield located approximately 11 miles east of the City in Rancho Cordova. Franklin Field is owned by Sacramento County and is located approximately 16 miles south of the city in Elk Grove.

3.4.2.3.7 Navigation

The Sacramento River is the only permanent waterway near the project area. The river flows in a generally southward direction and widths vary with water elevations. Navigation in the Sacramento River is limited to recreational watercraft because the river is too small and fluctuating water levels prevent the accommodation of large commercial vessels.

On the West Sacramento bank, in the project vicinity, there are no docks or other access points to the river. On the city of Sacramento side, there are several private docks that belong to homeowners living on top of or adjacent to the levee.

3.4.3 Environmental Consequences

This section describes the environmental consequences relating to transportation and navigation for the CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.4.3.1 Assessment Methods

The proposed project would construct levee alternatives along a section of the Sacramento Bypass Levee. Because of the earthwork involved and the need for materials deliveries, construction would intermittently generate substantial volumes of traffic. Once the construction is completed, maintenance needs would be similar to current conditions. Analysis of traffic effects therefore concentrated on the construction of levee alternatives.

The effects of these project activities were analyzed according to truck and worker trip effects on roadway operation and circulation. Haul routes for the CHP Academy EIP are shown in Figure 3.4-1.

This analysis used estimated construction traffic generation (expressed as average trips per day) to develop a qualitative evaluation of short-term effects on the local and regional roadway in the project vicinity. Table 3.4-5 summarizes construction phase-related trips anticipated for the CHP Academy APA and CHP Academy Alternative B, which includes trips generated by trucks hauling away excavated materials, and trucks delivering construction equipment and materials. Daily truck trips required to haul away excavated spoils and import fill materials are estimated based on a typical capacity of 20 cubic yards per truck. Each truck and each work would generate two construction-related trips. A detailed list of construction equipment, construction areas, daily and total excavation, and daily total imported material for each phase are included in Appendix FE.

The key effects were identified and evaluated based on the environmental characteristics of the CHP Academy EIP project area and the magnitude, intensity, and duration of activities related to the construction and operation of this project.

Table 3.4-5. Estimated Daily Construction Traffic by Alternative and Construction Phase

Phase of Construction	Duration (Days)	Daily Exported Spoils and Imported Material (cy)	Workers per day	Estimated Maximum Daily Truck Trips	Estimated Maximum Daily Worker Trips	Maximum Total Daily Trips
APPLICANT PREFERRED ALTERNATIVE						
Clearing and grubbing	9	2,200	20	220	40	260
Concrete removal	7	146	12	8	24	32
Levee degrade	26	2,200	19	220	38	258
Slurry wall construction	29	1,200	11	4	22	26
Fill placement	27	2,982	29	298	58	356
Concrete placement	24	43	11	8	22	30
ALTERNATIVE B						
Clearing and grubbing	4	2,200	20	220	40	260
Excavate stability Berm	5	2,200	20	220	40	260
Install stability Berm and drain system	31	2,343	22	234	44	278
Install relief wells	22	N/A	7	2	14	16
CHP ACADEMY TRAIL IMPROVEMENT						
Grading	8	0	10	0	20	20
Install pathways and signs	12	154	10	16	20	36

Source: HDR Engineering, Inc.
cy = cubic yards.

3.4.3.2 Determination of Effects

For this analysis, a transportation effect was considered significant if it would result in any of the following outcomes, which are based on professional practice, State CEQA Guidelines Appendix G, *City of West Sacramento General Plan Policy Document*, and the City's LOS policies:

- cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in the number of vehicle trips, the V/C ratio on roads, or congestion at intersections);
- cause, either individually or cumulatively, exceedance of a LOS standard established by the City and/or the California Department of Transportation (Caltrans) for designated roads or highways;
- substantially alter present patterns of circulation or movement;
- substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., slow-moving vehicles);
- result in inadequate emergency access;
- result in inadequate parking capacity; or

Figure 3.4-1
CHP Academy EIP Haul Routes

- conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks); or substantially impede navigation of watercraft as a result of the installation of cofferdams or the staging of barges within navigable sections of the surrounding waterways.

3.4.4 Effects and Mitigation Measures

3.4.4.1 No Action Alternative

The No Action Alternative represents the continuation of the existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. It is likely that the levee roads and other roads in the project area would continue to be maintained by the City. No road modifications, including the construction the paved road atop the Sacramento Bypass Levee would occur.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability or geometry issues would continue. Failure of the Sacramento Bypass Levee, depending on the magnitude of the event, could cause catastrophic flooding of the entire city. Without levee improvements, there is a continued risk of levee failure or collapse, which would trigger widespread flooding and damage to the city's utilities, roadways, major interstate transportation corridors, and other infrastructure systems. The severity and magnitude would depend on the severity of the storm and river flows at the time of a potential levee failure. A catastrophic flood event in West Sacramento would disrupt state and interstate highway, rail, and shipping traffic, causing long-term effects on the region's and state's economy and ability to move people and goods in normal circulation patterns. West Sacramento has one of the most comprehensive transportation networks on the west coast. Its central geographic location and extensive north-south, east-west highway access has made it a major distribution center. High volumes of truck and passenger traffic pass through the city on I- 80 and US-50/Business 80 every day, with truck traffic transporting approximately $63 billion worth of cargo annually through West Sacramento. Major transcontinental rail lines also pass through the city (transporting $5 billion in goods annually) and the Port of West Sacramento runs domestic and international shipping services. The normal circulation patterns of all of these transportation modes would be significantly affected if widespread flooding were to occur. In addition, flooding could result in substantial disruption to critical facilities and the city's emergency response capacity and critical lifelines of West Sacramento.

3.4.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on transportation and navigation. A description of these effects is provided below the summary table.

The CHP APA would avoid the UPRR tracks that run adjacent to the eastern end of the Sacramento Bypass Levee. Construction-related activities would not have an effect on its normal operations. Therefore, effects on railroads are not addressed further in this section.

Effect	Finding	With Mitigation	Mitigation Measure
TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic	Less than significant	N/A	N/A
TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee	Less than significant	N/A	N/A
TN-3: Increase in Safety Hazards Attributable to Construction-Generated Traffic	Less than significant	N/A	N/A
TN-4: Increase in Emergency Response Times	Less than significant	N/A	N/A
TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers	Less than significant	N/A	N/A
TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures	Less than significant	N/A	N/A

Effect TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic

Effect TN-1 would apply only to highways and surface streets in the CHP Academy EIP project area. Implementation of the CHP Academy APA would require hauling of construction equipment and materials to the CHP Academy EIP project area along major highways and through surface streets in the city.

The use of highways to haul construction equipment and materials to and from the CHP Academy EIP project area would increase daily traffic. Additionally, many of the construction-generated trips would involve slow-moving trucks, which would further affect highway traffic. However, the increase in AADT would be relatively small. With the addition of the maximum daily construction-generated traffic shown in Table 3.4-5 to the AADT counts in Table 3.4-3, the maximum increase in traffic along any of the segments of these highways would be 0.42%. This increase in AADT is not expected to significantly degrade the operation of highways near the project area.

Surface routes that would be used would be along Reed Avenue and Harbor Boulevard. Table 3.4-6 shows the existing ADT levels on the roads to be used as haul routes for the CHP Academy APA with the addition of the maximum daily construction-generated traffic shown in Table 3.4-5.

Table 3.4-6. Existing and Projected ADT on Haul Routes for the CHP Academy APA

Street	Limits	Existing ADT	Existing LOS	Max Trips/Day	ADT During Construction
North Harbor Blvd	Riverbank Rd to Reed Ave	4,529	A	356	4,885
North Harbor Blvd	City Limits to Riverbank Rd	4,801	A	356	5,157
Reed Ave	Riverside Pkwy to Sunset Ave	15,930	A	356	16,286

The construction traffic generated by the CHP Academy APA would temporarily increase the daily and peak hour traffic along specified routes shown in Table 3.4-6, which are operating well within the City's LOS standard. Traffic levels would return to normal levels once construction is completed.

Should the CHP Academy APA be constructed concurrently with The Rivers APA, traffic would increase along Reed Avenue from Riverside Parkway to Sunset Avenue as this is the only haul route segment that is shared by the two sites. If the projects are constructed concurrently, it would add a maximum of 724 additional truck trips per day, of which 356 trips would result from the CHP Academy APA and 368 trips would result from The Rivers APA. However, this increase in traffic along Reed Avenue would not reduce the LOS to an unacceptable level.

Although this addition of construction-related traffic would not be expected to degrade the LOS on haul route roads to an unacceptable level, slow-moving heavy trucks could affect traffic flow on these roadways, particularly if numerous trips occur during the morning or afternoon peak traffic periods. Implementation of the traffic control and road maintenance plan environmental commitment, described in Section 2.7 of Chapter 2, Alternatives, would reduce the effects of construction traffic along highways and surface streets to a less-than-significant level.

Effect TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee

Implementation of the CHP Academy APA would involve the use and maneuvering of large equipment that may require the adjacent Riverbank Road to be temporarily closed or reduce its usage to a single lane. Temporary road closures or reduction in use of the roads would require a detour of normal traffic to adjacent streets. The detouring of traffic would increase daily traffic quantities on roads in the surrounding areas. The environmental commitment to develop and implement a traffic control and road maintenance plan, as described in Section 2.7 of Chapter 2, Alternatives, would reduce this effect to a less-than-significant level.

Effect TN-3: Increase in Safety Hazards Attributable to Construction-Generated Traffic

The maneuvering of construction-related vehicles and equipment among the general-purpose traffic on Riverbank Road and other local roads could cause safety hazards. However, execution of the environmental commitment to develop and implement a traffic control and road maintenance plan, described in Section2.7 of Chapter 2, Alternatives, would minimize construction-related traffic hazards, and would reduce the intensity of this effect. This effect would be less than significant.

Effect TN-4: Increase in Emergency Response Times

Emergency access to the project vicinity could be affected by construction of the proposed project, and construction-related traffic could delay or obstruct the movement of emergency vehicles. However, execution of the environmental commitment to develop and implement a traffic control and road maintenance plan, described in Section2.7 of Chapter 2, Alternatives, would minimize construction-related effects on emergency response times. This effect would be less than significant.

Effect TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers

A parking area for construction workers and trucks would be provided at staging areas adjacent to a work site or areas within the levee right-of-way; therefore, this effect would be less than significant.

Effect TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures

Although most of the construction of the proposed project would take place within the project right-of-way, temporary road closures may be needed in some areas, which could interfere with transit services or bicycle travel along these roads. Implementation of the Traffic Control and Road Maintenance Plan environmental commitment, described in Section2.7 of Chapter 2, Alternatives, would minimize construction-related traffic conflicts with alternative modes of transportation. Therefore, this effect would be less than significant. No mitigation is required.

3.4.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on transportation and navigation. A description of these effects is provided below the summary table.

The CHP Academy Alternative B would avoid the UPRR tracks that run adjacent to the eastern end of the Sacramento Bypass Levee. Construction-related activities would not affect the normal operation of the tracks. Therefore, effects on railroads are not addressed further in this section.

Effect	Finding	With Mitigation	Mitigation Measure
TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic	Less than significant	N/A	N/A
TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee	Less than significant	N/A	N/A
TN-3: Increase in Safety Hazards Attributable to Construction-Generated Traffic	Less than significant	N/A	N/A
TN-4: Increase in Emergency Response Times	Less than significant	N/A	N/A
TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers	Less than significant	N/A	N/A
TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures	Less than significant	N/A	N/A

Effect TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic

This effect on major highways in the project vicinity would be the same as described under the CHP Academy APA, above. The maximum number of trips per day would be 278, rather than 356 as noted for the CHP Academy APA, resulting in a maximum increase in traffic of 0.33% on highway segments near the project area.

This effect on surface streets in the project vicinity would be the same as described under the CHP Academy APA, above. The maximum number of trips per day would be 278, rather than 356 as noted for the CHP APA. Should the CHP Academy Alternative B be constructed concurrently with The Rivers APA or Alternative B, traffic would increase along Reed Avenue from Riverside Parkway to Sunset Avenue. This would be similar to the concurrent project construction mentioned under the CHP APA, but to a lesser extent because fewer truck trips would be required for both the CHP Academy Alternative B and The Rivers Alternative B. This effect is considered less than significant. No mitigation is required.

Effect TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee

This effect would be the same as described under the CHP Academy APA, above. This effect is considered less than significant. No mitigation is required.

Effect TN-3: Increase in Safety Hazards Attributable to Construction-Generated Traffic

This effect would be the same as described under the CHP APA, above. This effect is considered less than significant. No mitigation is required.

Effect TN-4: Increase in Emergency Response Times

This effect would be the same as described under the CHP Academy APA, above. This effect is considered less than significant. No mitigation is required.

Effect TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers

This effect would be the same as described under the CHP Academy APA, above. This effect is considered less than significant. No mitigation is required.

Effect TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures

This effect would be the same as described under the CHP Academy APA, above. This effect is considered less than significant. No mitigation is required.

Section 3.5
Air Quality and Climate Change— CHP Academy Early Implementation Project

3.5.1 Introduction

This section describes the regulatory and environmental setting for air quality and climate change, the effects on air quality and climate change that would result from the proposed project, and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below. Additional information is available in Appendix F.

- *Handbook for Assessing and Mitigating Air Quality Impacts* (Yolo-Solano Air Quality Management District 2007)
- *Guide to Air Quality Assessment in Sacramento County* (Sacramento Metropolitan Air Quality Management District 2009a)
- *CEQA and Climate Change*, *Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act* (California Air Pollution Control Officers Association 2008)

3.5.2 Affected Environment

This section describes the affected environment for air quality and climate change in the CHP Academy EIP project area, including the regulatory and environmental settings.

3.5.2.1 Air Quality Regulatory Setting

The study area and surrounding areas are subject to air quality regulations developed and implemented at the Federal, state, and local levels. At the Federal level, the U.S. Environmental Protection Agency (EPA) is responsible for implementation of the Clean Air Act (CAA). Some portions of the CAA (e.g., certain mobile-source and other requirements) are implemented directly by EPA. Other portions of the CAA (e.g., stationary-source requirements) are implemented by state and local agencies.

Responsibility for attaining and maintaining air quality in California is divided between the California Air Resources Board (CARB) and regional air quality districts. Areas of control for the regional districts are set by CARB, which divides the state into air basins. These air basins are defined by topography that limits air flow access, or by county boundaries. Plans, policies, and regulations relevant to the proposed project are discussed below.

3.5.2.1.1 Federal

The following Federal policies related to air quality may apply to the implementation of the CHP Academy EIP.

Clean Air Act

The CAA establishes Federal air quality standards, known as National Ambient Air Quality Standards (NAAQS), and specifies future dates for achieving compliance. The standards are divided into primary and secondary standards; the former are set to protect human health within an adequate margin of safety, and the latter to protect environmental values, such as plant and animal life.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and an incorporation of additional sanctions for failure to attain or meet interim milestones. The sections of the CAA that are most applicable to the proposed project are Title I (Non-attainment Provisions) and Title II (Mobile Source Provisions). Title I of the CAA identifies attainment, non-attainment, and unclassifiable areas with regard to criteria pollutants and sets deadlines for all areas to reach attainment for the following criteria pollutants: ozone, carbon monoxide (CO), respirable particulates (PM10, particulate matter less than 10 microns in diameter), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. The NAAQS were amended in July 1997 to include the 8-hour ozone standard and a NAAQS for fine particulates (PM2.5, particulate matter less than 2.5 microns in aerodynamic diameter). Applicable NAAQS for these criteria pollutants are presented in Table 3.5-1.

Table 3.5-1. National and California Ambient Air Quality Standards

		Federal [(1)]		
Pollutant	**Averaging Time**	**Primary**	**Secondary**	**California** [(2)]
Ozone	8 hour [(3)]	0.075 ppm	0.075 ppm	0.07 ppm
	1 hour	No standard	No standard	0.09 ppm
Carbon monoxide—CO	8 hour	9 ppm	No standard	9 ppm
	1 hour	35 ppm	No standard	20 ppm
Respirable particulate matter—PM10	24 hour [(4)]	150 $\mu g/m^3$	150 $\mu g/m^3$	50 $\mu g/m^3$
	Annual	No standard	No standard	20 $\mu g/m^3$
Fine particulate matter—PM2.5	24 hour [(5)]	35 $\mu g/m^3$	35 $\mu g/m^3$	35 $\mu g/m^3$
	Annual	15 $\mu g/m^3$	15 $\mu g/m^3$	12 $\mu g/m^3$
Nitrogen dioxide—NO_2	Annual	0.053 ppm	0.053 ppm	0.03 ppm
	1 hour	No standard	No standard	0.18 ppm
Sulfur dioxide—SO_2	Annual	0.03 ppm	No standard	No standard
	24 hour	0.14 ppm	No standard	0.04 ppm
	3 hour	No standard	0.50 ppm	No standard
	1 hour	No standard	No standard	0.25 ppm
Lead	30 day	No standard	No standard	1.5 $\mu g/m^3$
	Calendar quarter	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	No standard
	Rolling 3 month	0.15 $\mu g/m^3$	0.15 $\mu g/m^3$	No standard

Source: California Air Resources Board 2009a

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

[1] National standards are not to be exceeded more than once a year.

		Federal (1)		
Pollutant	**Averaging Time**	**Primary**	**Secondary**	**California (2)**

[2] California standards for ozone, CO, PM10, PM2.5, NO_2, and SO_2 (1 and 24 hour) are values that are not to be exceeded. All others are not to be equaled or exceeded.

[3] To attain the Federal ozone standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.

[4] To attain the Federal PM10 standard, the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ must be equal to or less than 1.

[5] To attain the Federal PM2.5 standard, 98% of the daily concentrations, averaged over 3 years, must be equal to or less than 35 $\mu g/m^3$.

The CAA requires states to submit a state implementation plan (SIP) for areas in non-attainment for Federal standards. The SIP, which is reviewed and approved by EPA, must demonstrate how the Federal standards would be achieved. Failing to submit a plan or secure approval could lead to denial of Federal funding and permits. In cases where the SIP is submitted by the state but fails to demonstrate achievement of the standards, EPA is directed to prepare a Federal implementation plan.

Title II of the CAA contains a number of provisions regarding mobile sources, including requirements for reformulated gasoline, new tailpipe emission standards for cars and trucks, oxides of nitrogen (NO_X) standards for heavy-duty vehicles, and a program for cleaner fleet vehicles.

General Conformity Regulation

EPA enacted the Federal General Conformity regulation (40 CFR Parts 5, 51, and 93) in 1993. The General Conformity rule applies to Federal actions located in non-attainment areas that do not include stationary industrial sources requiring preconstruction air quality permits from local air pollution control agencies. The purpose is to ensure that Federal actions do not generate emissions that interfere with state and local agencies' SIPs and emission-reduction strategies.

The General Conformity rule applies in air quality non-attainment or maintenance areas, and only to direct and indirect emissions associated with the portions of any Federal action for which a Federal permitting agency has the authority to impose emission reductions. Since the project is within U.S. Army Corps of Engineers (USACE jurisdiction and would require a permit from USACE, all direct and indirect emissions generated by the project construction are subject to General Conformity.

The proposed project would generate air pollutant emissions from construction sites in Yolo County and would generate indirect on-road emissions in both Yolo County and Sacramento County, both of which are designated a severe non-attainment area for ozone NAAQS and a non-attainment area for PM2.5 NAAQS. Sacramento County is a moderate non-attainment area for PM10 NAAQS. Based on those designations, the General Conformity thresholds are:

- 25 tons/year of NO_X,
- 25 tons/year of reactive organic gasses (ROG),
- 100 tons/year of PM2.5, and
- 100 tons/year of PM10.

All emission sources include in-water equipment, on-land non-road equipment, on-road haul trucks, and on-road commute vehicles that operate on project components are required to comply with the General Conformity thresholds. If the annual emissions exceed the applicability thresholds, then the applicant must consult with the air quality district to confirm that the county-wide emission budget prepared for the SIP included the general types of activity proposed by the applicant.

Federal Tailpipe Emission Standards

To reduce emissions from off-road diesel equipment, on-road diesel trucks, and harbor craft, EPA established a series of increasingly strict emission standards for new engines. New construction equipment used for the project, including heavy-duty trucks, off-road construction equipment, tugboats, and barges, will be required to comply with the emission standards.

3.5.2.1.2 State

The following state policies or agencies related to air quality may apply to the implementation of the CHP Academy EIP.

California Clean Air Act

In 1988, the state legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. The CCAA requires all areas of the state to achieve and maintain the California Ambient Air Quality Standards (CAAQS) by the earliest practical date. The CAAQS incorporate additional standards for most criteria pollutants and set standards for other pollutants recognized by the state. In general, the CAAQS are more stringent than the corresponding NAAQS.

CARB and local air districts bear responsibility for achieving California's air quality standards, which are to be achieved through district-level air quality management plans that would be incorporated into the SIP. In California, EPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

Responsibilities of air districts include overseeing stationary source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA.

The CCAA of 1988 substantially added to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA focuses on attainment of the CAAQS, which, for certain pollutants and averaging periods are more stringent than the comparable Federal standards.

The CCAA requires designation of attainment and non-attainment areas with respect to CAAQS. The CCAA also requires that local and regional air districts expeditiously adopt and prepare an Air Quality Attainment Plan if the district violates state air quality standards for ozone, CO, NO_2, or SO_2. These plans are specifically designed to attain these standards and must be designed to achieve an annual 5% reduction in district-wide emissions of each non-attainment pollutant or its precursors. No locally prepared attainment plans are required for areas that violate the state PM10 standards.

The CCAA requires that the state air quality standards be met as expeditiously as practicable but, unlike the Federal CAA, does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that would require more time to achieve the standards.

Idling Limit Regulation

CARB has adopted a regulation for in-use off-road diesel vehicles that became effective under California law on June 15, 2008. This regulation is designed to reduce toxic air contaminants (TACs) from diesel-powered construction and mining vehicles operating in California. Fleet owners are subject to retrofit or accelerated replacement/repower requirements for which CARB must obtain authorization from EPA prior to enforcement under the CAA. However, this regulation also imposes idling limitations on owners, operators, and renters or lessees of off-road diesel vehicles, which CARB is authorized to enforce.

The idling limits are effective and enforceable as of June 15, 2008. The regulation requires an operator of applicable off-road vehicles (self-propelled diesel-fueled vehicles of 25 horsepower and greater that were not designed for on-road driving) to limit idling to no more than 5 minutes. These requirements are specified in 13 CCR 2449(d)(3).

Control of Airborne Asbestos

CARB has adopted an asbestos Airborne Toxic Control Measure (ATCM) for construction, grading, quarrying, and surface mining operations. The measure requires use of best available dust control measures to prevent off-site migration of asbestos-containing dust from road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas of asbestos, serpentine, or ultramafic rock.

State Tailpipe Emission Standards

To reduce emissions from off-road diesel equipment, on-road diesel trucks, and harbor craft, CARB established a series of increasingly strict emission standards for new engines. New construction equipment used for the project, including heavy duty trucks, off-road construction equipment, tugboats, and barges, will be required to comply with the standards.

State NO_X Reduction Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The program is a partnership between the CARB and the local air districts throughout the state. Locally, the air districts administer the Carl Moyer program. The purpose of the program is to reduce air pollution emissions from heavy-duty engines. Grants are available for projects that:

- install particulate traps,
- replace older heavy-duty engines with newer and cleaner engines and add a particulate trap,
- purchase new vehicles or equipment that is cleaner than the law requires,

- replace heavy-duty equipment with electric equipment, and
- install electric idling-reduction equipment.

3.5.2.1.3 Local

At the local level, responsibilities of air quality districts include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality-related sections of environmental documents required by CEQA. The air quality districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of Federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

The following local policies or agencies related to air quality and climate change may apply to the implementation of The Rivers EIP.

Yolo-Solano Air Quality Management District

The project construction sites are located in Yolo County, where the Yolo-Solano Air Quality Management District (YSAQMD) has local air quality jurisdiction over the project components. YSAQMD has adopted CEQA emission thresholds in the *Handbook for Assessing and Mitigating Air Quality Impacts* (Yolo-Solano Air Quality Management District 2007) to determine the level of significance of project-related emissions. Table 3.5-2 summarizes applicable thresholds that are used in the analysis of project-related construction and operational emissions. Emissions that exceed the designated threshold levels are considered potentially significant and should be mitigated.

Table 3.5-2. YSAQMD Significance Thresholds for Construction and Operational Emissions

Pollutant	Construction and Operation Significance Threshold
ROG	10 tons/year
NO_X	10 tons/year
PM10	80 lbs/day
CO	Violation of a CAAQA for CO

Source: Yolo-Solano Air Quality Management District 2007.
ROG = reactive organic gas.
NO_X = oxides of nitrogen.
PM10 = particulate matter 10 microns or less in diameter.
CO = carbon monoxide.

All projects located in Yolo County are subject to the YSAQMD regulations in effect at the time of construction. Specific regulations applicable to the proposed project components may involve diesel construction equipment emissions, fugitive dust, on-road haul truck emissions, and general permit requirements. List below are description of YSAQMD rules that would be applicable to the project.

- Dust emissions must be prevented from creating a nuisance to surrounding properties as regulated under Rule 2.5, Nuisance.

- Portable equipment greater than 50 horsepower, other than vehicles, must be registered with either the CARB Portable Equipment Registration Program (PERP) or with the YSAQMD.
- Architectural coating and solvents used at the project shall be compliant with Rule 2.14, Architectural Coatings.
- Cutback and emulsified asphalt application shall be conducted in accordance with Rule 2.28, Cutback and Emulsified Asphalt Paving Materials.

Sacramento Metropolitan Air Quality Management District

The project would generate direct air pollutant emissions from on-site construction equipment in Yolo County; however, the indirect on-road emissions would be generated from delivery trucks and commute vehicles in both Yolo County and Sacramento County. For the indirect on-road emissions that would occur in Sacramento County, the Sacramento Metropolitan Air Quality Management District (SMAQMD) has local air quality jurisdiction over the air pollutant emissions.

SMAQMD has adopted CEQA emission thresholds in the *Guide to Air Quality Assessment* (Sacramento Metropolitan Air Quality Management District 2009a) to determine the level of significance of project-related emissions. Table 3.5-3 summarizes applicable thresholds that are used in the analysis for project-related on-road vehicle emissions. Emissions that exceed the designated threshold levels are considered potentially significant and should be mitigated.

Table 3.5-3. SMAQMD Significance Thresholds for Construction and Operational Emissions

Pollutant	Construction Significance Threshold	Operation Significance Threshold
ROG	No threshold	65 lbs/day
NO_X	85 lbs/day	65 lbs/day
PM10	Violation of a CAAQA for PM10	
CO	Violation of a CAAQA for CO	

Source: Sacramento Metropolitan Air Quality Management District 2009a

All projects occurring in Sacramento County are subject to the SMAQMD regulations in effect at the time of construction. All construction projects, regardless of size, are required to implement standardized BMPs for fugitive dust control and reduction of tailpipe emissions. If the construction emission exceeds the NO_X threshold, the contractor will be required to provide a plan, for approval by SMAQMD, demonstrating that the heavy-duty off-road equipment to be used in the project sites will achieve a project-wide fleet-average 20% NO_X reduction and 45% diesel particulate reduction compared to the most recent CARB fleet average at time of construction. Because the project would not generate construction emissions from non-road equipment within the SMAQMD, this reduction measure is not applicable. For this project, if the on-road NO_X emissions generated within the SMAQMD exceed the CEQA threshold, the project proponent will be required to pay an offsite mitigation fee of $16,000 per ton of mitigated on-road construction emissions exceeding the NO_X threshold.

3.5.2.2 Climate Change Regulatory Setting

3.5.2.2.1 Federal

The following Federal policies related to climate change may apply to the implementation of the CHP Academy EIP.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA released its final Greenhouse Gas Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year (FY) 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110-161), that required EPA to develop "… mandatory reporting of greenhouse gasses above appropriate thresholds in all sectors of the economy…." The Reporting Rule would apply to most entities that emit 25,000 metric tons of carbon dioxide equivalents (CO_2e) or more per year. Starting in 2010, facility owners are required to submit an annual greenhouse gas (GHG) emissions report with detailed calculations of facility GHG emissions. The Reporting Rule would also mandate recordkeeping and administrative requirements in order for EPA to verify annual GHG emissions reports.

Environmental Protection Agency Endangerment and Cause and Contribute Findings

On December 7, 2009, EPA signed the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the CAA. Under the Endangerment Finding, EPA finds that the current and projected concentrations of the six key well-mixed GHGs, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride in the atmosphere threaten the public health and welfare of current and future generations. Under the Cause or Contribute Finding, EPA finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing the EPA's proposed new Corporate Average Fuel Economy standards for light-duty vehicles, which EPA proposed in a joint proposal including the Department of Transportation's proposed Corporate Average Fuel Economy standards on September 15, 2009.

On February 19, 2010, the CEQ issued draft NEPA guidance on the consideration of the effects of climate change and GHG emissions. This guidance advises Federal agencies that they should consider opportunities to reduce GHG emissions caused by Federal actions, adapt their actions to climate change impacts throughout the NEPA process; and address these issues in their agency NEPA procedures. Where applicable, the scope of the NEPA analysis should cover the GHG emissions effects of a proposed action and alternatives action and the relationship of climate change effects to a proposed action or alternatives.

3.5.2.2.2 State

The following state policies or agencies related to climate change may apply to the implementation of the CHP Academy EIP.

Executive Order S-3-05

Signed by Governor Arnold Schwarzenegger on June 1, 2005, Executive Order S-3-05 asserts that California is vulnerable to the effects of climate change. The executive order puts forth that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established total GHG emissions targets. Executive Order S-3-05 established the following GHG emissions reduction targets for California.

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

The executive order directed the secretary of the California Environmental Protection Agency (CalEPA) to initiate a multi-agency effort to reduce GHG emissions to target levels. To comply with the executive order, the secretary of CalEPA created a Climate Act Team (CAT) composed of members of various state agencies and commissions. CAT released its first report in March 2006 (California Environmental Protection Agency 2006). The report proposes achieving GHG targets through the voluntary actions of California businesses, local government and community actions, and state incentive and regulatory programs.

Assembly Bill 32, California Climate Solutions Act of 2006

In September 2006, the California State Legislature adopted Assembly Bill 32, the California Global Warming Solutions Act of 2006 (AB 32). AB 32 establishes a cap on statewide GHG emissions and sets forth the regulatory framework to achieve the corresponding reduction in statewide emission levels. Under AB 32, GHGs are defined as CO_2, methane, NO_X, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 requires that CARB takes the following actions.

- Adopt early action measures to reduce GHG.
- Establish a statewide GHG emissions cap for 2020 based on 1990 emissions.
- Adopt mandatory report rules for significant GHG sources.
- Adopt a scoping plan indicating how emission reductions would be achieved through regulations, market mechanisms, and other actions.
- Adopt regulations needed to achieve the maximum technologically feasible and cost-effective reductions in GHGs.

In December 2007, CARB approved the 2020 emission limit (1990 level) of 427 million metric tons of CO_2e. The 2020 target requires the reduction of 169 million metric tons of CO_2e, or approximately 30% below the state's projected "business-as-usual" 2020 emissions of 596 million metric tons of CO_2e.

Also in December 2007, CARB adopted mandatory reporting and verification regulations pursuant to AB 32. The regulations became effective January 1, 2009, with the first reports covering 2008 emissions. The mandatory reporting regulations require reporting for major facilities, those that generate more than 25,000 metric tons/year of CO_2e. To date, CARB has met all of the statutorily mandated deadlines for promulgation and adoption of regulations.

Climate Change Scoping Plan

On December 11, 2008, pursuant to AB 32, CARB adopted the Climate Change Scoping Plan. This plan outlines how emissions reductions from significant sources of GHGs will be achieved via regulations, market mechanisms, and other actions. Six key elements, outlined in the scoping plan, are identified to achieve emissions reduction targets:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards.
- Achieving a statewide renewable energy mix of 33%.
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system.
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard.
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gasses, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

The Climate Change Scoping Plan also described recommended measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately affect low-income and minority communities. These measures put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80% below 1990 levels. The measures in the approved Climate Change Scoping Plan will be developed over the next 2 years and be in place by 2012.

Senate Bill 97

Senate Bill 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under CEQA. The bill directs the California Office of Planning and Research (OPR) to prepare, develop, and transmit to CARB the guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, by July 1, 2009. SB 97 directs the State Resources Agency (now Natural Resources Agency), the agency charged with adopting the CEQA Guidelines, to certify and adopt such Guidelines by January 2010.

In June 2008, OPR issued a Technical Advisory on CEQA and Climate Change (California Office of Planning and Research 2008). For projects subject to CEQA, this document recommends that emissions be calculated and mitigation measures be identified to reduce those emissions. The OPR report does not identify emission thresholds for GHGs but instead recommends that each lead agency develop their own thresholds. On December 30, 2009 the Natural Resources Agency adopted amendments to the CEQA Guidelines for Greenhouse gas emission. Those amendments became effective on March 18, 2010. The amendments provide guidance on the analysis and mitigation of the effects of GHG emissions, including determining significance and significance thresholds.

Actions Taken by California Attorney General's Office

The California Attorney General (AG) has filed comment letters under CEQA about a number of proposed projects. The AG also has filed several complaints and obtained settlement agreements for CEQA documents covering general plans and individual programs that the AG found either failed to analyze GHG emissions or failed to provide adequate GHG mitigation. The AG's office prepared a report listing the measures that local agencies should consider under CEQA to offset or reduce global warming effects. The AG's office also has prepared a chart of modeling tools to estimate GHG emissions effects of projects and plans. Information on the AG's actions can be found on the California Department of Justice, Office of Attorney General web site (California Department of Justice 2008).

California Air Pollution Control Officers Association Guidance

The California Air Pollution Control Officers Association (CAPCOA) released a report in January 2008 that describes methods to estimate and mitigate GHG emissions from projects subject to CEQA. The CAPCOA report evaluates several GHG thresholds that could be used to evaluate the significance of a project's GHG emissions. The CAPCOA report, however, does not recommend any one threshold. The report is designed as a resource for public agencies as they establish agency procedures for reviewing GHG emissions from projects subject to CEQA. (California Air Pollution Control Officers Association 2008)

Executive Order S-13-08

Executive Order S-13-08, issued November 14, 2008, directs the California Natural Resources Agency, Department of Water Resources, Office of Planning and Research, Energy Commission, State Water Resources Control Board, State Parks Department, and California's coastal management agencies to participate in a number of planning and research activities to advance California's ability to adapt to the impacts of climate change. The order specifically directs agencies to work with the National Academy of Sciences to initiate the first California Sea Level Rise Assessment and to review and update the assessment every 2 years after completion; to immediately assess the vulnerability of the California transportation system to sea level rise; and to develop a California Climate Change Adaptation Strategy.

3.5.2.3 Air Quality Environmental Setting

The environmental setting for air quality in the CHP Academy EIP project area is described below.

3.5.2.3.1 Regional Climate and Meteorology

The study area is in Yolo County, which is located in the Sacramento Valley Air Basin (SVAB). The SVAB includes Sacramento, Shasta, Tehama, Butte, Glenn, Colusa, Sutter, Yuba, Yolo, and parts of Solano and Placer Counties. The SVAB is bounded on the north by the Cascade Range, on the south by the San Joaquin Valley Air Basin, on the east by the Sierra Nevada, and on the west by the Coast Range.

The SVAB has a Mediterranean climate characterized by hot, dry summers and cool, rainy winters. During winter, the North Pacific storm track intermittently dominates Sacramento Valley weather, and fair weather alternates with periods of extensive clouds and precipitation. Periods of dense and persistent low-level fog, which is most prevalent between storms, are also characteristic of winter weather in the valley. The frequency and persistence of heavy fog in the valley diminishes with the approach of spring. The average yearly temperature range for the Sacramento Valley is 20°F to 115°F, with summer high temperatures often exceeding 90°F and winter low temperatures occasionally dropping below freezing.

In general, the prevailing winds are moderate in strength and vary from moist clean breezes from the south to dry land flows from the north. The mountains surrounding the SVAB create a barrier to airflow, which can trap air pollutants under certain meteorological conditions. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells collect over the Sacramento Valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with temperature inversions that trap pollutants near the ground.

The ozone season (May through October) in the Sacramento Valley is characterized by stagnant morning air or light winds with the delta sea breeze arriving in the afternoon out of the southwest. Usually the evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. During about half of the days from July to September, however, a phenomenon called the "Schultz Eddy" prevents this from occurring. Instead of allowing for the prevailing wind patterns to move north carrying the pollutants out, the Schultz Eddy causes the wind pattern to circle back to the south. Essentially, this phenomenon causes the air pollutants to be blown south toward the Sacramento Valley and Yolo County. This phenomenon has the effect of exacerbating the pollution levels in the area and increases the likelihood of violating Federal or state standards. The eddy normally dissipates around noon when the delta sea breeze arrives. (Yolo-Solano Air Quality Management District 2007)

3.5.2.3.2 Background Information on Air Pollutants

Air quality studies generally focus on five pollutants most commonly measured and regulated, and referred to as criteria air pollutants: ozone, CO, inhalable PM (PM10 and PM2.5), NO_2, and SO_2. Because ozone, a photochemical oxidant, is not emitted into the air directly from sources, emissions of ozone precursors, including NO_X and ROG, are regulated with the aim of reducing ozone formation in the lowermost region of the troposphere.

Ozone and NO_2 are considered regional pollutants because they (or their precursors) affect air quality on a regional scale: NO_2 reacts photochemically with ROG to form ozone, and this reaction occurs at some distance downwind of the source of pollutants. Pollutants such as CO, PM10, and PM2.5 are considered to be local pollutants because they tend to disperse rapidly with distance from the source.

The principal characteristics surrounding these pollutants are discussed below. TACs and GHGs are also discussed below, although no air quality standards exist for these pollutants.

Ozone

Ozone is an oxidant that attacks synthetic rubber, textiles, and other materials and causes extensive damage to plants by leaf discoloration and cell damage. It is also a severe eye, nose, and throat irritant and increases susceptibility to respiratory infections. Ozone is not emitted directly into the air: it forms from a photochemical reaction in the atmosphere. Ozone precursors, including ROG and NO_X, are emitted by mobile sources and stationary combustion equipment and react in the presence of sunlight to form ozone. Because reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summertime problem.

Carbon Monoxide

CO is essentially inert to most materials and to plants but can significantly affect human health because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. Effects on humans range from slight headaches to nausea to death. Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter, when periods of light wind combine with the formation of ground-level temperature inversions—typically from evening through early morning. These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

Particulate Matter

PM suspended in the atmosphere can reduce visibility, retard plant growth, corrode materials, and affect human health. Health concerns focus on particles small enough to reach the lungs when inhaled (inhalable PM). NAAQS and CAAQS for PM apply to two classes of inhalable particulates: PM10 and PM2.5.

Nitrogen Dioxide

NO_2 is a brownish gas that contributes to the formation of ground-level ozone pollution. NO_2 increases respiratory disease and irritation and may reduce resistance to certain infections. The majority of ambient NO_2 is not directly emitted but is formed rather quickly from the reaction of nitric oxide (NO) and oxygen in the atmosphere. NO and NO_2 are the primary pollutants that make up the group of pollutants referred to as NO_X. In the presence of sunlight, complex reactions of NO_X with ozone and other air pollutants produce the majority of NO_2 in the atmosphere. NO_2 is one of the NO_X emitted from high-temperature combustion processes, such as those occurring in trucks, cars, and power plants. Indoors, home heaters and gas stoves also produce substantial amounts of NO_2.

Sulfur Dioxide

SO_2 is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. SO_2 is formed when sulfur-containing fuel is burned by mobile sources, such as locomotives and off-road diesel equipment. SO_2 also is emitted from several industrial processes, such as petroleum refining and metal processing.

Toxic Air Contaminants

TACs are a category of air pollutants that have been shown to affect human health but are not classified as criteria pollutants. TACs are generated by various kinds of sources, including stationary sources such as dry cleaners and gas stations; combustion sources; mobile sources such as diesel trucks, ships, and trains; and area sources such as farms, landfills, and construction sites. Significant health effects of TACs can be carcinogenic (cancer-causing), short-term (acute) non-carcinogenic, and long-term (chronic) non-carcinogenic. To date, CARB has identified 21 TACs and adopted EPA's list of hazardous air pollutants (HAPs) as TACs. In August 1998, diesel particulate matter (DPM) was added to the CARB list of TACs (California Air Resources Board 1998).

Diesel Particulate Matter

DPM is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, result from diluted and cooled exhaust gasses. DPM in California is a significant part of the total TAC level in the state. In September 2000, CARB approved a Diesel Risk Reduction Plan (California Air Resources Board 2000) to reduce PM emissions from diesel-fueled engines and vehicles. The plan outlines a comprehensive and ambitious program to reduce emissions from new and existing on-road vehicles (e.g., heavy-duty trucks and buses); off-road equipment (e.g., graders, tractors, forklifts, sweepers, and boats); portable equipment (e.g., pumps); and stationary engines (e.g., stand-by power generators). According to the plan, CARB will work with the heavy-duty equipment manufacturing companies and operators to develop an emissions reduction program for construction equipment.

3.5.2.3.3 Existing Air Quality Conditions

Air quality monitoring data for the last 3 years (2006–2008) are presented in Table 3.5-4. Although the project is located in Yolo County, the nearest monitoring stations in both Yolo County and Sacramento County are selected to present air quality of project vicinity. Air quality concentrations typically are expressed in terms of ppm or micrograms per cubic meter ($\mu g/m^3$). The nearest monitoring stations to the study area are the West Sacramento 15th Street station, which monitors PM10, the Sacramento T Street station, which monitors ozone and PM2.5; and the Sacramento Del Paso Manor station, which monitors CO.

As indicated in Table 3.5-4, the 15th Street monitoring station has experienced 19 violations of the state 24-hour PM10 standard during the last 3 years. The T Street monitoring station has experienced 15 violations of the state 1-hour ozone standard and 39 violations of the state 8-hour ozone standard. There were 37 violations of the Federal 24-hour PM2.5 standard at the T Street monitoring station. There were no violations of the CO standards during this period.

Table 3.5-4. Ambient Air Quality Monitoring Data from the West Sacramento and Sacramento Stations (2006–2008)

Pollutant Standard	2006	2007	2008
Ozone—Sacramento T Street Station			
National maximum 1-hour concentration (ppm)	0.106	0.109	0.107
National maximum 8-hour concentration (ppm)	0.090	0.089	0.092
Number of days standard exceeded [a]			
CAAQS 1-hour (>0.09 ppm)	6	2	7
NAAQS 8-hour (>0.075 ppm)	6	2	9
CAAQS 8-hour (>0.07 ppm)	14	7	18
CO—Sacramento Del Paso Manor Station			
National maximum 8-hour concentration (ppm)	3.5	2.9	2.5
National maximum 1-hour concentration (ppm)	4.4	3.5	2.9
Number of days standard exceeded [a]			
NAAQS 8-hour (≥9.0 ppm)	0	0	0
CAAQS 8-hour (≥9.0 ppm)	0	0	0

Pollutant Standard	2006	2007	2008
NAAQS 1-hour (≥35 ppm)	0	0	0
PM10[b]—West Sacramento 15th Street Station			
National maximum 24-hour concentration (μg/m^3) [c]	77	61	61
State maximum 24-hour concentration (μg/m^3) [d]	78.0	66.0	61.6
National annual average concentration (μg/m^3)	28	21	29
State annual average concentration (μg/m^3) [e]	28.8	21.7	–
Number of days standard exceeded [a]			
NAAQS 24-hour (>150 μg/m^3) [f]	0	0	0
CAAQS 24-hour (>50 μg/m^3) [f]	9	5	5
PM2.5[b]— Sacramento T Street Station			
National maximum 24-hour concentration (μg/m^3) [c]	54.0	58.0	66.1
State maximum 24-hour concentration (μg/m^3) [d]	54.0	58.0	78.9
National annual average concentration (μg/m^3)	12.4	11.9	9.8
State annual average concentration (μg/m^3) [e]	12.9	–	–
Number of days standard exceeded [a]			
NAAQS 24-hour (>35 μg/m^3) [f]	14	19	4

Sources: California Air Resources Board 2009b, U.S. Environmental Protection Agency 2009a
– = insufficient data available to determine the value.
[a] An exceedance is not necessarily a violation.
[b] Measurements usually are collected every 6 days.
[c] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using Federal reference or equivalent methods.
[d] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California-approved samplers.
[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
[f] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored.

3.5.2.3.4 Air Quality Attainment Status

The air quality attainment status for criteria pollutants in Yolo County and Sacramento County are summarized in Table 3.5-5. Areas are classified as in attainment or in non-attainment with respect to CAAQS and NAAQS. These classifications are made by comparing actual monitored air pollutant concentrations to state and Federal standards. If a pollutant concentration is lower than the state or Federal standard, the area is considered to be in attainment of the standard for that pollutant. If pollutant levels exceed a standard, the area is considered a non-attainment area. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated as unclassified. This typically occurs in non-urbanized areas, where pollutant levels may be less closely monitored.

On December 22, 2008, EPA classified Yolo County as a partial non-attainment area for the PM2.5 standard. With the new designation, an attainment plan will be submitted to EPA by 2012.

Table 3.5-5. Yolo County and Sacramento County Air Quality Attainment Status

Pollutant	Averaging Time	State Standards	National Standards
Yolo County			
Ozone	1-Hour	Serious Non-attainment	No Designation
	8-Hour	Non-attainment	Severe Non-attainment
CO		Attainment	Attainment
PM10	24-Hour	Non-attainment	Unclassified
PM2.5	24-Hour	Unclassified	Partial Non-attainment
Sacramento County			
Ozone	1-Hour	Serious Non-attainment	No Designation
	8-Hour	Non-attainment	Severe Non-attainment
CO		Attainment	Attainment
PM10	24-Hour	Non-attainment	Moderate Non-attainment
PM2.5	24-Hour	Non-attainment	Non-attainment

Source: California Air Resources Board 2009c

3.5.2.3.5 Sensitive Receptors

The NAAQS and CAAQS apply at publicly accessible areas, regardless of whether those areas are populated. For the purposes of air quality analysis, sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (e.g., 24-hour, 8-hour, and 1-hour). Typical sensitive receptors are residences, hospitals, and schools.

Sensitive land uses in the vicinity of the CHP Academy EIP project area are primarily agriculture and public open space. The CHP Academy is the only employer that has facilities that lie within, or adjacent to, the project area. No sensitive land uses are identified within 500 feet of the project site.

3.5.2.4 Climate Change Environmental Setting

This section describes the environmental setting related to climate change in the CHP Academy project area.

3.5.2.4.1 Background Information on Climate Change

Global warming refers to the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to by unequivocal (Intergovernmental Panel on Climate Change 2007) with global surface temperature increasing approximately 1.33°F over the last 100 years. Continued warming is projected to increase the average global temperature between 2°F and 11°F over the next 100 years. The causes of this warming have been identified as both natural processes and as the result of human actions. The Intergovernmental Panel on Climate Change (IPCC) concludes that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. However, after 1950, increasing

GHG concentrations resulting from human activity such as fossil fuel burning and deforestation have been responsible for most of the observed temperature increase.

Increases in 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. Some GHGs occur naturally and are necessary for keeping the Earth's surface inhabitable. However, increases in the concentrations of these gasses in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

The principal GHGs are CO_2, CH_4, N_2O, sulfur hexafluoride (SF_6), perfluorocarbons, hydrofluorocarbons, and water vapor. Each of the principal greenhouse gasses has a long atmospheric lifetime (1 year to several thousand years). In addition, the potential heat trapping ability of each of these gasses varies significantly. Methane is 23 times as potent as CO_2, while SF_6 is 22,200 times more potent than CO_2. The most common GHG is CO_2, which constitutes approximately 84% of all emissions of GHGs in California. GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors) and TACs, which are pollutants of regional and local concern.

Conventionally, GHGs have been reported as CO_{2e}, an equivalency measure that takes into account the relative potency of non-CO_2 GHGs and converts their quantities to an equivalent amount of CO_2 so that all emissions can be reported as a single quantity. The primary human-made processes that release these gasses include burning of fossil fuels for transportation, heating and electricity generation; agricultural practices that release methane such as livestock grazing and crop residue decomposition; and industrial processes that release smaller amounts of high global warming potential gasses such as SF_6, perfluorocarbons, and hydrofluorocarbons. Deforestation and land cover conversion have also been identified as contributing to global warming by reducing the Earth's capacity to remove CO_2 from the air and altering the Earth's albedo or surface reflectance, allowing more solar radiation to be absorbed.

3.5.2.4.2 Global Climate Trends and Associated Impacts

The rate of increase in global average surface temperature over the last 100 years has not been consistent; the last three decades have warmed at a much faster rate – on average 0.32°F per decade. Eleven of the twelve years from 1995 to 2006 rank among the twelve warmest years in the instrumental record of global average surface temperature (going back to 1850) (Intergovernmental Panel on Climate Change 2007).

During the same period over which this increased global warming has occurred, many other changes have occurred in other natural systems. Sea levels have risen on average1.8 millimeters per year; precipitation patterns throughout the world have shifted, with some areas becoming wetter and others drier; tropical cyclone activity in the North Atlantic has increased; peak runoff timing of many glacial and snow-fed rivers has shifted earlier; as well as numerous other observed conditions. Although it is difficult to prove a definitive cause and effect relationship between global warming and other observed changes to natural systems, there is high confidence in the scientific community that these changes are a direct result of increased global temperatures (Intergovernmental Panel on Climate Change2007).

3.5.2.4.3 California Climate Trends

Maximum (daytime) and minimum (nighttime) temperatures are increasing almost everywhere in California but at different rates. The annual *minimum* temperature averaged over all of California increased 0.33°F per decade from 1920 to 2003, while the average annual *maximum* temperature increased 0.1°F per decade (Moser et al. 2009).

With respect to California's water resources, the most significant impacts of global warming have been changes to the water cycle and sea level rise. Over the past century, the precipitation mix between snow and rain has shifted in favor of more rainfall and less snow (Mote et al. 2005, Knowles 2006) and snow pack in the Sierra Nevada is melting earlier in the spring (Kapnick and Hall 2009). The average early spring snowpack in the Sierra Nevada has decreased by about 10% during the last century, a loss of 1.5 million acre-feet of snowpack storage (California Department of Water Resources 2008). These changes have significant implications for water supply, flooding, aquatic ecosystems, energy generation, and recreation throughout the state. During the same period, sea levels along California's coast rose 7 inches (California Department of Water Resources 2008). Sea level rise associated with global warming will continue to threaten coastal lands and infrastructure, increase flooding at the mouths of rivers, place additional stress on levees in the Sacramento-San Joaquin Delta, and will intensify the difficulty of managing the Sacramento-San Joaquin Delta as the heart of the state's water supply system.

3.5.3 Air Quality Environmental Consequences

This section describes the environmental consequences relating to air quality for the proposed CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.5.3.1 Air Quality Assessment Methods

Almost all increased air pollutant emissions associated with the CHP Academy EIP would be generated by construction-related activities. Therefore, the focus of the air quality analysis is to evaluate whether the construction-related emissions would exceed emission thresholds as established by YSAQMD, SMAQMD, and General Conformity thresholds. Construction emissions from the project implementation would result in localized, short-term effects on ambient air quality in the area. These short-term emissions, especially PM10, ROG, and NO_X, have the potential to represent a significant air quality effect. Fugitive dust emissions are associated primarily with site preparation, excavation, and levee reconstruction earthwork, and vary as a function of factors such as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled on site and off site. For the construction of the project, ROG and NO_X emissions are associated primarily with diesel equipment exhaust and asphalt paving.

After the CHP Academy EIP is constructed, maintenance of the project facilities generally would be performed as needed. Maintenance work is less extensive than the construction activities and takes place over a few days per year. In addition, maintenance and operational activities are part of the existing environmental baseline and thus would not create a substantial source of new emissions.

To assist in the determination of effects, various quantitative models are available to predict emissions and particulate matter generation. Two such models are URBEMIS and SacRCEM. While

SacRCEM has typically been used for other recent levee improvement projects in the Sacramento Valley, both models have been applied to simulate the project-level air quality effects of the CHP Academy EIP. Given the similarity in the architecture of the two models, for ROG, NO_X, and CO_2, the outputs from the two models are very similar and any variance is considered not statistically significant. For PM, the URBEMIS outputs are considered more conservative (meaning the production values are higher) based on the model's internal methods and assumptions for treatment of earthwork. As the project proponent, WSAFCA has selected this more conservative approach to not under-predict potential project effects. URBEMIS further allows application of mitigation measures to fine-tune and predict quantitative effectiveness of available measures and assist in determining post-mitigation findings. For these reasons, WSAFCA has selected to use the results of URBEMIS for quantitative determination of effects, effect findings, and mitigation efficacy. The results of both models for the CHP Academy EIP are in Appendix F.

Construction-related emissions were estimated using URBEMIS 2007 model (Version 9.2.4), which uses EPA, CARB, and air district emissions factors to estimate emissions from construction activities. Construction emissions (tailpipe emissions and fugitive dust) were modeled using the conceptual construction schedule, phases, and equipment usage based on the most current available project design information.

3.5.3.2 Air Quality Determination of Effects

For this analysis, an effect pertaining to air quality was analyzed based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.). An effect was considered significant if it would:

- conflict with, or obstruct implementation of, the applicable air quality plan;
- violate any air quality standard or substantial contribution to existing or projected air quality violation;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment area under NAAQS and CAAQS;
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

The appropriate district-recommended emission thresholds as published in their respective CEQA guidance documents also apply to individual projects under their jurisdiction. An air quality effect is considered to be significant if the project's construction emissions would exceed the General Conformity thresholds. For portions of the construction and operational activities that would occur in Yolo County, an air quality effect is considered to be significant if the air pollutant emissions would exceed YSAQMD's thresholds of significance as shown in Table 3.5-2.

For portions of the construction activities that would occur in Sacramento County (i.e., haul trucks and commute vehicles traveling on public roads in the County), an air quality effect is considered to be significant if the air pollutant emissions would exceed SMAQMD's thresholds of significance as shown in Table 3.5-3.

3.5.4 Air Quality Effects and Mitigation Measures

3.5.4.1 No Action Alternative

The No Action Alternative represents the continuation of the existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. Current levee operations and maintenance activities would continue, but there would be no construction-related emissions from project implementation or maintenance.

Without improvements to the levee system, the risk of levee failure would remain high. Under these conditions, any of the levee deficiencies could cause portions of the levee to fail, triggering widespread flooding and extensive damage. If a catastrophic flood were to occur, emergency flood fighting and clean-up actions would require the use of a considerable amount of heavy construction equipment. Timing and duration of use would directly correlate with flood fighting needs, but it is likely that pollutants emitted would violate air quality standards for pollutants (including those for which the area is already considered non-attainment), increase GHG emissions, and expose sensitive receptors to toxic air emissions. Depending on the magnitude of the flood, flood fighting could last for weeks or even months. Furthermore, because of the unpredictable nature of an emergency response, no BMPs to manage emissions would be in place. All of these effects could be considered significant. However, the timing, duration, and magnitude of a flood event are speculative and unpredictable, and therefore a precise determination of significance is not possible. A discussion of the potential exposure to ruptured gas lines and utilities is provided in Section 3.16, Public Health and Environmental Hazards.

3.5.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in effects as a result of construction phases and schedule, which are summarized in Table 3.5-6.

As described in Chapter 2, Alternatives, construction of the proposed project is anticipated to take place in 2011 and would be completed during the typical construction season. For the air quality effect analysis, it is assumed that the construction work would occur progressively by phases. For each construction phase, construction equipment uses at the site, exported spoils, and imported materials are provided by the project engineers and summarized in Table 3.5-6. Detailed operation hours and horsepower ratings of construction equipment used for each construction phase and URBEMIS model results are included in Appendix F.

Table 3.5-6. Construction Phases, Schedule, and Activities: CHP Academy APA

Phase	Duration (days)	Area (acres)	Excavated Spoils (cy)	Import Material (cy)	Construction Equipment
Flood Control					
Clearing and grubbing	9	14.3	20,266	–	12 dump trucks, 2 bulldozers, 1 excavator
Concrete removal	7	1.9	1,018	–	4 dump trucks, 1 loader, 2 excavators
Levee degrade and slope flattening	26	4.3	59,374	–	12 dump trucks, 1 bulldozer, 1 excavator
Slurry wall construction	29	–	29,260	500	2 dump trucks, 1 loader, 1 bulldozer, 1 long reach track hoe, 1 rough terrain forklifts
Fill placement	27	4.3	–	79,600	14 dump trucks, 4 bulldozers, 1 excavator, 2 sheepsfoot compactors, 2 maintainers, 1 water truck
Concrete placement	24	1.9	–	1,018	5 concrete trucks, 1 crane
Recreation					
Grading	8	1.7	–	–	1 scraper, 1 wheel loader, 1 motor grader, 1 dump truck, 1 steel wheel loader, 1 water truck
Install pathways and signs	12	1.3	–	1,850	1 dump truck, 1 asphalt paver, 1 asphalt sealer, 1 striping truck, 1 small front loader, 1 skid steer loader, 1 small roller

cy = cubic yards

Based on the construction activities described above, construction-related emissions were estimated using the URBEMIS 2007 model. It is anticipated that on-site equipment operations would generate the highest daily diesel exhaust and site earthmoving activities would result in the highest daily fugitive dust generation. The estimated construction emissions are shown in Table 3.5-7. To comply with YSAQMD, SMAQMD, and General Conformity thresholds, annual emissions are estimated for ROG, NO_X, CO, PM10, and PM2.5 and the maximum daily emission is estimated for NO_X and PM10. It is assumed that half of delivery trucks and construction workers would come from the YSAQMD and the other half of trucks and commute vehicles would come from the SMAQMD. Detailed construction emissions for each construction phase are summarized in Appendix F.

1 **Table 3.5-7. Estimated Construction Emissions: CHP Academy APA**

Construction Emissions	ROG (tons/year)	NO_X (lbs/day)	NO_X (tons/year)	CO (tons/year)	PM10 (lbs/day)	PM10 (tons/year)	PM2.5 (tons/year)	CO_2 (tons/year)
Project Construction without Mitigations								
Project-wide								
Maximum daily emissions	–	371	–	–	369	–	–	–
Total annual Emissions	1.2	–	11.1	4.2	–	13.9	3.2	1,290
Within YSAQMD								
Maximum daily emissions	–	325	–	–	367	–	–	–
Total annual Emissions	1.1	–	9.8	3.6	–	13.8	3.2	1,115
Within SMAQMD								
Maximum daily emissions	–	46	–	–	2	–	–	–
Total annual emissions	0.1	–	1.3	0.6	–	0.1	0.1	174
Project Construction with Mitigations								
Project-wide								
Maximum daily emissions	–	253	–	–	45	–	–	–
Total annual emissions	1.2	–	7.5	4.2	–	3.1	0.8	1,290
Within YSAQMD								
Maximum daily emissions	–	207	–	–	43	–	–	–
Total annual emissions	1.1	–	6.2	3.6	–	3	0.7	1,115
Within SMAQMD								
Maximum daily emissions	–	46	–	–	2	–	–	–
Total annual emissions	0.1	–	1.3	0.6	–	0.1	0.1	174
Construction Thresholds								
Federal General Conformity (Project-wide emissions)	25	–	25	–	–	100	100	–
YSAQMD (Emissions in YSAQMD)	10	–	10	–	80	–	–	–
SMAQMD (Emissions in SMAQMD)	–	85	–	–	–	–	–	–

2

As described in Chapter 2, Alternatives, in order to complete the project before the flood season, the contractors would be allowed to construct on a 24/7 work schedule. Depending on the daily construction activities, the 24/7 work schedule could result in higher daily NOX and PM10 emissions than the estimated emissions shown in Table 3.5-7, which are based on the standard construction schedule (10 hours per day and 5 days per week). The annual emissions for ROG, NOX, CO, PM10, and PM2.5 would be the same for both the standard schedule and the 24/7 schedule because the project would be completed in 2011 under either schedule.

Construction and operation of the CHP Academy APA would result in the following effects. A description of these effects follows the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
AQ-1: Causes Conflicts with or Obstruction of an Applicable Air Quality Plan	Less than significant	N/A	N/A
AQ-2: Construction Emissions to Exceed Applicable Thresholds	Significant	Less than significant to significant and unavoidable	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-2: Implement Fugitive Dust Control Plan If Unmitigated Emissions Exceed PM10 or PM 2.5 Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents AQ-MM-4: Pay Required Fees to SMAQMD to Offset NO_X Emissions
AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10	Less than significant	N/A	N/A
AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds
AQ-5: Exposure to Objectionable Odors from Diesel Exhaust	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents

Effect AQ-1: Causes Conflicts with or Obstruction of an Applicable Air Quality Plan

A project is deemed inconsistent with an air quality plan if it would result in population or employment growth that exceeds the growth estimates in the applicable air quality plan—thus generating emissions not accounted for in the applicable air quality plan emissions budget. Consequently, proposed programs need to be evaluated to determine whether they would generate population and employment growth and, if so, whether that growth would exceed the growth rate included in the relevant air quality plan.

As described in Chapter 5, Growth-Inducing and Cumulative Effects, the implementation of the proposed project combined with implementation of future levee improvement projects might remove an obstacle for undeveloped lands in West Sacramento and make development easier or more attractive for these lands. This might result in population growth in these areas in the long term. The City is currently in the process of updating its 1994 General Plan. It is expected that the new General Plan will include the land use changes in these areas. Additionally, the 2035 Metropolitan Transportation Plan (Sacramento Area Council of Government 2008) has included the population projection of 278,786 people for Yolo County and 87,402 people for West Sacramento, which has accounted for the land development and population growth of these areas through 2035. The air quality conformity analysis as part of the 2035 Metropolitan Transportation Plan meets the emission conformity test for the Sacramento ozone non-attainment area. Therefore, the CHP Academy APA would not conflict with or obstruct the implementation of air quality plans. This effect would be less than significant. No mitigation is required.

Effect AQ-2: Construction Emissions to Exceed Applicable Thresholds

Without mitigation, construction-related emissions under the CHP Academy APA would exceed YSAQMD's emission thresholds for NO_X and PM10 and would result in a significant effect. Mitigation measures for this effect are AQ-MM-1 through AQ-MM-4, described below, would reduce these effects to levels ranging from less than significant to significant and unavoidable.

Table 3.5-7 shows the NO_X and PM10 emissions with these mitigation measures. After mitigation, the NO_X and PM10 emissions would be less than YSAQMD's significance thresholds.

The 24/7 work schedule could result in higher daily NO_X and PM10 emissions than the standard schedule, depending on the daily construction activities. The implementation of AQ-MM-2, which includes all applicable and feasible fugitive dust control measures required by YSAQMD, would reduce PM10 emissions below the YSAQMD's significance threshold. The implementation of AQ-MM-4, which includes the NO_X mitigation fee required by the SMAQMD, would reduce NO_X emissions below the SMAQMD's significance threshold.

It is possible the CHP Academy EIP could be constructed simultaneously with The Rivers EIP. Depending on whether the APA or Alternative B for each project is constructed at the same time, it is possible the combined emissions from the simultaneous projects could exceed the annual average YSCAQMD threshold for NO_X, annual General Conformity threshold for NOx, and/or the maximum daily SMAQMD threshold for NO_X. In either case, Mitigation Measure AQ-MM-1 would be implemented. SMAQMD's requirement for NO_X offset purchases would reduce the impact in Sacramento County to less than significant. However, YSAQMD does not require purchase of offsets, so after implementation of the mitigation measure the impact of simultaneous projects could still be significant and unavoidable in Yolo County. Nevertheless, the construction contractor should implement all feasible, cost-effective mitigation measures to prevent exceedance of YSAQMD thresholds.

Mitigation Measures

Mitigation Measure AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds

Unmitigated NO_X and ROG emissions from construction equipment tailpipes could potentially exceed the YSAQMD CEQA thresholds. Therefore, WSAFCA will require the construction contractor to implement feasible and reasonable measures to reduce public nuisance and tailpipe emissions from diesel-powered construction equipment. This requirement will be incorporated into the construction contracts.

Depending on the exceedance amounts of NO_X and ROG emissions, the WSAFCA will require the construction contractor to implement either or both of the following mitigation options.

Mitigation Measure AQ-MM-1a

According to the YSAQMD guidelines (Yolo-Solano Air Quality Management District 2007), the project lead agency is encouraged to explore and incorporate mitigation measures as technology advances and less emissive products become available at lower costs.

The measures recommended by the YSAQMD are listed below.

- Reduce use, trips, and unnecessary idling of heavy equipment. Shut down idling equipment that is not used for more than 5 consecutive minutes as required by California law.
- Maintain all construction equipment in proper tune according to manufacturer's specifications.
- Use a modern equipment fleet meeting CARB's 1996 or newer certification standard for off-road heavy-duty diesel engines.
- Install emission control devices on older equipment to reduce CO, ROG, and NO_X emissions to levels equivalent to CARB's 1996 or newer certification standard.
- Locate stationary diesel-powered equipment and haul truck staging areas as far as practicable from sensitive receptors.
- Use existing power sources (e.g., power lines) or clean fuel generators rather than conventional diesel generators, when feasible
- Substitute gasoline-powered for diesel-powered equipment when feasible.
- Use reformulated and emulsified diesel fuels where feasible.
- Use alternatively fueled construction equipment on site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel.
- Use aqueous diesel fuel where feasible.
- Use CARB and/or EPA-verified particulate traps and other appropriate controls (i.e. diesel oxidation catalyst or diesel particular filters) where feasible to reduce emissions of NO_X, diesel particulate, and other pollutants at the construction site.

Mitigation Measure AQ-MM-1b

In addition to above measures, the construction contractor could provide a plan, for approval by WSAFCA, demonstrating that the heavy-duty off-road equipment to be used at the project sites, including owned, leased, and subcontractor equipment, will achieve a project-wide fleet-average reduction of 20% for NO_X and 45% for diesel particulate, compared to the most recent CARB fleet average at time of construction. A construction mitigation calculator may be downloaded from the SMAQMD web site to perform the fleet average evaluation (Sacramento Metropolitan Air Quality Management District 2009b).

Mitigation Measure AQ-MM-2: Implement Fugitive Dust Control Plan if Unmitigated Emissions Exceed PM10 or PM 2.5 Thresholds

The construction contractor will implement all applicable and feasible fugitive dust control measures required by YSAQMD including those listed below. This requirement will be incorporated into the construction contract.

- Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person would respond and take corrective action within 48 hours. The phone number of YSAQMD also will be visible to ensure compliance with the YSAQMD Rule 2.5, Nuisance.
- Water active unpaved areas at all construction sites at least twice daily in dry conditions, with the frequency of watering based on the type of operation, soil, and wind exposure.
- Prohibit all grading activities and water all areas of disturbed soil under windy conditions (more than 20 miles per hour).
- Limit on-site vehicles to a speed that prevents visible dust emissions to extend beyond unpaved roads.
- Cover all trucks hauling dirt, sand, or loose materials.
- Cover active and inactive storage piles where appropriate.
- Cover or hydroseed unpaved areas that will remain inactive for extended periods.
- Apply soil stabilizers to active and inactive areas where appropriate.
- Install wheel washers at the entrance to construction sites for all exiting trucks.
- Sweep streets if visible soil material is carried out from the construction site.
- Install wind fencing and phase grading operations where appropriate.

Fugitive dust emissions from the construction of the CHP Academy EIP would be reduced to a less-than-significant level with the implementation of above mitigation. However, with the implementation of above mitigations, fugitive dust emissions from the simultaneous construction of CHP Academy EIP and The Rivers EIP still might exceed YSAQMD thresholds, depending on whether APA or Alternative B for each project is constructed. The construction contractor should implement all feasible, cost-effective mitigation measures to prevent exceedance of YSAQMD thresholds.

Mitigation Measure AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents

WSAFCA will provide advance written notification of the proposed construction activities to all residences and other air quality-sensitive uses within 500 feet of the construction site. Notification will include a brief overview of the proposed project and its purpose, as well as the proposed construction activities and schedule. It will also include the name and contact information of

WSAFCA's project manager or a representative for ensuring that reasonable measures are implemented to address the problem.

Mitigation Measure AQ-MM-4: Pay Required Fees to SMAQMD to Offset NO_X Emissions

It is possible that on-road construction emissions, for vehicles traveling within the Sacramento County, could exceed the SMAQMD NO_X threshold. If on-road construction emissions exceed SMAQMD threshold levels, WSAFCA will be required to pay an offsite mitigation fee. Prior to the approval of project plans or the issuance of grading permits, the WSAFCA will submit proof that the offsite air quality mitigation fee of $16,000 per ton of NO_X has been paid to SMAQMD and that the construction air quality mitigation plan has been approved by SMAQMD and the lead agency. SMAQMD already has enacted a well-defined program to use NO_x offset fees received from applicants to fund regional NO_x emission reduction projects. Therefore, with the implementation of this mitigation, the air quality impact to SMAQMD would be reduced to a less-than-significant level.

Effect AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10

After the CHP Academy APA is constructed, the facilities would be generally maintained as needed. Maintenance work would be less extensive and would take place over a few days per year. In addition, maintenance and operational activities are part of the existing environmental baseline and thus would not create a substantial source of new emissions. This effect would be less than significant. No mitigation is required.

Effect AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions

Construction of the proposed project would result in short-term diesel exhaust emissions from on-site heavy duty equipment. Particulate exhaust emissions from diesel-fueled engines (DPM) were identified as a TAC by CARB in 1998. Construction of the project would result in the generation of DPM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities.

The assessment of health risks associated with exposure to diesel exhaust typically is associated with chronic exposure, in which a 70-year exposure period is often assumed. However, while cancer can result from exposure periods of less than 70 years, acute exposure periods (i.e., exposure periods of 2 to 3 years) to diesel exhaust are not anticipated to result in an increased health risk, as health risks associated with exposure to diesel exhaust are typically seen in exposures periods that are chronic. Construction of the project is not expected to take place at the same construction site for more than 1 to 2 years and would be expected to use a limited number of pieces of heavy equipment at the same construction site. Furthermore, as required by CARB regulation, no in-use off-road diesel vehicles may idle for more than 5 consecutive minutes.

This effect would be less than significant. In addition, implementation of Mitigation Measure AQ-MM-1 would further reduce exhaust emissions during construction. No further mitigation is required.

Effect AQ-5: Exposure to Objectionable Odors from Diesel Exhaust

The proposed project would not result in any major sources of odor, nor would it involve operation of any of the common types of facilities that are known to produce odors (e.g., landfill, wastewater treatment facility). In addition, odors associated with diesel exhaust from the use of on-site construction equipment would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance.

Furthermore, as required by CARB regulation, no in-use off-road diesel vehicles may idle for more than 5 consecutive minutes. Implementation of Mitigation Measures AQ-MM-1 and AQ-MM-3 would further reduce exhaust emissions during construction. This effect would be less than significant. No mitigation is required.

3.5.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Applicant Alternative B would result in effects on air quality as a result of construction phases and schedule, as summarized in Table 3.5-8.

As described in Chapter 2, Alternatives, construction of the proposed project is anticipated to take place in 20110 and would be completed during the typical construction season. For the air quality effect analysis, it is assumed that the construction work would occur progressively by phases. For each construction phase, construction equipment uses at the site, exported spoils, and imported materials are provided by the project engineers and summarized in Table 3.5-8. Detailed operation hours and horsepower ratings of construction equipment used for each construction phase are included in Appendix F.

1 **Table 3.5-8. Construction Phases, Activities, Schedule, and Equipment: CHP Academy Alternative B**

Phase	Duration (days)	Area (acres)	Excavated Spoils (cy)	Import Material (cy)	Construction Equipment
Flood Control Alternative					
Clearing and grubbing	4	3.07	8,865	–	12 dump trucks, 2 bulldozers, 1 excavator
Excavate stability berm	5	1.48	11,054	–	4 dump trucks, 2 bulldozers, 1 excavator
Install stability berm and drain system	31	1.48	–	7,065	11 dump trucks, 2 bulldozers, 1 excavator, 1 sheepsfoot compactor, 1 maintainer, 1 water truck
Install relief wells	22	1.59	–	500	1 drill rig, 1 crane
Recreation Alternative					
Grading	8	1.7	–	–	1 scraper, 1 wheel loader, 1 motor grader, 1 dump truck, 1 steel wheel loader, 1 water truck
Install pathways and signs	12	1.3	–	1,850	1 dump truck, 1 asphalt paver, 1 asphalt sealer, 1 striping truck, 1 small front loader, 1 skid steer loader, 1 small roller

cy = cubic yards

2

3 Based on the construction activities described above, construction-related emissions were
4 estimated using the URBEMIS 2007 model. The estimated construction emissions are shown in
5 Table 3.5-9. Detailed construction emissions for each construction phase are summarized in
6 Appendix F.

Table 3.5-9. Estimated Construction Emissions: CHP Academy Alternative B

Construction Emissions	ROG (tons/year)	NO_X (lbs/day)	NO_X (tons/year)	CO (tons/year)	PM10 (lbs/day)	PM10 (tons/year)	PM2.5 (tons/year)	CO_2 (tons/year)
Project Construction without Mitigations								
Project-wide								
Maximum daily emissions	–	261	–	–	285	–	–	–
Total annual Emissions	0.5	–	5	1.8	–	5.7	1.3	577
Within YSAQMD								
Maximum daily emissions	–	226	–	–	285	–	–	–
Total annual Emissions	0.5	–	4.8	1.7	–	5.7	1.3	543
Within SMAQMD								
Maximum daily emissions	–	35	–	–	0	–	–	–
Total annual Emissions	0	–	0.2	0.1	–	0	0	34
Project Construction with Mitigations								
Project-wide								
Maximum daily emissions	–	261	–	–	39	–	–	–
Total annual emissions	0.5	–	5	1.8	–	0.8	0.3	577
Within YSAQMD								
Maximum daily emissions	–	226	–	–	39	–	–	–
Total annual Emissions	0.5	–	4.8	1.7	–	0.8	0.3	543
Within SMAQMD								
Maximum daily emissions	–	35	–	–	0	–	–	–
Total annual Emissions	0	–	0.2	0.1	–	0	0	34
Construction Thresholds								
Federal General Conformity (Project-wide emissions)	25	–	25	–	–	100	100	–
YSAQMD (Emissions in YSAQMD)	10		10	–	80		–	–
SMAQMD (Emissions in SMAQMD)	–	85	–	–	–	–	–	–

As described in Chapter 2, Alternatives, in order to complete the project before the flood season, the contractors would be allow to construct on a 24/7 work schedule. Depending on the daily construction activities, the 24/7 work schedule could result in higher daily NO_X and PM10 emissions than the estimated emissions shown in Table 3.5-9, which are based on the standard construction schedule (10 hours per day and 5 days per week). The annual emissions for ROG, NO_X, CO, PM10, and PM2.5 would be the same for both the standard schedule and the 24/7 schedule because the project would be completed in 2011 under either schedule.

Implementation of the CHP Academy Alternative B would result in the following effects on air quality. A description of these effects follows the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
AQ-1: Cause Conflicts with or Obstruction of an Applicable Air Quality Plan	Less than significant	N/A	N/A
AQ-2: Construction Emissions to Exceed Applicable Thresholds	Significant	Less than significant – Significant and unavoidable	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-2: Implement Fugitive Dust Control Plan If Unmitigated Emissions Exceed PM10 or PM2.5Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents AQ-MM-4: Pay Required Fees to the SMAQMD to Offset NO_X Emissions
AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10	Less than significant	N/A	N/A
AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds
AQ-5: Exposure to Objectionable Odors from Diesel Exhaust	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents

Effect AQ-1: Cause Conflicts with or Obstruction of an Applicable Air Quality Plan

This effect is the same as described above under the CHP Academy APA. The effect is considered less than significant. No mitigation is required.

Effect AQ-2: Increase in Construction Emissions to Exceed Applicable Thresholds

Without mitigation, construction-related emissions under the CHP Academy Alternative B may exceed YSAQMD's emission threshold for PM10 and would result in a significant effect. Mitigation measures for this effect are AQ-MM-1 through AQ-MM-4, described above under the CHP APA. Table 3.5-9 shows the mitigated PM10 emissions with the above fugitive dust control measures. After mitigation, the controlled PM10 emissions would be less than YSAQMD's 80 pounds/day significance threshold.

The 24/7 work schedule could result in higher daily NO_X and PM10 emissions than the standard schedule, depending on the daily construction activities. The implementation of AQ-MM-2, which includes all applicable and feasible fugitive dust control measures required by YSAQMD, will reduce PM10 emissions below the YSAQMD's significance threshold. The implementation of AQ-MM-4, described above under CHP Academy APA, which includes the NO_X mitigation fee required by the SMAQMD, would reduce NO_X emissions below the SMAQMD's significance threshold.

It is possible the CHP Academy EIP could be constructed simultaneously with The Rivers EIP. Depending on whether the APA or Alternative B for each project is constructed at the same time, it is possible the combined emissions from the simultaneous projects could exceed the annual average YSCAQMD threshold for NO_X, annual General Conformity threshold for NOx, and/or the maximum daily SMAQMD threshold for NO_X. In either case, Mitigation Measure AQ-MM-1 would be implemented. SMAQMD's requirement for NO_X offset purchases would reduce the impact in Sacramento County to less than significant. However, YSAQMD does not require purchase of offsets, so after implementation of the mitigation measure the impact of simultaneous projects could still be significant and unavoidable in Yolo County.

Effect AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10

This effect is the same as described above under the CHP Academy APA. The effect is considered less than significant. No mitigation is required.

Effect AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions

This effect is the same as described above under the CHP Academy APA. The effect is considered less than significant. No mitigation is required, although AQ-MM-1 will further reduce effects.

Effect AQ-5: Exposure to Objectionable Odors from Diesel Exhaust

This effect is the same as described above under the CHP Academy APA. The effect is considered less than significant. No mitigation is required, although AQ-MM-1 and AQ-MM-3 will further reduce effects.

3.5.5 Climate Change Environmental Consequences

This section describes the environmental consequences relating to climate change for the proposed CHP Academy EIP. It describes the methods used to determine the effects of the project and lists the thresholds used to conclude whether an effect would be significant.

3.5.5.1 Climate Change Assessment Methods

Almost all increased GHG emissions associated with the proposed project would be generated by construction-related activities. Therefore, the focus of the GHG analysis is to evaluate construction-related emissions. The principal source of GHG associated with would be temporary tailpipe emissions from construction equipment and haul trucks; the principal GHG produced would be CO_2. Neither YSAQMD nor SMAQMD has formally adopted a significant threshold for analyzing GHG or CO_2 emissions generated by a proposed project or a methodology for analyzing air quality effects related to global warming. However, CARB and South Coast Air Quality Management District (SCAQMD)have published draft thresholds for defining the significance of GHG emissions from construction projects and operational projects. Bay Area Air Quality Management District (BAAQMD) has also adopted CEQA thresholds of significance for operational-related GHG emissions and San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted the guidance for addressing operational-related GHG impacts under CEQA. Those thresholds and mitigation measures were utilized in the analysis of effects related to climate change.

To assist in the determination of effects, various quantitative models are available to predict emissions; URBEMIS and SacREM. Those two models were utilized for quantitative determination of effects, effect findings, and mitigation efficacy.

3.5.5.2 Climate Change Determination of Effects

For this analysis, an effect pertaining to air quality was analyzed based on professional practice, draft NEPA Guidance published by CEQ, and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.). An effect was considered significant if it would:

- generate GHG emission that may have a significant impact on the environment;
- conflict with an applicable plan adopted for the purpose of reducing GHG emissions.

3.5.6 Climate Change Effects and Mitigation Measures

3.5.6.1 No Action Alternative

The No Action Alternative would be the same as that described above in Section 3.5.4.1, Air Quality No Action.

3.5.6.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on climate change. A description of these effects follows the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
CC-1: Increase in Greenhouse Gas Emissions during Construction	Less than significant	Less than significant	CC-MM-1: Implement Measures to Minimize Greenhouse Gas Emissions during Construction
CC-2: Causes Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of GHGs	Less than significant	N/A	N/A
CC-3: Changes in Flood Frequency and Floodwater Elevation Caused by Global Climate Change	Less than significant	N/A	N/A

Effect CC-1: Increase in Greenhouse Gas Emissions during Construction

Both SMAQMD and YSAQMD have not formally adopted GHG thresholds for projects such as the CHP Academy EIP. Therefore, a presumptive threshold of 7,000 metric tons per year (the lowest threshold of any formally adopted GHG threshold) is compared against the CO_2 emissions for the CHP Academy EIP. As noted in Table 3.5-7, the CO_2 emissions project-wide without mitigation would be 1,290 metric tons per year. Within YSAQMD and SMAQMD, respectively, CO_2 emissions without mitigation would be 1,115 and 174 metric tons per year. These emissions are well below the presumptive threshold and the effects of GHG emissions during construction are considered less than significant. However, before YSAQMD and SMAQMD publish their significance thresholds for GHG emissions, the project lead agency is encouraged to implement Mitigation Measure CC-MM-1 to reduce GHG emissions.

It is possible that CHP Academy EIP and The Rivers EIP could be constructed concurrently. The CHP Academy EIP project-wide emissions without mitigation would be 1,290 metric tons per year, and The Rivers EIP would be 1,786 metric tons per year. These two totals combined would be 3,086 metric tons per year without mitigation. These combined project-wide emissions fall below the presumptive threshold of 7,000 metric tons per year and the combined effect would be considered less than significant.

Mitigation

Mitigation Measure CC-MM-1: Implement Measures to Minimize Greenhouse Gas Emissions during Construction

The following measures could be considered to lower GHG emissions during the construction. These mitigation measures combine the most stringent aspects of the currently proposed mitigation measures published by BAAQMD (2010) and SCAQMD (2008).

- Comply with all applicable future GHG regulations at the time of project-level permitting and construction.
- Use biodiesel fuel to fuel a substantial portion of the diesel-powered equipment and vehicles (e.g., 15% of the vehicles, as proposed by the BAAQMD). However, it is important to note that according to a recent EPA report (U.S. Environmental Protection Agency 2009b), some renewable fuels (e.g., ethanol and recycled vegetable oil biodiesel) could result in less GHG emissions than petroleum fuels, while some renewable fuels (e.g., soy-based biodiesel) might

increase GHG emissions. Therefore, the construction contractors should be cautious with the use of appropriate biodiesel fuels, and should avoid using soy-based biodiesel as an attempt to reduce GHG emissions.

- Encourage construction workers to carpool.
- Recycle at least 50% of construction waste and demolition debris.
- Purchase at least 10% of the building materials and imported soil from sources within 100 miles of the project site.
- Use electricity from utility power lines rather than fossil fuel, where appropriate.
- Purchase GHG offset for project GHG emissions (direct emissions plus indirect emissions from on-road haul trucks plus commute vehicles) exceeding future state or Federal or local significance thresholds applicable at the time of construction. If no GHG significance thresholds have been formally adopted at the time of permitting, then a presumptive GHG threshold of 7,000 metric tons per year of CO_2-equivalent (amortized over the 50-year life of the levee project) should be used to define the offset requirement. The 7,000 metric ton/year presumptive threshold matches the lowest industrial project threshold that has been proposed by any air quality agency in California as of the date of this study. All purchased offsets must be verifiable under protocols set by the California Climate Action Registry, the Chicago Climate Exchange, or comparable auditing programs.

Effect CC-2: Causes Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases

The CHP Academy APA does not pose any apparent conflict with the goals of AB 32, the key elements and GHG reduction measures in the Climate Change Scoping Plan, or any other plans for reduction or mitigation of GHGs. To date, no federal, state, or local agency with jurisdiction over the proposed project has adopted plans or regulations that set specific goals for emission limits or emission reductions applicable to the proposed levee improvement project. As described in Effect CC-1, the average forecast emissions from the implementation of the proposed project were compared to conservatively low presumptive significance thresholds that were derived from the draft GHG guidelines published by several local air quality agencies. The forecast emission rates are well below the presumptive significant threshold. Therefore, the proposed project would not conflict with or obstruct the implementation of greenhouse gas emission reduction plans. This effect would be less than significant.

Effect CC-3: Changes in Flood Frequency and Floodwater Elevation Caused by Global Climate Change

Global climate change could affect the hydrology of the Sacramento River, including the frequency of future flood events and the intensity of future flood events. As described under Projections of Future Mean Sea Level Change in Appendix D, Environmental Setting and Study Results for the West Sacramento Levee System, the entire West Sacramento levee system (including the Sacramento Bypass) is relatively insensitive to the projected changes in sea level rise. This effect would be less than significant.

3.5.6.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on climate change. A description of these effects follows the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
CC-1: Increase in Greenhouse Gas Emissions during Construction	Less than significant	Less than significant	CC-MM-1: Implement Measures to Minimize Greenhouse Gas Emissions during Construction
CC-2: Causes Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of GHGs	Less than significant	N/A	N/A
CC-3: Changes in Flood Frequency and Floodwater Elevation Caused by Global Climate Change	Less than significant	N/A	N/A

Effect CC-1: Increase in Greenhouse Gas Emissions during Construction

Both SMAQMD and YSAQMD have not formally adopted GHG thresholds for projects such as the CHP Academy EIP. Therefore, a presumptive threshold of 7,000 metric tons (the lowest threshold of any formally adopted GHG threshold) is compared against the CO_2 emissions for the CHP Academy EIP. As noted in Table 3.5-9, the CO_2 emissions project-wide without mitigation would be 577 metric tons per year. Within YSAQMD and SMAQMD, respectively, CO_2 emissions without mitigation would be 543 and 34 metric tons per year. These emissions are well below the presumptive threshold and the effects of GHG emissions during construction are considered less than significant. However, before YSAQMD and SMAQMD publish their significance thresholds for GHG emissions, the project lead agency is encouraged to implement Mitigation Measure CC-MM-1 to reduce GHG emissions.

Effect CC-2: Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases

This effect is the same as described above under the CHP Academy APA. The effect is considered less than significant. No mitigation is required.

Effect CC-3: Changes in Flood Frequency and Floodwater Elevation Caused by Global Climate Change

This effect is the same as described above under the CHP Academy APA. The effect is considered less than significant. No mitigation is required.

Section 3.6
Noise—
CHP Academy Early Implementation Project

3.6.1 Introduction

This section describes the affected environment for noise, including the regulatory setting associated with noise, the effects on noise that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- *City of Sacramento General Plan* Noise Element (City of Sacramento 1988)
- City of Sacramento noise ordinance (City of Sacramento 1977)
- *City of West Sacramento General Plan* Noise Element (City of West Sacramento 2004)
- City of West Sacramento noise ordinance (City of West Sacramento 1994)
- *Yolo County General Plan* Noise Element (County of Yolo 1983)
- Roadway Construction Noise Model User's Guide (Federal Highway Administration 2006)
- Noise control for buildings, manufacturing plants, equipment, and products (Hoover & Keith 2008)

3.6.2 Affected Environment

This section describes the affected environment for noise in the CHP Academy EIP project area, including the regulatory and environmental settings.

3.6.2.1 Fundamentals of Noise and Vibration

3.6.2.1.1 Noise

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary enormously within the range of human hearing, the logarithmic decibel scale is used to keep sound intensity numbers at a convenient and manageable level.

The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called A-weighting. Since humans are less sensitive to low frequency sound than to high frequency sound, A-weighted decibel (dBA) levels de-emphasize low frequency sound energy to better represent how humans hear. Table 3.6-1 summarizes typical A-weighted sound levels.

Table 3.6-1. Typical A-weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: California Department of Transportation 1998

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (L_{xx}), the day-night sound level (L_{dn}), and the community noise equivalent level (CNEL). Below are brief definitions of these measurements and other terminology used in this section:

- **Sound.** A vibratory disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Ambient noise.** The composite of noise from all sources near and far in a given environment exclusive of particular noise sources to be measured.

- **Decibel (dB).** A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
- **A-weighted decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent sound level (L_{eq}).** The average of sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period.
- **Exceedance sound level (L_{xx}).** The sound level exceeded XX percent of the time during a sound level measurement period. For example, L_{90} is the sound level exceeded 90 percent of the time, and L_{10} is the sound level exceeded 10 percent of the time. L_{90} is typically considered to represent the ambient noise level.
- **Maximum and minimum sound levels (L_{max} and L_{min}).** The maximum or minimum sound level measured during a measurement period.
- **Day-night level (L_{dn}).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
- **Community noise equivalent level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

L_{dn} and CNEL values rarely differ by more than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment. In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving sound level.

For a point source such as a stationary compressor, sound attenuates based on geometry at rate of 6 dB per doubling of distance. For a line source such as free- flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance. Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travel over a hard surface such as pavement. The increased attenuation is typically in the range of 1 to 2 dB per doubling of distance. Barriers such as buildings and topography that block the line of site between a source and receiver also increase the attenuation of sound over distance.

Auditory and non-auditory effects can result from excessive or chronic exposure to elevated noise levels. Auditory effects of noise on people can include temporary or permanent hearing loss. Non-auditory effects of exposure to elevated noise levels include sleep disturbance, speech interference, and psychological effects, such as annoyance. Land use compatibility standards for noise are typically based on research related to these non-auditory effects.

3.6.2.1.2 Vibration

Operation of heavy construction equipment, particularly pile driving and other impulsive devices such as pavement breakers, create seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Vibration from operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance will result in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes will decrease with increasing distance.

As seismic waves travel outward from a vibration source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second [in/sec]) at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the peak particle velocity (ppv). Table 3.6-2 summarizes typical vibration levels generated by construction equipment (Federal Transit Administration 2006).

Table 3.6-2. Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 feet
Pile driver (impact)	0.644 to 1.518
Pile drive (sonic)	0.170 to 0.734
Vibratory roller	0.210
Hoe ram	0.089
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003

Source: Federal Transit Administration 2006

Vibration amplitude attenuates over distance and is a complex function of how energy is imparted into the ground and the soil conditions through which the vibration is traveling. The following equation can be used to estimate the vibration level at a given distance for typical soil conditions. PPV_{ref} is the reference ppv at 25 feet from Table 3.6-2:

$$PPV = PPV_{ref}\left(\frac{25}{distance}\right)^{1.5}$$

Table 3.6-3 summarizes typical human response to steady state vibration such as that produced by typical non-impact construction activity.

Table 3.6-3. Human Response to Steady State Vibration

PPV	Human Response
3.6 (at 2 Hz) – 0.4 (at 20 Hz)	Very disturbing
0.7 (at 2 Hz) – 0.17 (at 20 Hz)	Disturbing
0.10	Strongly perceptible
0.035	Distinctly perceptible
0.012	Slightly perceptible
Source: California Department of Transportation 2004.	

Table 3.6-4 summarizes typical human response to transient vibration that is usually associated with transitory impact construction sources such as pile driving activity.

Table 3.6-4. Human Response to Transient Vibration

PPV	Human Response
2.0	Severe
0.9	Strongly perceptible
0.24	Distinctly perceptible
0.035	Barely perceptible
Source: California Department of Transportation 2004.	

3.6.2.2 Regulatory Setting

3.6.2.2.1 State

There are no state policies related to noise that would apply to the implementation of the CHP Academy EIP. However, the *General Plan Guidelines* published by the Governor's Office of Planning and Research (2003) include recommendations for maximum noise exposure based on type of land use. These recommendations are available for counties and cities to adopt as part of their state-mandated requirement in establishing policies and standards in their general plans regarding incompatibilities between land uses as they relate to noise exposure.

There are no applicable Federal, state, or local quantitatively-defined regulations relating to vibration resulting from construction activities. Thresholds for annoyance and structural damage reported by Caltrans (2004) are used in this analysis. Tables 3.6-3 and 3.6-4 summarize human response/annoyance thresholds. Table 3.6-5 summarizes vibration damage thresholds.

Table 3.6-5. Maximum Vibration Levels for Preventing Damage to Structures

Type of Situation	Limiting Velocity (in/sec)
Historic sites or other critical locations	0.1
Residential buildings, plastered walls	0.2 to 0.3
Residential buildings in good repair with gypsum board walls	0.4 to 0.5
Engineered structures, without plaster	1.0 to 1.5

Source: California Department of Transportation 2004

3.6.2.2.2 Local

The following local policies related to noise may apply to the implementation of the CHP Academy EIP.

City of West Sacramento Noise Ordinance

The City noise ordinance is the primary enforcement tool for the operation of locally regulated noise sources, such as construction activity or outdoor recreation facilities, and is set forth in Chapter 17.32 of the City Code. The City noise ordinance sets noise level performance standards for non-transportation noise sources, which are summarized in Table 3.6-6. Examples of non-transportation noise sources include construction equipment, industrial operations, outdoor recreation facilities, HVAC units, and loading docks. The City of West Sacramento's noise ordinance does not specify an exemption for temporary daytime construction activity, so all construction associated with the proposed project must comply with the daytime and nighttime noise limits listed in Table 3.6-6. City of West Sacramento transportation noise level standards are listed in Table 3.6-7.

Table 3.6-6. City of West Sacramento Non-Transportation Noise Level Standards

		Exterior Noise Levels		Interior Noise Levels	
Land Use	Noise Level Descriptor	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Residential	Hourly L_{eq}, dBA	50	45	45	35
	Max. Level, dBA	70	65	–	–
Transient Lodging	Hourly L_{eq}, dBA	–	–	45	35
Hospital, nursing homes	Hourly L_{eq}, dBA	–	–	45	35
Theatres, auditoriums, music halls	Hourly L_{eq}, dBA	–	–	35	35
Churches, meeting halls	Hourly L_{eq}, dBA	–	–	40	40
Office buildings	Hourly L_{eq}, dBA	–	–	45	45
Schools, libraries, museum	Hourly L_{eq}, dBA	–	–	45	45

Source: City of West Sacramento 1994

Note: Each of the noise levels specified above will be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercials uses (e.g., caretaker dwellings)

Table 3.6-7. City of West Sacramento Maximum Allowable Noise Exposure—Transportation Noise Sources

Land Use	Outdoor Activity Areas[1] L_{dn}/CNEL, dB	Interior Spaces L_{dn}/CNEL, dB	Interior Spaces L_{eq}, dB[2]
Residential	60[3]	45	–
Transient Lodging	60[3]	45	–
Hospitals, nursing homes	60[3]	45	–
Theatres, auditoriums, music halls	–	–	35
Churches, meeting halls	60[3]	–	40
Office buildings	–	–	45
Schools, libraries, museum	–	–	45
Playgrounds, neighborhood parks	70	–	–

Note:

[1] Where the location of outdoor activity is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.

[2] As determined for a typical worst-case hour during period of use.

[3] Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn/CNEL may be allowed, provided that practical exterior noise level reduction measures have been implemented and that interior noise levels are in compliance with this table. An exterior noise level of 70 dB Ldn/CNEL shall be allowed in the triangle specific plan area and the Washington specific plan area.

In addition, the City code stipulates that no operation shall be installed which by its construction or nature habitually or consistently produces noticeable vibration beyond the property line. As is discussed above, vibration from non-impact construction equipment (which typically produces steady state vibration) is not anticipated to result in a significant effect. As indicated in Table 3.6-4, human response to transient vibration sources (such as impact pile driving) typically becomes "distinctly perceptible" at or above 0.24 in/sec ppv (California Department of Transportation 2004).

West Sacramento General Plan

The primary purpose of the Noise Element of the *West Sacramento General Plan* is to protect city residents from the harmful effects of excessive noise (City of West Sacramento 1990). To this end, the Noise Element serves to set acceptable limits for the land use compatibility of new developments or land uses as it relates to noise exposure. The Noise Element sets the following policies for new development and planning purposes that may relate to the proposed project.

Policies

Policy 2: Where proposed non-residential land uses are likely to produce noise levels exceeding the performance standards if Table II-4 at existing or planned uses shown in Table II-4, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design. Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table II-4 as measured immediately within the property line of land uses designated in Table II-4.

Policy 4: New development of land uses contained in Table II-6 will not be permitted in areas exposes to existing or projected levels of noise from transportation noise sources which exceed the levels specified in Table II-6. Where the land uses contained in Table II-6 are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels specified in Table II-6, an acoustical analysis shall be required and appropriate mitigation shall be included in the project design.

Policy 7: Where noise mitigation measures are required to achieve the standards of Tables II-4 and II-6, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered a means of achieving the noise standards only after all other practical design-related noise mitigation measures have been integrated into the project.

In addition to the policies set forth in the *West Sacramento General Plan*, the *City of West Sacramento General Plan Background Document* states that "Sporting events such as softball games are conducted at city parks, with some games played at night. Public reaction to the noise produced by such activities may range from supportive to antagonistic, depending upon individual perceptions. In any case, late-night games with their attendant crowd noise and traffic can be annoying to nearby residents. To guard against adverse public reaction to nighttime sporting events at city parks, activities and use of public address systems should be limited to 10:00 p.m. or 11:00 p.m., depending upon neighborhood reactions. New facilities for sporting events should be designed to control crowd and public address system impacts."

Yolo County

To date, Yolo County has not adopted a noise ordinance that sets numerical or qualitative limits on the construction noise that would be generated by the proposed project. The *Yolo County General*

Plan sets forth policies relating to noise, including a policy that Yolo County will adopt a comprehensive noise ordinance. Yolo County is currently in the process of a general plan update.

City of Sacramento Noise Ordinance

The City of Sacramento's noise ordinance limits described below have been used in this EIR as a noise impact criterion for homes inside the city.

The City of Sacramento noise ordinance is the primary enforcement tool for the operation of locally regulated noise sources, such as construction activity, and is set forth in Chapter 8.68 of the City Code. The noise ordinance sets exterior noise level standards for noise sources that affect residential or agricultural property. These exterior noise level performance standards are summarized in Table 3.6-8. Noise associated with the erection (including excavation), demolition, alteration, or repair of any structure occurring between 7:00 a.m. and 6:00 p.m., Monday through Saturday, and between 9:00 a.m. and 6:00 p.m. on Sunday is exempted from the provisions of the City noise ordinance.

Table 3.6-8. City of Sacramento Exterior Noise Level Standards

Cumulative Duration of the Intrusive Sound in Any One Hour	Daytime[1] (7:00 a.m. to 10:00 p.m.)	Nighttime[1] (10:00 p.m. to 7:00 a.m.)
30 Minutes	55	50
15 Minutes	60	55
5 Minutes	65	60
1 Minute	70	65
Level not to be exceeded	75	70
Resultant 1-hour L_{eq}	59	54

Source: City of Sacramento 1977

Notes:

Each of the noise limits specified shall be reduced by five dBA for impulsive or simple tone noise, or for noises consisting of speech or music;

If the ambient noise level exceeds that permitted by any of the first four noise level categories, the allowable noise limit shall be increased in five dB increments in each category to encompass the ambient noise level. If the ambient noise level exceeds the fifth noise level category, the maximum ambient noise level shall be the noise limit for that category.

City of Sacramento General Plan

The Noise Element of the *City of Sacramento General Plan* establishes interior and exterior noise level standards for planning purposes to ensure land use compatibility for new zoned developments as it relates to noise exposure. The City of Sacramento is currently in the process of a general plan update. The Noise Element sets noise level standards for new development and planning purposes, which do not pertain directly to the proposed project.

3.6.2.3 Environmental Setting

This section discusses the environmental setting related to noise for the CHP Academy EIP.

Noise-sensitive land uses in the vicinity of the project area are primarily residential uses located across the Sacramento River in the City of Sacramento, with the closest residences located on Garden Highway within 900 feet of the east terminus of the levee reach and 1,900 feet from the staging/mixing area. In addition, the CHP Academy, located south of the reach in the city of West Sacramento, would be considered noise-sensitive at buildings where cadets are housed (during nighttime hours) or trained (during daytime hours). The closest noise-sensitive CHP Academy dormitory building is located at a distance of approximately 1,500 feet south of the levee reach and 1,700 feet south of the staging/mixing area.

The primary existing noise sources in the project vicinity are vehicular traffic on I-80 and local roadways. Secondary noise sources include boating traffic on the Sacramento River, agricultural and industrial operations, and airplane and helicopter flyovers (to and from the CHP Academy and regional airports and facilities).

I-80 is the dominant noise source in the area, and existing noise levels in the project vicinity depend on relative distance from this freeway. Traffic noise levels in the vicinity of I-80 were calculated at various distances using the existing traffic volumes (California Department of Transportation 2007) and the Federal Highway Administration (FHWA) Traffic Noise Model (Version 2.5). Table 3.6-9 summarizes the results of modeling. Estimated peak-hour daytime traffic noise levels at the noise-sensitive receptors nearest the levee reach are 63 to 64 dBA. Nighttime noise levels near major freeways are typically 10 to 15 dBA quieter than the peak-hour daytime levels, so the estimated nighttime noise levels at the closest noise-sensitive receptors are likely 48 to 54 dBA.

Table 3.6-9. Modeled Peak Hour Traffic Noise Levels in the CHP Academy Project Vicinity

Distance from Interstate 80 (feet)	Noise-Sensitive Receptor	Peak Hour Daytime Traffic Noise L_{eq} (dBA)	Estimated Nighttime L_{eq} (dBA)
2,000	City of Sacramento homes closest to levee reach	64	49–54
2,200	CHP buildings closest to levee reach	63	48–53

3.6.3 Environmental Consequences

This section describes the environmental consequences relating to noise for the CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.6.3.1 Assessment Methods

This analysis focuses on the potential construction-related and operational noise effects associated with the CHP Academy EIP. Methods recommended by the Federal Transit Administration (2006) have been used to assess construction noise. Potential noise effects associated with construction activities have been evaluated by assuming the simultaneous operation of multiple pieces of heavy equipment as a reasonable upper bound for noise effects.

Temporary groundborne vibration from construction activity has also been assessed using methods recommended by the Federal Transit Administration (2006).

3.6.3.2 Determination of Effects

The environmental checklist in the State CEQA Guidelines Appendix G (14 CCR 15000 et seq.) provides guidance to be used in determining the significance of noise effects. A noise effect is normally considered significant if it would:

- expose persons to or generate noise levels in excess of applicable standards;
- result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- expose persons to vibration or generation of excessive groundborne noise levels;
- expose people residing or working in the area to excessive noise levels, for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport; or
- expose people residing or working in the project area to excessive noise levels, for a project within the vicinity of a private airstrip.

For the purposes of this analysis, a noise or vibration effect is considered to be significant if:

- construction noise levels exceed allowable numerical limits specified by the City of West Sacramento or the City of Sacramento, for receivers in those jurisdictions.
- construction noise levels at receivers located where there are no numerical noise limits (i.e., other than the cities of West Sacramento or Sacramento) exceed 70 dBA L_{eq} during the day, or 60 dBA L_{eq} at night. Those noise criteria were established for this analysis based on recommended values by the Federal Transit Administration 2006, adjusted downward by 10 dBA to account for the relatively quiet baseline conditions throughout the study area.
- construction vibration ppv would exceed 0.2 in/sec (potential damage at plaster-walled structures) or 0.24 in/sec (human response threshold for "distinctly perceptible" due to transient vibration sources) at any structure or occupied building. 0.2 in/sec will be the governing threshold for assessing the significance of vibration.

It is possible that construction activity for levee improvements might have to be conducted at night to respond to expedited schedule requirements. Therefore, the noise analyses described in this section assumes the project must comply with nighttime noise ordinance limits for the two local jurisdictions:

- CHP Academy dormitories within the city of West Sacramento: 45 dBA (L_{eq}); 65 dBA (L_{max})
- City of Sacramento dwellings: 54 dBA (L_{eq}); 70 dBA (L_{max})

The CHP Academy EIP would require the use of heavy construction equipment. Table 3.6-10 summarizes typical construction noise emission levels for the types of equipment proposed for use.

Table 3.6-10. Typical Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (L_{max})[1]	Equipment	Typical Noise Level (L_{max})[1]
Backhoe	78	Grader	85
Batch mixing plant	83	Haul truck[2]	76
Compactor	83	Maintainer[5]	77
Dozer	82	Paver	77
Dump truck	76	Pickup truck	75
Excavator	81	Roller	80
Forklift[3]	75	Scraper	84
Front-end loader	79	Trackhoe[4]	78
Water truck[2]	76	Water truck[2]	76

Source: Federal Highway Administration 2006
[1] dBA, A-weighted decibel level, measured at 50 feet
[2] Based on data for dump truck
[3] Based on data for pickup truck
[4] Based on data for backhoe
[5] Based on data for paver

3.6.3.2.1 Effect Assumptions

The following assumption regarding project effects on noise in the CHP Academy project area have been made for this analysis:

- Vibration from non-impact/impulsive construction equipment typically attenuates below significant levels within about 50 feet of construction activity, and is not anticipated to result in a significant effect during implementation of the project. Therefore, effects from non-impulsive construction equipment are not discussed further in this section.
- Groundborne noise occurs when groundborne vibration causes the ground surface and structures to radiate audible acoustical energy. It is primarily an issue for underground rail systems and is not a concern for groundborne noise generated by construction or maintenance equipment because airborne noise from construction and maintenance equipment typically overshadows the groundborne noise generated by the equipment. Accordingly, groundborne noise is not considered further in this analysis.
- The maintenance of certain levee alternatives would involve intermittent vehicular trips to inspect the proper functioning of the alternative and/or light mechanical equipment operation to conduct vegetative weeding, irrigation, repair, or cleaning activities as needed. These intermittent vehicular trips and light maintenance activities, by their very nature and frequency, are considered less than significant.
- There are no significant sources of groundborne vibration associated with operation of the proposed project. Therefore, operation of the proposed project would have no effect related to the exposure of persons to, or generation of excessive groundborne vibration or groundborne noise levels and evaluation of this effect is not applicable, and is not discussed further.

3.6.4 Effects and Mitigation Measures

3.6.4.1 No Action Alternative

The No Action Alternative represents the continuation of the existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. Current levee operations and maintenance activities would continue, but there would be no noise or vibration associated with new construction or operational activities.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability or geometry issues would continue. Failure of the Sacramento Bypass Levee, depending on the magnitude of the event, could cause catastrophic flooding. Without improvements to the levee system, the risk of levee failure would remain high. Under these conditions, any of the levee deficiencies could cause portions of the levees to fail, triggering widespread flooding and extensive damage. If a catastrophic flood were to occur, emergency flood fighting and clean-up actions would require the use of a considerable amount of heavy construction equipment. Timing and duration of use would directly correlate with flood fighting needs, but could last for days, weeks, even months. Depending on the magnitude of the flood, people may or may not be present during flood fighting activities. If flooding occurred only in West Sacramento, nearby Sacramento residents could still be residing and working near a clean-up area, exposing them to excessive noise and vibration levels for extended periods of time.

Furthermore, because of the unpredictable nature of an emergency response, compliance with local noise ordinances and implementation of BMPs to manage noise levels would not be possible. All of these effects could be considered significant. However, the timing, duration, and magnitude of a flood event are speculative and unpredictable, and therefore a precise determination of significance is not possible.

3.6.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following noise-related effects. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise	Less than significant	N/A	N/A
NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations	Less than significant	N/A	N/A

Effect NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise

Under the CHP Academy APA, levee deficiency improvements would be constructed along a 6,500-foot-long area of the Sacramento Bypass Levee reach. The CHP Academy APA would include two sequential stages of construction activity: construction of slurry cutoff walls using the conventional slot trench method, and waterside slope flattening. Noise levels generated during slope flattening activity would be lower than those generated during slurry wall construction. Therefore, the following noise impact assessment focuses on the louder activity (combined slurry wall and staging/mixing area).

Construction equipment proposed for slurry wall construction would include long-reach trackhoes, dump trucks, haul trucks, loaders, rough-terrain forklifts, compactors, maintainers, and water trucks. The three loudest pieces of equipment employed during slurry cutoff wall construction would likely be the compactor, dozer, and long-reach excavator. The loudest pieces of equipment at the staging/mixing area would include a loader, a batch mixing plant, and a haul truck. The total noise emissions from the combined slurry wall and staging/mixing area activity would be 89 dBA (L_{max}) at 50 feet and 83 dBA (L_{eq}) at 50 feet.

Table 3.6-11 summarizes noise levels at various distances projected from the simultaneous construction activity for the slurry wall and staging/mixing area. That table compares the modeled L_{max} and L_{eq} noise levels to the nighttime noise ordinance limits at each of the noise sensitive receptors.

Construction equipment proposed for slope flattening includes motor graders, sheepsfoot rollers, haul trucks, and water trucks. The three loudest pieces of equipment under this treatment option would be the grader, roller, and large truck (haul or water). The total noise emissions from the slope-flattening construction activity would be 87 dBA (L_{max}) at 50 feet and 82 dBA (L_{eq}) at 50 feet.

Table 3.6-11. Projected Construction Noise Levels due to Slurry Cutoff Wall Installation (Including Staging/Mixing Area)

Distance between Source and Receiver (feet)	Noise Receptor	Calculated L_{max} Sound Level (dBA)	Calculated L_{eq} Sound Level (dBA)	L_{max} Nighttime Noise Limit (dBA)	L_{eq} Nighttime Noise Limit (dBA)
900	Homes along Garden Highway in City of Sacramento	54	50	70[1]	54[1]
1,600	Closest dormitories at CHP Academy	47	43	65[2]	45[2]

Calculations based on Federal Transit Administration 2006

[1] Nighttime noise ordinance limit for City of Sacramento

[2] Nighttime noise ordinance limit for City of West Sacramento

Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers

The closest dormitories at the CHP Academy and the closest homes across the river in the city of Sacramento are relatively far from the construction areas (1,600 and 900 feet, respectively), so the modeled noise levels at those receptors would be lower than the respective nighttime noise ordinance limits. Therefore, construction noise effects would not be significant, even if nighttime construction is required.

Similarly, construction-related haul trucks and commute vehicles traveling along public streets are not expected to cause 24-hour day-night (L_{dn}) noise levels exceeding the City's noise limits for transportation noise sources. The highest truck traffic volumes along residential streets would occur along North Harbor Boulevard, where there are single-family and multi-family dwellings along the road. As described in Section 3.4, Transportation and Navigation, temporary construction activity could generate up to 298 haul truck trips per day and 58 worker commute trips per day. If the haul trucks and commute vehicles were used 24 hours per day, project-related traffic noise levels at the existing dwellings along North Harbor Boulevard would be 61 dBA-L_{dn}. That project-related L_{dn} noise level is less than the 65 dBA-L_{dn} limit set by the City's noise ordinance. If haul trucks usage could be restricted to daytime hours, then the resulting L_{dn} noise levels would be lower. Therefore, this impact would be less than significant. No mitigation is required.

Effect NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations

There would be no additional ongoing flood control related levee maintenance activities at areas subsequently treated with cutoff wall installations beyond current maintenance activities. Areas treated with slope flattening would be regularly mowed and maintained to control vegetation. Recreation trail maintenance would include sweeping, pavement repair, removal of obstacles, and periodic asphalt overlays. These maintenance activities would not have a significant effect on noise or vibration. Therefore, this effect would be considered less than significant. No mitigation is required.

3.6.4.3 CHP Academy Alternative B

Implementation of the CHP Academy APA would result in the following noise-related effects. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise	Less than significant	N/A	N/A
NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations	Less than significant	N/A	N/A

Effect NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise

Under CHP Academy Alternative B, levee treatments and construction practices along the Sacramento Bypass reach would consist of two sequential stages of construction activity:

- Stability berm construction using a grader, dozer, and compactor. The combined noise emissions from the loudest equipment would be 88 dBA (L_{max}) and 84 dBA (L_{eq}).
- Relief well installation using a drill rig, an excavator, and a water truck. The combined noise emissions from the loudest equipment would be 84 dBA (L_{max}) and 81 dBA (L_{eq}).

Construction of the stability berm would generate the loudest noise levels. Therefore, the noise impact assessment focuses on that stage of construction. This assessment assumes that nighttime construction might be required.

Noise-sensitive receptors are the same as those considered for the CHP Academy APA: the closest dormitories at the CHP Academy within the City of West Sacramento (1,600 feet from the levee reach); and homes along Garden Highway in the City of Sacramento (900 feet from the eastern terminus of the levee reach). As described previously, each of those jurisdictions has its own nighttime noise ordinance limits.

Noise generated by nighttime construction of the stability berm (the loudest activity forecast for Alternative B) was modeled. Table 3.6-12 lists the forecast construction noise levels at each noise sensitive receptor, and compares the forecast values to the respective nighttime noise ordinance limits.

Table 3.6-12. Projected Construction Noise Levels during Alternative B Stability Berm Construction

Distance between Source and Receiver (feet)	Noise Receptor	Calculated L_{max} Sound Level (dBA)	Calculated L_{eq} Sound Level (dBA)	L_{max} Nighttime Noise Limit (dBA)	L_{eq} Nighttime Noise Limit (dBA)
900	Homes along Garden Highway in City of Sacramento	55	51	70[1]	54[1]
1,600	Closest dormitories at CHP campus	48	44	65[2]	45[2]

Calculations based on Federal Transit Administration 2006
[1] Nighttime noise ordinance limit for City of Sacramento
[2] Nighttime noise ordinance limit for City of West Sacramento
This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers

Forecast nighttime noise levels generated by the loudest construction activity are less than the nighttime noise ordinance limits. Therefore, noise impacts would be less than significant even if nighttime construction is required.

Similar to the CHP Academy APA, haul trucks and worker commute vehicles traveling along public streets would not cause project-related traffic noise to exceed the City's noise ordinance limits, even if haul trucks were used 24 hours per day. Forecast traffic noise levels for the APA are less than the City's noise ordinance limit, and Alternative B would generate lower traffic volumes than the APA. Therefore, traffic noise generated by Alternative B would also be less than the City noise ordinance limited. This effect would be less than significant. No mitigation is required.

Effect NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations

There would be no additional ongoing flood control related levee maintenance activities beyond what is currently undertaken to control vegetation and maintain the existing drainage ditch. Relief well maintenance would include annual inspection and test pumping every 2 years. Recreation trail maintenance would include sweeping, pavement repair, removal of obstacles, and periodic asphalt overlays. These maintenance activities would not have a significant effect on noise or vibration. Therefore, this effect would be considered less than significant. No mitigation is required.

Section 3.7
Vegetation and Wetlands— CHP Academy Early Implementation Project

3.7.1 Introduction

This section describes the regulatory and environmental setting for vegetation and wetlands, effects on vegetation and wetlands that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- California Natural Diversity Database (CNDDB) records search of the U.S. Geological Survey (USGS) 7.5-minute Grays Bend, Taylor Monument, Rio Linda, Davis, Sacramento West, Sacramento East, Saxon, Clarksburg, and Florin quadrangles (California Natural Diversity Database 2009b)
- U.S. Fish and Wildlife Service (USFWS) list of endangered, threatened, and proposed species for the USGS 7.5-minute Sacramento West quadrangle and Yolo County obtained from the USFWS web site (U.S. Fish and Wildlife Service 2009b)
- California Native Plant Society (CNPS) 2009 online *Inventory of Rare and Endangered Plants of California* (California Native Plant Society 2009b)
- The California Department of Food and Agriculture *Pest Ratings of Noxious Weed Species and Noxious Weed Seed* (California Department of Food and Agriculture 2009)
- The California Invasive Plant Council's California Invasive Plant Inventory (California Invasive Plant Council 2006, 2007)
- City of West Sacramento General Plan Policy Document (City of West Sacramento 2004)

3.7.2 Affected Environment

This section describes the affected environment for vegetation and wetlands in the CHP Academy EIP project area, including regulatory and environmental settings.

3.7.2.1 Regulatory Setting

3.7.2.1.1 Federal

The following Federal policies related to vegetation and wetlands apply to implementation of the CHP Academy EIP.

Endangered Species Act

USFWS and NMFS are responsible for implementation of the Federal Endangered Species Act (ESA) (16 USC 1531 *et seq*.). The ESA protects fish and wildlife species that are listed as threatened or endangered, as well as their habitats. Endangered species, subspecies, or distinct population segments are in danger of extinction through all or a significant portion of their range. Threatened species, subspecies, or distinct population segments are likely to become endangered in the near future.

ESA Section 7 mandates that all Federal agencies consult with USFWS and the National Marine Fisheries Service (NMFS) if the agencies determine that a proposed project may affect a listed species or its habitat. The purpose of consultation with USFWS and NMFS is to ensure that the Federal agencies' actions do not jeopardize the continued existence of a listed species or destroy or significantly modify any critical habitat for listed species.

For plants listed as endangered under the ESA, Section 9(a)(2) of the act prohibits their import or export from the United States. Section 9(a)(2) also prohibits acts to remove, cut, dig up, damage, or destroy endangered plant species in non-Federal areas in knowing violation of any state law or in the course of criminal trespass. Candidate species and species that are proposed or under petition for listing receive no protection under Section 9.

Clean Water Act

The Federal Clean Water Act (CWA) is administered by the EPA and the U.S. Army Corps of Engineers (USACE). USACE is responsible for regulating the discharge of fill material into waters of the United States (including lakes, rivers, streams, and their tributaries) and wetlands. Wetlands are defined for regulatory purposes as areas that are "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions"(Environmental Laboratory 1987: 13).

The discharge of dredged or fill material into waters of the United States is subject to permitting under CWA Section 404. Certification from the applicable regional water quality control board (RWQCB) is also required when a proposed activity may result in discharge into navigable waters, pursuant to CWA Section 401 and EPA's Section 404(b)(1) guidelines.

On June 5, 2007, USACE and EPA issued a memorandum titled Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos* v. *United States & Carabell* v*. United States* that states that the agencies will assert jurisdiction over the following categories of water bodies: traditional navigable waters (TNWs), wetlands adjacent to TNWs, non-navigable tributaries of TNWs that are relatively permanent, and wetlands that abut such tributaries.

Additionally, on November 8, 2008 the Sacramento District of USACE issued a public notice (SPK-2008-01557) regarding local processing procedures for jurisdictional determinations. Applicants seeking USACE permits can elect either the traditional "approved" approach to obtain a jurisdictional determination from USACE or seek a preliminary jurisdictional determination that concedes jurisdiction to USACE. The preliminary jurisdictional determination is intended to streamline the process for applicants who want to obtain USACE permit authorizations or jurisdictional determinations.

Rivers and Harbors Act

Rivers and Harbors Act Section 10 requires authorization from USACE for the construction of any structure in or over any navigable waters of the United States. Tidal waterways within the Delta are considered navigable waters. The law applies to any dredging, excavation, filling, or other modification of a navigable water of the United States, as well as to all structures, including bank protection (e.g., riprap) and mooring structures, such as those in a marina. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work would affect the course, location, or condition of the water body.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) of 1958 requires that all federal agencies consult with USFWS, NMFS, and the affected state wildlife agency for activities that affect, control, or modify surface waters, including wetlands and other waters. Under the FWCA, USFWS and NMFS have an extended responsibility for project review that encompasses concerns about plant and wildlife species that may not be addressed under NEPA and the federal ESA. This extended responsibility may include a project's secondary effects on jurisdictional waters, including wetlands. USFWS and NOAA Fisheries review CWA Section 404 permit applications, as well as other federal actions perceived to modify waters, and prepare a coordination act report to document the coordination between the federal agency and the appropriate state regulatory agencies. (Cylinder et al. 2004: 54).

Executive Order 11990: Protection of Wetlands

Executive Order 11990, signed May 24, 1977, directs all Federal agencies to refrain from assisting in or giving financial support to projects that encroach on publicly or privately owned wetlands. It further requires that Federal agencies support a policy to minimize the destruction, loss, or degradation of wetlands. A project that encroaches on wetlands may not be undertaken unless the agency has determined that 1) there are no practicable alternatives to such construction, 2) the project includes all practicable measures to minimize harm to wetlands that would be affected by the project, and 3) the effect would be minor.

Executive Order 13112: Invasive Species

EO 13112, signed February 3, 1999, directs all federal agencies to prevent and control the introduction of invasive species in a cost-effective and environmentally sound manner. The EO established the National Invasive Species Council (NICS), which is composed of federal agencies and departments, and a supporting Invasive Species Advisory Committee composed of state, local, and private entities. In 2008, the NISC released an updated national invasive species management plan that recommends objectives and measures to implement the executive order and prevent the introduction and spread of invasive species (National Invasive Species Council 2008). The EO requires consideration of invasive species in NEPA analyses, including their identification and distribution, their potential impacts, and measures to prevent or eradicate them.

3.7.2.1.2 State

The following state policies related to vegetation and wetlands apply to implementation of the CHP Academy EIP.

California Endangered Species Act

The California Endangered Species Act (CESA) was enacted in 1984. The act prohibits the take of endangered, threatened, and candidate species and defines it as an activity that would directly or indirectly kill an individual of a species; habitat destruction is not included in the state's definition of take. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. The California Department of Fish and Game (DFG) administers the act and authorizes take through Section 2081 agreements (except for species designated as fully protected). DFG can adopt a Federal biological opinion as a state biological opinion under California Fish and Game Code, Section 2095. In addition, DFG can write a consistency determination for species that are both federally and state-listed if DFG determines that the avoidance, minimization, and compensation measures will ensure no take of species. In the case of rare plant species, CESA defers to the California Native Plant Protection Act of 1977 (CNPPA; discussed below).

California Native Plant Protection Act

The CNPPA prohibits importation of rare and endangered plants into California, and take or sale of rare and endangered plants. CESA defers to CNPPA, which ensures that state-listed plant species are protected when state agencies are involved in projects subject to CEQA. In this case, plants listed as rare under CNPPA are not protected under CESA, but rather under CEQA.

California Fish and Game Code

DFG provides protection from take for a variety of species under the California Fish and Game Code. DFG also protects streams, water bodies, and riparian corridors through the streambed alteration agreement process under Fish and Game Code 1601–1606. The code stipulates that it is "unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake" without notifying DFG, incorporating necessary mitigation, and obtaining a streambed alteration agreement. DFG's jurisdiction extends to the top of banks and often includes the outer edge of riparian vegetation canopy cover. Riparian trees that have a diameter of 6 inches or greater also fall within DFG's jurisdiction.

Porter-Cologne Water Quality Control Act

Section 13260 of the California Water Code requires "any person discharging waste, or proposing to discharge waste, in any region that could affect the *waters of the state* to file a report of discharge (an application for waste discharge requirements)." Under the Porter-Cologne Water Quality Control Act definition, the term *waters of the state* is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." Although all waters of the United States that are within the borders of California are also waters of the state, the converse is not true—in California, waters of the United States represent a subset of waters of the state. Therefore, the State of California retains authority to regulate discharges of waste into any waters of the state, regardless of whether USACE has concurrent jurisdiction under CWA Section 404.

3.7.2.1.3 Local

The following local policies related to vegetation and wetlands apply to implementation of the CHP Academy EIP.

Yolo County

Yolo County General Plan

Table 3.7-1 summarizes the *Yolo County General Plan* policies (Yolo County 2002) related to vegetation and wetlands in the project area.

Yolo County Oak Woodland Conservation and Enhancement Plan

The *Yolo County Oak Woodland Conservation and Enhancement Plan* (Yolo County 2007) promotes voluntary efforts to conserve and enhance the county's existing oak woodlands to help minimize the effects of land conversion and other factors that disturb the health and longevity of existing oak woodlands.

Table 3.7-1. Summary of Yolo County General Plan Policies Related to Vegetation and Wetlands in the Project Area

Policy Number	Policy Description
OP-4	The County shall encourage and support coordinated efforts by State and federal agencies, cities, special districts, and non-profit and conservation organizations to protect lands containing open space resources.
OP-5	The County shall utilize the CEQA process to identify significant impacts on open space and shall require new development to implement county-approved mitigation measures that minimize such impacts.
OP-6	The County shall utilize the following objective criteria when considering conversion of open space lands to other uses: • The use is directly related and essential to an otherwise approved open space, agricultural or recreational activity; • Lack of suitable locations in Yolo County prevent the use from locating within an area not designated for open space uses; • The site is not located in a conservation easement, contracted agricultural preserve, Farmland Security Zone, flood control bypass or channel, or earthquake fault zone; • The use will not diminish or prevent open space, recreational or agricultural use on adjoining lands; • The use can be developed without impairing the open space experience, managed resource production and other open space uses and activities in the vicinity; and • The use does not conflict with any adopted local, State or federal plans for protection of open space resources.
OP-7	Development shall be directed away from naturally occurring riparian areas and wetlands.
OP-8	Open space buffer areas shall be utilized to separate incompatible uses from areas of unique biological or agricultural importance.
OP-18	The County, in conjunction with the cities in Yolo County, shall endeavor to adopt a Natural Communities Conservation Plan that protects wildlife resources, open space and agricultural production.

Source: Yolo County 2002

City of West Sacramento

City of West Sacramento General Plan

Table 3.7-2 summarizes the *City of West Sacramento General Plan* policies (Part II, Section 6) (City of West Sacramento 2004) that are applicable to vegetation and wetlands in the project area.

Table 3.7-2. Summary of City of West Sacramento General Plan Policies Related to Vegetation and Wetland Resources in the Project Area

Section-Goal-Policy Number	Policy Description
VI-C-1	The City shall encourage and support development projects and programs that enhance public appreciation and awareness of the natural environment.
VI-C-2	The City shall support state and federal policies for preservation and enhancement of riparian and wetland habitats by incorporating, as deemed appropriate, the findings and recommendations of the *Sacramento Greenway Plan*, California Department of Fish and Game and the U.S. Fish and Wildlife Service into site-specific development proposals.
VI-C-3	The City shall require site-specific surveys to identify significant wildlife habitat and vegetation resources for development projects located in or near riparian or wetland areas.
VI-C-4	The City shall support mitigation measures which provide for no net loss of riparian or wetland habitat acreage and value by regulating development in and near these habitats and promoting projects that avoid sensitive areas. Where habitat loss is unavoidable, the City shall seek replacement on at least a 1:1 basis. Replacement entails creating habitat that is similar in extent and ecological value to that displaced by the project. The replacement habitat should consist of locally occurring, native species and shall be located as close as possible to the project site or be part of a larger replacement habitat project.
VI-C-5	To minimize disturbance to wildlife, the City shall require the provision and maintenance of an adequate setback between significant wetland habitat and adjacent development. The buffer shall be landscaped with native or compatible introduced ornamental vegetation and may be used for passive recreation purposes.
VI-C-6	The City shall encourage the maintenance of marsh and riparian vegetation along irrigation/drainage canals and along the Deep Water Ship Channel by encouraging that routine maintenance and clearing disturb only one bank per year and maintain the fringes of marsh vegetation.
VI-C-7	The City shall seek to minimize the loss or degradation of wetland and riparian habitats at the following sites: Lake Washington and associated wetlands; Bee Lakes and associated riparian woodlands; riparian woodlands along the Sacramento River north of the I Street Bridge and south of the barge canal; and riparian woodlands along the Deep Water Ship Channel and the Yolo Bypass.
VI-C-9	The City shall seek to preserve populations of rare, threatened, and endangered species by ensuring that development does not adversely affect such species or by fully mitigating adverse effects.
VI-C-10	The City shall not approve projects that would affect endangered wildlife or plant species.
VI-C-11	The City shall implement measures to ensure that development in the city does not adversely affect fishery resources in the Sacramento River, Deep Water Ship Channel, and Lake Washington.
VI-C-12	Public access and recreation facilities shall not eliminate or degrade riparian habitat values. Trails, picnic areas, and other developments shall be sited to minimize impacts on sensitive wildlife habitat or riparian vegetation.

Section-Goal-Policy Number	Policy Description
VI-C-13	The City shall promote the use of native plants, especially valley oaks, for landscaping roadsides, parks, and private properties. In particular, native plants should be used along the Sacramento River and in areas adjacent to riparian and wetland habitats.
Source: City of West Sacramento 2004	

Tree Preservation Ordinance

The City's Tree Preservation Ordinance is found in the West Sacramento Municipal Code, Title 8 (Health and Safety), Chapter 24 (Tree Preservation). The City has definitions for heritage and landmark trees.

A *heritage tree* is defined as any living tree with a trunk circumference of 75 inches (diameter of 24 inches) or more, or any living native oak (any species of the genus *Quercus*) with a trunk circumference of 50 inches (diameter of 16 inches) or more, both measured 4.5 feet above ground level. The circumference of multi-trunk trees is based on the sum of the circumference of each trunk. A *landmark tree* is defined as a tree or stand of trees that is especially prominent, stately, or of historical significance as designated by the City Council. Trees that are too small in diameter to meet the size threshold of either a heritage or landmark tree but are located within the public right-of-way (typically 12.5 feet from the curb) are also protected by the ordinance.

It is unlawful in West Sacramento to perform any of the following acts with respect to a heritage or landmark tree without a tree permit issued by the City's tree administrator:

- Move, remove, cut down, poison, set fire to or permit fire to burn in proximity to, or perform or fail to perform any act that results in the unnatural death or destruction of a landmark or heritage tree.
- Perform any activity that will interfere with or retard the natural growth of any landmark or heritage tree.
- Perform any work or permit any work to be performed within the dripline area of a landmark or heritage tree.
- Trim or prune any branch of a landmark or heritage tree that is 5 inches or more in diameter.
- Change the appropriate amount of irrigation or drainage water provided to any landmark, heritage, or street tree. Trench, grade, pave, or otherwise damage or disturb any exposed roots within 1 foot outside the dripline area of any landmark, heritage, or street tree.
- Park or operate any motor vehicle within 1 foot outside the dripline area of any landmark, heritage, or street tree.
- Place or store any equipment or construction materials within 1 foot outside the dripline area of any landmark, heritage, or street tree.
- Place, apply, or attach any signs, ropes, cables, or other items to any landmark, heritage, or street tree.
- Place or allow to flow any oil, fuel, concrete mix, or other deleterious substance into or over within 1 foot outside the dripline area of any landmark, heritage, or street tree.

Tree permits require the applicant to replace a tree that must be removed with a living tree on the property or within West Sacramento in a location approved by the tree administrator. The applicant must also replace the replacement tree if it dies any time within 3 years of the initial planting. Replacement is not required if a tree is removed because it poses a risk or hosts a plant parasite.

Replacement trees are required at a ratio of 1:1 (i.e., 1-inch diameter of replacement plant for every 1-inch diameter of tree removed). Replacement trees may be a combination of 15-gallon trees, which are the equivalent of a 1-inch-diameter tree, or 24-inch box trees, which are the equivalent of a 3-inch-diameter tree. If a property owner is unable to replace the tree on his or her property or within an area approved by the tree administrator, the tree administrator shall require the property owner to pay an in-lieu fee to the city. An in-lieu fee payment is not required if the tree needs to removed solely because it poses a risk to persons or property or if the tree acts as a host for a plant that is parasitic. In-lieu fees will be set by city council resolution and be used to purchase and plant trees elsewhere in West Sacramento.

3.7.2.2 Environmental Setting

This section discusses the environmental setting related to vegetation and wetlands in the CHP Academy EIP project area.

3.7.2.2.1 Study Area

For the purposes of this section, the CHP Academy EIP study area consists of the project disturbance footprint plus an additional 100-foot-wide buffer zone to support an assessment of potential indirect effects. The width of the buffer zone was selected to account for indirect effects on elderberry shrubs (*Sambucus mexicana*) that are the host plant for the federally threatened valley elderberry longhorn beetle (VELB), which is discussed in Section 3.9, Wildlife. The study area occurs within the Great Central Valley subdivision of the California Floristic Province in Yolo County (Hickman 1993: 44, 45) and encompasses a portion of the Sacramento Bypass Levee near the CHP Academy. The majority of the study area consists of the levee itself. The levee crown and the eastern portion of the levee slope adjacent to the bypass are paved. The levee slope facing the CHP Academy and the western portion of the levee slope adjacent to the bypass support ruderal annual grassland. Additionally, an unpaved road is located approximately halfway down the levee slope adjacent to the CHP Academy. The topography of the portions of the study area adjacent to the levees is relatively level and elevations in the study area range from approximately 15 to 36 feet above mean sea level.

3.7.2.2.2 Field Surveys

The methods used to identify vegetation and wetland resources in the study area consisted of a pre-field investigation, reconnaissance-level site visits, a delineation of wetlands and waters, an arborist survey, and a botanical survey. Each of these components is described below.

Pre-Field Investigation

Prior to conducting the reconnaissance-level site visits, an ICF International botanist/wetland ecologist reviewed information pertaining to vegetation and wetland resources in the project region from the sources listed below.

- a CNDDB records search of the USGS 7.5-minute Sacramento West, Sacramento East, Grays Bend, Taylor Monument, Rio Linda, Davis, Clarksburg, Saxon, and Florin quadrangles (California Natural Diversity Database 2007);
- the USFWS list of endangered, threatened, and proposed species for the U.S. Geological Survey 7.5-minute Sacramento West quadrangle and Yolo County obtained from the USFWS web site (U.S. Fish and Wildlife Service 2007); and
- the CNPS 2007 online *Inventory of Rare and Endangered Plants of California* (California Native Plant Society 2009a).

No Federal, state, or local regulatory agencies were contacted prior to conducting the pre-field investigation; however, it was not appropriate at that time because the potential for the study area to contain sensitive vegetation and wetland resources could not be completely evaluated without field observations.

Reconnaissance-Level Site Visits

The botanist/wetland ecologist conducted three reconnaissance-level site visits to evaluate existing vegetation and wetland resources in the study area. The field visits were conducted on September 19 and October 5, 2007, and January 9 and February 13, 2009. The purpose of the site visits was to complete the following actions:

- Identify land cover types and compare field observations with existing vegetation data.
- Evaluate whether potential habitat may be present for special-status plant species that have been identified in the project region.
- Identify potential wetlands and other waters of the United States and/or state that these should be delineated during future surveys (see discussion below).
- Identify trees that may potentially be protected under the City's Tree Preservation Ordinance.
- Identify invasive plant species present in the study area.

Delineation of Wetlands and Other Waters

An ICF International soil scientist and a botanist delineated wetlands and other waters of the United States in the study area on December 29, 2008, and March 20 and August 13, 2009. The delineation was conducted to identify the types and locations of wetlands and other waters that may be subject to regulation by Federal (USACE) and/or state (Central Valley RWQCB) agencies. The delineation was conducted in accordance with guidance provided in the 1987 *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987: 53–69), the *Regional Supplement to the Corps of Engineers 1987 Manual: Arid West Region* (U.S. Army Corps of Engineers 2008), and USACE Regulatory Guidance Letter RGL 05-05 (U.S. Army Corps of Engineers 2005). The delineation was conducted to support the submission of a preliminary jurisdictional determination to the USACE Sacramento District and to obtain wastewater discharge requirements from the Central Valley RWQCB for waters of the state.

Arborist Survey

An ICF International arborist conducted tree surveys on December 16 and 17, 2008. The arborist survey methods followed standard professional practices and all tree location data were collected with a global positioning system unit with sub-meter accuracy. The arborist recorded the species, number of trunks, and diameter at breast height (diameter at 4.5 feet above the ground surface, unless otherwise noted, measured with a calibrated diameter-at-breast-height tape), tree height, dripline diameter, and the health and vigor of each tree. At the time of the arborist survey, the boundary of the study area was located approximately 400 feet west of the depressional wetland, so trees located west of that previous boundary were not surveyed. However, there are no direct effects proposed on any tree resources within the study area boundaries. The results of the 2008 survey are described below under the section entitled Tree Resources.

Botanical Survey

Two ICF International botanists conducted a botanical survey in the study area on April 30, 2009. The botanists walked meandering transects throughout the study area. All plant species observed were identified to the level necessary to determine if they were special-status plants or were plant species with unusual or significant range extensions. Plant species specific to the CHP Academy EIP study area are identified in Appendix G.

3.7.2.2.3 Land Cover Types

The study area contains the following land cover types: Great Valley mixed riparian forest, non-native annual grassland, depressional wetland, drainage ditch, open water, and levee/developed/landscaped. The Great Valley mixed riparian forest and non-native annual grassland are natural communities identified in DFG's List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database (California Department of Fish and Game 2003). The depressional wetland was classified using the hydrogeomorphic approach described by Brinson (1993: 7–9). Each of the land cover types is discussed below and shown in Figure 3.7-1.

Great Valley Mixed Riparian Forest

Great Valley mixed riparian forest surrounds the depressional wetland and pond within the Sacramento Bypass (Figure 3.7-1). The study area contains a total of 1.16 acres of Great Valley mixed riparian forest and only 0.07 acre occurs within the project disturbance footprint. The dominant overstory species are Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), Goodding's black willow (*Salix gooddingii*), and valley oak (*Quercus lobata*). The shrub layer is relatively open and contains small valley oaks, box elder (*Acer negundo* var. *californicum*), and tree tobacco (*Nicotiana glauca*). Representative species observed in the herbaceous understory were mugwort (*Artemisia douglasiana*), rough cocklebur (*Xanthium strumarium*), and cudweed (*Gnaphalium luteo-album*). None of the trees observed in the Great Valley mixed riparian forest met the definition of heritage or landmark trees as defined in the City's Tree Preservation Ordinance. Riparian forest is identified as a sensitive natural community by the CNDDB (California Natural Diversity Database 2009b).

Riparian communities in general are some of the richest community types in terms of structural and biotic diversity of any plant community found in California. Riparian vegetation provides three important functions in addition to that of wildlife habitat: 1) acts as a travel lane between the river and adjacent uplands, providing an important migratory corridor for wildlife; 2) filters out pollutants, thus protecting water quality; and 3) helps to reduce the severity of floods by stabilizing riverbanks.

Figure 3.7-1
Land Cover Types in the Study Area at CHP Academy Early Implementation Project Site

Land Cover Type	Project Area: Construction Limit	Project Area: Staging Area	Acres: Total in Study Area
Non-native Annual Grassland	9.68	11.86	21.45
Levee/Developed/ Landscaped	26.06	0.55	42.10
Great Valley Mixed Riparian Forest	0.07	---	1.25
Depressional Wetland	---	---	2.91
Open Water	---	---	.31
Drainage Ditch	---	---	0.13
Total Acreage	35.81	12.41	68.03

Study Area
Construction Limit
Staging Area
Alignment
Paved Bicycle Trail

N

Feet
400 200 0 400

Aerial Photo Source: Aerials Express, 2007

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Despite widespread disturbances resulting from urbanization, agricultural conversion, and grazing, riparian forests remain important wildlife resources because of their scarcity regionally and statewide and because riparian communities are used by a large variety of wildlife species.

Non-Native Annual Grassland

The majority of the non-native annual grassland in the CHP Academy EIP study area occurs within the Sacramento Bypass (Figure 3.7-1). A total of approximately 21.45 acres of non-native annual grassland occur within the study area. Rattail fescue (*Vulpia myuros* var. *myuros*) and soft chess (*Bromus hordeaceus*) were the dominant species observed in the non-native annual grassland in the Sacramento Bypass basin, and the dominant forbs observed were perennial pepperweed (*Lepidium latifolium*), winter vetch (*Vicia villosa* ssp. *varia*), and mugwort. Other species observed in the grassland were red brome (*Bromus madritensis* ssp. *rubens*), yellow star-thistle (*Centaurea solstitialis*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), perennial pepperweed, and Italian ryegrass (*Lolium multiflorum*). The non-native annual grassland within the Sacramento Bypass basin contained a high proportion of forb species. A large elderberry shrub was observed in the non-native annual grassland within the bypass. Narrow swaths of non-native annual grassland that occur on the levee itself were included in the levee/developed/landscaped land cover type described below because they are subject to periodic maintenance (i.e., mowing). In general, the annual grasslands in the study area contain a relatively large proportion of ruderal species, likely as a result of the substantial degree of disturbance from human activities.

Depressional Wetland

A single depressional wetland encompassing 2.91 acres was delineated in the study area (Figure 3.7-1). The depressional wetland is located entirely within the buffer zone component of the study area (i.e., outside the project disturbance footprint). The depressional wetland is located within the Sacramento Bypass basin and appears to receive most of its hydrologic input from groundwater in addition to direct precipitation and surface runoff. The depressional wetland is shaded by the Great Valley mixed riparian forest and does not support emergent marsh vegetation (i.e. cattails [*Typha* sp.] and tules [*Scirpus* sp.]). The depressional wetland was inundated at the time of the delineation of wetlands and waters and at the time of the botanical survey.

The depressional wetland does not provide habitat for the special-status plants known from the project region that occur in vernal pools or marshes because it does not support vernal pool or marsh vegetation and lacks the restrictive hardpan layer that characterizes vernal pools.

Dominant plant species associated with the depressional wetland were weedy species: knotweed (*Polygonum* sp.), Bermuda grass (*Cynodon dactylon*), perennial peppergrass, and rough cocklebur. The depressional wetland is surrounded by Great Valley mixed riparian forest and would be considered a sensitive natural community even though it is not listed on DFG's *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (California Department of Fish and Game 2003) because state and Federal regulatory agencies consider wetlands sensitive habitats.

Drainage Ditch

The study area contains several segments of a drainage ditch that that occurs parallel to the south side of the Sacramento Bypass levee. The drainage ditch appears to be ephemeral and no water was observed during the site visits. The area of the drainage encompassed by the study area is 0.13 acre and the drainage ditch is located entirely in the buffer zone component of the study area. The drainage ditch appears to drain upland areas between the CHP Academy and the Sacramento Bypass Levee.

Open Water

For the purposes of this analysis, the open water category includes the small pond at the western edge of the study area within the Sacramento Bypass and the canal, which are both located within the buffer zone component of the study area. Within the study area, the pond encompasses 0.19 acre and the canal encompasses 0.12 acre (for a total of 0.31 acre). The pond is bordered by Great Valley mixed riparian forest to the north, east, and south and by freshwater marsh to the west. A pipe (approximately 3 feet in diameter) was observed above the water level on the south side of the pond and appears to periodically convey water pumped from the canal into the pond. The unnamed canal is bordered by the CHP Academy on the east and on the west by the levee. A pumping station is located at the north end of the canal. The canal channel supports only a few small, scattered clumps of tules and cattails but is essentially unvegetated.

Levee/Developed/Landscaped

The levee/developed/landscaped land cover type is comprised of the levee itself as well as areas that are developed and/or landscaped (Figure 3.7-1). This land cover type that encompasses approximately 42.10 acres also includes unpaved roads and trails and areas that appear to have been mowed. The levee crown and the eastern portion of the levee slope adjacent to the bypass are paved, and an unpaved road is located approximately halfway down the levee slope adjacent to the CHP Academy. The levee slope facing the CHP Academy and the western portion of the levee slope adjacent to the bypass both support narrow swaths of non-native annual grassland dominated by slender wild oat (*Avena barbata*), ripgut brome (*Bromus diandrus*), and soft chess. The non-native annual grassland on the levee slope facing the CHP Academy appears to be periodically mowed as part of routine levee maintenance. The trees observed in the southeastern portion of the study area consist of a mixture of native oak trees (*Quercus* spp.) and species planted for landscaping purposes, e.g., coast redwood (*Sequoia sempervirens*), catalpa (*Catalpa* sp.), and London planetree (*Platanus hybrida*). Several elderberry shrubs were observed between the railroad tracks and Old River Road in the southeastern portion of the study area.

3.7.2.2.4 Waters of the United States, Including Wetlands

The study area contains 3.35 acres of waters of the United States consisting of the depressional wetland (2.91 acres), drainage ditch (0.13 acre), pond (0.19 acre), and canal (0.12 acre). Although portions of the Sacramento Bypass basin are inundated (e.g., depressional wetland, pond) and meet the three USACE wetland criteria (i.e., hydrophytic vegetation, hydric soils, & wetland hydrology), areas sampled in the remainder of the portion of the basin located within the study area do not meet all three wetland criteria. In accordance with USACE guidelines for submitting a preliminary jurisdictional determination, the depressional wetland and the other waters were interpreted to be subject to USACE regulation under Section 404 of the CWA. The detailed wetland delineation report was submitted to the USACE as part of the CWA Section 404 permitting process, and on February 12, 2010 the Sacramento District of the USACE issued a preliminary jurisdictional determination form for the proposed project. The depressional wetland and the other waters also qualify as waters of the state.

3.7.2.2.5 Special-Status Plant Species

Special-status plants are species that are legally protected under California Endangered Species Act, the federal Endangered Species Act, or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. For the purposes of this EIS/EIR, sensitive plants include:

- species listed or proposed for listing as threatened or endangered under ESA (50 CFR 17.12 [listed plants] and various notices in the *Federal Register* [proposed species]);
- species that are candidates for possible future listing as threatened or endangered under ESA (74 FR 57804, November 9, 2009);
- species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5);
- species that meet the definitions of rare or endangered under the State CEQA Guidelines Section 15380;
- plants listed as rare under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.);
- plants considered by CNPS to be "rare, threatened, or endangered in California" (Lists 1B and 2, California Native Plant Society 2009b); and
- plants listed by CNPS as plants about which more information is needed to determine their status, and plants of limited distribution (Lists 3 and 4, California Native Plant Society 2009b), which may be included as special-status species on the basis of local significance or recent biological information.

No special-status plant species occur in the study area based on one or more of the following findings: absence of habitat, absence of suitable microhabitat, and lack of occurrence during field surveys. Eighteen special-status plant species were identified as occurring in the project region (California Natural Diversity Database 2009b; California Native Plant Society 2009b; U.S. Fish and Wildlife Service 2009b). Four of the eighteen species are federally and/or state-listed as endangered or threatened: palmate-bracted bird's-beak (*Cordylanthus palmatus*), Boggs Lake hedge hyssop (*Gratiola heterosepala*), Colusa grass (*Neostapfia colusana*), and Crampton's tuctoria (*Tuctoria mucronata*). The status, distribution, habitat requirements, and identification period of the eighteen species are shown in Table 3.7-3. Although the Great Valley mixed riparian forest is potential habitat for northern California black walnut, no protected native stands were observed during any of the site visits.

Five of the remaining seventeen species occur in habitats (i.e., vernal pools, marshes) that are not present in the study area: Bogg's Lake hedge hyssop (*Gratiola heterosepala*), rose-mallow (*Hibiscus lasiocarpos*), legenere (*Legenere limosa*), Colusa grass (*Neostapfia colusana*), and Sanford's arrowhead (*Sagittaria sanfordii*). Although habitat is present in the grassland for eight of the remaining ten species, suitable microhabitat (mesic areas, adobe clay soils, alkaline soils) is not present. No mesic areas were observed during site visits and no alkaline, serpentine, or adobe clay soils have been documented in the three soil mapping units present in the study area: Lang sandy loam, deep; Lang sandy loam, deep, flooded; and Sycamore silt loam (Andrews 1972; 15, 16, 33, 34). Two special-status plant species, stinkbells (*Fritillaria agrestis*) and heartscale (*Atriplex cordulata*) were determined to have low potential to occur in the study area. No special-status plants were observed in the study area during the April 30, 2009 botanical survey that coincided with the reported blooming periods of stinkbells and heartscale (California Native Plant Society 2009b).

The timing of the survey also coincided with the reported blooming period of eight other special-status plant species identified during the pre-field investigation as occurring in the project region (California Native Plant Society 2009b) but for which the project study area lacked suitable habitat or microhabitat. Therefore, the proposed CHP Academy alternatives would not have a significant effect on special-status plants and effects on special-status plants are not discussed further. The closest special-status plant occurrence to the study area is rose-mallow that has been documented approximately 1.5 miles northeast of the study area (California Natural Diversity Database 2009b); however, no suitable habitat (i.e., freshwater marsh) is present in the CHP Academy study area.

1 **Table 3.7-3. Special-Status Plants Identified as Occurring in the Project Region for the CHP Academy EIP**

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution/Floristic Province[1]	Habitat Requirements	Identification Period	Potential for Occurrence in CHP Academy Study Area
Ferris's milk vetch *Astragalus tener* var. *ferrisiae*	–/–/1B.1	Historic range included the Central Valley from Butte to Alameda Counties; currently only occurs in Butte and Glenn Counties	Seasonally wet areas in meadows and seeps, sub-alkaline flats in valley and foothill grassland; 16–246 feet	Apr–May	Habitat present in grasslands but no suitable microhabitat (i.e., alkaline flats) is present. No occurrences within 10 mi. Not observed during April 2009 botanical survey.
Alkali milk vetch *Astragalus tener* var. *tener*	–/–/1B.2	Southern Sacramento Valley, northern San Joaquin Valley, eastern San Francisco Bay	Playas, on adobe clay in valley and foothill grassland, vernal pools on alkali soils; below 197 feet	Mar–Jun	Habitat present in grasslands but suitable microhabitat (i.e., adobe clay) is not present. Nearest occurrence is ~9 mi. away. Not observed during April 2009 botanical survey.
Heartscale *Atriplex cordulata*	–/–/1B.2	Western Central Valley and valleys of adjacent foothills	Saline or alkaline soils in chenopod scrub, meadows and seeps, sandy areas in valley and foothill grassland; below 1,230 feet	Apr–Oct	Habitat present in grasslands and sandy soils occur in the study area, but grasslands are highly disturbed by human activities. No saline or alkaline soils have been documented in the study area. Nearest reported occurrence (extirpated) was ~7.5 mi away. Not observed during April 2009 botanical survey.
Brittlescale *Atriplex depressa*	–/–/1B.2	Western and eastern Central Valley and adjacent foothills on west side of Central Valley	Alkaline or clay soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools; below 1,050 feet	Apr–Oct	Habitat present in grasslands but no suitable microhabitat (i.e., alkaline soils) is present. Nearest occurrence is ~10 mi. away. Not observed during April 2009 botanical survey.

[1] Floristic provinces as defined in Hickman 1993.

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution/Floristic Province[1]	Habitat Requirements	Identification Period	Potential for Occurrence in CHP Academy Study Area
San Joaquin saltscale *Atriplex joaquiniana*	–/–/1B.2	Western edge of the Central Valley from Glenn to Tulare Counties	Alkaline soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland; below 2,739 feet	Apr–Oct	Habitat present in grasslands but no suitable microhabitat (i.e. alkaline soils) is present. Nearest occurrence is ~8 mi. away. Not observed during April 2009 botanical survey.
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E/E/1B.1	Livermore Valley and scattered locations in the Central Valley from Colusa to Fresno Counties	Alkaline grassland, alkali meadow, chenopod scrub; 16–508 meters	May–Oct	Grasslands in study area lack typical associates (i.e., iodine bush [*Allenrolfea occidentalis*]) and no suitable microhabitat (i.e., alkaline soils) is present. Nearest occurrence is ~8 mi. away. Not observed during April 2009 botanical survey.
Dwarf downingia *Downingia pusilla*	–/–/2.2	Inner North Coast Ranges, southern Sacramento Valley, northern and central San Joaquin Valley	Mesic areas in valley and foothill grassland, vernal pools; below 1,460 feet	Mar–May	Habitat present in grasslands but no suitable microhabitat (i.e., mesic areas) is present. Nearest occurrence is ~7.5 mi. away. Not observed during April 2009 botanical survey.
Stinkbells *Fritillaria agrestis*	–/–/4.2	Outer North Coast Ranges, Sierra Nevada foothills, Central Valley, Central Western California	Clay, sometimes serpentine soils in chaparral, cismontane woodland, pinyon-juniper woodland, valley and foothill grassland; 33–5,102 feet	March–June	Habitat present in grassland and clay subsoils may be present at surface from disturbance to study area. Overlap between highest study area elevation (36ft) and elevation range of species (i.e., 36–5,102 feet above mean sea level) is very minimal. Grasslands are highly disturbed from human activities. No serpentine soils occur in the study area. Nearest occurrence is ~8.5 mi. away. Not observed during April 2009 botanical survey.

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution/Floristic Province[1]	Habitat Requirements	Identification Period	Potential for Occurrence in CHP Academy Study Area
Boggs Lake hedge hyssop *Gratiola heterosepala*	–/E/1B.2	Inner North Coast Ranges, central Sierra Nevada foothills, Sacramento Valley, Modoc Plateau	Marshes and swamps along lake margins, vernal pools on clay soils; 32–7,792 feet	Apr–Aug	No marsh or vernal pool habitat present. Nearest occurrence is ~10 mi. away.
Rose-mallow *Hibiscus lasiocarpos*	–/–/2.2	Central and southern Sacramento Valley, deltaic Central Valley, and elsewhere in the U.S.	Freshwater marsh along rivers and sloughs; below 394 feet	Jun–Sep	No marsh habitat present. Nearest occurrence is ~1 mi. away.
Northern California black walnut *Juglans hindsii*	–/–/1B.1	Last two native stands in Napa and Contra Costa Counties; historically widespread through southern Inner North Coast Ranges, southern Sacramento Valley, northern San Joaquin Valley, San Francisco Bay	Riparian scrub and riparian woodland; below 1,443 feet	Apr–May	Riparian habitat present but no native stands observed during 2007 & 2009 field surveys. Nearest occurrences is ~9 mi. away.
Legenere *Legenere limosa*	–/–/1B.1	Sacramento Valley, North Coast Ranges, northern San Joaquin Valley and Santa Cruz mountains	Vernal pools; below 2,887 feet	Apr–Jun	No vernal pool habitat present. Nearest occurrence is ~7.5–8.5 mi. away.
Heckard's pepper-grass *Lepidium latipes* var. *heckardii*	–/–/1B.2	Southern Sacramento Valley	Alkaline flats in valley and foothill grassland; 32–656 feet	Mar–May	Habitat present in grasslands but no suitable microhabitat (i.e., alkaline soils) is present. Nearest occurrence is ~7 mi. away. Not observed during April 2009 botanical survey.
Little mousetail *Myosurus minimus* ssp. *apus*	–/–/3.1	Central Valley, San Francisco Bay area, southern Outer Coast Ranges, South Coast	Alkaline soils in valley and foothill grassland and vernal pools; 66–2,100 feet	Mar–Jun	Study area is substantially lower than species elevation range. No alkaline soils or vernal pool habitat present. No occurrences within 10 mi. Not observed during April 2009 botanical survey.
Baker's navarretia *Navarretia leucocephala* ssp. *Bakeri*	–/–/1B.1	Inner North Coast Ranges, western Sacramento Valley	Mesic areas in cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, vernal pools;16–5,709 feet	Apr–Jul	Habitat present in grasslands but no suitable microhabitat (i.e., mesic areas) is present. No occurrences within 10 mi. Not observed during April 2009 botanical survey.

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution/Floristic Province[1]	Habitat Requirements	Identification Period	Potential for Occurrence in CHP Academy Study Area
Colusa grass *Neostapfia colusana*	T/E/1B.1	Central Valley with scattered occurrences from Colusa to Merced Counties	Adobe soils of vernal pools; 16–656 feet	May–Aug	No vernal pool habitat present. Nearest occurrence is ~9 mi. away.
Sanford's arrowhead *Sagittaria sanfordii*	–/–/1B.2	Scattered locations in Central Valley and Coast Ranges from Del North to Fresno Counties	Freshwater marshes, sloughs, canals, and other slow-moving water habitats; below 2,132 feet	May–Oct	Not observed in canal during August 2009 field survey. Nearest occurrence is ~4.5 mi. away.
Crampton's tuctoria *Tuctoria mucronata*	E/E/1B.1	Southwestern Sacramento Valley, Solano and Yolo Counties	Mesic areas in valley and foothill grassland, vernal pools; 16–33 feet	Apr–Aug	Habitat present in grasslands but no suitable microhabitat (i.e., mesic areas) is present. No vernal pool habitat present. Nearest occurrence is ~9 mi. away. Not observed during April 2009 botanical survey.

[a] Status explanations:

Federal

E = listed as endangered under the Federal Endangered Species Act.

T = listed as threatened under the Federal Endangered Species Act.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

R = listed as rare under the California Native Plant Protection Act (this category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.

– = no listing.

California Native Plant Society (CNPS)

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.

3 = List 3 species: more information is needed about this plant

4 = List 4 species: limited distribution and on a watch list.

0.1 = seriously endangered in California.

0.2 = fairly endangered in California.

* = presumed extirpated from that County.

3.7.2.2.6 Tree Resources

Approximately 78 trees were observed during the December 2008 arborist survey and consisted of Goodding's black willow, box elder, interior live oak (*Quercus wislizeni*), coast live oak (*Quercus agrifolia*), Fremont cottonwood, Oregon ash, catalpa (*Catalpa* sp.), and valley oak. The results of the December 2008 arborist survey are shown in Table 3.7-4. None of the trees observed during the arborist survey met the definition of a heritage or landmark tree as defined in the City's Tree Preservation Ordinance. Trees located outside of the area that was covered during the 2008 arborist survey consist of scattered individual trees and trees that comprise the small patch of Great Valley mixed riparian forest located at the west end of the study area. However, no direct effects are proposed on trees within the study area.

Table 3.7-4. Arborist Survey Results for CHP Academy EIP

Tree Species	Number of Individuals Observed
Goodding's black willow	16
Box elder	4
Interior live oak	22
Coast live oak	1
Fremont cottonwood	11
Oregon ash	3
Catalpa	2
Valley oak	19

3.7.2.2.7 Invasive Plant Species

Plant species that are considered invasive by the California Department of Agriculture and the California Invasive Plant Council are well-represented and fairly widespread throughout the study area (California Invasive Plant Council 2006, 2007, California Department of Agriculture 2009). Invasive plant species that were observed in the study area during the field visits were Himalayan blackberry, perennial pepperweed, yellow star-thistle, Bermuda grass, Mediterranean mustard, and ripgut brome. The California Department of Food and Agriculture and California Invasive Plant Council ratings for the invasive species observed in the CHP Academy EIP study area during the site visits are provided with the plant list (Appendix G).

3.7.2.2.8 Protected Tree Resources

As discussed above, no heritage or landmark trees were documented in the 2008 arborist survey; however, trees within the study area, but outside of the construction limit that have not been surveyed have the potential to meet the criteria for heritage or landmark trees that would be protected under the City's Tree Preservation Ordinance. However, as noted above, no direct effects are proposed on trees within the study area.

3.7.3 Environmental Consequences

This section describes the environmental consequences relating to vegetation and wetlands for the proposed CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.7.3.1 Assessment Methods

Evaluation of the vegetation and wetland effects in this section is based on the information provided by technical maps, reports, and other documents that describe the resource conditions of the study area. This information was then compared to the proposed project to determine whether effects would occur.

3.7.3.2 Determination of Effects

For this analysis, based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.), an effect pertaining to vegetation and wetlands was considered an adverse effect under NEPA and a significant impact under CEQA if it would:

- have a substantial adverse effect, either directly or 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 DFG or USFWS;
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by DFG or USFWS;
- have a substantial adverse effect on federally protected wetlands as defined by CWA Section 404 (including, but not limited to, marshes and vernal pools) through direct removal, filling, hydrological interruption, or other means;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- conflict with the provisions of an adopted habitat conservation plan, natural communities conservation plan, or other approved local, regional, or state habitat conservation plan.

3.7.3.2.1 Effect Assumptions

The following assumptions regarding project effects on vegetation and wetlands in the CHP Academy study area have been made for this analysis.

- No special-status plants occur in the study area and therefore effects on special-status plant species are not discussed in this section.
- Other than minor trimming, no direct effects on Great Valley mixed riparian forest would occur as a result of implementation of the proposed project alternatives.
- No trees located behind the fence of the adjacent CHP Academy property would be removed.
- All project activities, including equipment staging and access, would take place only within the project disturbance footprint and noted staging areas.
- Fill or borrow material would be obtained from a quarry or other authorized location.

- Operations and maintenance activities post-project would remain the same as those currently implemented.
- Grading would require a CWA Section 402 permit and preparation of a SWPPP.
- Grading or other construction activities would require a streambed alteration agreement from DFG.

3.7.3.2.2 Effect Mechanisms

Vegetation and wetland resources could be directly and indirectly affected by the proposed project. The following types of activities could cause varying degrees of effects on these resources:

- grading, and fill placement during construction of levee alternatives;
- channel dewatering or installation of temporary water-diversion structures;
- temporary stockpiling and sidecasting of soil, construction materials, or other construction wastes;
- soil compaction, dust, and water runoff from the construction site into adjacent areas;
- introduction or spread of invasive plant species into adjacent open space areas; and
- runoff of herbicides, fertilizers, diesel fuel, gasoline, oil, raw concrete, or other toxic materials used for levee alternatives, operations, and maintenance into sensitive biological resource areas (e.g., riparian habitat, wetlands).

3.7.4 Effects and Mitigation Measures

3.7.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects on vegetation or wetlands would occur.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability/geometry issues would continue. These effects could include significant loss of vegetation and habitat quality due to both the hydraulic forces of the flood itself as well as the clean-up efforts. However, given the uncertainty of the occurrence or magnitude of such an event, potential effects on vegetation and waters of the United States cannot be fully quantified based on available information.

As presented in Chapter 2, the No Action Alternative relative to USACE levee vegetation policy is characterized by four possible scenarios (see Appendix C for further details):

- full application of the ETL, meaning prohibition and removal of woody vegetation within the levee prism or within 15 feet of the landside or waterside levee toes;

- no application of the ETL, assuming the continued existence into the future of the vegetation conditions at the time of the analysis;
- application of the interim guidance for USACE levee vegetation policy from the Framework process, meaning trees within the levee prism on the landside slope, upper 20 feet of the waterside slope, or within 10 feet of the landside toe must be trimmed up five feet above the ground (or 12 feet above the crown road) and thinned; and
- application of a possible variance, such as the variance issued for Natomas Levee Improvement Program (NLIP) under USACE's draft variance policy, meaning removal of trees within the levee prism on the landside slope or within the landside operations and maintenance corridor, and allowance of trees within the levee prism on the waterside slope based on demonstration of not affecting the critical levee prism.

The table below summarizes the potential loss of trees based on these No Action Alternative scenarios. It should be noted that a potential variance under no action would likely allow two waterside trees to remain but would not protect a landside tree.

	No Action – Full ETL	No Action – No ETL	No Action - Framework	No Action - Variance
Potential Approximate Trees Removed	3	0	0	1

As discussed in the Draft EIS/EIR, zero to minimal vegetation will be removed at this EIP site to comply with the USACE vegetation policy as there is very little woody vegetation within the specified corridor. Zero to minimal effects on vegetation are anticipated in relation to implementation of USACE levee vegetation policy under the No Action Alternative.

3.7.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on vegetation and wetlands. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
VEG-1: Disturbance or Removal of Riparian Habitat as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor

Effect	Finding	With Mitigation	Mitigation Measure
VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor VEG-MM-4: Compensate for Loss of Protected Trees
VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction	Less than significant	N/A	N/A
VEG-5: Conflict with Provisions of an Adopted HCP/NCCP or Other Approved Local, Regional, or State Habitat Conservation Plan	No effect	N/A	N/A

Effect VEG-1: Disturbance or Removal of Riparian Habitat as a Result of Project Construction

No direct effects are proposed to trees as part of the CHP Academy APA except for minor trimming of trees within approximately 0.07 acre of Great Valley mixed riparian forest that occurs within and adjacent to the project disturbance footprint (i.e., construction zone) on the northern border of the project site. This trimming may be necessary to allow vertical clearance for construction equipment. Therefore, construction activities associated with the proposed project could potentially result in the disturbance of the Great Valley mixed riparian forest, a sensitive natural community. This effect is considered potentially significant. As described in Section 2.5, Chapter 2, Alternatives, WSAFCA has incorporated measures to avoid and minimize disturbance or potential effects to Great Valley mixed riparian forest in coordination with USFWS, NMFS and DFG. Figure 2-5, Protection Fencing Map, illustrates the locations of K-rail concrete barriers, orange construction fencing, and exclusion and silt fencing. These protection measures, in combination with the implementation of Mitigation Measures VEG-MM-1, VEG-MM-2, VEG-MM-3, would ensure that the proposed project would not have a significant effect on the Great Valley mixed riparian forest in the study area.

The table below summarizes the potential loss of trees from the APA relative to the No Action Alternative scenarios. It should be noted that the APA has been designed to be compliant with USACE levee vegetation policy; therefore, the effects are potentially less than those for no action.

	No Action - Full ETL	No Action - No ETL	No Action - Framework	No Action - Variance	APA
Potential Approximate Trees Removed	3	0	0	1	0

Mitigation

Mitigation Measure VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat

For direct effects on woody riparian habitat that cannot be avoided, WSAFCA will compensate for the loss of riparian habitat to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with the appropriate state and Federal agencies during the permitting process (e.g., 2:1=2 acres restored/created/enhanced or credits purchased for every 1 acre removed. Compensation may be a combination of off-site restoration or mitigation credits. WSAFCA will develop a restoration and monitoring plan that describes how riparian habitat will be enhanced or recreated and monitored over a minimum period of time, as determined by the appropriate state and Federal agencies.

If WSAFCA identifies on-site areas (adjacent to the levees) that are outside the USACE vegetation-free zone and chooses to compensate on site or in the project vicinity, a revegetation plan will be prepared.

The revegetation plan will be prepared by a qualified restoration ecologist and reviewed by the appropriate agencies. The revegetation plan will specify the planting stock appropriate for each riparian land cover type and each mitigation site, ensuring the use of genetic stock from the project area. The plan will employ the most successful techniques available at the time of planting. Success criteria will be established as part of the plan and will include a minimum of 80% revegetation success at the end of 5 years and will attain 70% revegetation success after three years and 75% vegetative coverage after 5 years.

WSAFCA will monitor and maintain the plantings as necessary for 5 years, including weed removal, irrigation, and herbivory protection. WSAFCA will submit annual monitoring reports of survival to the regulatory agencies issuing permits related to habitat effects, including DFG, USACE, NMFS, and USFWS. Replanting will be necessary if success criteria are not met and replacement plants will subsequently be monitored and maintained to meet the success criteria. The riparian habitat mitigation will be considered successful when the sapling trees established meet the success criteria, the habitat no longer requires active management, and vegetation is arranged in groups that, when mature, replicate the area, natural structure, and species composition of similar riparian habitats in the region.

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Before any work occurs in the project area, including grading, a qualified biologist will conduct mandatory contractor/worker awareness training for construction personnel. The awareness training will be provided to all construction personnel to brief them on the need to avoid effects on sensitive biological resources (e.g., riparian habitat, special-status species, special-status wildlife habitat) and the penalties for not complying with permit requirements. The biologist will inform all construction personnel about the life history of special-status species with potential for occurrence on site, the importance of maintaining habitat, and the terms and conditions of the biological opinion or other authorizing document. Proof of this instruction will be submitted to USFWS, DFG, or other overseeing agency, as appropriate.

The training will also cover the restrictions and guidelines that must be followed by all construction personnel to reduce or avoid effects on special-status species during project construction. The crew leader will be responsible for ensuring that crew members adhere to the guidelines and restrictions. Educational training will be conducted for new personnel as they are brought on the job during the construction period. General restrictions and guidelines for vegetation and wildlife that must be followed by construction personnel are listed below.

- Project-related vehicles will observe the posted speed limit on hard-surfaced roads and a 10-mile-per-hour speed limit on unpaved roads during travel in the project site.
- Project-related vehicles and construction equipment will restrict off-road travel to the designated construction area.
- All food-related trash will be disposed of in closed containers and removed from the study area at least once a week during the construction period. Construction personnel will not feed or otherwise attract fish or wildlife to the project site.
- No pets or firearms will be allowed in the project site.
- To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel will not service vehicles or construction equipment outside designated staging areas.

For special-status wildlife, any worker who inadvertently injures or kills a special-status wildlife species or finds one dead, injured, or entrapped will immediately report the incident to the biological monitor. The monitor will immediately notify WSAFCA, who will provide verbal notification to the USFWS Endangered Species Office or the local DFG warden or biologist within 3 working days. WSAFCA will follow up with written notification to USFWS or DFG within 5 working days.

Mitigation Measure VEG-MM-3: Retain a Biological Monitor

WSAFCA will retain qualified biologists to monitor construction activities adjacent to sensitive biological resources (e.g., special-status species, riparian habitat, wetlands, elderberry shrubs). The biologists will assist the construction crew, as needed, to comply with all project implementation restrictions and guidelines. In addition, the biologists will be responsible for ensuring that WSAFCA or its contractors maintain the construction barrier fencing adjacent to sensitive biological resources.

Effect VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction

Although the depressional wetland (2.96 acres), pond (0.16 acre), canal (0.11 acre), and drainage ditch (0.05 acre) are located outside the construction zone, ground disturbance associated with the construction of the two levee deficiency treatments could potentially result in the accidental placement of fill materials into one or all of these features. This effect is potentially significant because if fill materials enter the depressional wetland, the proposed project would have adverse significant effect on a sensitive natural community that was interpreted to be a federally protected wetland under the preliminary jurisdictional determination approach. Although the drainage ditch is not considered a sensitive natural community and is not a wetland, it was interpreted to be a water of the United States under the preliminary jurisdictional determination approach and is therefore also subject to USACE regulation under CWA. As described in Chapter 2, Alternatives, WSAFCA has incorporated measures to avoid and minimize disturbance or potential effects on wetlands and waters of the United States. These protection measures, in combination with the implementation of Mitigation Measures VEG-MM-2, and VEG-MM-3, described above, would ensure that the CHP Academy APA would not have adverse significant effect on the depressional wetland, pond, canal, or drainage ditch.

Effect VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction

As discussed under Effect VEG-3, no direct effects are proposed to trees as part of the CHP Academy APA except for minor trimming of trees within approximately 0.03 acre of Great Valley mixed riparian forest that occurs within and adjacent to the project disturbance footprint (i.e., construction zone) on the northern border of the project site. No effect is proposed for resources meeting the definition of heritage or landmark trees. Trimming to enable vertical clearance for construction equipment may be required for a small portion of the canopy of the Great Valley mixed riparian forest. However, ground disturbance associated with the construction of the two levee deficiency treatments could potentially result in the disturbance of protected trees. As described in Chapter 2, Alternatives, WSAFCA has incorporated measures to avoid and minimize disturbance to Great Valley mixed riparian forest and other tree resources. These protection measures, in combination with the implementation of project mitigation measures VEG-MM-1, VEG-MM-2, VEG-MM-3, described above, and VEG-MM-4, below, would ensure that CHP Academy APA would not have a significant effect on trees that are potentially protected.

Mitigation

Mitigation Measure VEG-MM-4: Compensate for Loss of Protected Trees

WSAFCA will apply for a tree permit for the removal of any protected trees during construction. WSAFCA will replace trees that must be removed with trees at or near the location of the effect or another location within West Sacramento approved by the City's tree administrator. WSAFCA will also replace any replacement trees that die within 3 years of the initial planting. Replacement is not required if a tree is removed because it poses a risk to persons or property or hosts a plant parasite.

Replacement trees are required at a ratio of 1:1 (i.e., 1-inch diameter of replacement plant for every 1-inch diameter of tree removed). Trees may also be mitigated through payment of an in-lieu fee, which will be used to purchase and plant trees elsewhere in West Sacramento. Mitigation will be subject to approval by the City's tree administrator and will take into account species affected, replacement species, location, health and vigor, habitat value, and other factors to determine fair compensation for tree loss.

Effect VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction

Invasive plants are already present in the project area. However, activities associated with construction could introduce new invasive plants or contribute to the spread of existing invasive plants to un-infested areas outside the project area. Invasive plants or their seeds may be dispersed by construction equipment if appropriate prevention measures are not implemented. The introduction or spread of invasive plants as a result of the proposed project could have a significant effect on sensitive natural communities within and outside the project area by displacing native flora. The implementation of one or more of the BMPs described in the environmental commitment to avoid or minimize the spread or introduction of invasive plant species (Section 2.7 of Chapter 2, Alternatives) will ensure that the proposed project would not have a significant effect on sensitive natural communities from the introduction or spread of invasive plants.

Effect VEG-5: Conflict with Provisions of an Adopted HCP/NCCP or other Approved Local, Regional or State Habitat Conservation Plan

There is no adopted habitat conservation plan or natural communities conservation plan applicable to the CHP Academy project site area. There are three plans under development but not yet formally adopted and one adopted plan that apply in the region or project area. The plans under development are the Yolo County Natural Community/Habitat Conservation Plan (NCCP/HCP), the South Sacramento HCP, and the Bay Delta NCCP. To the north of the project site, the adopted Natomas Basin HCP/NCCP applies to a 53,537 acre area in the northern portion of Sacramento County and the southern portion of Sutter County. The Natomas Basin HCP covers 22 listed, candidate and other species, including 7 plant species and sets forth biological goals and objectives for wetland species/habitat and upland species/habitat within the NBHCP plan area. The CHP Academy EIP would not be in conflict with these goals because no special-status plant species occur within the CHP EIP study area (see Section 3.7.2.2.5, Special-Status Plant Species) and as discussed in Effect VEG-1 above, other than minor trimming, no direct effects are proposed to trees. Therefore, there is no effect. A discussion regarding wildlife is included in Section 3.9.

3.7.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on vegetation and wetlands. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
VEG-1: Disturbance or Removal of Riparian Habitat as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor VEG-MM-4: Compensate for Loss of Protected Trees
VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction	Less than significant	N/A	N/A
VEG-5: Conflict with Provisions of an Adopted HCP/NCCP or other Approved Local, Regional, or State Habitat Conservation Plan	No effect	N/A	N/A

Effect VEG-1: Disturbance or Removal of Riparian Habitat as a Result of Project Construction

This effect would be the same as described above under CHP Academy APA. This effect is considered less than significant with the implementation of protection measures as described in the CHP Academy EIP project description (Chapter 2, Alternatives) and Mitigation Measures VEG-MM-1, VEG-MM-2, and VEG-MM-3.

Effect VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction

This effect would be the same as described above under CHP Academy APA. This effect is considered less than significant with the implementation of protection measures as described in the CHP Academy EIP project description (Chapter 2, Alternatives) and Mitigation Measures VEG-MM-2 and VEG-MM-3.

Effect VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction

This effect would be the same as described above under CHP Academy APA. This effect is considered less than significant with the implementation of protection measures as described in the CHP Academy EIP project description (Chapter 2, Alternatives) and Mitigation Measures VEG-MM-2, VEG-MM-3, and VEG-MM-4.

Effect VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction

This effect would be the same as described above under CHP Academy APA. This effect is considered less than significant with the implementation of environmental commitments as described in the CHP Academy EIP project description (Chapter 2, Alternatives). No mitigation is required.

Effect VEG-5: Conflict with Provisions of an Adopted HCP/NCCP or other Approved Local, Regional or State Habitat Conservation Plan

This effect would be the same as described under CHP Academy APA. There is no effect.

Section 3.8
Fisheries and Aquatic Resources— CHP Academy Early Implementation Project

3.8.1 Introduction

This section describes the regulatory and environmental setting for fisheries resources and aquatic habitats, the effects on special-status fish species that would result from the proposed project, and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- U.S. Fish and Wildlife Service (USFWS) list (dated February 4, 2009) of endangered, threatened, and proposed species for the study area (Appendix H)
- Published and unpublished reports
- Field survey on October 26, 2007
- ICF International file information

3.8.2 Affected Environment

This section describes the affected environment for fisheries and aquatic resources in the CHP Academy EIP project area, including the regulatory and environmental settings.

3.8.2.1 Regulatory Setting

3.8.2.1.1 Federal

The following Federal policies related to fisheries and aquatic resources may apply to implementation of the CHP Academy EIP.

Endangered Species Act

The Federal Endangered Species Act (ESA) protects fish and wildlife species and their habitats that have been identified by the National Marine Fisheries Service (NMFS) or USFWS as threatened or endangered. *Endangered* refers to species, subspecies, or distinct population segments (DPSs) that are in danger of extinction through all or a significant portion of their range. *Threatened* refers to species, subspecies, or DPSs that are likely to become endangered in the near future.

ESA is administered by USFWS and NMFS. In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fish, and USFWS is responsible for other listed species. Provisions of Sections 9 and 7 of ESA are relevant to this project and are summarized below.

Section 9: ESA Prohibitions

Section 9 of the ESA prohibits the take of any fish or wildlife species listed under ESA as endangered. Take of threatened species also is prohibited under Section 9, unless otherwise authorized by Federal regulations.[1] *Take*, as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." In addition, Section 9 prohibits removing, digging up, cutting, and maliciously damaging or destroying federally listed plants on sites under Federal jurisdiction.

Section 7: ESA Authorization Process for Federal Actions

Section 7 of the ESA provides a means for authorizing take of threatened and endangered species by Federal agencies. Under Section 7, the Federal agency conducting, funding, or permitting an action (the lead Federal agency, such as USACE) must consult with NMFS or USFWS, as appropriate, to ensure that the proposed project will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed project "may affect" a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment (BA) to evaluate the nature and severity of the expected effect. In response, NMFS or USFWS issues a biological opinion (BO), with a determination that the proposed project either:

- may jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding), or
- will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

The BO issued by NMFS or USFWS may stipulate discretionary "reasonable and prudent" conservation measures. If the project would not jeopardize a listed species, USFWS or NMFS issues an incidental take statement to authorize the proposed activity.

Critical Habitat

Critical habitat, as defined in ESA Section 3, is:

I. the specific area within the geographic area occupied by a species, at the time it is listed in accordance with ESA, on which are found those biological features
    i. essential to the conservation of the species, and
    ii. may require special management considerations or protection; and
II. specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Aquatic habitats in the study area have been designated as critical habitat for the following species:

- Central Valley spring-run Chinook salmon,
- Central Valley winter-run Chinook salmon,

[1] In some cases, exceptions may be made for threatened species under ESA Section 4(d); in such cases, USFWS or NMFS issues a "4(d) rule" describing protections for the threatened species and specifying the circumstances under which take is allowed.

- Central Valley steelhead, and
- Delta smelt.

Clean Water Act

The Clean Water Act (CWA) was enacted as an amendment to the Federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary Federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands.

The CWA empowers the U.S. Environmental Protection Agency (EPA to set national water quality standards and effluent limitations and includes programs addressing both point-source and nonpoint-source pollution. Point-source pollution is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. Nonpoint-source pollution originates over a broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. The following sections provide additional details on pertinent sections of the CWA.

Section 404: Permits for Fill Placement in Waters and Wetlands

The U.S. Army Corps of Engineers (USACE) and EPA regulate the discharge of dredged and fill material into waters of the United States under Section 404 of the CWA. USACE jurisdiction over non-tidal waters of the United States extends to the OHWM, provided the jurisdiction is not extended by the presence of wetlands (33 CFR Part 328, Section 328.4). The OHWM is defined in the Federal regulations to mean:

> [T]hat line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 CFR Part 328, Section 328.3[e]).

USACE typically will exert jurisdiction over that portion of the project site that contains waters of the United States and adjacent or isolated wetlands. This jurisdiction equals approximately the bank-to-bank portion of a creek along its entire length up to the ordinary high water mark (OHWM) and adjacent wetland areas that will either be directly or indirectly adversely affected by a proposed project.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires all Federal agencies to consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect essential fish habitat (EFH). EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation states that migratory routes to and from anadromous fish spawning grounds should also be considered EFH. The phrase *adversely affect* refers to the creation of any effects that reduce the quality or quantity of EFH. Federal activities that occur outside an EFH but that may, nonetheless, have an effect on EFH waters and substrate must also be considered in the consultation process. Under the Magnuson-Stevens Act, effects on habitat managed under the Pacific Salmon Fishery Management Plan must also be considered.

3.8.2.1.2 State

The following state regulations or agencies may govern the implementation of the CHP Academy EIP.

California Endangered Species Act

The California Endangered Species Act (CESA),, which is administered by the California Department of Fish and Game (DFG), protects wildlife and plants listed by the California Fish and Game Commission as threatened and endangered under the act. CESA prohibits all persons from taking species that are state-listed as threatened or endangered except under certain circumstances; the CESA definition of take is any action or attempt to "hunt, pursue, catch, capture, or kill."

CESA Section 2081 provides a means by which agencies or individuals may obtain authorization for incidental take of state-listed species, except for certain species designated as "fully protected" under the California Fish and Game Code. Take must be incidental to, and not the purpose of, an otherwise lawful activity. Requirements for a Section 2081 permit are similar to those used in the ESA Section 7 process. They include identification of effects on listed species, development of mitigation measures that minimize and fully mitigate effects, development of a monitoring plan, and assurance of funding to implement mitigation and monitoring.

California Fish and Game Code Section 1600: Streambed Alteration Agreements

DFG has jurisdictional authority over wetland resources associated with rivers, streams, and lakes under Sections 1600–1607. DFG has the authority to regulate all work under the jurisdiction of the State of California that would substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed.

In practice, DFG marks its jurisdictional limit at the top of the stream or lake bank, or the outer edge of the riparian vegetation, where present, and sometimes extends its jurisdiction to the edge of the 100-year floodplain. Because riparian habitats do not always support wetland hydrology or hydric soils, wetland boundaries, as defined by CWA Section 404, sometimes include only portions of the riparian habitat adjacent to a river, stream, or lake. Therefore, jurisdictional boundaries under Section 1600 may encompass a greater area than those regulated under CWA Section 404.

DFG enters into a streambed alteration agreement with an applicant and can impose conditions on the agreement to ensure that no net loss of wetland values or acreage will be incurred. The streambed or lakebed alteration agreement is not a permit, but a mutual agreement between DFG and the applicant.

3.8.2.1.3 Local

The following local regulations or agencies may govern the implementation of the CHP Academy EIP.

City of West Sacramento General Plan

Section VI, Natural Resources Goals and Policies, of the *City of West Sacramento General Plan* identifies policies designed to protect habitat and biological resources that are applicable to the resources located in the study area. The policies listed below are pertinent to fish resources in the project area (City of West Sacramento 2004, II-68-69).

Goal C: To protect sensitive native vegetation and wildlife communities and habitat in West Sacramento

Policies:

2. The City shall support state and Federal policies for preservation and enhancement of riparian and wetland habitats by incorporating, as deemed appropriate, the findings and recommendations of the *Sacramento Greenway Plan*, California Department of Fish and Game and the U.S. Fish and Wildlife Service into site-specific development proposals.

3. The City shall require site-specific surveys to identify significant wildlife habitat and vegetation resources for development projects located in or near riparian or wetland areas.

4. The City shall support mitigation measures which provide for no net loss of riparian or wetland habitat acreage and value by regulating development in and near these habitats and promoting projects that avoid sensitive areas. Where habitat loss is unavoidable, the City shall seek replacement on at least a 1:1 basis. Replacement entails creating habitat that is similar in extent and ecological value to that displaced by the project. The replacement habitat should consist of locally occurring, native species and shall be located as close as possible to the project site or be part of a larger replacement habitat project.

7. The City shall seek to minimize the loss or degradation of wetland and riparian habitats at the following sites: Lake Washington and associated wetlands; Bee Lakes and associated riparian woodlands; riparian woodlands along the Sacramento River north of the I Street Bridge and south of the barge canal; and riparian woodlands along the Deep Water Ship Channel and the Yolo Bypass.

9. The City shall seek to preserve populations of rare, threatened, and endangered species by ensuring that development does not adversely affect such species or by fully mitigating adverse effects.

10. The City shall not approve projects that would cause unmitigable impacts on rare, threatened, or endangered wildlife or plant species.

11. The City shall implement measures to ensure that development in the city does not adversely affect fishery resources in the Sacramento River, Deep Water Ship Channel, and Lake Washington.

12. Public access and recreation facilities shall not eliminate or degrade riparian habitat values. Trails, picnic areas, and other developments shall be sited to minimize impacts on sensitive wildlife habitat or riparian vegetation.

13. The City shall promote the use of native plants, especially valley oaks, for landscaping roadsides, parks, and private properties. In particular, native plants should be used along the Sacramento River and in areas adjacent to riparian and wetland habitats.

Yolo County General Plan

The *Yolo County General Plan* was adopted in 1983. The objective of the general plan is to provide guidance for the development of Yolo County. The general plan promotes the preservation of farm land and open spaces to minimize the area of urbanization. The Open Space and Recreation Element of the general plan was updated in 2002. The following goals, objectives, and policies are relevant to fish resources in the study area:

Goals and Supporting Objectives

- **OG-4:** Protect and manage local water resources.
  - **OO-5:** Provision for open space corridors within existing and future development.
- **OG-5:** Preserve and enhance existing biological resources.
  - **OO-6:** No net loss of wetland and/or riparian habitat.
  - **OO-7:** Maintenance of unique or sensitive plant or animal habitat.

3.8.2.2 Environmental Setting

3.8.2.2.1 Study Area

The CHP Academy EIP project area is located on the Sacramento Bypass Levee. The Sacramento Bypass Levee has a concrete-lined bank and the channel is floodplain habitat with terrestrial vegetation. The study area contains 1.16 acres of great valley mixed riparian forest trees; however, there is no SRA present in the study area. The bypass has approximately 284 acres of floodplain habitat. The Sacramento Bypass is only flooded in the winter during high flow events.

The Sacramento Bypass provides emigration and rearing habitat for juvenile anadromous fish and spawning and rearing habitat for Sacramento splittail. The occurrence of these life stages in the Sacramento Bypass is limited to periods when flooding (via the Fremont and Sacramento Weirs) allows individuals to access the area from the Sacramento River. Sacramento splittail and juvenile Chinook salmon have been captured in the Sacramento Bypass (Jones & Stokes 2001). Most juveniles emigrate from the Sacramento Bypass during winter and spring before the floodplains become dry. Thus, the potential for these species' life stages to occur in these areas in any given year depends on the occurrence of flooding; the timing, magnitude, and duration of flooding; and the seasonal timing of specific life stages.

3.8.2.2.2 Aquatic Habitat

Aquatic habitat in the CHP Academy EIP project area consists of seasonal habitat characterized as floodplain habitat which is present in the Sacramento Bypass. Fish and other species use this habitat for growth, survival, and reproduction. Floodplains are important habitat for young fish, especially Chinook salmon and splittail (Moyle et al. 2005: 21) that use inundated floodplain habitats (when available) for rearing. Chinook growth has been shown to be faster in floodplain habitat (Sommer et al. 2001b) and Sacramento splittail produce the highest number of young when flows are high and floodplain habitat is inundated (Moyle 2002: 148). Fish may use floodplain habitat differently, depending on species and life stage.

Floodplain

Recognition is growing that naturally functioning floodplains provide many benefits, including direct economic benefits, ecosystem services, and habitat for a wide diversity of species (Bayley 1991, Tockner and Stanford 2002, as cited in Ahearn et al. 2006). Floodplains provide freshwater habitat for the migration, reproduction, and rearing of native fishes (Moyle et al. 2003, Crain et al. 2004) and mitigate flood damage to human settlements (Sommer et al. 2001a).

Floodplains are highly productive habitats that flood during high flows in the winter and spring. Floodplains are important habitats for young fish, especially Chinook salmon and splittail (Moyle et al. 2005). Chinook salmon, which spawn in freshwater rivers and streams upstream of the Delta, use inundated floodplain habitats (when available) for rearing. Chinook salmon growth has been shown to be faster in floodplain habitat than in river systems (Sommer et al. 2001b). Sacramento splittail, which spawn in inundated floodplains, produce the highest numbers of young when flows are high and floodplain habitat is inundated (Moyle 2002).

3.8.2.2.3 Special-Status Fish Species

The special-status fish species listed below have the potential to occur in the study area.

- Sacramento River winter-run Chinook salmon Evolutionarily Significant Unit (ESU) (*Oncorhynchus tshawytscha*)—FE/SE
- Central Valley spring-run Chinook salmon ESU (*O. tshawytscha*)—FT/ST
- Central Valley fall-/late fall–run Chinook sal*mon ESU (O. tshawytscha*)—FSC/SSC
- Central Valley steelhead DPS (*O. mykiss*)—FT
- *Southern DPS* of North American green sturgeon (*Acipenser medirostris*)—FT/SSC
- Delta smelt (*Hypomesus transpacificus*)—FT/ST
- Sacramento splittail (*Pogonichthys macrolepidotus*)—SSC
- River lamprey (*Lampetra ayresi*)—SSC

Special-status fish species that occur or have the potential to occur in or near the study area, as well as their likely status in the study area, are presented in Table 3.8-1. Critical habitat for winter and spring-run Chinook salmon and Central Valley steelhead falls within the study area in the Sacramento River. In addition, the Sacramento and Yolo Bypasses are designated critical habitat for Central Valley steelhead (70 FR 52612:52617 September 2, 2005) and spring-run Chinook salmon (70 FR 52597:52601 September 2, 2005). Critical habitat for delta smelt includes the Sacramento River and the Yolo Bypass upstream to the I Street Bridge (U.S. Fish and Wildlife Service 2003).

1 **Table 3.8-1. Special-Status Fish Species with Potential to Occur in the Study Area**

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Occurrence in the Study Area
Delta smelt *Hypomesus transpacificus*	T/T	Primarily in the Sacramento–San Joaquin Estuary, but has been found as far upstream as the mouth of the American River on the Sacramento River and Mossdale on the San Joaquin River; range extends downstream to San Pablo Bay	Occurs in estuary habitat in the Delta where fresh and brackish water mix in the salinity range of 2–7 parts per thousand (Moyle 2002).	High
Sacramento splittail *Pogonichthys macrolepidotus*	–/SSC	Occurs throughout the year in low-salinity waters and freshwater areas of the Sacramento–San Joaquin Delta, Yolo Bypass, Suisun Marsh, Napa River, and Petaluma River (Moyle 2002).	Spawning takes place among submerged and flooded vegetation in sloughs and the lower reaches of rivers.	High
Central Valley steelhead *Oncorhynchus mykiss*	T/–	Sacramento River and tributary Central Valley rivers	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 7.8 to 18°C (Moyle 2002). Habitat types are riffles, runs, and pools.	High—spawning during migration
Sacramento River winter-run Chinook salmon *Oncorhynchus tshawytscha*	E/E	Mainstem Sacramento River below Keswick Dam (Moyle 2002)	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools. (Moyle 2002.)	High—spawning during migration
Central Valley spring-run Chinook salmon *Oncorhynchus tshawytscha*	T/T	Upper Sacramento River and Feather River	Has the same general habitat requirements as winter-run Chinook salmon. Coldwater pools are needed for holding adults (Moyle 2002).	High—spawning during migration
Central Valley fall-/late fall–run Chinook salmon *Oncorhynchus tshawytscha*	SC/SSC	Sacramento and San Joaquin Rivers and tributary Central Valley rivers	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	High—spawning during migration

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Occurrence in the Study Area
Green sturgeon (southern DPS) *Acipenser medirostris*	T/SSC	Sacramento, Klamath and Trinity Rivers (Moyle 2002)	Spawn in large river systems with well-oxygenated water, with temperatures from 8.0 to 14°C	High—spawning during migration
River lamprey *Lampetra ayresi*	–/SSC	Sacramento, San Joaquin, and Napa Rivers; tributaries of San Francisco Bay (Moyle 2002; Moyle et al. 1995)	Adults live in the ocean and migrate into fresh water to spawn	High—spawning during migration

[a] Species Definitions

Federal

E = endangered under the Federal Endangered Species Act
T = threatened under the Federal Endangered Species Act
SC = species of concern
– = no listing

State

E = endangered under the California Endangered Species Act
T = threatened under the California Endangered Species Act.
SSC = species of special concern
– = no listing

Chinook Salmon

Chinook salmon are anadromous fish, meaning that adults live in marine environments and return to their natal freshwater streams to spawn. Juveniles rear in freshwater for a period of up to 1 year until smoltification (i.e., a physiological preparation for survival in marine environs) and subsequent ocean residence.

Four distinct runs of Chinook salmon occur in the Sacramento River system: winter-run, spring-run, fall-run, and late fall–run. The runs are named after the season of adult migration, with each run having a distinct combination of adult migration, spawning, juvenile residency, and smolt migration periods. In general, fall- and late fall-run Chinook salmon spawn soon after entering their natal streams, while spring- and winter-run Chinook salmon typically hold in their natal streams for up to several months before spawning.

Winter Run

Both the ESA and CESA list the winter-run Chinook salmon ESU as an endangered species. Critical habitat for winter-run Chinook salmon includes the Sacramento River from Keswick Dam (river mile [RM] 302) to Chipps Island (RM 0) in the Delta (National Marine Fisheries Service 1997).

Historically, winter-run Chinook salmon spawned in cold tributary streams upstream of present-day Shasta Reservoir, including the Little Sacramento, Pit, McCloud, and Fall Rivers and Battle Creek. Presently, winter-run Chinook salmon persist in the Sacramento River below Keswick Dam and are sustained by coldwater releases from Shasta Reservoir.

Adult winter-run Chinook salmon immigration (upstream migration) through the Delta and into the Sacramento River occurs from December through July, with peak immigration from January through April. Winter-run Chinook salmon spawn primarily in the mainstem Sacramento River between Keswick Dam (RM 302) and the Red Bluff Diversion Dam (RM 242). Winter-run Chinook salmon spawn between late April and mid-August, with peak spawning generally occurring in June (Snider et al. 2000) (Table 3.8-2).

Juvenile emigration (downstream migration) past the Red Bluff Diversion Dam (RM 242) begins in late July, peaks during September, and may extend through mid-March (National Marine Fisheries Service 1997). The peak period of juvenile emigration through the lower Sacramento River into the Delta generally occurs between January and April (National Marine Fisheries Service 1997) (Table 3.8-2). Differences in peak emigration periods between these two locations suggest that juvenile winter-run Chinook salmon may exhibit a sustained residence in the upper or middle reaches of the Sacramento River before entering the lower Sacramento River and the Delta. Although the location and extent of rearing in these lower or middle reaches is unknown, it is believed that the duration of fry presence in an area is directly related to the magnitude of river flows during the rearing period (Stevens 1989). Additional information on life history and habitat requirements is available in the NMFS biological opinion (BO), which was developed specifically to evaluate effects on winter-run Chinook salmon associated with Central Valley Project (CVP) and State Water Project (SWP) operations (National Marine Fisheries Service 1993).

Spring Run

The Central Valley spring-run Chinook salmon ESU, which includes populations spawning in the Sacramento River and its tributaries, is listed as threatened under ESA and CESA. Critical habitat is designated for spring-run Chinook salmon in the Sacramento River, but the Sacramento DWSC is excluded from the critical habitat designation (70 FR 52596).

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 spring-run Chinook salmon populations are the Sacramento River and its tributaries, including the Yuba River, Mill Creek, Deer Creek, and Butte Creek.

Spring-run Chinook salmon enter the Sacramento River from late March through September (Reynolds et al. 1993), but peak abundance of immigrating adults in the Delta and lower Sacramento River occurs from April through June (Table 3.8-2). Adult spring-run Chinook salmon remain in deep-water habitats downstream of spawning areas during summer until their eggs fully develop and become ready for spawning. This is the primary characteristic that distinguishes spring-run Chinook salmon from the other runs. Spring-run Chinook salmon spawn primarily upstream of the Red Bluff Diversion Dam and in the aforementioned tributaries. Spawning occurs from mid-August through early October (Reynolds et al. 1993) (Table 3.8-2). A small portion of an annual year-class may emigrate as post-emergent fry (less than 1.8 inches long) and reside in the Delta undergoing smoltification. However, most are believed to rear in the upper river and tributaries during winter and spring, emigrating as juveniles (more than 1.8 inches long). The timing of juvenile emigration from the spawning and rearing reaches can vary depending on tributary of origin and can occur from November through June (Table 3.8-2).

Fall and Late Fall Run

Central Valley fall-run and late fall–run Chinook salmon are commercially and recreationally important. These ESUs are Federal species of concern. Because the fall-run Chinook salmon is currently the largest run of Chinook salmon in the Sacramento River system, it continues to support commercial and recreational fisheries of significant economic importance.

All Central Valley streams that had adequate flows in the fall, even if they were intermittent during the summer, probably supported fall-run Chinook salmon. Unlike spring- and winter-run Chinook salmon that migrated to higher elevation streams, fall-run Chinook salmon likely were limited to streams of the valley floor and lower foothill reaches because of their egg-laden and generally deteriorated physical condition.

In general, adult fall-run Chinook salmon migrate into the Sacramento River and its tributaries from July through December, with immigration peaking from mid-October through November (Table 3.8-2). Fall-run Chinook salmon spawn in numerous tributaries of the Sacramento River, including the lower American River, lower Yuba River, Feather River, and tributaries of the upper Sacramento River. Most mainstem Sacramento River spawning occurs between Keswick Dam and the Red Bluff Diversion Dam. A greater extent of fall-run spawning, relative to the other three runs, occurs below the Red Bluff Diversion Dam, with limited spawning potentially occurring as far downstream as Tehama (RM 220) (Yoshiyama et al. 1996). Spawning generally occurs from October through December, with fry emergence typically beginning in late December and January (Table 3.8-2). Fall-run Chinook salmon emigrate as post-emergent fry, juveniles, and smolts after rearing in their natal streams for up to 6 months. Consequently, fall-run emigrants may be present in the lower Sacramento River from January through June (Reynolds et al. 1993) (Table 3.8-2) and remain in the Delta for variable lengths of time before ocean entry.

Adult immigration of late fall-run Chinook salmon into the Sacramento River generally begins in October, peaks in December, and ends in April (Moyle et al. 1995) (Table 3.8-2). Primary spawning areas for late fall-run Chinook salmon are located in tributaries of the upper Sacramento River (e.g., Battle Creek, Cottonwood Creek, Clear Creek, Mill Creek), although late fall-run Chinook salmon are believed to return to the Feather and Yuba Rivers as well (Moyle et al. 1995). Spawning in the mainstem Sacramento River occurs primarily from Keswick Dam (RM 302) to the Red Bluff Diversion Dam (RM 258), generally from January through April (Moyle et al. 1995). Juveniles emigrate through the lower Sacramento River primarily from October through April (Table 3.8-2).

Central Valley Steelhead

Central Valley steelhead is listed as threatened under the ESA. Critical habitat is designated for steelhead in the Sacramento River, but the Sacramento DWSC is excluded from the critical habitat designation (70 FR 52596). Steelhead, an anadromous variant of rainbow trout, is closely related to Pacific salmon. The species was once abundant in California coastal and Central Valley drainages. However, population numbers have declined significantly in recent years, especially in the tributaries of the Sacramento River. Steelhead typically migrate to marine waters after spending 1 year or more in fresh water. In the marine environment, they typically mature for 1 to 3 years before returning to their natal streams to spawn as 3- or 4-year-olds. Unlike Pacific salmon, steelhead are capable of spawning more than once before they die. Immigration of adult steelhead in the Sacramento River occurs in nearly all months but peaks in late September and October (Moyle 2002). The steelhead spawning season typically stretches from December through April (Table 3.8-2). After several months, fry emerge from the gravel and begin to feed. Juveniles rear in fresh water from 1 to 4 years (usually 2 years), then migrate to the ocean as smolts in the spring (March through June).

Sacramento Splittail

Sacramento splittail is a California species of special concern. Sacramento splittail is an endemic California minnow that was once widely distributed in lakes and rivers throughout the Central Valley, including the Sacramento River upstream to Redding and the American River as far east as Folsom (Moyle 2002). Present distribution includes Suisun Bay, the Napa and Petaluma Rivers (Sommer et al. 1997), the Sacramento River as far north as the Red Bluff Diversion Dam, portions of the Delta, and the San Joaquin River upstream of its confluence with the Tuolumne River (Moyle 2002).

Adult splittail usually reach sexual maturity in their second year. They then migrate upstream in late fall to early winter before spawning. Spawning occurs from mid-winter through July in water temperatures between 48°F and 68°F (Wang 1986) at times of high winter or spring runoff (Moyle et al. 1995). Eggs acquire adhesive properties following exposure to water and adhere to vegetation or other benthic substrates (Wang 1986). Fertilized eggs generally hatch in 3 to 5 days, and larvae begin feeding on plankton soon thereafter. Juvenile splittail inhabit shallow areas with abundant vegetation that are devoid of strong currents (Wang 1986) as they travel downstream from the spawning grounds to the Delta.

Mature splittail are generally found in the shallows of sloughs in edgewater habitat by emergent vegetation. They feed primarily on benthic invertebrates and aquatic insect larvae (Moyle 2002). Although they are tolerant of brackish water (Moyle 2002), splittail tend to move from areas of relatively high salinity to those characterized by fresh water (Moyle et al. 1995).

Delta Smelt

Delta smelt are listed as threatened under the ESA and CESA. Critical habitat is designated from the Delta into the Sacramento River. Estuarine rearing habitat for juvenile and adult delta smelt is typically found in the waters of the lower Delta and Suisun Bay where salinity is between 2 and 7 parts per thousand (ppt). Delta smelt tolerate 0 to 19 ppt salinity. They typically occupy open shallow waters but also occur in the main channel in the region where fresh and brackish water mix. The zone may be hydraulically conducive to their ability to maintain position and metabolic efficiency (Moyle 2002).

Adult delta smelt begin spawning migration into the upper Delta in December or January (Table 3.8-2). Migration may continue over several months. Spawning occurs between January and July, with peak spawning during April through mid-May (Moyle 2002) (Table 3.8-2). Spawning occurs along the channel edges in the upper Delta, including the Sacramento River above Rio Vista, Cache Slough, Lindsey Slough, and Barker Slough. Spawning has been observed in the Sacramento River up to Garcia Bend during drought conditions, possibly attributable to adult movement farther inland in response to saltwater intrusion (Wang and Brown 1993). Eggs are broadcast over the river bottom where they attach to firm substrate, woody material, and vegetation. Hatching takes approximately 9 to 13 days, and larvae begin feeding 4 to 5 days later. Newly hatched larvae contain a large oil globule and are semi-buoyant. Larval smelt feed on rotifers and other zooplankton. As their fins and swim bladder develop, they move higher into the water column. Larvae and juveniles gradually move downstream toward rearing habitat in the estuarine mixing zone (Wang 1986).

Green Sturgeon

NMFS has divided sturgeon into two DPSs: the southern and northern DPS. The northern DPS comprises sturgeon from the Eel River northward; the southern DPS comprises populations below the Eel, specifically the Sacramento River population (71 FR 17757). The southern DPS, which occurs in the study area, is federally listed as threatened (71 FR 17757, April 7, 2006). In October 2009, NMFS designated critical habitat for green sturgeon in the Sacramento River which includes the project area (74 FR 52300). Green sturgeon are known to occur in the lower reaches of large rivers, including the Klamath, Eel, and Smith Rivers from the Delta northward (Moyle 2002). Green sturgeon also have been found in saltwater from Ensenada, Mexico, to the Bering Sea and Japan (Miller and Lea 1972). Adults of this species tend to be associated with marine environments more than the more common white sturgeon, although spawning populations have been identified in the Sacramento and Klamath rivers (Beak Consultants 1993). Virtually all green sturgeon spawning occurs upstream of Hamilton City and as far upstream as Keswick Dam (Adams et al. 2002). Green sturgeon are thought to spawn upstream of the Red Bluff Diversion Dam following modifications to the operation of that facility (Adams et al. 2002). The preferred spawning substrate is thought to be large cobble, although the substrate type may range from clean sand to bedrock. Eggs are broadcast and fertilized in relatively fast-flowing water where depths typically exceed 10 feet (Moyle 2002). In the Sacramento River, green sturgeon presumably spawn at temperatures ranging from 46°F to 57°F (Beak Consultants 1993).

River Lamprey

River lamprey is a state species of special concern. River lamprey are relatively small (averaging 6.7 inches long) and highly predaceous (Moyle 2002). They are anadromous and will attack fish in both fresh and saltwater (Moyle 2002). A great deal of what is known about the species is based on populations in British Columbia. There, adults migrate from the Pacific Ocean into rivers and streams in September and spawn in winter. Adults excavate a saucer-shaped depression in sand or gravel riffles where eggs are deposited. After spawning, the adults perish. Juvenile river lamprey, called ammocoetes, remain in backwaters for several years where they feed on algae and microorganisms (Moyle et al. 1986). The metamorphosis from juvenile to adult begins in July and is complete by the following April. From May through July, following completion of metamorphosis, river lamprey aggregate in the Delta before entering the ocean.

River lamprey is distributed in streams and rivers along the eastern Pacific Ocean from Juneau, Alaska, to San Francisco Bay. They may be most abundant in the Sacramento and San Joaquin River systems, although they are only rarely observed (Moyle et al. 1986).

Table 3.8-2. Life Stage Timing and Distribution of Selected Species Potentially Affected by the CHP Academy EIP

Species/Life Stage	Distribution	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Winter-Run Chinook Salmon													
Adult migration and holding	S.F. Bay to Upper Sacramento River												
Juvenile rearing (natal stream)	Upper Sacramento River to S.F. Bay												
Juvenile movement and rearing	Upper Sacramento River to S.F. Bay												
Spring-Run Chinook Salmon													
Adult migration	S.F. Bay to Upper Sacramento River and Tributaries												
Juvenile movement	Upper Sacramento River and Tributaries to S.F. Bay												
Late Fall–Run Chinook Salmon													
Adult migration	S.F. Bay to Upper Sacramento River and Tributaries												
Juvenile movement and rearing	Upper Sacramento River and Tributaries												
Fall-Run Chinook Salmon													
Adult migration and holding	S.F. Bay to Upper Sacramento River and Tributaries												
Juvenile movement	Upper Sacramento River and Tributaries to S.F. Bay												
Steelhead													
Adult migration	S.F. Bay to Upper Sacramento River and Tributaries												
Juvenile and smolt movement	Upper Sacramento River and Tributaries to S.F. Bay												

Species/Life Stage	Distribution	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Green Sturgeon													
Adult migration and holding	S.F. Bay to Upper Sacramento River												
Juvenile rearing (natal stream to estuary)	Upper Sacramento River to S.F. Bay												
Juvenile movement and rearing	Upper Sacramento River to S.F. Bay												
Delta Smelt													
Adult migration	South Delta to North Delta and Lower Sacramento River												
Spawning	Upper Delta to Lower Sacramento River												
River Lamprey													
Adult migration and spawning	Pacific Ocean to Sacramento River												
Metamorphosis and movement	Sacramento River to Delta												

Sources: Wang and Brown 1993, U.S. Fish and Wildlife Service 1996, McEwan 2001, Moyle 2002, Hallock 1989, Beamesderfer et al. 2006

Note: Primary occurrence included in the assessment of project effects

3.8.2.2.4 Factors that Affect Abundance of Fish Species

Information relating abundance with environmental conditions is most available for listed species, especially Chinook salmon. The following section focuses on factors that have potentially affected the abundance of listed species in the Central Valley. Although not all species are discussed, factors affecting the listed species are assumed also to affect the abundance of other native and non-native species in similar fashion.

Spawning Habitat Area

Spawning habitat area may limit the production of juveniles and subsequent adult abundance of some species. Spawning habitat area for fall- and late fall–run Chinook salmon, which compose more than 90% of the Chinook salmon returning to the Central Valley streams, has been identified as limiting their population abundance. Existing spawning habitat area has not been identified as a limiting factor for the less-abundant winter-run and spring-run Chinook salmon (National Marine Fisheries Service 1996, U.S. Fish and Wildlife Service 1996), although habitat may be limiting in some streams (e.g., Butte Creek) during years of high adult abundance.

Delta smelt spawn in fresh water at low tide on aquatic, submerged, and inshore plants and over sandy and hard bottom substrates of sloughs and shallow edges of channels in the upper Delta and Sacramento River above Rio Vista (Wang 1986, Moyle 2002). Spawning habitat area has not been identified as a factor affecting delta smelt abundance (U.S. Fish and Wildlife Service 1996), but little is known about specific spawning areas and requirements in the Delta.

A lack of sufficient seasonally flooded vegetation may limit splittail spawning success (Young and Cech 1996; Sommer et al. 1997). Splittail spawn over flooded vegetation and debris on floodplains inundated by high flows from February to early July in the Sacramento River and San Joaquin River systems. The onset of spawning appears to be associated with rising water levels, increasing water temperature, and day length (Moyle 2002). The Sutter and Yolo Bypasses along the Sacramento River are important spawning habitat areas during high flow.

Rearing Habitat Area

Rearing habitat area may limit the production of juveniles and subsequent adult abundance of some species. USFWS (1996) has indicated rearing habitat area in Central Valley streams and rivers limits the abundance of juvenile fall-run and late fall–run Chinook salmon and juvenile steelhead. Rearing habitat for salmonids is defined by environmental conditions such as water temperature, dissolved oxygen (DO), turbidity, substrate, water velocity, water depth, and cover (Jackson 1992, Bjornn and Reiser 1991, Healey 1991). Chinook salmon also rear along the shallow vegetated edges of Delta channels (Grimaldo et al. 2000).

Environmental conditions and interactions among individuals, predators, competitors, and food sources determine habitat quantity and quality and the productivity of the stream (Bjornn and Reiser 1991). Everest and Chapman (1972) found juvenile Chinook salmon and steelhead of the same size using similar in-channel rearing area.

Rearing area varies with flow. High flow increases the area available to juvenile Chinook salmon because they extensively use submerged terrestrial vegetation on the channel edge and the floodplain. Deeper inundation provides more overhead cover and protection from avian and terrestrial predators than shallow water (Everest and Chapman in Jackson 1992). In broad, low-gradient rivers, change in flow can greatly increase or decrease the lateral area available to juvenile Chinook salmon, particularly in riffles and shallow glides (Jackson 1992).

Rearing habitat for larval and early juvenile delta smelt encompasses the lower reaches of the Sacramento River below Isleton and the San Joaquin River below Mossdale. Estuarine rearing by juveniles and adults occurs in the lower Delta and Suisun Bay. USFWS (1996) has indicated that loss of rearing habitat area would adversely affect the abundance of larval and juvenile delta smelt. The area and quality of estuarine rearing habitat are assumed to be dependent on the downstream location of approximately 2 ppt salinity (Moyle et al. 1992). The condition where 2 ppt salinity is located in the Delta is assumed to provide less habitat area and lower quality than the habitat provided by 2 ppt salinity located farther downstream in Suisun Bay. During years of average and high outflow, delta smelt may concentrate anywhere from the Sacramento River around Decker Island to Suisun Bay (Moyle 2002). This geographic distribution may not always be a function of outflow and 2 ppt isohaline position. Outflow and the position of the 2 ppt isohaline may account for only about 25% of the annual variation in abundance indices for delta smelt (California Department of Water Resources and Bureau of Reclamation 1994).

Rearing habitat has not been identified as a limiting factor in splittail population abundance, but as with spawning, a lack of sufficient seasonally flooded vegetation may be limiting population abundance and distribution (Young and Cech 1996). Rearing habitat for splittail encompasses the Delta, Suisun Bay, Suisun Marsh, the lower Napa River, the lower Petaluma River, and other parts of San Francisco Bay (Moyle 2002). In Suisun Marsh, splittail concentrate in the dead-end sloughs that have small streams feeding into them (Daniels and Moyle 1983; Moyle 2002). As splittail grow, salinity tolerance increases (Young and Cech 1996). Splittail are able to tolerate salinity concentrations as high as 29 ppt and as low as 0 ppt (Moyle 2002).

Migration Habitat Conditions

The Sacramento River and the Delta provide a migration pathway between freshwater and ocean habitats for adult and juvenile steelhead and all runs of Chinook salmon.

Migration habitat conditions include streamflows that provide suitable water velocities and depths that provide successful passage. Flow in the Sacramento River and in the Delta provides the necessary depth, velocity, and water temperature; however, flow and environmental conditions in the Central Valley are not always at optimal levels (e.g., see discussion below for water temperature). In the Delta, the channel pathways affect migration of juvenile Chinook salmon. Juvenile Chinook salmon survival is lower for fish migrating through the central Delta (i.e., diverted into the Delta Cross Channel and Georgiana Slough) than for fish continuing down the Sacramento River (Newman and Rice 1997). Similarly, juvenile Chinook salmon entering the Delta from the San Joaquin River appear to have higher survival rates if they remain in the San Joaquin River channel instead of moving into Old River and the south Delta (Brandes and McLain 2001).

Larval and early juvenile delta smelt are transported by currents that flow downstream into the upper end of the mixing zone of the estuary where incoming saltwater mixes with outflowing fresh water (Moyle et al. 1992). Reduced flow may adversely affect transport of larvae and juveniles to rearing habitat.

Adult splittail gradually move upstream during the winter and spring months to spawn. Year-class success of splittail is positively correlated with wet years, high Delta outflow, and floodplain inundation (Sommer et al. 1997; Moyle 2002). Low flow impedes access to floodplain areas that support rearing and spawning.

Water Temperature

Fish species have different responses to water temperature conditions depending on their physiological adaptations. Salmonids in general have evolved under conditions in which water temperatures need to be relatively cool. Delta smelt and splittail can tolerate warmer temperatures. In addition to species-specific thresholds, different life stages have different water temperature requirements. Eggs and larval fish are the most sensitive to warm water temperature.

Unsuitable water temperatures for adult salmonids such as Chinook salmon and steelhead during upstream migration lead to delayed migration and the potential for lower reproduction rates. Elevated summer water temperatures in holding areas cause mortality of spring-run Chinook salmon (U.S. Fish and Wildlife Service 1996). Warm water temperature and low DO also increase egg and fry mortality. USFWS (1996) cited elevated water temperatures as limiting factors for fall- and late fall-run Chinook salmon.

Juvenile salmonid survival, growth, and vulnerability to disease are affected by water temperature. In addition, water temperature affects prey species abundance and predator occurrence and activity. Juvenile salmonids alter their behavior depending on water temperature, including movement to take advantage of local water temperature refugia (e.g., movement into stratified pools, shaded habitat, subsurface flow) and improve feeding efficiency (e.g., movement into riffles).

Water temperature in Central Valley rivers frequently exceeds the tolerance of Chinook salmon and steelhead life stages. For example, adult fall-run Chinook salmon have been observed to stop their upstream migration when water temperatures exceed 66°F (Hallock et al. 1970). For Chinook salmon eggs and larvae, survival during incubation is assumed to decline with increasing temperature between 54°F and 61°F (Myrick and Cech 2001, Seymour 1956 in Alderice and Velsen 1978). For juvenile Chinook salmon, survival is assumed to decline as temperature warms from 64°F to 75°F (Myrick and Cech 2001, Rich 1987). Relative to rearing, Chinook salmon require cooler temperatures to complete the parr-smolt transformation and maximize their saltwater survival. Successful smolt transformation is assumed to deteriorate at temperatures ranging from 63°F to 73°F (Marine 1997 in Myrick and Cech 2001, Baker et al. 1995).

For steelhead, successful adult migration and holding are assumed to deteriorate as water temperature warms between 52°F and 70°F. Adult steelhead appear to be much more sensitive to thermal extremes than are juveniles (National Marine Fisheries Service 1996, McCullough 1999). Conditions supporting steelhead spawning and incubation are assumed to deteriorate as temperature warms between 52°F and 59°F (Myrick and Cech 2001). Juvenile rearing success is assumed to deteriorate at water temperatures ranging from 63°F to 77°F (Raleigh et al. 1984, Myrick and Cech 2001). Relative to rearing, smolt transformation requires cooler temperatures, and successful transformation occurs at temperatures ranging from 43°F to 50°F. Juvenile steelhead, however, have been captured at Chipps Island in June and July at water temperatures exceeding 68°F (Nobriga and Cadrett 2001). Juvenile Chinook salmon have also been observed to migrate at water temperatures warmer than expected based on laboratory experimental results (Baker 1995).

Delta smelt and splittail populations are adapted to water temperature conditions in the Delta. Delta smelt may spawn at temperatures as high as 72°F (U.S. Fish and Wildlife Service 1996) and can rear and migrate at temperatures as warm as 82°F (Swanson and Cech 1995). Splittail may withstand temperatures as warm as 91°F but prefer temperatures between 66°F and 75°F (Young and Cech 1996).

Entrainment

All fish species are entrained to varying degrees by the SWP and CVP Delta export facilities and many other smaller diversions in the Delta and Central Valley rivers. Fish entrainment and subsequent mortality are highly variable among species and may be a function of the size of the diversion, the location of the diversion, the behavior of the fish (Swanson et al. 2004, 2005), and other factors, such as fish screens, the presence of predatory species, and water temperature. Diversions that divert relatively little water from the total channel and with low approach velocities are assumed to minimize stress and protect fish from entrainment.

Juvenile striped bass populations have steadily declined since the mid-1960s partially because of entrainment losses of eggs and young fish at water diversions (Foss and Miller 2001). The CVP and SWP fish facilities indicate entrainment of adult delta smelt during spawning migration from December through April (California Department of Water Resources and Bureau of Reclamation 1994). Juveniles are entrained primarily from April through June. Young-of-year splittail are entrained between April and August when fish are moving downstream into the estuary (Cech et al. 1979 as cited in Moyle 2002). Juvenile Chinook salmon are entrained in all months but primarily from November through June when juveniles are migrating downstream.

Although several studies documenting entrainment at small, unscreened Delta diversions are available, few address population-level effects or accurately estimate the total loss of fish at the diversions studied (Moyle and Israel 2005). Some diversions may in fact entrain large numbers of individuals. However, many studies report capturing mostly larval or post-larval fish, with the majority of the catch being dominated by non-native species such as gobies, threadfin shad, and striped bass (Cook and Buffaloe 1998, Nobriga et al. 2004).

Contaminants

In the Sacramento and San Joaquin River basins, industrial and municipal discharge and agricultural runoff transport contaminants into rivers and streams that ultimately flow into the Delta. Principal pollutants in the Delta are agricultural chemicals and their derivatives (Herbold et al. 1992). Organophosphate insecticides, such as carbofuran, chlorpyrifos, and diazinon, are present throughout the Central Valley and dispersed in agricultural and urban runoff. The “first-flush” storm event or the “dormant spray” storm event is of most concern because of the higher concentration of contaminants in the runoff. In particular, diazinon and chlorpyrifos are applied to control wood-boring insects in dormant stone fruit orchards from December to February (Zamora et al. 2003). These contaminants enter rivers in winter runoff and enter the estuary in concentrations that can be toxic to invertebrates (CALFED Bay-Delta Program 2000). Unlike severe bioaccumulators such as organochlorine pesticides, organophosphate pesticides are typically metabolized by most invertebrates. However, some organophosphate pesticides do not bioaccumulate, and some do bioaccumulate. In particular, diazinon has a solubility of 68.9 milligrams per liter (mg/L) (at 68°F), but should not bioaccumulate in aquatic organisms (Zamora et al. 2003). Chlorpyrifos, on the other hand, is more persistent in the environment and tends to be hydrophobic to the water column. Chlorpyrifos has a lower solubility than diazinon (1.12 mg/L at 75°F) and has a significant potential to bioaccumulate in aquatic organisms (Zamora et al. 2003). Because some organophosphate may accumulate in living organisms, they may become toxic to fish species, especially those life stages that remain in the system year-round and spend considerable time there during the early stages of development, such as Chinook salmon, steelhead, splittail, green sturgeon, and delta smelt.

Mercury contamination from historical mining activities is extensive on both sides of the Central Valley and occurs primarily from widely scattered hydraulic mining debris along eastside tributaries and active abandoned mines and associated debris piles on the west side. These sources continue to deposit significant amounts of mercury into the Bay-Delta system. The Cosumnes River, Yolo Bypass, and Sacramento River are the primary ongoing sources of mercury contamination in the Bay-Delta. Mercury occurs in several forms, including pure elemental mercury and toxic methylmercury. Mercury is mobile in aquatic systems as aqueous mercury or when attached to suspended particulate matter. Methylmercury is a significant water quality concern because small amounts can bioaccumulate in fish to levels that are toxic to humans and wildlife. In the Delta, mercury concentrations in bluegill, Sacramento sucker, and largemouth bass have been found to exceed the human health standard of 0.5 part per million (ppm) by two to six times (Slotten 1991).

Other contaminants of particular concern in the Bay-Delta system include high concentrations of trace elements such as selenium, copper, cadmium, and chromium; however, their effects on higher trophic levels are poorly understood, in part as a result of the complex distribution of high concentrations in both time and space (Herbold et al. 1992). In general, it appears that the highest concentrations occur in areas where human activity adjacent to the bay is also the highest. Although these trace elements also occur naturally, concentrations of these trace elements have been found to be high enough to adversely affect the growth and reproduction of aquatic animals in laboratory experiments (Herbold et al. 1992).

Further discussion on water quality constituents of concern can be found in Section 3.2, Water Quality and Groundwater Resources.

Predation

Nonnative species cause substantial predation mortality on native species. Studies at Clifton Court Forebay estimated predator-related mortality of hatchery-reared fall-run Chinook salmon to be from about 60% to more than 95%. Although the predation contribution to mortality is uncertain, the estimated mortality suggests that striped bass and other predatory fish, primarily non-native, pose a threat to juvenile Chinook salmon moving downstream, especially where the stream channel has been altered from natural conditions. Turbulence from water passing over dams and other structures may disorient juvenile Chinook salmon and steelhead, increasing their vulnerability to predators. Predators such as striped bass, largemouth bass, and catfish also prey on delta smelt and splittail (U.S. Fish and Wildlife Service 1996).

Food

Food availability and type affect survival of fish species. Species such as threadfin shad and wakasagi may affect delta smelt survival through competition for food. Introduction of non-native food organisms also may have an effect on delta smelt and other species' survival. Non-native zooplankton species are more difficult for small smelt and striped bass to capture, increasing the likelihood of larval starvation (Moyle 2002). Splittail feed on opossum shrimp, which in turn feed on native copepods that have shown reduced abundance, potentially attributable to the introduction of non-native zooplankton and the Asiatic clam (*Potamorcorbula amurensis)*. In addition, flow affects the abundance of food in rivers, the Delta, and Suisun Bay. In general, higher flows result in higher productivity, including a higher input of nutrients from channel margins and floodplain inundation, and higher production when low salinity occurs in the shallows of Suisun Bay. Higher productivity increases the availability of prey organisms for delta smelt and other fish species.

3.8.3 Environmental Consequences

This section describes the environmental consequences relating to fisheries and aquatic resources for the CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.8.3.1 Assessment Methods

3.8.3.1.1 Prefield Investigation

To prepare for the field surveys and analysis of the potential effects of the proposed project on fish species, fisheries biologists reviewed existing resource information related to the study area to evaluate whether sensitive habitats and special-status fish species are known from or could occur in the study area. The information reviewed included the following sources:

- a USFWS list of endangered, threatened, and proposed species for the Sacramento West, Clarksburg, Liberty Island, and Rio Vista USGS 7.5-minute quadrangle and Sacramento and Yolo Counties (U.S. Fish and Wildlife Service 2009); and
- published and unpublished documents and reports pertaining to the study area.

3.8.3.1.2 Field Surveys

A reconnaissance-level survey of the study area was conducted by an ICF International fisheries biologist on October 26, 2007. During the survey, fish habitat was identified and evaluated for its ability to support special-status fish species.

3.8.3.2 Determinations of Effects

For this analysis, an effect pertaining to special-status fish species and their habitats was considered adverse under NEPA or significant under CEQA if it would result in any of the following environmental effects, which are based on professional practice and CEQA Guidelines Appendix G (14 CCR 15000 *et seq.).*

Assessment species are selected based on listing under the ESA and/or CESA. An effect was considered adverse under NEPA and significant under CEQA if project actions would substantially reduce the abundance and distribution of the identified important fish species. Additionally, adverse effects/significant impacts may occur if the project alternatives would result in:

- substantial interference with the movement of any resident or migratory fish species;
- substantial long- or short-term loss of habitat quality or quantity;
- substantial adverse effects on rare or endangered species, candidate species, other special-status species, or habitat of the species; or
- substantial adverse effects on fish communities or species protected by applicable environmental plans and goals.

3.8.3.2.1 Effect Assumptions

The determination of significance requires that:

- environmental conditions are measurably changed by the project,
- the change in environmental conditions adversely affects a species or its habitat,
- the change in environmental conditions is permanent or ongoing or affects a substantial proportion of the species population, or
- species population abundance is likely reduced, including a short-term reduction.

Qualitative relationships between environmental conditions and life stage survival are the basis of the effect assessment. Cause-and-effect relationships are identified for assessment species, including the relationship between environmental conditions and habitat and the effects of changes in habitat on survival. Determination of significance requires a qualitative or quantitative assessment of population sensitivity to changes in survival of specific life stages.

3.8.3.2.2 Effect Mechanisms

The assessment of effects considers the occurrence and potential occurrence of species and life stages relative to the magnitude, timing, frequency, and duration of project activities. Species habitat attributes potentially affected by construction activities include rearing habitat area and migration habitat conditions. Short-term effects on fish species attributable to bank protection activities include water quality effects and noise and disturbance. Long-term effects on fish habitat include loss of aquatic vegetation and SRA cover. This evaluation of effects on special-status fish species was based on the analysis of the proposed levee treatments.

Short-term construction effects are evaluated qualitatively based on general knowledge of the physiological tolerances and behavioral responses of listed fish species to potential increases in turbidity and suspended sediment, noise, and contaminants.

3.8.4 Effects and Mitigation Measures

3.8.4.1 No Action Alternative

The No Action Alternative would consist of the continuation of the existing deficiencies along the portion of the Sacramento Bypass Levee reach encompassed by the CHP Academy project area (i.e., no levee improvements would be implemented to meet the minimum level of acceptable flood protection). Current levee operations and maintenance activities would continue. No construction-related release of contaminants would occur, and no noise and disturbance to special-status fish species or construction-related loss of habitat for special-status fish species would occur. The current levee maintenance activities, including mowing and application of herbicides, would continue.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability/geometry issues would continue. Failure of the Sacramento Bypass Levee, depending on the magnitude of the event, could cause catastrophic flooding.

A catastrophic levee failure could result in the displacement of fish into flooded areas and the potential for stranding and mortality. In addition, adverse water quality effects could result from the release of hazardous materials during a flooding event, which could lead to stress and direct mortality or adversely affect migration, spawning and rearing habitat of fish species in the Sacramento River, Yolo Bypass, and the Delta. Emergency clean-up and earth-moving activities could also result in an increase in sediment and turbidity and the release of hazardous materials into the Sacramento River, the Delta and adjacent waterways that adversely affect migration, spawning or rearing habitat, or result in direct mortality of special status fish species. Depending on the magnitude of the flood, emergency clean-up activities could last for days, weeks, or even months. If a flood occurred in late winter, clean-up activities could last into the spring, a critical time for migration, movement and rearing of winter-run and spring-run Chinook salmon, steelhead, and green sturgeon. Given the unpredictable nature of emergency clean-up activities, is it likely that implementation of best management practices (BMPs) and measures to reduce effects on fish would not be possible. All of these effects would be considered significant. Furthermore, if levees along the Sacramento River were to collapse, important SRA habitat would be lost. Restoration of this critical habitat could require decades. All of these effects would be considered significant; however, given the uncertainty of the occurrence or magnitude of such an event, potential effects on fisheries cannot be quantified based on available information.

As discussed under the No Action Alternative in Section 3.7, Vegetation and Wetlands, compliance with the vegetation-free zone as described in the USACE's Vegetation Guidance is one of the conditions that could result under the No Action. Currently there is no vegetation within the USACE vegetation-free zone that would require removal. However, under full ETL compliance, this zone would continue to be maintained vegetation free, and would preclude the establishment of future vegetation that may support important fish habitats.

3.8.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effect on fisheries and aquatic resources. A description of the effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
FISH-1: Temporary Effects on Seasonal Floodplain Habitat for Special-Status Fish	Less than significant	N/A	N/A

Effect FISH-1: Temporary Effects on Seasonal Floodplain Habitat for Special-Status Fish

When the Sacramento bypass is inundated with seasonal flood flows, it can provide seasonal floodplain habitat for special-status fish species such as juvenile Chinook salmon (for rearing) and by Sacramento splittail (for spawning and rearing). Green sturgeon and delta smelt may also use floodplain habitat during migration. Approximately 6.5 acres of the bypass will be utilized for construction staging activities. Any effects on floodplain habitat as a result of the proposed project would be temporary and primarily related to construction activities. Post-construction, any disturbed areas would be hydroseeded to provide reestablishment of vegetation. Effects on fish would be less than significant because construction would be limited to the typical construction season and outside the principal spawning and migration season. The typical construction season generally corresponds to the dry season, but, if necessary, project construction may occur outside the limits of the dry season. Construction outside the typical dry season would likely only occur during years when the onset of rains is delayed and conditions are still favorable for construction activities to continue without adverse environmental effects and only as allowed by applicable permit conditions or consultation with NMFS.

3.8.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effect on fisheries and aquatic resources. A description of the effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
FISH-1: Temporary Effects on Seasonal Floodplain Habitat for Special-Status Fish	Less than significant	N/A	N/A

Effect FISH-1: Temporary Effects on Seasonal Floodplain Habitat for Special-Status Fish

Construction of a stability berm, interior drain, and relief wells would all take place on the landside of the levee, making the majority of construction activities occur outside the channel. However, staging areas would still occur within the bypass and encompass 6.5 acres. Nonetheless, as discussed above under the CHP Academy APA, construction would occur during the dry season and floodplain habitat would be reseeded and restored to its original condition post-construction. Effects on special-status fish or their habitat would be less than significant. No mitigation is required.

Section 3.9
Wildlife—
CHP Academy Early Implementation Project

3.9.1 Introduction

This section describes the regulatory and environmental setting for wildlife resources, effects on wildlife resources that would result from the proposed project, and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- California Natural Diversity Database (CNDDB) records search of the Sacramento West U.S. Geological Survey (USGS) 7.5-minute quadrangles and the nine quads surrounding each (California Natural Diversity Database 2009)
- U.S. Fish and Wildlife Service (USFWS) list of endangered, threatened, and proposed species for the Sacramento West, Clarksburg, Saxon, Liberty Island, and Rio Vista USGS 7.5-minute quadrangle and Sacramento, Yolo, and Solano Counties (U.S. Fish and Wildlife Service 2009)
- Vegetation data from the Yolo Natural Heritage Program (Yolo Natural Heritage Program 2009)
- Aerial photographs of the project study area
- *City of West Sacramento General Plan 2004* (City of West Sacramento 2004)
- *Yolo County General Plan* (Yolo County 2002)
- Published and unpublished reports
- ICF International file information

An ICF International biologist conducted pre-field investigations and reconnaissance-level field surveys in the study area, as described in the Environmental Consequences section below. This information was used to develop lists of special-status wildlife species that could be present in the study area. Special-status species with potential to occur in the study area are discussed in the Environmental Setting section.

3.9.2 Affected Environment

This section describes the affected environment for wildlife resources in the CHP Academy EIP study area, including regulatory and environmental setting.

3.9.2.1 Regulatory Setting

3.9.2.1.1 Federal

The following Federal laws, regulations, and policies apply to wildlife resources at the CHP Academy EIP.

Federal Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973 and subsequent amendments provide for the conservation of listed endangered or threatened species or candidates for listing and the ecosystems on which they depend. USFWS has jurisdiction over federally listed plants, wildlife, and resident fish and the National Marine Fisheries Service (NMFS) has jurisdiction over anadromous fish and marine fish and mammals.

Section 7: ESA Authorization Process for Federal Actions

Section 7 of the ESA provides a means for authorizing take of threatened and endangered species by Federal agencies. It applies to actions that are conducted, permitted, or funded by a Federal agency. Under ESA Section 7, the lead Federal agency conducting, funding, or permitting an action must consult with USFWS or NMFS, as appropriate, to ensure that the proposed action will not jeopardize the continued existence of an endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed action may affect a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment (BA) evaluating the nature and severity of the expected effect. In response, USFWS or NMFS issues a biological opinion (BO), with a determination that the proposed action either:

- may jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding), or
- will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

The BO issued by USFWS or NMFS may stipulate discretionary "reasonable and prudent" conservation measures. If it is determined the proposed project would not jeopardize the continued existence of a listed species, USFWS or NMFS would issue an incidental take statement to authorize the proposed activity.

Section 9: ESA Prohibitions

Section 9 of ESA prohibits the take of any fish or wildlife species listed under ESA as endangered. *Take*, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Harm is defined as "any act that kills or injures the species, including significant habitat modification." Take of threatened species also is prohibited under Section 9 unless otherwise authorized by Federal regulations.[1] Additionally, Section 9

[1] In some cases, exceptions may be made for threatened species under ESA Section 4[d]; in such cases, USFWS or NMFS issues a "4[d] rule" describing protections for the threatened species and specifying the circumstances under which take is allowed.

prohibits removing, cutting, and maliciously damaging or destroying federally listed plants on sites under Federal jurisdiction.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes hunting seasons and capture limits for game species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10).

Executive Order 13186 (January 10, 2001) directs each Federal agency taking actions that have or may have a negative effect on migratory bird populations to work with USFWS to develop a memorandum of understanding (MOU) that will promote the conservation of migratory bird populations. Protocols developed under the MOU must include the following agency responsibilities:

- avoid and minimize, to the extent practicable, adverse effects on migratory bird resources when conducting agency actions;
- restore and enhance migratory bird habitats, as practicable; and
- prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable.

The executive order is designed to assist Federal agencies in their efforts to comply with the MBTA, and does not constitute any legal authorization to take migratory birds.

The project will incorporate measures to avoid and minimize adverse effects to migratory birds in order to comply with MBTA.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act, as amended in1946, requires consultation with USFWS and the state fish and wildlife agencies where the waters of any stream or other body of water are proposed, authorized, permitted, or licensed to be impounded, diverted, or otherwise controlled or modified under a Federal permit or license. Consultation is undertaken for the purpose of preventing loss of and damage to wildlife resources.

Consultation with federal and state fish and wildlife agencies (USFWS, NOAA Fisheries, and DFG) will be required prior to project implementation.

Golden and Bald Eagle Protection Act

This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. The USFWS has proposed regulations to create a permit program to authorize limited take of bald eagles and golden eagles where take is associated with otherwise lawful activities. The permits will authorize limited, non-purposeful take of eagles; authorizing individuals, companies, government agencies (including tribal governments), and other organizations to disturb or otherwise take eagles in the course of conducting lawful activities such as operating utilities and airports. Most permits issued under the new regulations would authorize disturbance. In limited cases, a permit may authorize the physical take of eagles, but only if every precaution is taken to avoid physical take. Removal of eagle nests would usually be allowed only when it is necessary to protect human safety or the eagles (U.S. Fish and Wildlife Service 2010) (see also the Migratory Bird Treaty Act).

3.9.2.1.2 State

The following state laws, regulations, and policies apply to wildlife resources at the CHP Academy EIP.

California Endangered Species Act

California implemented the California Endangered Species Act (CESA) in 1984. The act prohibits the take of listed endangered and threatened species. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. The California Department of Fish and Game (DFG) administers the act and authorizes take through Section 2081 agreements (except for species designated as fully protected). Swainson's hawk is the only state listed species with known and/ or potential occurrence within the study area. Protection measures for this species have been incorporated into the project to ensure that take does not occur.

California Fish and Game Code

Section 1602 of the California Fish and Game Code (CFGC) requires project proponents to notify DFG before any project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review generally occur during the environmental process. When an existing fish or wildlife resource may be substantially adversely affected, DFG is required to propose reasonable changes to the project to protect the resources. These modifications are formalized in a streambed alteration agreement that becomes part of the plans, specifications, and bid documents for the project.

The CFGC provides protection from take for a variety of species, referred to as fully protected species. CFGC 5050 lists protected amphibians and reptiles. CFGC 5515 prohibits take of fully protected fish species. CFGC 3511 prohibits take of fully protected bird species. Fully protected mammals are protected under CFGC 4700. The CFGC defines take as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research, all take of fully protected species is prohibited.

CFGC 3503 prohibits the killing of birds or the destruction of bird nests. CFGC 3503.5 prohibits the killing of raptor species and destruction of raptor nests. Many bird species could potentially nest in the study area or vicinity. These nests would be protected under these sections of the CFGC.

3.9.2.1.3 Local

City of West Sacramento General Plan

In 1990, the City adopted the *City of West Sacramento General Plan*. The general plan was last revised and adopted in December 8, 2004. The general plan outlines goals and policies related to natural resources within the study area. The following objectives, policies, and implementation procedures are relevant to the study area:

Objective: To protect native vegetation and wildlife communities and habitat in West Sacramento

Policies

1. The City shall encourage and support development projects and programs that enhance public appreciation and awareness of the natural environment.
2. The City shall support state and federal policies for preservation and enhancement of riparian and wetland habitats by incorporating, as deemed appropriate, the findings and recommendations of *Sacramento Greenway Plan*, DFG, and USFWS into site-specific development proposals.
3. The City shall require site-specific surveys to identify significant wildlife habitat and vegetation resources for development projects locate in or near riparian or wetland areas.
4. The City shall support mitigation measures which provide for no net loss of riparian or wetland habitat acreage and value by regulating development in and near these habitats and promoting projects that avoid sensitive areas. Where habitat loss is unavoidable, the City shall seek replacement on at least a 1:1 basis. Replacement entails creating habitat that is similar in extent and ecological value to that displaced by the project. The replacement habitat should consist of locally occurring, native species and shall be located as close as possible to the project site or be part of a larger replacement habitat project.
5. To minimize disturbance to wildlife, the City shall require the provisions and maintenance of an adequate setback between significant wetland habitat and adjacent development. The buffer shall be landscaped with native or compatible introduced ornamental vegetation and may be used for passive recreation purposes.
6. The City shall encourage the maintenance of marsh and riparian vegetation along irrigation/drainage canals and along the Deep Water Ship Channel by encouraging that routine maintenance and clearing disturb only one bank per year and maintain the fringes of marsh vegetation.
7. The City shall seek to minimize the loss and degradation of wetland and riparian habitats at the following sites: Lake Washington and associated wetlands; Bee Lakes and associated riparian woodlands; riparian woodlands along the Sacramento River north of the I Street Bridge and south of the barge canal; and riparian woodlands along the Deep Water Ship Channel and the Yolo Bypass.
8. The City shall seek a cooperative effort with other jurisdictions; the State, and the federal government to conserve habitat. The goal of this effort shall be to preserve and enhance habitat values in appropriate large areas while allowing the orderly development within the incorporated areas of Yolo County. In the event a multi-jurisdictional effort is unsuccessful, the City shall adopt a conservation ordinance or plan that identifies specific habitats and sites where development could diminish or eliminate significant biological habitat and protects them from the adverse effects of excavating, grading, filling, dredging, removing vegetation, landscaping with exotic species, and other incompatible uses and activities. In event protection is not possible, full mitigation shall be required.
9. The City shall seek to preserve populations of rare, threatened, and endangered wildlife or plant species.

10. The City shall not approve project that would cause unmitigatible impacts on rare, threatened, or endangered wildlife or plant species.

11. The City shall implement measures to ensure that development in the city does not adversely affect fishery resources in the Sacramento River, Deep Water Ship Channel, and Lake Washington.

12. Public access and recreation facilities shall not eliminate or degrade riparian habitat values. Trails, picnic areas, and other developments shall be sited to minimize impacts on sensitive wildlife habitat or riparian vegetation.

13. The City shall promote the use of native plants, especially valley oaks, for landscaping roadsides, parks, and private properties. In particular, native plants shall be used along the Sacramento River and in areas adjacent to riparian and wetland habitats.

Yolo County General Plan

The *Yolo County General Plan* was adopted in 1983. The objective of the general plan is to provide guidance for the development of Yolo County. The general plan promotes the preservation of farm land and open spaces to minimize the area of urbanization. The Open Space and Recreation Element of the general plan was updated in 2002. The following goals, objectives, and policies are relevant to wildlife resources in the study area:

Goals and Supporting Objectives

- OG-1: Preserve open space lands utilizing a variety of land use controls and regulations.
  - OO-1: Creation and maintenance of regulatory framework that places a high priority on preservation of public and private open space lands.
- OG-2: Preserve agricultural land as the principal component of the local open space program.
  - OO-2: Maintenance of Urban Boundaries to direct urban growth into existing towns and cities to protect open space and agricultural lands.
- OG-3: Ensure a harmonious relationship between open space users and agriculture.
  - OO-3: Avoidance of conflicts with agricultural activities.
  - OO-4: Clearly demarcated boundaries between public open space and private agricultural lands.
- OG-4: Protect and manage local water resources.
  - OO-5: Provision for open space corridors within existing and future development.
- OG-5: Preserve and enhance existing biological resources.
  - OO-6: No net loss of wetland and/or riparian habitat.
  - OO-7: Maintenance of unique or sensitive plant or animal habitat.
- OG-8: Create a continuous open space corridor along Lower Cache Creek and provide expanded public access to the Yolo Bypass, Lower Putah Creek, Willow Slough, the Sacramento River, and the Blue Ridge Mountains.

- OO-10: Development of partnerships with local stakeholder watershed organizations to expand existing public open space along Cache Creek, Lower Putah Creek, the Sacramento River and within the Yolo Bypass.

Policies

- **OP-4:** The County shall encourage and support coordinated efforts by State and federal agencies, cities, special districts, and non-profit and conservation organizations to protect lands containing open space resources.
- **OP-5:** The County shall utilize the CEQA process to identify significant impacts to open space and shall require new development to implement county-implemented mitigation measures that minimize such impacts.
- **OP-7:** Development shall be directed away from naturally occurring riparian areas and wetlands.
- **OP-8:** Open space buffers shall be utilized to separate incompatible uses from areas of unique biological or agricultural importance.
- **OP-18:** The County, in conjunction with cities in Yolo County, shall endeavor to adopt a Natural Communities Conservation Plan that protects wildlife resources, open space, and agricultural production.

3.9.2.2 Environmental Setting

This section discusses the environmental setting related to wildlife resources in the study area for the CHP Academy EIP, including the methods used to evaluate wildlife habitats including upland and wetland habitats, a description of existing land cover types and associated habitat uses, and discussions of the special-status wildlife species that are known to occur in the project region.

3.9.2.2.1 Study Area

The CHP Academy EIP project area is located in West Sacramento in Yolo County. The project area is approximately 6,500 feet in length, encompassing the Sacramento Bypass levee and additional areas adjacent to the levee required for construction and staging. For the purposes of this wildlife analysis, the wildlife study area consists of the project area plus an approximately 100-foot-wide buffer zone that accounts for potential indirect effects on the valley elderberry longhorn beetle (VELB). The majority of the study area consists of the levee itself. The portion of the Sacramento Bypass Levee in the study area is mostly unvegetated. Landscaped areas located just outside of the levee are associated with the CHP Academy. The Sacramento Bypass Levee is steeply sloped on both sides. The topography of the portion of the study area adjacent to both levees is relatively level. Elevations in the study area range from approximately 15 to 36 feet above mean sea level.

3.9.2.2.2 Field Surveys

Pre-Field Investigation

Prior to field surveys CNDDB (2009a, 2009b) and USFWS (2009) species lists and aerial photographs for the study area were reviewed.

Reconnaissance-Level Site Visits

An initial general survey of the project area was conducted by ICF Jones & Stokes biologists on November 29, 2007. The survey was conducted by walking around the study area to visually assess potential wildlife resources. Focused elderberry shrub (the host plant for VELB) surveys were also conducted, as described below. During all surveys, wildlife habitat uses associated with land cover types were identified, habitats were evaluated for their ability to support special-status wildlife species, and all wildlife species observed were recorded (Table 3.9-1).

Table 3.9-1. List of Wildlife Species Observed in the CHP Academy Study Area

Common Name	Scientific Name
Birds	
Acorn woodpecker	*Melanerpes formicivorus*
American crow	*Corvus brachyrhynchos*
American kestrel	*Falco sparverius*
Black phoebe	*Sayornis nigricans*
Brewer's blackbird	*Euphagus cyanocephalus*
Bushtit	*Psaltriparus minimus*
California towhee	*Pipilo crissalis*
Canada goose	*Branta canadensis*
Dark-eyed junco	*Junco hyemalis*
European starling	*Sturnus vulgaris*
Golden-crowned sparrow	*Zonotrichia atricapilla*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
House sparrow	*Passer domesticus*
Killdeer	*Charadrius vociferus*
Mallard	*Anas platyrhynchos*
Mourning dove	*Zenaida macroura*
Red-tailed hawk	*Buteo jamaicensis*
Rock dove	*Columba livia*
Spotted towhee	*Pipilo erythrophthalmus*
Swainson's hawk	*Buteo swainsoni*
Turkey vulture	*Cathartes aura*
Western meadow lark	*Sturnella neglecta*
Western scrub jay	*Aphelocoma californica*
White-crowned sparrow	*Zonotrichia leucophrys*
White-tailed kite	*Elanus leucurus*
Yellow-rumped warbler	*Dendroica coronata*

Elderberry Surveys

Focused elderberry shrub surveys were conducted in the study area by ICF biologists on January 9, February 13, and August 13, 2009. Elderberry shrub surveys consisted of walking through the project area and mapping, with a sub-meter accurate geographic positioning system (GPS), elderberry shrubs (and shrub clusters) in the proposed flood improvements construction area and within 100 feet in accordance with the USFWS Conservation Guidelines for the VELB (U.S. Fish and Wildlife Service 1999). Other information recorded for each shrub included number of stems between 1 and 3 inches, 3 and 5 inches, and greater than 5 inches in diameter; whether each stem 1 inch or more in diameter is located in a riparian or non-riparian location; approximate height and width of the elderberry shrub; presence of VELB exit holes; and dominant vegetation that is associated with the elderberry shrub. The results of the survey are presented below under in the section entitled Effects and Mitigation Measures, Effect WILD-1, and illustrated on Figure 3.9-1.

3.9.2.2.3 Wildlife Habitat—Land Cover Type Associations

The study area contains the following land cover types: non-native annual grassland, depressional wetland, Great Valley mixed riparian forest, open water, drainage ditch, and developed/landscaped areas. These land cover types are discussed below with respect to the habitat they provide for wildlife. A detailed description of each of these types, including the dominant plants contained within each type, is in Section 3.7, Vegetation and Wetlands. These land cover types are shown in Figure 3.7-1 in Section 3.7, Vegetation and Wetlands, along with acreages of these types occurring within the construction limit, staging area, and larger study area.

Non-Native Annual Grassland

The majority of the non-native annual grassland in the study area occurs adjacent to the Sacramento Bypass Levee. Non-native grassland in the study area consists of non-native annual grasses, forbs, and scattered shrubs.

Annual grasslands provide nesting and foraging habitat for several species of songbirds, including savanna sparrow (*Passerculus sandwichensis*), white-crowned sparrow (*Zonotrichia leucophrys*), western meadowlark (*Sturnella neglecta*), and foraging habitat for several species of raptors including red-tailed hawk (*Buteo jamaicensis*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), great-horned owl(*Bubo virginianus*), and Swainson's hawk (*Buteo swainsoni*). California ground squirrels (*Spermophilus beecheyi*) commonly occur in annual grassland habitat. Their burrows provide important nesting habitat for western burrowing owls (*Athene cunicularia hypugea*). Reptiles found in these habitats include California king snake (*Lampropeltis getulus californiae*), gopher snake (*Pituophis catenifer*), and western rattlesnake (*Crotalus viridis*).

Depressional Wetland

A perennial depressional wetland encompassing approximately 3 acres occurs within the Sacramento Bypass basin portion of the study area. This wetland provides avian foraging opportunities for flycatchers such as western kingbird (*Tyrannus verticalis*) and black phoebe (*Sayornis nigricans*), swallows such as cliff swallow (*Petrochelidon pyrrhonota*), tree swallow (*Tachycineta bicolor*), barn swallow (*Hirundo rustica*), northern rough-winged swallow (*Stelgidopteryx serripennis*), and purple martin (*Progne subis*), waterfowl including mallard (*Anas platyrhynchos*) and ruddy duck (*Oxyura jamaicensis*), other water birds including eared grebe (*Podiceps nigricollis*), and wading birds including great blue heron (*Ardea herodias*), great egret (*Ardea alba*), and snowy egret (*Egretta thula*). The wetland also contains suitable aquatic habitat for reptiles including common garter snake (*Thamnophis sirtalis*), giant garter snake (*Thamnophis gigas*), and western pond turtle (*Actinemys marmorata*) and amphibians including bullfrog (*Rana* *catesbeiana*), Pacific tree frog (*Hyla regilla*), and western toad (*Bufo boreas*). The wetland does not provide suitable habitat for federally listed vernal pool invertebrates because it is perennial.

Great Valley Mixed Riparian Forest

Great Valley mixed riparian forest occurs adjacent to the depressional wetland within the Sacramento Bypass portion of the study area (Figure 3.7-1 in Section 3.7, Vegetation and Wetlands). The dominant overstory species are Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), Goodding's black willow (*Salix gooddingii*), and valley oak (*Quercus lobata*). The shrub layer is relatively open and contains small valley oaks, box elder (*Acer negundo* var. *californicum*), and tree tobacco (*Nicotiana glauca*).

Overstory trees may be used for nesting and roosting by numerous raptors, including Swainson's hawk, white-tailed kite, red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), great horned owl, Cooper's hawk (*Accipiter cooperii*), and American kestrel (*Falco sparverius*) as well as by herons and egrets. Other birds that are known to use riparian forests for nesting include Bullock's oriole (*Icterus bullockii*), yellow-rumped warbler (*Dendroica coronata*), tree swallow (*Tachycineta bicolor*), yellow-billed magpie (*Pica nuttalli*), acorn woodpecker (*Melanerpes formicivorus*), northern flicker (*Colaptes auratus*), and western scrub jay (*Aphelocoma californica*). The understory of riparian forests provide habitat for mammals, including various species of rodents, raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*). Riparian forests also provide cover and foraging habitat for reptiles and amphibians, such as terrestrial garter snake (*Thamnophis elegans*), California king snake, gopher snake, Pacific tree frog, and western toad. Suitable areas in the understory may also be used as nesting habitat for western pond turtles.

Open Water

Open water areas consist of the canal, which runs perpendicular to the Sacramento Bypass Levee and the pond just upstream of the canal pump station to the north of the levee. Open water areas contain foraging habitat for birds including swallows and other flycatcher birds, wading birds, and waterfowl. Specific bird species that may use these areas for foraging are comparable to those discussed above under the Great Valley mixed riparian forest community. This community also contains suitable aquatic habitat for amphibians and reptiles including bullfrogs, Pacific tree frogs, western toad, common garter snake, giant garter snake, and western pond turtle. Just outside of the study area small to large patches of freshwater marsh occur in association with these open water areas increasing the overall habitat values and uses of these areas.

Drainage Ditch

A single drainage ditch is located inside the fence around the CHP Academy EIP project area. The drainage ditch appears to drain upland areas between the site and the Sacramento Bypass Levee. The drainage ditch may provide breeding habitat for Pacific tree frogs and western toad.

Levee/Developed/Landscaped Areas

The levee/ developed/landscaped portions of the study area consist of the unvegetated portions of the Sacramento Bypass Levee and developed and landscaped areas in the CHP Academy EIP project area. Unvegetated or developed areas have minimal potential to support wildlife. Landscape trees and shrubs present along the northern boundary of the CHP Academy project area have potential to support nesting of common and special-status birds with potential to nest in riparian forest areas.

K:\Projects 1\HDR\00875 07\mapdoc\Permitting\4 Tanya\Fig 3 09 01 CHP Elderberry Shrub Locations and Fencing 20110121.mxd (KBA 01-21-2011)

N

0 250 500 1,000 Feet

Figure 3.9-1
Elderberry Shrub Locations and Fencing Map

3.9.2.2.4 Special-Status Wildlife

Special-status wildlife species are wildlife that are legally protected under the ESA, CESA, or other regulations and species that are considered rare by the scientific community. Special-status species include the following:

- species that are listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.12 for listed plants, 50 CFR 17.11 for listed animals, and various notices in the *Federal Register* for proposed species);
- species that are candidates for future listing as threatened or endangered under the ESA (72 FR 69034, December 6, 2007);
- species listed or proposed for listing by the State of California as threatened or endangered under the CESA (14 CCR 670.5);
- species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines Section 15380); and
- animals that are identified as California species of special concern or fully protected species on California Department of Fish and Game's Special Animals List (California Department of Fish and Game 2008).

Based on the USFWS (2009) species list for the Sacramento West quadrangle and Yolo County, a review of CNDDB (2009a, 2009b) occurrences within a 10-mile radius of the study area, and information collected during field surveys, 35 special-status wildlife species were identified as having potential to occur in the project region (Table 3.9-2). Of these, 22 have low to no potential to occur because the study area is outside the species' known range or suitable habitat is absent from the study area. The remaining 13 wildlife species identified as having potential to occur in the study area include the VELB, giant garter snake, western pond turtle, Swainson's hawk, white-tailed kite, loggerhead shrike, tricolored blackbird, purple martin, northern harrier, western burrowing owl, hoary bat, western red bat, and pallid bat.

The protection status, distributional range, and habitat requirements for these species are described below in Table 3.9-2.

1 **Table 3.9-2. Special-Status Wildlife Species with Potential to Occur in the CHP Academy Study Area**

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Invertebrates				
Delta green ground beetle *Elaphrus viridus*	T/–	Restricted to Olcott Lake and other vernal pools at Jepson Prairie Preserve, Solano County	Sparsely vegetated edges of vernal lakes and pools; occur up to 250 feet from pools	None. Study area is outside of the species' range.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/–/–	Stream side habitats below 3,000 feet throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant	High. Known occurrences within a mile of the study area.
Conservancy fairy shrimp *Branchinecta conservatio*	E/–/–	Disjunct occurrences in Solano, Merced, Tehama, Ventura, Butte, and Glenn Counties	Large, deep vernal pools in annual grasslands	None. Study area is outside of the species' range.
Vernal pool fairy shrimp *Branchinecta lynchi*	T/–/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. Isolated populations also in Riverside County.	Common in vernal pools; also found in sandstone rock outcrop pools.	None. No suitable habitat in the study area.
Vernal pool tadpole shrimp *Lepidurus packardi*	E/–/–	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds	None. No suitable habitat in the study area.
Lange's metalmark butterfly *Apodemia mormo langei*	E/–/–	Once found throughout the Antioch Dunes; range now reduced to less than 10 acres of Antioch Dunes in Contra Costa County	Limited to dense to moderately dense patches of food plant, wild buckwheat, in stabilized sand dunes	None. Study area is outside of the species' range.
Amphibians				
California tiger salamander *Ambystoma californiense*	T/C/–	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to northeastern San Luis Obispo County.	Small ponds, lakes, or vernal pools in grass-lands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy	None. No suitable habitat in the study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
California red-legged frog *Rana aurora draytonii*	T/SSC/–	Found along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation. May estivate in rodent burrows or cracks during dry periods.	None. The study area is outside of this species current known range. This species is believed to be extirpated from the valley floor.
Reptiles				
Silvery legless lizard *Anniella pulchra pulchra*	–/SSC/–	Along the Coast, Transverse, and Peninsular Ranges from Contra Costa County to San Diego County with spotty occurrences in the San Joaquin Valley	Habitats with loose soil for burrowing or thick duff or leaf litter; often forages in leaf litter at plant bases; may be found on beaches, sandy washes, and in woodland, chaparral, and riparian areas	Low. No CNDDB occurrences within 10 miles of the study area. Potential habitat in the study area.
Giant garter snake *Thamnophis couchi gigas*	T/T/–	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno	Sloughs, canals, low gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter	Moderate. CNDDB occurrences 2 miles from study area. Suitable aquatic and upland habitat in the study area.
Western pond turtle *Actinemys marmorata*	–/SSC/–	Occurs from the Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of Sierra Nevada	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests	Moderate. Species observed within ponds 4 miles south of study area along South River Road. Suitable habitat within study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Birds				
Double-crested cormorant *Phalacrocorax auritus* (rookery site)	–/SSC/–	Winters along the entire California coast and inland over the Coast Ranges into the Central Valley from Tehama County to Fresno County; a permanent resident along the coast from Monterey County to San Diego County, along the Colorado River, Imperial, Riverside, Kern and King Co.s, and the islands off San Francisco; breeds in Siskiyou, Modoc,Lassen, Shasta, Plumas, and Mon Co.s; also breeds in the San Francisco Bay Area and in Yolo and Sacramento Counties	Rocky coastlines, beaches, inland ponds, and lakes; needs open water for foraging, and nests in riparian forests or on protected islands, usually in snags	Low. No CNDDB nesting records within 10 miles of the study area. No nesting habitat within study area. Sacramento River within study area provides suitable foraging habitat.
White-faced ibis *Plegadis chihi* (rookery site)	–/SSC	Both resident and winter populations on the Salton Sea and in isolated areas in Imperial, San Diego, Ventura, and Fresno Counties; breeds at Honey Lake, Lassen County, at Mendota Wildlife Management Area, Fresno County, and near Woodland, Yolo County.	Prefers freshwater marshes with tules, cattails, and rushes, but may nest in trees and forage in flooded agricultural fields, especially flooded rice fields	Low. No CNDDB nesting records within 10 miles of the study area. No suitable nesting habitat within study area. Grasslands within the Sacramento Bypass provide suitable resting and foraging habitat.
California black rail *Laterallus jamaicensis coturniculus*	–/T/–	Permanent resident in the San Francisco Bay and eastward through the Delta into Sacramento and San Joaquin Counties; small populations in Marin, Santa Cruz, San Luis Obispo, Orange, Riverside, and Imperial Counties.	Tidal salt marshes associated with heavy growth of pickleweed; also occurs in brackish marshes or freshwater marshes at low elevations.	None. No CNDDB nesting records within 10 miles of the study area. No suitable habitat within study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
California clapper rail *Rallus longirostris obsoletus*	E/E/–	Marshes around the San Francisco Bay and east through the Delta to Suisun Marsh	Restricted to salt marshes and tidal sloughs; usually associated with heavy growth of pickle-weed; feeds on mollusks removed from the mud in sloughs	None. Study area is outside of the species' range.
Mountain plover *Charadrius montanus*	PT/SSC	Does not breed in California; in winter, found in the Central Valley south of Yuba County, along the coast in parts of San Luis Obispo, Santa Barbara, Ventura, and San Diego Counties; parts of Imperial, Riverside, Kern, and Los Angeles Counties	Occupies open plains or rolling hills with short grasses or very sparse vegetation; nearby bodies of water are not needed; may use newly plowed or sprouting grainfields	None. Study area is outside of the species' breeding range, unlikely to forage in study area.
Western snowy plover (inland population) *Charadrius alexandrinus nivosus*	–/SSC	Nests at inland lakes throughout northeastern, central, and southern California, including Mono Lake and Salton Sea	Barren to sparsely vegetated ground at alkaline or saline lakes, reservoirs, ponds and riverine sand bars; also along sewage, salt-evaporation, and agricultural waste-water ponds	None. No suitable nesting or foraging habitat in the study area.
Northern harrier *Circus cyaneus*	–/SSC	Occurs throughout lowland California. Has been recorded in fall at high elevations	Grasslands, meadows, marshes, and seasonal and agricultural wetlands	Moderate. No CNDDB nesting records within 10 miles of the study area. Grasslands within the Sacramento Bypass provide suitable nesting and foraging habitat.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
White-tailed kite *Elanus leucurus*	–/ FP/–	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County at the Mexico border	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging	High. CNDDB nesting records within 10 miles of the study area, closest reported is approximately 4 miles from the study area A potential nesting pair was observed in study area by DFG though no nest was confirmed. Suitable nesting and foraging habitat in study area.
Swainson's hawk *Buteo swainsoni*	–/T/–/–	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County.	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields.	High. One CNDDB nesting record within study area.
Western burrowing owl *Athene cunicularia hypugea*	–/SSC/–	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along south coast	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows	High. CNDDB nesting records within a mile of the study area. Suitable nesting and foraging habitat in study area.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	–/E	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers	Wide, dense riparian forests with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley-oak riparian habitats where scrub jays are abundant	None. No suitable nesting habitat in the study area; forests in study area are dominated by valley oak and contain abundant scrub jays.
Loggerhead shrike *Lanius ludovicianus*	–/SSC/–	Resident and winter visitor in lowlands and foothills throughout California; rare on coastal slope north of Mendocino County, occurring only in winter	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches	Moderate. No CNDDB nesting records within 10 miles of the study area. Suitable nesting and foraging habitat in study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Tricolored blackbird *Agelaius tricolor*	–/SSC/–	Permanent resident in the Central Valley from Butte County to Kern County; breeds at scattered coastal locations from Marin County south to San Diego County and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony	Moderate. CNDDB nesting records within 3 miles study area. No suitable nesting habitat in study area; suitable foraging habitat in grasslands within the Sacramento Bypass.
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	–/SSC/–	Locally numerous in the Klamath Basin, Modoc Plateau, Great Basin desert, and large mountain valleys in northeastern California; and in the San Joaquin Valley. Common breeders in the Colorado River valley, the Salton Sink, and the western Mojave desert; scarce in the Sacramento Valley and along the southern coast in Los Angeles, Riverside, and San Bernardino counties.	Nest in marshes with tall emergent vegetation, such as tules or cattails, generally in open areas and edges over relatively deep water. Breeding marshes often on edges of deep water bodies such as lakes, reservoirs, and or larger ponds.	None. CNDDB nesting records approximately 10 miles south of the study area. No suitable nesting or foraging habitat in the study area.
Purple martin *Progne subis*	–/SSC/–	Coastal mountains south to San Luis Obispo County, west slope of the Sierra Nevada, and northern Sierra and Cascade ranges. Absent from the Central Valley except in Sacramento. Isolated, local populations in southern California	Nests in abandoned woodpecker holes in oaks, cottonwoods, and other deciduous trees in a variety of wooded and riparian habitats. Also nests in vertical drainage holes under elevated freeways and highway bridges	Moderate. CNDDB nesting records under nearby freeway approximately 5 miles southeast of the study area. Suitable nesting habitat in study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Bank swallow *Riparia riparia*	–/T/–	Occurs along the Sacramento River from Shasta County to Sacramento County, along the Feather and lower American Rivers, in the Owens Valley; and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou Counties. Small populations near the coast from San Francisco County to Monterey County	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam	Low. CNDDB nesting records approximately 5 miles southeast of the study area. No suitable nesting habitat in the study area.
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	–/SSC/–	Found only in the San Francisco Bay Area in Marin, Napa, Sonoma, Solano, San Francisco, San Mateo, Santa Clara, and Alameda Counties	Freshwater marshes in summer and salt or brackish marshes in fall and winter; requires tall grasses, tules, and willow thickets for nesting and cover	None. Study area is outside of the species' range.
Grasshopper sparrow *Ammodramus savannarum*	–/SSC/–	Summer resident in the foothills of the Sierra Nevada and Coast Range from Mendocino and Trinity counties south to San Diego County.	Dry, dense grasslands with a variety of grasses and tall forbs and scattered shrubs.	Low. No CNDDB nesting records within 10 miles of the study area. Low quality nesting habitat within study area.
Suisun song sparrow *Melospiza melodia maxillaris*	–/SSC/–	Restricted to the extreme western edge of the Delta, between the cities of Vallejo and Pittsburg near Suisun Bay	Brackish and tidal marshes supporting cattails, tules, various sedges, and pickleweed	None. Study area is outside of the species' range.
Mammals				
Hoary bat *Lasurius cinerius*	–/SSC/–	Occurs throughout California from sea level to 13,200 feet.	Primarily found in forested habitats. Also found in riparian areas and in park and garden settings in urban areas. Day roosts within foliage of trees.	Moderate. Not reported to occur within study area; reported in CNDDB to occur approximately 2 miles of the study area. Suitable roosting habitat in study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Pallid bat *Antrozous pallidus*	–/SSC/FSS, WBWG: High priority	Occurs throughout California except the high Sierra from Shasta to Kern County and the northwest coast, primarily at lower and mid elevations	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts	Moderate. Not reported to occur within study area; no CNDDB record reported to occur within 10 of the study area. Suitable roosting habitat in study area.
Western red bat *Lasiurus blossevillii*	–/–/FSS, WBWG: High priority	Scattered throughout much of California at lower elevations	Found primarily in riparian and wooded habitats. Occurs at least seasonally in urban areas. Day roosts in trees within the foliage. Found in fruit orchards and sycamore riparian habitats in the central valley	Moderate. Not reported to occur within study area; no CNDDB record reported to occur within 10 of the study area. Suitable roosting habitat in study area.
Salt marsh harvest mouse *Reithrodontomys raviventris*	E/E, FP	San Francisco, San Pablo, and Suisun Bays; the Delta	Salt marshes with a dense plant cover of pickle-weed and fat hen; adjacent to an upland site	None. Study area is outside of the species' range.
American badger *Taxidea taxus*	–/SSC/–	In California, badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties	Badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground	Low. One historic record (1938) reported approximately 8 miles from the study area. Study area contains limited suitable habitat for this species.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area

Status explanations:

Federal

E = listed as endangered under the Federal Endangered Species Act.

T = listed as threatened under the Federal Endangered Species Act.

P = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

C = candidate for listing

– = no listing.

Western Bat Working Group (WBWG) Available: http://www.wbwg.org/spp_matrix.html)

High priority = species are imperiled or at high risk of imperilment

Moderate priority= this designation indicates a level of concern that should warrant closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat

Low priority = While there may be localized concerns, the overall status of the species is believed to be secure.

Valley Elderberry Longhorn Beetle

Although no occurrences of VELB have been reported in the study area, one CNDDB (2009b) record for VELB occurs within a mile of the study area along the Sacramento River riparian corridor. Numerous other occurrences are located within 10 miles of the study area. Although not reported to occur in the study area, elderberry shrubs sized 1 inch or more at ground level are present in the study area and therefore VELB has potential to occur. See elderberry shrub survey map Figure 3.9-1 for locations of these shrubs.

Giant Garter Snake

There are no CNDDB (2009b) records for giant garter snakes in the study area, although there are approximately 25 occurrences within 10 miles of the study area, most of which are labeled as sensitive. The closest of these occurrences is located in a drainage canal approximately 2 miles northeast of study area (California Natural Diversity Database 2009b).

Aquatic features in the study area include a drainage ditch, a depressional wetland, and open water (canal and pond north of canal pump station) areas. The drainage ditch is narrow, minimally vegetated, and was observed to contain little to no water during the snakes active period and therefore does not contain suitable habitat for this species. The depressional wetland and open water areas contain suitable aquatic habitat for this species and are associated with higher ground grassy uplands that would provide suitable basking and cover areas. Therefore, suitable aquatic and upland habitat for this species occurs in the study area adjacent to the construction site.

Western Pond Turtle

CNDDB (2009a, 2009b) records do not indicate any western pond turtle occurrences in the study area. However pond turtles have been incidentally observed approximately 5 miles southeast of the study area in ponds west of South River Road, by ICF biologists. Additionally, western pond turtle is recorded to occur 8 miles east of the study area in a drainage at the McClellan Air Force Base (California Natural Diversity Database 2009a, b).

In the study area, the depressional wetland and open water areas contain suitable aquatic habitat for this species while surrounding upland areas may provide winter hibernacula and nesting habitat.

Swainson's Hawk

According to CNDDB (2010), five nest sites occur within 0.5 mile of the CHP Academy EIP project area. One nest site occurs within 100 feet, in the Sacramento Bypass. This nest site is located in a cottonwood tree in the depressional wetland north of the study area. The nest was last observed to be used for breeding in 2001, at which time a breeding pair and three juveniles were observed. The next nearest nest site to the project area is located south of the Sacramento Bypass, west of the drainage canal in a cottonwood tree in a wetland corridor. This nest was last observed to be used for breeding in 2000, at which time two juveniles were observed. A third nest site is located in a cottonwood tree along the western end of the Sacramento Bypass Levee. This nest was last observed to be used for breeding in 2001, at which time a breeding pair and three juveniles were observed. Lastly, two nest sites are located in a riparian corridor on the east side of the Sacramento River. One of the nests was last observed to be used for breeding in 1998, at which time a breeding pair were observed. The other nest was last observed to be used for breeding in 2000, at which time two juveniles were observed. In addition, there are numerous other Swainson's hawk nests reported within 10 miles of the study area (California Natural Diversity Database 2010).

As suggested by representatives of the Yolo Natural Heritage Program, a review of the nest records reported in *The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk in Yolo County* was also conducted. One new nest record was found to occur about 0.5 mile north of the study area along County Road 126 at River Road (Estep Environmental Consulting 2008).

Grasslands in the study area are likely used as foraging habitat for this species.

White-Tailed Kite

A pair of white-tailed kites was observed in the study area in December 2009 by a DFG biologist but an active nest was not confirmed during the breeding season. There are no CNDDB (2009b) occurrences reported for this species in the study area. CNDDB (2009b) records indicate white-tailed kite nesting records within 10 miles of the study area with the closest occurrence approximately 4 miles east of the study area. Large trees within and adjacent to the study area provide suitable nesting habitat, and grasslands provide suitable foraging habitat.

Loggerhead Shrike

CNDDB (2009b) records do not indicate any loggerhead shrike occurrences within 10 miles of the study area. However, the study area is within the expected range for this species. Scattered trees and shrubs in the study area have potential to support nesting of this species and grasslands provide suitable foraging habitat.

Tricolored Blackbird

There are no CNDDB (2009b) occurrences for this species in the study area. Within 10 miles of the study area, CNDDB (2009b) indicated one tricolored blackbird nesting site located approximately 2 miles south of the study area, located near the Port of West Sacramento, in the vicinity of the Port North Levee. The birds were reported to be nesting in an area containing thistle and mustard in 1969 and 1974. The size of this population was not reported. The study area does not contain suitable nesting habitat for this species though grasslands provide suitable foraging habitat for this species.

Purple Martin

There are no CNDDB (2009b) occurrences for this species in the study area. Between 21 and 29 pairs of birds have been recorded nesting in weep holes under the I-5 freeway overpass at I Street approximately 3 miles southeast of the study area (California Natural Diversity Database 2009b). Numerous other CNDDB (2009b) nesting colonies under freeway or street overpasses have been reported within a 10-mile radius of the study area. In the study area, suitable nesting habitat for this species occurs within trees within the riparian forest.

Northern Harrier

There are no CNDDB (2009b) occurrences for this species in the study area. CNDDB (2009b) records do not indicate any northern harrier occurrences within 10 miles of the study area. Annual grasslands in the study area provide potential foraging habitat for this species.

Western Burrowing Owl

There are no CNDDB (2009b) occurrences for this species in the study area. CNDDB (2009b) indicated numerous burrowing owl records within10 miles of the study area. The closest recorded nesting record is within 1 mile of the site located 0.2 mile southwest of the intersection of Highway 84 and Harbor Boulevard, in the Sacramento River North Levee reach. Grassland areas in the study area provide suitable nesting habitat where ground squirrel burrows are present and open grassland areas near suitable nesting habitat provide suitable foraging habitat.

Hoary Bat

There are no CNDDB (2009b) occurrences for this species in the study area. CNDDB (2009b) records indicate a hoary bat observation approximately 3 miles southeast of the study area within the Sacramento River North Levee reach. Riparian forest in the study area provides suitable nesting and foraging habitat for this species.

Western Red Bat

There are no CNDDB (2009b) occurrences for this species in the study area or within 10 miles of the study area. Riparian forest in the study area provides suitable nesting and foraging habitat for this species.

Pallid Bat

There are no CNDDB (2009b) occurrences for this species in the study area or within 10 miles of the study area. Riparian forest in the study area provides suitable nesting and foraging habitat for this species.

3.9.3 Environmental Consequences

This section describes the environmental consequences related to wildlife resources for the CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether a potential effect would be significant.

3.9.3.1 Assessment Methods

The effect analysis below is quantitative and is based on site-specific information.

The key effects were identified and evaluated based on the environmental conditions observed in the CHP Academy EIP study area and the expected magnitude, intensity, and duration of project related effects associated with project construction and operation.

3.9.3.1.1 Effect Mechanisms

This section discusses the construction related project activities that could affect wildlife resources in the study area. It is assumed that following project construction, O&M activities within the project area would consist of the same types of activities that occurred prior to construction. These activities include hand and mechanical (mower) removal of weeds, spraying of weeds, minimal tree or shrub trimming, and reconditioning of levee slope and road with bull dozer up to once a year. O&M activities are currently conducted between May 1 to October 1and will continue to be conducted during this time period following construction and thus are assumed to not impact giant garter snake. Additionally, these activities do not produce significant noise that could impact nesting birds. Therefore additional direct or indirect effects associated with O&M activities are not anticipated and are not discussed further.

The types of construction related direct and indirect effects used to assess effects on wildlife resources are listed below.

Direct Effects

Direct effects on wildlife could result from the following actions:

- vegetation clearing (including trees), grading, excavating/trenching, placement of rock slope protection, and paving activities during construction;
- temporary stockpiling and sidecasting of soil, construction materials, or other construction wastes;
- soil compaction, dust, and water runoff from the construction site;
- short-term construction-related noise (from equipment); and
- degradation of water quality in drainages and wetlands, resulting from construction runoff containing petroleum products.

Indirect Effects

Indirect effects on wildlife could e caused result from the following actions:

- permanently altering light and noise levels;
- altering hydrology;
- causing damage through toxicity associated with herbicides, insecticides, and rodenticides;
- introducing pet and human disturbance (including trash dumping);
- increasing habitat for native competitors or predators; and
- introducing invasive non-native species.

3.9.3.2 Determination of Effects

For this analysis, an effect pertaining to wildlife resources was considered significant if it would result in any of the following environmental effects, which are based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq.).*

- have a substantial adverse effect, either directly or 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 DFG 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;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- conflict with the provisions of an adopted habitat conservation plan, natural communities conservation plan, or other approved local, regional, or state habitat conservation plan; or
- contribute to a substantial reduction or elimination of species diversity or abundance.

Qualitative relationships between environmental conditions and life stage survival or wildlife resources are the basis of the effect assessment. Cause and effect relationships are identified for assessment species, including the relationship between environmental conditions and habitat, and the effects of changes in habitat on survival.

The mitigation measures described for potential effects on sensitive wildlife resources have not been developed through formal consultation with resource agencies (e.g., DFG, USFWS, NMFS, and the USACE). WSAFCA will contact agencies as part of the environmental compliance process to determine specific compensatory mitigation for effects on wetlands, state- and federally listed species, riparian habitats, and other habitats supporting special-status species. Additional mitigation measures may also be identified as conditions of permits (e.g., a BO, Section 7 Incidental Take Statement, or Section 1602 Streambed Alteration Agreement).

3.9.4 Effects and Mitigation Measures

3.9.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects on wildlife, such as displacement or loss of habitat would occur.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability/geometry issues would continue. A catastrophic levee failure would result in flooding and inundation that could significantly affect wildlife and their upland or wetland habitats by physical displacement, mortality, or destruction of habitat. In addition, cleanup and repair activities could result in physical displacement for extended periods of time and significant effects on habitat. If a flood event were to occur along the Sacramento River corridor, the narrow band of valuable riparian habitat located along the levees could be damaged. Given the importance of this riparian corridor for numerous special-status species and for the pacific flyway in general, loss or fragmentation of this habitat would be a significant effect, and it could take decades for a mature riparian forest to re-establish itself in the affected areas. Given the uncertainty of the occurrence or magnitude of such an event, potential effects on wildlife and their habitats cannot be quantified based on available information.

As discussed under the No Action Alternative in Section 3.7, Vegetation and Wetlands, compliance with the vegetation-free zone as described in the USACE's Vegetation Guidance could be required in the absence of project implementation. Compliance with the vegetation guidance could result in the removal of vegetation (approximately 3 trees), including riparian vegetation that supports habitat for special-status species. This could result in significant effects on wildlife and their habitats.

3.9.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following potential effects on wildlife resources. These potential effects are summarized in the table below and are discussed in detail following the table.

Effect	Finding	With Mitigation	Mitigation Measure
WILD-1: Disturbance or Loss of VELB and Their Habitat (Elderberry Shrubs)	Significant	Less than Significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-2: Disturbance or Loss of Western Pond Turtle and Their Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-1: Conduct a Preconstruction Survey for Western Pond Turtle and Exclude Turtles from Work Area, If Present
WILD-3: Disturbance or Loss of Giant Garter Snake and Their Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop Appropriate Compensation Plan for Giant Garter Snake
WILD-4: Disturbance to Nesting Swainson's Hawks and Loss of Nesting and Foraging Habitat	Significant	Less than Significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-5: Disturbance to Nesting Special-Status Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-6: Disturbance to Burrowing Owl and Loss of Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-3: Conduct Preconstruction Surveys for Burrowing Owl Prior to Construction and If Present, Protect Nests through Use of Agency-Approved Protection Buffers WILD-MM-4: Coordinate with Resource Agencies and Develop Appropriate Compensation Plans for Burrowing Owl

Effect	Finding	With Mitigation	Mitigation Measure
WILD-7: Disturbance or Loss of Bats and Bat Roosts	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-5: Conduct a Preconstruction Survey for Roosting Bats and Avoid or Mitigate for Potential Effects
WILD-8: Disturbance to Nesting Non-Special-Status Migratory Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-9: Disturbance or Loss of Common Wildlife Species and Their Habitats	Less than significant	N/A	N/A
WILD-10: Disruption of Wildlife Movement Corridors	Less than significant	N/A	N/A
WILD-11: Conflict with Provisions of an Adopted HCP/NCCP or Other Approved Local, Regional, or State Habitat Conservation Plan	No effect	N/A	N/A

Effect WILD-1: Disturbance or Loss of VELB and Their Habitat (Elderberry Shrub)

Two elderberry shrubs occur in the study area. One elderberry shrub (EB 146) occurs in the northwestern area of the project site within the Sacramento Bypass. This shrub occurs adjacent to an existing maintenance road (approximately 30 feet wide) utilized for levee maintenance and patrolling activities. Grading activities are proposed to occur down the levee slope to the toe of the levee, approximately 30 feet from the shrub. Hauling activities may occur adjacent to the shrub, but outside the dripline. The other shrub (EB 177) is in the southeast corner of the project area approximately 15 feet from the proposed construction limits, beneath a large oak tree. Neither is expected to be removed or disturbed. Elderberry shrub survey results are shown in Table 3.9-3, below, and the locations of these shrubs are shown in Figure 3.9-1.

Table 3.9-3. Elderberry Shrub Survey Results

Elderberry Shrub/Cluster Number	Number of Stems > 1 Inch and < 3 Inches	Number of Stems > 3 Inches and < 5 Inches	Number of Stems > 5 Inches	Total Number of Stems	Exit holes N/Y
Riparian					
EB177	0	0	1	1	N
Non-Riparian					
EB 146	20	3	1	24	Y
Total	**20**	**3**	**2**	**25**	**N/A**

Complete avoidance of effects on VELB is assumed when a 100-foot buffer (from construction) is established around elderberry shrubs. Direct effects on VELB may generally occur if construction occurs within 20 feet of elderberry shrubs. Indirect effects on VELB may generally occur if elderberry shrubs are located from 20 to 100 feet of construction.

To ensure that elderberry shrubs within the study area will be protected during construction, WSAFCA has coordinated with USFWS and incorporated protection measures (as described in Section 2.5, Chapter 2, Alternatives) into the CHP Academy EIP. These measures include the following actions:

- For shrub EB 146, 100 feet of concrete barriers (K-rails) will be installed along the maintenance road in front of the shrub (50 feet west and 50 feet east of the shrub). Beyond the concrete barrier, temporary orange construction fencing (4-foot-high commercial-quality woven polypropylene) will be installed to completely surround the shrub and form 20-foot construction buffer on the north, east and west sides of the shrub. For shrub EB 177, a 20-foot temporary orange construction fence buffer will be installed around the shrub and any adjacent vegetation that requires protection (see Figure 3.9-1). Within buffer areas, signs will be posted along fencing for the duration of construction. The signs will contain the following information:

  > This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.

- Buffer area fences around elderberry shrubs/clusters will be inspected weekly by a qualified biologist during ground-disturbing activities and monthly after ground-disturbing activities until project construction is complete or until the fences are removed, as approved by the biological monitor and the resident engineer. The biological monitor will be responsible for ensuring that the contractor maintains the buffer area fences around elderberry shrubs throughout construction. Biological inspection reports will be provided to the project lead and USFWS.
- WSAFCA will ensure that the project site will be watered down as necessary to prevent dust from becoming airborne and accumulating on elderberry shrubs in and adjacent to the project site.

The incorporation of these measures into the CHP Academy APA as well as implementation of VEG-MM-2 will ensure avoidance of effects on VELB. Therefore, potential effects on VELB would be considered less than significant.

Mitigation

Mitigation Measure VEG--MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Effect WILD-2: Disturbance or Loss of Western Pond Turtle and Their Habitats

Although western pond turtle is not currently known to occur in the study area, there is potential for occurrence in the depressional wetland and surrounding riparian forest and in the open water areas. Although the project construction is limited to the toe of the Sacramento Bypass Levee, these features are located within 50 feet from the construction limit and therefore pond turtles using upland areas adjacent to aquatic features could be affected by project construction. Potential effects on this species include temporary disturbance to upland nesting or cover habitat and the potential for direct loss of individuals. Effects on western pond turtle would be considered significant. WSAFCA has incorporated protective fencing measures into the project, including the installation of concrete K-rails and/or orange construction fencing along the depressional wetland, open water, and riparian features. Implementation of these measures and VEG-MM-2, and WILD-MM-1would reduce potential effects on western pond turtle to less than significant.

Mitigation

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-1: Conduct a Preconstruction Survey for Western Pond Turtle and Exclude Turtles from Work Area, If Present

To avoid and minimize impacts on western pond turtles, the project proponent will retain a qualified wildlife biologist to conduct a preconstruction survey 1 week before and within 48 hours of disturbance in aquatic and riparian habitats. The survey objectives are to determine presence or absence of pond turtles within the construction work area.

If possible, the surveys should be timed to coincide with the time of day and year when turtles are most likely to be active (during the cooler part of the day 8am-12 pm during spring, summer, and late summer). Prior to conducting presence/absence surveys the biologist should locate the microhabitats for turtle basking (logs, rocks, brush thickets) and determine a location to quietly observe turtles.

Each survey should include a 30 minute wait time after arriving onsite to allow startled turtles to return to open basking areas. The survey should consist of a minimum 15 minute observation time per area where turtles could be observed.

If turtles are observed during a survey, they will be relocated outside of the construction area to appropriate aquatic habitat by a biologist with a valid memorandum of understanding from CDFG and as determined during coordination with CDFG.

If turtles are present they can either be hand-captured or trapped and then moved.

If turtles are captured and moved up or downstream, install exclusion fence perpendicular to the river extending upslope an appropriate distance, determined based on topography and site vegetation. If this is determined to be infeasible, a monitor will need to be present during in-water construction (and construction within riparian habitat areas) to ensure that turtles do not move into the construction area.

Effect WILD-3: Disturbance or Loss of Giant Garter Snake and Their Habitat

Numerous occurrences of giant garter snake are reported in canals located within 10 miles of the study area with the closest occurrence located approximately 2 miles northwest of the study area. Giant garter snakes have potential to use aquatic habitat in the study area, including depressional wetland and open water areas. Upland areas adjacent to these aquatic habitats could also be used by giant garter snakes for basking, cover, and refuge areas. Construction is limited to the toe of the Sacramento Bypass Levee and would not affect adjacent aquatic habitat. However, because the toe of the levee is located within 200 feet of aquatic habitat there is some potential for garter snakes, if present, to seek refuge in burrows along the levee toe. Potential effects on this species include the temporary disturbance of less than 1 acre of upland habitat, which has potential to result in the loss of individuals. Effects on giant garter snake would be considered significant. Pursuant to an on-site discussion with representatives of USFWS and DFG in December 2009, WSAFCA has incorporated the following standard agency-approved protection measures for giant garter snake into the project to avoid and minimize effects on giant garter snake and their habitat.

- To reduce the likelihood of snakes entering these areas during construction activities, WSAFCA will install exclusion fencing along the depressional wetland and open water areas (areas within 200 feet of suitable habitat) (Figure 2-5). The exclusion fencing will be installed during the active period for giant garter snakes (May 1 to October 1) to reduce the potential for direct loss of the species during this activity. The fencing will consist of 3- to 4-foot-tall erosion fencing buried at least 6 to 8 inches below ground level. The fencing will ensure that giant garter snakes are excluded from the construction area and that suitable upland and aquatic habitat is protected throughout construction. To ensure that construction equipment and personnel do not affect aquatic habitat for giant garter snake outside the construction corridor, a combination of K-rail fencing and orange barrier fencing will be erected (in addition to the exclusion fencing) to clearly define the aquatic habitat to be avoided.
- A USFWS-approved biologist will conduct a preconstruction survey in suitable habitat no more than 24 hours before construction. Prior to construction each morning, construction personnel will inspect exclusion and orange barrier fencing to ensure they are both in good working order. If any snakes are observed within the construction area during this inspection or at any other time during construction the project biologist will be contacted to survey the site for snakes. The project area will be re-inspected and surveyed whenever a lapse in construction activity of 2 weeks or more has occurred. If a snake (believed to be a giant garter snake) is encountered during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed.
- Vegetation clearing within 200 feet of the banks of potential giant garter snake aquatic habitat will be limited to the minimum area necessary. Avoided giant garter snake habitat within or adjacent to the project area will be flagged and designated as an environmentally sensitive area, to be avoided by all construction personnel.
- The movement of heavy equipment within 200 feet of the banks of potential giant garter snake aquatic habitat will be confined to designated haul routes to minimize habitat disturbance.

Implementation of these measures and VEG-MM-2 and WILD-MM-2 would reduce potential effects on giant garter snake to less than significant.

Mitigation

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-24: Coordinate with Resource Agencies and Develop Appropriate Compensation Plan for Giant Garter Snake

Based on the USFWS's 1997 Programmatic Formal Consultation for Giant Garter Snake the project would likely result in only Level 1 impacts, which are defined as those that result in minimal environmental effects, such as repair, rehabilitation, or replacement of previously authorized structures, and would not result permanent habitat loss and would result in temporary habitat disturbance not exceed 20 acres (U.S. Fish and Wildlife Service 1997). Required mitigation would therefore likely consist of restoration of temporary impacts to giant garter snake habitat and one year of monitoring, as described below.

- **Restoration.** After completion of construction activities, remove any temporary fill and construction debris and, wherever feasible, restore disturbed areas to pre-project conditions. Restoration work may include such activities as replanting species removed from banks or replanting emergent vegetation in the active channel.
- **Monitoring.** Restoration of habitat should be monitored for 1year following implementation. Monitoring reports documenting the restoration effort should be submitted to USFWS (1) upon completion of the restoration implementation, and (2) 1 year from restoration implementation. Monitoring reports should include photo documentation, when restoration was completed, what materials were used, plantings (if specified) and justification of any substitutions to USFWS-recommended guidelines. Monitoring reports should also include recommendations for remedial actions and approval from USFWS, if necessary, and justification from release of any further monitoring, if requested.

Effect WILD-4: Disturbance to Nesting Swainson's Hawk and Loss of Nesting and Foraging Habitat

The study area contains suitable Swainson's hawk nesting and foraging habitat. Swainson's hawk foraging habitat consists of grassland areas along the levee toe and within the Sacramento Bypass. A total of 3.15 acres of grasslands occur within the project area, including the staging area (0.93 acres). Because the availability of foraging habitat has been closely tied to the breeding success of this species, projects that will significantly modify suitable Swainson's hawk foraging habitat are considered to have potential to significantly affect this species (California Department of Fish and Game 1994). However, because construction would only result in temporary disturbance to suitable foraging habitat for this species this effect is less than significant and no mitigation is needed.

In addition, Swainson's hawks are known to nest adjacent to the study area, and project construction could affect Swainson's hawk, either directly or through habitat modification. As noted in the Environmental Setting section, CNDDB has documented five Swainson's hawk nests within 0.5 mile of the study area (California Natural Diversity Database 2010). Suitable nesting habitat for Swainson's hawk occurs within the riparian forest adjacent to the depressional wetland. Another nest record was also documented in 0.5 mile north of the study area along County Road 126 at River Road (Estep Environmental Consulting 2008). Although riparian forest would not be removed for construction, some minor tree trimming may occur and active nests located within riparian areas have potential to be disturbed by construction noise. Additionally, removal of trees (unexpected) and shrubs, or other vegetation clearing, grading, or other construction activities conducted during the nesting season (generally February 1 through August 31) could remove or cause abandonment of active nests of Swainson's hawk, if present in these areas.

WSAFCA representatives coordinated with DFG representatives during a field visit in December 2009 to discuss appropriate protection measures for Swainson's hawk. As part of the project, WSAFCA will implement the following agreed upon measures:

- Install construction barrier fencing (described in Chapter 2, The Rivers EIP Alternatives) to delineate the construction area and protect sensitive resources.

- A breeding season (generally February 1-August 31) survey for nesting migratory birds will be conducted for all trees and shrubs located within 500 feet (0.25 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys will be completed during at least two of the following survey periods: January 1 to March 20, March 20 to April 5, April 5 to April 20, and June 10 to July 30 with no fewer than three surveys completed in at least two survey periods, and with at least one of these surveys occurring immediately prior (within 48 hours) to project initiation (Swainson's Hawk Technical Advisory Committee 2000). The results of the surveys will be submitted to DFG. Other migratory bird nest surveys can be conducted concurrent with Swainson's hawk surveys. If the biologist determines that the area surveyed does not contain any active migratory bird nests, construction activities, including vegetation removal or pruning of trees and shrubs, can commence without any further mitigation.
- If active nests are found, WSAFCA will maintain a 0.25-mile buffer or other distance determined appropriate through consultation with DFG, between construction activities and the active nest(s) until young have been determined to have fledged. In addition, a qualified biologist (experienced with raptor behavior) will be present on-site (daily) during construction activities occurring during the breeding season to watch for any signs of stress. If nesting birds are observed to exhibit agitated behavior indicating that they are experiencing stress, construction activities will cease until a qualified biologist, in consultation with DFG, determines that young have fledged the active nest.
- To avoid removing or disturbing any active Swainson's hawk nests, other special-status bird nests, or non-special-status migratory bird nests, tree and shrub removal will be conducted during the non-breeding season (generally September 1 through January 31) or after a qualified biologist determines that fledglings have left an active nest.

The implementation of these measures along with VEG-MM-2 would ensure that ensure that effects on Swainson's hawk would be avoided and therefore potential effects to this species would be less than significant.

Mitigation

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Effect WILD-5: Disturbance to Nesting Special-Status Birds and Loss of Nesting and Foraging Habitat

Several other special-status birds have potential to nest in or adjacent to the study area based on reported occurrences within a 10-mile radius. These species include white-tailed kite, northern harrier, loggerhead shrike, and purple martin.

None of these species have been confirmed to nest in the study area but are known to nest in the project vicinity. Areas of riparian forest and landscape trees adjacent to the construction area contain suitable nesting habitat for white-tailed kite and purple martin. Open grassland areas containing scattered shrubs and trees provide suitable nesting habitat for loggerhead shrike. Grasslands in the Sacramento Bypass area provide potential nesting habitat for northern harrier.

As discussed above with regard to Swainson's hawk, grasslands that provide suitable foraging habitat would be temporarily disturbed during construction but would be restored following construction and project construction would not require removal of riparian habitat or other landscape trees that may be used for nesting.

Tree trimming and shrub removal, other vegetation clearing, grading, or other construction activities conducted during the nesting season (generally February 1 through August 31) could remove or cause abandonment of active nests of special-status birds listed above. The effects would be considered significant.

WSAFCA will implement the following measures as part of the project:

- Install construction barrier fencing (described in Chapter 2, The Rivers EIP Alternatives) to delineate the construction area and protect sensitive resources.
- A breeding season (generally February 1-August 31) survey for nesting migratory birds will be conducted for all trees and shrubs located within 500 feet (0.25 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys will be completed during at least two of the following survey periods: January 1 to March 20, March 20 to April 5, April 5 to April 20, and June 10 to July 30 with no fewer than three surveys completed in at least two survey periods, and with at least one of these surveys occurring immediately prior (within 48 hours) to project initiation (Swainson's Hawk Technical Advisory Committee 2000). The results of the surveys will be submitted to DFG. Other migratory bird nest surveys can be conducted concurrent with Swainson's hawk surveys. If the biologist determines that the area surveyed does not contain any active migratory bird nests, construction activities, including vegetation removal or pruning of trees and shrubs, can commence without any further mitigation.
- If active nests are found, WSAFCA will maintain a 0.25-mile buffer for all raptors, including the Swainson's hawk, or other distance determined appropriate through consultation with DFG, between construction activities and the active nest(s) until young have been determined to have fledged. In addition, a qualified biologist (experienced with raptor behavior) will be present on-site (daily) during construction activities occurring during the breeding season to watch for any signs of stress. If nesting birds are observed to exhibit agitated behavior indicating that they are experiencing stress, construction activities will cease until a qualified biologist, in consultation with DFG, determines that young have fledged the active nest.
- To avoid removing or disturbing any active Swainson's hawk nests, other special-status bird nests, or non-special-status migratory bird nests, tree and shrub removal will be conducted during the non-breeding season (generally September 1 through January 31) or after a qualified biologist determines that fledglings have left an active nest.

Implementation of these measures and VEG-MM-2 would reduce potential effects to less than significant.

Mitigation

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Effect WILD-6: Disturbance to Western Burrowing Owl and Loss of Habitat

Burrowing owl is reported to nest adjacent to the study area. In the study area, burrowing owls have potential to nest in grasslands and unvegetated areas along the Sacramento Bypass Levee where burrows or other nesting substrates are present. Construction activities, including grading and clearing activities within and adjacent to these lands cover types, could result in nesting failure, death of nestlings, or loss of eggs. Effects on a state species of special concern and species protected under the MBTA and CFGC are considered significant. Implementation of Mitigation Measures VEG-MM-2, WILD-MM-3, and WILD-MM-4 would ensure that project activities would not result in nesting disturbance or habitat loss for this species and reduce potential effects to less than significant.

Mitigation

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-3: Conduct Preconstruction Surveys for Burrowing Owl Prior to Construction and If Present, Protect Nests through Use of Agency-Approved Protection Buffers

A preconstruction survey for burrowing owl will be completed, in accordance with DFG guidelines described in the *Staff Report on Burrowing Owl Mitigation*, prior to the start of construction. The survey area will include suitable habitat in the study area and where possible other suitable areas within 500 feet of the construction zone. Surveys will be conducted during the wintering (December 1 through January 31 recommended survey period) and nesting (April 15 through July 15 recommended survey period seasons. Surveys will be conducted from 2 hours before sunset to 1 hour after, or from 1 hour before or 2 hours after sunrise. If no burrowing owls are located during these surveys, no additional action would be warranted. However, if breeding or resident owls are located on or immediately adjacent to, the site, the following measures will be implemented.

- No burrowing owls will be evicted from burrows during the nesting season (February 1 through August 31). Eviction outside the nesting season may be permitted pending evaluation of eviction plans and receipt of formal written approval from the DFG authorizing the eviction.
- A 250-foot buffer, within which no new activity would be permissible, would be maintained between project activities and nesting burrowing owls. This protected area would remain in effect until August 31, or at the DFG's discretion and based on monitoring evidence, until the young owls are foraging independently.
- If accidental disturbance, injury, or death of owls occurs, the DFG would be notified immediately.

Mitigation Measure WILD-MM-4: Coordinate with Resource Agencies and Develop Appropriate Compensation Plan for Burrowing Owl

If a preconstruction survey finds that burrowing owls occupy a project site, and occupied habitat will be converted to unsuitable habitat, habitat compensation on off-site mitigation lands will be implemented. Habitat management lands comprising existing burrowing owl foraging and breeding habitat will be acquired and preserved. An area of 6.5 acres (the amount of land found to be necessary to sustain a pair or an individual owl) will be secured for each pair of owls or for an individual, in the case of an odd number of birds.

Where construction would only temporarily modify occupied habitat but habitat value would return to the preproject condition, compensation would not be required.

Effect WILD-7: Disturbance or Loss of Bats and Bat Roosts

Pallid bat, hoary bat, and western red bat are known to occur within the vicinity of the study and have potential to roost within riparian forest areas adjacent to the project site.

Bat roosts of special-status species and non-special-status species are highly sensitive to disturbance and are considered a sensitive resource by DFG. Construction activities such as tree removal (not expected) and trimming or construction noise could result in impacts on roosting bats, including the destruction of active roosts, the loss of individuals, or roost failure. However, riparian trees or other landscape trees will not be removed as part of the project so removal of an active bat roost is not expected to occur.

Nighttime construction activities could also disturb bats emerging from nearby roosts resulting in the disruption of foraging activities. These effects could be considered significant if the subsequent population decline was large and affected the viability of the local populations of bats. WSAFCA will install protective fencing as outlined in Section 2.5, Chapter 2, Alternatives, to protect sensitive riparian habitat. Implementation of this measure and Mitigation Measures VEG-MM-2 and WILD-MM-5, described below, would reduce this potential effect to less than significant.

Mitigation

Mitigation Measure VEG--MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-5: Conduct a Preconstruction Survey for Roosting Bats and Avoid or Mitigate for Potential Effects

Prior to any tree trimming and removal (not expected) or other construction activities, a qualified biologist will conduct a preconstruction survey to determine whether bats are present. The survey should consist of a nighttime emergence survey of suitable trees for evidence (presence of guano or urine stains) of use by bats, and it should be conducted no more than 14 days prior to construction activities. If the biologist determines that the area surveyed does not contain any active roosts, activities may commence without any further mitigation. If active roosts are found, roosting structures should be retained, and the need for a construction buffer should be determined through consultation with DFG. If avoidance is not possible, DFG may require that bats be excluded from the habitat prior to start of the breeding and/or hibernation season. Compensatory mitigation for the loss of roosting habitat also should be determined through consultation with DFG but may include the construction and installation of suitable replacement habitat on site.

Effect WILD-8: Disturbance to Nesting Non-Special-Status Migratory Birds and Loss of Nesting and Foraging Habitat

Numerous non-special-status bird species also have potential to nest in or adjacent to the study area. Examples of these include red-tailed hawk, red-shouldered hawk, great horned owl, and American kestrel.

As discussed above with regard to Swainson's hawk, grasslands that provide suitable foraging habitat would be temporarily disturbed during construction but would be restored following construction and project construction would not require removal of riparian habitat or other landscape trees that may be used for nesting.

Tree trimming and shrub removal, other vegetation clearing, grading, or other construction activities conducted during the nesting season (generally February 1 through August 31) could remove or cause abandonment of active nests of migratory birds protected under the MBTA and CFGC. The effects would be considered significant.

As part of the project, WSAFCA will implement the following agreed upon measures:

- Install construction barrier fencing (described in Chapter 2, The Rivers EIP Alternatives) to delineate the construction area and protect sensitive resources.
- A breeding season (generally February 1-August 31) survey for nesting migratory birds will be conducted for all trees and shrubs located within 500 feet (0.25 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys will be completed during at least two of the following survey periods: January 1 to March 20, March 20 to April 5, April 5 to April 20, and June 10 to July 30 with no fewer than three surveys completed in at least two survey periods, and with at least one of these surveys occurring immediately prior (within 48 hours) to project initiation (Swainson's Hawk Technical Advisory Committee 2000). The results of the surveys will be submitted to DFG. Other migratory bird nest surveys can be conducted concurrent with Swainson's hawk surveys. If the biologist determines that the area surveyed does not contain any active migratory bird nests, construction activities, including vegetation removal or pruning of trees and shrubs, can commence without any further mitigation.
- If active nests are found, WSAFCA will maintain a 0.25-mile buffer or other distance determined appropriate through consultation with DFG, between construction activities and the active nest(s) until young have been determined to have fledged. In addition, a qualified biologist (experienced with raptor behavior) will be present on-site (daily) during construction activities occurring during the breeding season to watch for any signs of stress. If nesting birds are observed to exhibit agitated behavior indicating that they are experiencing stress, construction activities will cease until a qualified biologist, in consultation with DFG, determines that young have fledged the active nest.
- To avoid removing or disturbing any active Swainson's hawk nests, other special-status bird nests, or non-special-status migratory bird nests, tree and shrub removal will be conducted during the non-breeding season (generally September 1 through January 31) or after a qualified biologist determines that fledglings have left an active nest.

Implementation of these measures and Mitigation Measure VEG-MM-2 would reduce potential effects to less than significant.

Mitigation

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Effect WILD-9: Disturbance to or Loss of Common Wildlife Species and Their Habitats

The study area contains both natural and human-influenced habitats that support numerous common species. Other common animals that could occupy the study area include terrestrial and aquatic mammals, amphibians, reptiles, and invertebrates. These species could also be affected by project construction but effects on these species would be considered less than significant because these species are not afforded protection under applicable laws, regulations, and policies described in the regulatory section. However, measures prescribed for special-status species would generally serve to protect other common species.

Effect WILD-10: Disruption of Wildlife Movement Corridors

In the study area, the Sacramento Bypass Levee may act as a movement corridor for wildlife. During construction of levee improvements, movement through the project site would be temporarily impeded by the placement of physical barriers (fencing) used to protect resources outside of the construction footprint but movement would be restored to the pre-project condition following construction. Therefore, disruption of movement through the project site is less than significant, and no mitigation is needed.

Effect WILD-11: Conflict with Provisions of an Adopted HCP/NCCP or other Approved Local, Regional or State Habitat Conservation Plan

There is no adopted habitat conservation plan or natural communities conservation plan applicable to the CHP Academy EIP project site area. There are three plans under development in the region or project area, but not yet formally adopted, and one adopted plan in the region. The plans under development are the Yolo County Natural Community/Habitat Conservation Plan (NCCP/HCP), the South Sacramento HCP, and the Bay Delta NCCP. To the north of the project site, the adopted Natomas Basin HCP/NCCP applies to a 53,537 acre area in the northern portion of Sacramento County and the southern portion of Sutter County. The Natomas Basin HCP covers 22 listed, candidate and other species, and sets forth biological goals and objectives for wetland species/habitat and upland species/habitat within the NBHCP plan area. Its primary biological goal is to create a system of reserves, with both wetland and upland components, that would support a viable population of giant garter snake, Swainson's hawk and other covered species, with a primary focus on preservation efforts for giant garter snake and Swainson's hawk. Species with the potential to occur in the CHP Academy EIP project area that are covered in the NBHCP are bank swallow, burrowing owl, loggerhead shrike, Swainson's hawk, tricolored blackbird, white-faced ibis, giant garter snake, and valley elderberry long horn beetle. The CHP Academy EIP project site is geographically outside of the plan area for the NBHCP; nonetheless, the CHP Academy EIP will not result in any significant effects or loss of habitat for species covered by the NBHCP. In addition, through consultation with USFWS, NMFS and CDFG, WSAFCA has committed to avoidance and minimization measures for the protection of these species similar to those set forth in the NBHCP. Therefore, the CHP Academy EIP would not conflict with the provisions set forth in the NBHCP and there is no effect.

3.9.4.3 CHP Academy Alternative B

With respect to wildlife resources, the construction corridor and construction-related effects associated with CHP Academy Alternative B are the same as those described above for the CHP Academy APA. Effects discussions and mitigation measures for CHP Academy Alternative B would be the same as those described for CHP Academy APA. In the interest of brevity, the text and table are not repeated here.

Section 3.10
Land Use and Agriculture—
CHP Academy Early Implementation Project

3.10.1 Introduction

This section describes the affected environment for land use and agriculture, including the regulatory setting associated with land use and agriculture, effects on land use and agriculture that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- *City of West Sacramento General Plan* (City of West Sacramento 2004)
- *Yolo County General Plan* (Yolo County 1983)
- California Department of Conservation resource files

3.10.2 Affected Environment

This section describes the affected environment for land use and agriculture in the CHP Academy EIP project area, including the regulatory and environmental setting.

3.10.2.1 Regulatory Environment

3.10.2.1.1 Federal

The following Federal policies related to land use and agriculture may apply to implementation of the CHP Academy EIP.

Farmland Protection Policy Act

A National Agricultural Land Study conducted in the early 1980s found that millions of acres of farmland were being converted to other uses each year in the United States. As a result, a need for Congress to implement programs and policies to protect farmland was identified. Congress then passed the Agriculture and Food Act of 1981, which contained the Farmland Protection Policy Act (FPPA). The purpose of the FPPA is to minimize the extent to which Federal programs contribute to the irreversible conversion of farmland to non-agricultural uses, and to ensure that Federal programs are administered in a manner that will be compatible with state, local, Federal, and private programs and policies to protect farmland. For the purpose of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be used currently for agriculture. These lands may contain forest land, pasture land, cropland, or other land but may not have water or urban built-up land.

Farmland Designations

The purpose of the Farmland Mapping and Monitoring Program (FMMP) farmland designations is to provide consistent and impartial data to decision makers for use in assessing the status, reviewing trends, and planning for the future of agricultural land resources in California; however, the program is not responsible for regulating farmland. FMMP rates agricultural land according to soil quality and irrigation status and updates maps every 2 years. Farmland designations are discussed below.

Prime Farmland

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion.

Unique Farmland

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops such as, citrus, tree nuts, olives, cranberries, fruits, and vegetables.

Farmland of Statewide Importance

Farmland of statewide importance is land of statewide or local importance identified by state or local agencies for agricultural use, but not of national significance.

3.10.2.1.2 State

The following state policies related to land use and agriculture may apply to implementation of the CHP Academy EIP.

Williamson Act

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agriculture or related open space use. In return, landowners receive property tax assessments that are much lower than normal because they are based on farming and open space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the state via the Open Space Subvention Act of 1971.

The Williamson Act was amended in August 1998 to establish Farmland Security Zones. Under this Farm Bureau–sponsored Super Williamson Act, landowners can receive an additional 35% reduction in the land's value for property tax purposes. This additional tax reduction can be earned only if farmers and ranchers keep their property in the conservation program for at least 20 years. Farmland Security Zone contracts are comparable to the Williamson Act contracts in that each year another year is added to the agreement unless the landowner or county does not renew the contract. The legislation prohibits the annexation of land enrolled in a 20-year contract to a city, or a special district that provides non-agricultural services, or for use as a public school site.

Of California's 58 counties, 52 have adopted the Williamson Act program. Yolo County is included in those that have adopted the act. The location of these lands in the project vicinity is discussed in the Environmental Setting that follows.

3.10.2.1.3 Local

The following local policies related to land use and agriculture may apply to implementation of the CHP Academy EIP.

Delta Protection Commission

The Delta Protection Act of 1992 created the Delta Protection Commission, which seeks to adaptively protect, maintain, and wherever possible, enhance and restore the overall quality of the Delta environment consistent with the Delta Protection Act. The Commission's goal is to guide orderly, balanced conservation and development of land resources in the Delta, and to improve flood protection.

The Commission divided the Delta area into a primary zone and a secondary zone. The city of West Sacramento is in the secondary zone, and parts of the Yolo Bypass are in the primary zone. Within the primary zone, standards limit uses and practices that could affect the beneficial uses of the Delta. Local county general plans all designate the primary zone primarily for agriculture; however, recreation, wildlife habitat, and nature preserves are approved on agriculture-zoned lands.

The secondary zone of the Delta surrounds the primary zone. The area of the city that lies south of the main line is within the secondary zone. While no standards affect the secondary zone, development within these areas is coordinated with and monitored by the Delta Protection Commission.

Yolo County General Plan

The *Yolo County General Plan* defines land use and zoning goals and policies for the county. The following project-related policies are included in the general plan.

Goals

- **AG-1:** Conserve and preserve agricultural lands in Yolo County, especially areas currently farmed or having prime agricultural soils and outside existing planned communities and city limits.
- **AG-3:** Ensure the compatibility of land uses adjacent to agricultural operations, so that agricultural productivity is not substantially affected.
- **AG-6:** Provide opportunities for recreation, tourism and associated support services in appropriate locations.

Policies

- **AP-1:** Land uses in areas designated for agricultural use shall be limited to those directly related to agricultural production or support of agriculture.
- **AP-2:** The County shall utilize an Agricultural Conservation Easement Program to help protect and preserve agricultural lands, as defined in this Element. This program shall require payment of an in-lieu fee sufficient to purchase a farmland conservation easement, farmland deed restriction, or other farmland conservation mechanism as a condition of approval for conversion of agricultural land to non-agricultural use. The in–lieu fee or other conservation mechanism shall recognize the importance of land value and shall require equivalent mitigation. This may include the use of a variable standard that requires a commitment to preserve fewer acres if the

land to be preserved is threatened by development and a greater number of acres to be preserved if the land to be preserved is removed from development pressures.

- **AP-5:** Yolo County shall actively maintain the Williamson Act Land Conservation (Agricultural Preserve) program.

City of West Sacramento General Plan

Land use and development in the study area are guided primarily by the *City of West Sacramento General Plan*. The general plan defines land use and zoning categories for the incorporated areas and provides an inventory of existing land uses in the city. The following policies and goals are included in the general plan.

Natural Resources

- **Goal B:** To promote the economic viability of agriculture in West Sacramento and to discourage premature development of agricultural land with non-agricultural uses, while providing for urban needs.
- **Policy 3:** The City shall encourage the County of Yolo to retain agricultural uses on lands adjacent to the city.

The general plan also includes land use standards for zoning purposes.

3.10.2.2 Environmental Setting

This section discusses the environmental setting related to land use and agriculture in the CHP Academy EIP project area.

The CHP Academy lies directly south of the Sacramento Bypass Levee, and directly east of the Sacramento River North Levee. The academy has a gymnasium, auditorium, quarter-mile track, obstacle course, jogging trails, dormitories, classrooms, a large water safety tank, an indoor and outdoor shooting range, and a driving track. The academy trains cadets and provides specialized departmental training courses for other law enforcement agencies (California Highway Patrol 2008). The City of West Sacramento has zoned this area as public-quasi public (City of West Sacramento 2009). The CHP Academy is the only employer that has facilities within, or adjacent to, the project site.

The Sacramento Bypass Wildlife Area lies north of the project site, in Yolo County and outside the city limits of West Sacramento. The area is owned by the California Department of Fish and Game (DFG). The 360–acre area is an important cover and feeding area for wildlife during late fall, winter, and early spring. The Sacramento Bypass receives overflow from the Sacramento River during periods of high precipitation. Hunting is allowed between September 1 and January 31. Fishing, hunting, and bird watching are also allowed (California Department of Fish and Game 2008).

The section of land located in the northeast corner of the project area is designated for agricultural use; however, it is not currently being used for that purpose. Additionally, it is not considered to be prime farmland, unique farmland, or farmland of statewide importance. The parcel of land is not part of a Williamson Act contract.

3.10.3 Environmental Consequences

This section describes the environmental consequences relating to land use and agriculture for the CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.10.3.1 Assessment Methods

This evaluation of land use and agriculture is based on a review of the regulatory setting above, review of the project in regard to compliance with Federal, state and local land use plans and regulations, and field observations. Key effects were identified and evaluated based on the environmental characteristics of the CHP Academy EIP project area and the magnitude, intensity, and duration of activities related to the construction and operation of this project.

3.10.3.2 Determination of Effects

For this analysis, an effect pertaining to land use and agriculture was analyzed under NEPA and CEQA if it would result in any of the following environmental effects, which are based on NEPA standards, State CEQA Guidelines Appendix G (14 CCR 15000 *et seq.*), and standards of professional practice.

3.10.3.2.1 Land Use

For the purposes of this analysis, effects on land use are considered significant if implementation of the proposed project would:

- physically divide an established community;
- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect; or
- conflict with any applicable habitat conservation plan or natural community conservation plan.

3.10.3.2.2 Agriculture

For the purposes of this analysis, effects on agriculture are considered significant if implementation of the proposed project would:

- convert prime farmland, unique farmland, or farmland of statewide importance;
- conflict with existing zoning for agricultural use, or a Williamson Act contract; or
- involve other changes in the existing environment, which because of their location or nature, could result in conversion of farmland to non-agricultural use.

The project would be considered to have a significant effect on important farmland (i.e., prime farmland, unique farmland, farmland of statewide importance) if it would result in an irretrievable conversion of a substantial acreage of such land. An irretrievable conversion is one that involves the conversion of land to uses that would cause serious degradation of the quality of soils and/or result in expenditures of substantial development costs that likely would preclude the practicality of future conversion back to agriculture. Implementation of the project would not physically divide an established community. There would be no conflict with any applicable habitat conservation plan or natural community conservation plan. The Yolo Natural Heritage Program is currently developing natural community conservation plan (NCCP) and habitat conservation plan (HCP), but has not formally released or adopted a program within the study area. Additionally, there would be no conflict with a Williamson Act contract because no Williamson Act lands are located within the study area. Therefore, the first, third, and fifth criteria do not apply to the project and are not considered further.

3.10.4 Effects and Mitigation Measures

3.10.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection.

Given levee conditions, the risk of levee failure at the CHP Academy EIP would continue under the No Action Alternative. A flood event could have severe ramifications for agriculture and land use in West Sacramento. Flooding may cause inundation, erosion, or sedimentation from high flows, destruction, or damage to agricultural equipment, outbuildings and processing facilities, all of which could lead to reduction in agricultural productivity. This damage may cause depression of the agricultural economy and cause abandonment of or prolonged delay in cultivation of productive lands, which could ultimately result in a change in the use of these lands that may be difficult to reverse.

Similarly, levee failure could significantly change the land uses in urban areas, both temporarily and permanently, and result in the physical division of established communities. A period of months or years would be required for clean-up and repair after a large flood event, during which time the affected parcels would be temporarily unable to support their designated land uses. Damages sustained by residential, commercial, civic, and industrial areas inundated by flooding could be so great as to render the properties permanently unusable. Additionally, the cost of cleanup and repair after flooding could be too great to make restoring the current land use worthwhile, resulting in permanent changes to land use in West Sacramento and potential division of established communities.

If the CHP Academy were inoperable for any length of time due to flood inundation, safety services could be compromised in the city and surrounding areas for an undefined period of time.

3.10.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effect on land use and agriculture. A description of this effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect LU-1: Temporary Changes in Land Uses to Accommodate Construction	Less than significant	N/A	N/A

Effect LU-1: Temporary Changes in Land Uses to Accommodate Construction

During construction of the CHP Academy APA, a staging area to house construction equipment and materials would be necessary (see Figure 2-4 for the location of the staging area). Temporary earthen ramps would also be constructed to allow equipment in the bypass to facilitate access between the levee crown and staging area. The area to be used for construction staging and stockpiling is located in the Sacramento Bypass and is currently subject to open space use, and the construction and access areas are located on lands zoned Public/Quasi-Public by the City of West Sacramento (Figure 3.10-1). These lands are not heavily used and will be returned to their original uses following the completion of construction. Thus, the CHP Academy APA would not result in significant effects on land use as a result of temporary land use changes. This effect is considered less than significant. No mitigation is required.

3.10.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effect on land use and agriculture. A description of this effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect LU-1: Temporary Changes in Land Uses to Accommodate Construction	Less than significant	N/A	N/A

Effect LU-1: Temporary Changes in Land Uses to Accommodate Construction

This effect would be the same as described above under the CHP Academy APA. This effect is considered less than significant. No mitigation is required.

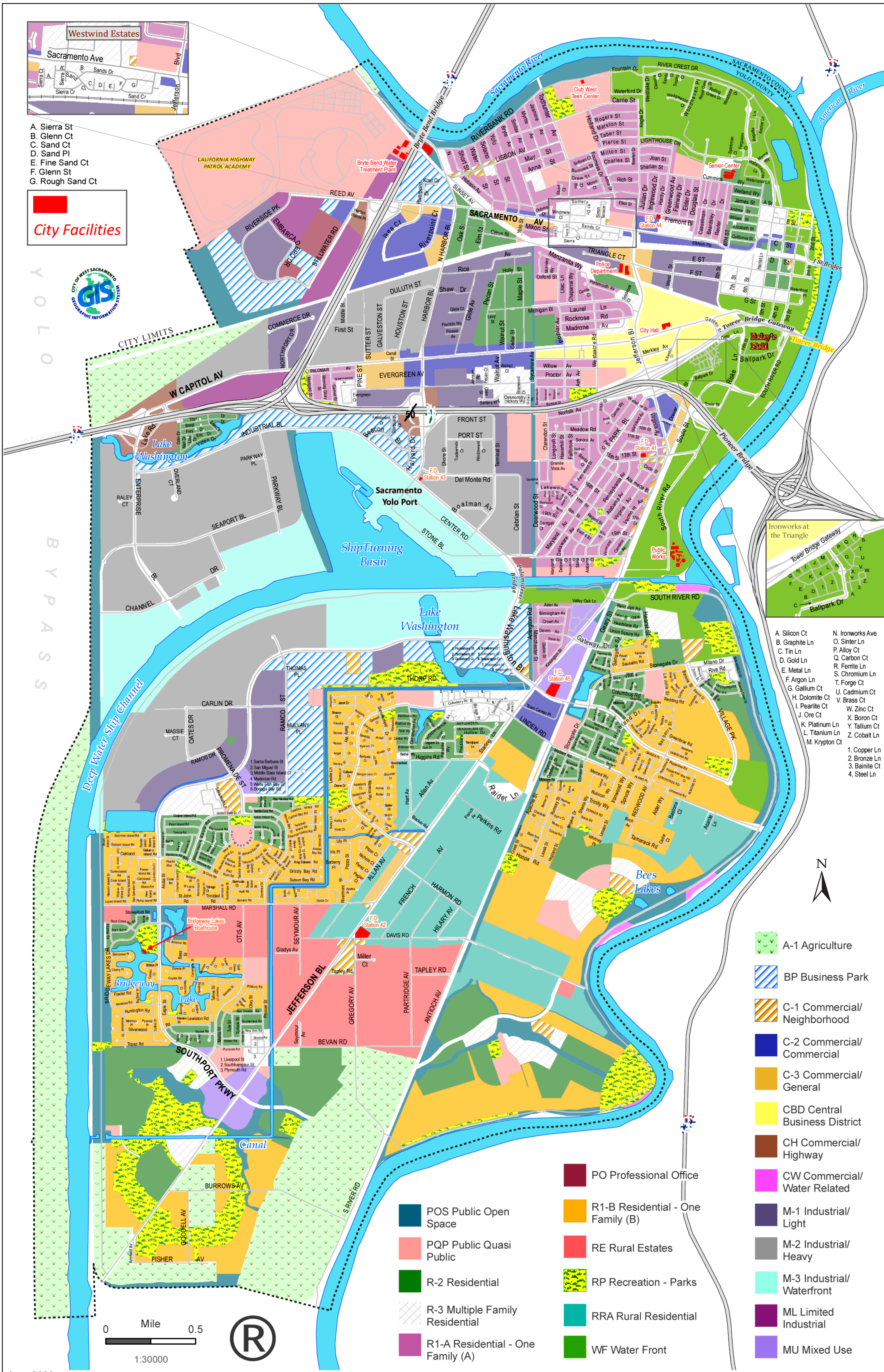

Figure 3.10-1
City of West Sacramento Zoning Map

Section 3.11
Socioeconomic and Community Effects—CHP Academy Early Implementation Project

3.11.1 Introduction

This section describes the affected environment socioeconomic and community conditions, including the regulatory setting associated with employment, agricultural production, population, and housing; the effects on socioeconomic and community conditions that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- California Department of Finance City/County Population and Housing Estimates (California Department of Finance 2009a, 2009b, 2009c)
- California Department of Water Resources Land Use Survey (California Department of Water Resources 1997)
- California Employment Development Department El Dorado, Placer, Sacramento, Sutter, Yolo, Yuba, and Solano County Local Area Profiles (California Employment Development Department 2009a, b, c, d, e, f, and g)
- *City of West Sacramento General Plan Policy Document* (City of West Sacramento 2004)
- *City of West Sacramento General Plan Background Document* (City of West Sacramento 2000)
- U.S. Census Bureau QuickFacts (U.S. Census Bureau 2009a, 2009b, 2009c)
- *Yolo County 2008 Agricultural Crop Report* (Yolo County Department of Agriculture 2008)

3.11.2 Affected Environment

This section describes the affected environment for socioeconomic and community effects in the CHP Academy EIP project area, including regulatory and environmental settings.

3.11.2.1 Regulatory Setting

3.11.2.1.1 State

The following state policies related to socioeconomics and the community may apply to the implementation of the CHP Academy EIP.

General Plans

State law requires each city and county to adopt a general plan for its future growth. This plan must include a housing element that identifies housing needs for all economic segments and provides opportunities for housing development to meet those needs. At the state level, the Housing and

Community Development Department estimates the relative share of California's projected population growth that will occur in each county presented by the Department of Finance's demographic research unit.

Each city and county must update its general plan housing element on a regular basis (usually every 5 years). Among other things, the housing element must incorporate policies and identify potential sites that would accommodate the city's and county's share of the regional housing need. Prior to adopting a general plan update for housing, the city or county must submit the draft to the Housing and Community Development Department for its review. The Housing and Community Development Department will take action to advise the local jurisdiction whether its housing element complies with provisions of California Housing Element Law. The *City of West Sacramento General Plan Housing Element* was last updated in 1992, but is currently undergoing an update process.

3.11.2.1.2 Local

The following local policies related to socioeconomics and the community may apply to the implementation of the CHP Academy EIP.

City of West Sacramento General Plan

The *City of West Sacramento General Plan* was adopted by the City in 1990. Although the 1990 general plan contains policies related to housing and economics, these policies are out of date in light of the significant amount of development that has occurred over the past 20 years. The City is in the process of updating the general plan, which is expected to be complete in 2009. The new general plan will guide the city's growth through 2030. The *General Plan Issues and Opportunities Report*, published in June 2008, identified the following areas of focus related to housing and economics:

- designating higher densities at appropriate locations to support transit,
- promoting mixed-use development,
- maintaining rural residential land in the southern area,
- promoting tourism,
- increasing the number of good-paying jobs (especially in Southport), and
- addressing telecommunication infrastructure.

3.11.2.2 Environmental Setting

This section discusses the environmental setting related to socioeconomic and community effects in Yolo County, the City of West Sacramento area, and more specifically, the CHP Academy EIP project area.

3.11.2.2.1 Yolo County

Employment

With its affordable housing and land and its easy access to highway, rail, water, and air transportation, Yolo County has an attractive business climate. The primary business sectors are government; professional and business services; transportation, warehousing, and utilities; and agriculture (LSA Associates, Inc. 2009). The largest employers in the county are the University of California Davis, Cache Creek Casino Resort, the U.S. Postal Service, and the State of California (Yolo County 2009). Total retail taxable sales in the county in 2007 were $3,259,843,000 (California Employment Development Department 2009e).

Yolo County has a population of 200,709 (California Department of Finance 2009a). The labor force is 98,200, with 87,900 people employed and 10,300 unemployed; an unemployment rate of 10.5% (California Employment Development Department 2009e). The median household income is $55,988 and the per capita income is $19,365 (U.S. Census Bureau 2009a).

Agricultural Production

Yolo County has a long agricultural heritage and, as recently as its current general plan update, has historically set policies that preserve agriculture. Almost 99% of the county's unincorporated land (621,224 acres) is designated for agricultural use (Yolo County 2008). The 2008 Yolo County Agricultural Crop Report indicates that Yolo County's total agricultural production in 2008 was $527,330,803. This is an increase of more than 16% over 2007 yields. The top- producing crops were tomatoes, alfalfa, rice, wine grapes, and seed crops (Table 3.11-1). It should be noted that these figures represent crop values only, and do not take into account other agricultural contributions to the economy such as field labor, processing, transport, marketing, and other services. When these factors are also considered, agriculture contributes over $1.5 billion to the Yolo County economy. (Yolo County Department of Agriculture 2008)

Table 3.11-1. Crop Yields and Values for Top-Producing Crops (and Corn and Grain) in Yolo County, 2008

	Total Tonnage Produced	Value per Ton	Total
Alfalfa	387,896	$189.24	$73,405,515
Corn (field)	44,730	$152.19	$6,807,486
Grain	53,969	$179.11	$9,666,518
Rice	105,104	$521.32	$54,792.829*
Rice, wild	3,415	$1,684.17	$5,751,816
Tomatoes	1,528,882	$68.76	$105,124,614
Wine grapes (black)	17,333	$597.72	$10,360.047
Wine grapes (white)	60,069	$526.83	$31,645,542
Seed crops (total)	24,135	Not available	$31,952,413

Source: Yolo County Department of Agriculture 2008
* Includes Federal rice payment

The Sacramento Area Council of Governments envisions that, because of its commitment to agriculture and natural resources, Yolo County will grow at a slower rate compared to the rest of the region. Local retail and office jobs will expand, while industrial jobs will decline (Sacramento Area Council of Governments 2004).

3.11.2.2.2 West Sacramento

Employment

West Sacramento attracts business with an accessible and cooperative government; access to multi-modal transportation (highway, rail, and port); a regional workforce of over one million people; and low business costs (City of West Sacramento Economic Development 2009). The city's economy is moving from a climate that was historically focused the on the transportation and warehouse sectors toward newer industries such as biotech, green energy, and green technology (Mintier & Associates 2008). West Sacramento had an 89% employment growth rate between 1990 and 1999, which is the third highest growth rate of any city in the Sacramento region (City of West Sacramento Economic Development 2009). The top employers are the United Parcel Service, the U.S. Postal Service, Nor-Cal Beverage, and Raleys/Bel Air. The City is targeting the following industries in its *City of West Sacramento General Plan Update* (Mintier & Associates 2008):

- biotechnology/life sciences,
- clean energy and green technology,
- food processing,
- manufacturing,
- retail, and
- small business.

The city's retail business greatly expanded over the last 4 years with the store openings of IKEA, Wal-Mart, Target, Home Depot, Lowe's, and Nugget Market. West Sacramento now has a higher sales-to-income ratio than surrounding communities and the region as a whole (Mintier & Associates 2008). Table 3.11-2 shows West Sacramento's largest private employers.

The Sacramento Area County of Governments envisions that West Sacramento will be the fastest growing city in the region because of its proximity to Sacramento's urban core and many opportunities for reinvestment. Major job growth will be in the retail and office sectors, with less growth in the industrial sector than in the past. (Sacramento Area Council of Governments 2004)

Table 3.11-2. West Sacramento's Largest Private Employers

Company Name	
United Parcel Service (UPS)	All Phase Security, Inc.
U.S. Postal Service	Bytheways Manufacturing Inc.
Nor-Cal Beverage	Clark Pacific
Raley's/Bel Air	Hunter Douglas
Fed-Ex Freight West, Inc.	Siemens Healthcare Diagnostics
Xyratex International	KOVR TV 13
C & S Wholesale Grocers	Idexx Veterinary Services
First Health Group Corporation	Capital Coors Company
Wal Mart	Consolidated Procurement Services
Prologix Distribution Services	Farmer's Rice Cooperative

Company Name	
Tony's Fine Foods	IKEA
Citibank	Lowe's
Roadway Express	

The City of West Sacramento has a population of 47,782 (California Department of Finance 2009a) and employs 30,655 people (Sacramento Area Council of Governments 2008a). The unemployment rate is 9.5% (California Employment Development Department 2009e). The median household income is $31,718 and the per capita income is $15,245 (U.S. Census Bureau 2009b).

Agricultural Production

The *City of West Sacramento General Plan* designates two areas within the city as agricultural: the area of Southport generally south of Bevan Road and a small part of the Yolo Bypass at the western edge of the city, immediately north of West Capitol Avenue and south of the Southern Pacific tracks (LSA Associates 2009). These areas, in addition to areas with other general plan designations, are currently used for farming (California Department of Water Resources 1997). A very conservative estimate of currently-farmed acreage located within the West Sacramento is 570 acres.

According to the most recently available DWR Land Use maps, the majority of the land in West Sacramento currently in agricultural production is planted in corn, grain, and alfalfa (California Department of Water Resources 1997). Alfalfa is the second highest-grossing crop in Yolo County (Table 3.11-3). Grain and corn crops are much smaller overall producers (Yolo County Department of Agriculture 2008).

Table 3.11-3. Annual Yields and Values for Crops Grown in West Sacramento

	Tonnage per Acre	Value per Ton	Value per Acre
Corn (field)	5.51	$152.19	$838.57
Grains	3.21	$179.11	$574.94
Alfalfa	6.84	$189.24	$1,294.40

Source: Yolo County Department of Agriculture 2008.

The Port of West Sacramento is an inland port that has historically served the agricultural industry. In 2005, the City of West Sacramento assumed leadership of the port and has since broadened the port's duties to include green cargo (specialized cargo that enhances the environment) (City of West Sacramento 2009a). There are thousands of jobs associated with the port and related movement of goods via truck, rail, and ship (City of West Sacramento 2009b). Due to increased worldwide demand for rice, the port expects to export about 339,000 metric tons of bagged rice this year—about double its normal capacity (The Cunningham Report 2009). President Obama's proposed 2010 Civil Works budget includes $10 million for widening the DWSC that leads to the port. Deepening the DWSC would almost double the number of fully loaded oceangoing freight ships able to access the Sacramento region (Port of West Sacramento 2009).

Population

The City of West Sacramento is the third largest city in Yolo County and is currently experiencing strong, steady growth (Yolo County 2009). The City incorporated in 1987, combining the former communities of Bryte, Broderick, West Sacramento, and Southport. Southport is home to newer residences and Bryte and Broderick have higher percentages of pre-WWII homes. The U.S. Census reports that the population in West Sacramento was 31,615 in 2000 (U.S. Census Bureau 2009b). According to the California Department of Finance the estimated population of residents in West Sacramento in January 2009 was 47,782, a 1.9% increase over 2008 and 51% increase since 2000 (California Department of Finance 2009c).

As a point of reference for the city, information about population in Yolo County is presented here. Yolo County's population is currently 200,709, an increase of 1.2% over last year (California Department of Finance 2009b), and approximately 17.2% over 2000 (U.S. Census Bureau 2009a). Over 88% of Yolo County's population lives in its four incorporated cities—West Sacramento, Davis, Woodland, and Winters. The remaining 12% live in unincorporated areas of the county (Yolo County 2008).

Housing

As the population of West Sacramento grows, the city's housing stock is growing as well. The California Department of Finance estimates that there are currently approximately18,550 total housing units in the city, which is an increase of approximately 50% over the number of housing units in 2000 (California Department of Finance 2009c; U.S. Census Bureau 2009b). An unofficial vacancy rate estimate for the city in 2009 is 5.5% (Sperling's Best Places 2009).

As a point of reference for the city, information about housing in Yolo County is presented here. The California Department of Finance estimates that there are currently approximately 73,811 housing units in Yolo County, an increase of approximately 20% over 2000 levels (California Department of Finance 2009c; U.S. Census Bureau 2009a).

3.11.2.2.3 CHP Academy EIP Project Area

No residences are located within or adjacent to the CHP Academy EIP project area and no relocation of residents would be required.

No land in agricultural production is located within or adjacent to the CHP Academy EIP project area and no disruptions to agricultural production (either temporary or permanent) would occur as a result of construction or maintenance.

A minimal amount of recreational activity presently occurs in the Sacramento Bypass Levee reach, so implementation the CHP Academy EIP would not affect recreation-related business.

3.11.3 Environmental Consequences

This section describes the analysis of effects relating to socioeconomics and the community for the CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.11.3.1 Assessment Methods

Effects on socioeconomics and the community were evaluated qualitatively based on the criteria listed below in Determination of Effects. Additionally, the CHP Academy EIP was evaluated for consistency with relevant local plans and policies at the Federal, state and local level.

3.11.3.2 Determinations of Effects

For this analysis, an effect pertaining to socioeconomics or the community was analyzed under NEPA and CEQA if it would result in any of the following environmental effects, which are based on NEPA standards, State CEQA Guidelines Appendix G (14 CCR 15000 et seq.), and standards of professional practice:

- a substantial change in employment;
- inducement of substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure); or
- displacement of substantial numbers of existing housing or people, necessitating the construction of replacement housing elsewhere.

3.11.4 Effects and Mitigation Measures

3.11.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to socioeconomics or the community would occur and there would be no changes in existing population or employment, except for the changes currently planned for in the appropriate local and state planning documents. Therefore, there would be no effect on this resource under the No Action Alternative.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability/geometry issues would continue. Should a levee failure and associated flooding occur, there could be widespread temporary and permanent displacement of residents. Damages suffered from flooding could lead to the long-term disruption of industrial, agricultural, and retail economic activities within the city of West Sacramento. Dependent on the degree of damage caused, disruption of activities could lead to a reduction in employment and short- to long-term depressed economic conditions resulting from damage to industrial, retail, and agricultural facilities and major transportation facilities that support their activities. These effects are explored in more detail below.

Levee failure at the CHP Academy EIP site and subsequent flooding of the city of West Sacramento would affect the entire city, causing substantial damage to structures, contents, and other property such as landscaping and automobiles. A population of 40,439 lives in 15,448 housing units within the city (Sacramento Area Council of Governments 2008b and 2008c). All of these residents could be displaced by a catastrophic flood event. Additionally, the city is home to 30,655 jobs (Sacramento Area Council of Governments 2008a), 734 commercial and industrial structures, 46 public structures and 27 park facilities, all of which would be affected by a flood event (HDR, Inc. 2009). Agricultural operations could also sustain major damage in a flood event; 22.6% of the land area within the city is either farmland or open space (City of West Sacramento 2009c).

During the recovery period after a flood event, West Sacramento residents would require temporary housing, and displacement of many or all occupants would occur while levees, buildings, and other infrastructure were repaired. Businesses, social services, and other employers occupying affected structures would be forced to relocate. The potential number of displaced residents throughout the city (more than 40,000) and businesses (more than 30,000 jobs) is so large that the demand for temporary quarters would likely exceed the available supply of vacant buildings surrounding the West Sacramento area. Thus, many displaced residents and businesses may be forced to relocate to areas a considerable distance from West Sacramento, resulting in substantial intermediate-term and long-term economic impacts to the West Sacramento area. These impacts include changes in employment numbers and patterns, changes in business and personal incomes, changes in tax revenues, and changes in regional economic activity.

A flood event in West Sacramento would also disrupt state and interstate highway, rail, and shipping traffic, causing long-term effects on the region’s and the state’s economy. West Sacramento has one of the most comprehensive transportation networks on the west coast. Its central geographic location and extensive north-south and east-west highway access has made it a major distribution center. High volumes of truck traffic pass through the city on I-80 and US 50/Business 80 every day, with truck traffic transporting approximately $63 billion worth of cargo annually through West Sacramento (HDR, Inc. 2009). Major transcontinental rail lines passing through the city provide commercial and passenger rail service to all parts of the nation, and the Port of West Sacramento runs domestic and international shipping services (City of West Sacramento 2009). Approximately 9.3 million tons of rail freight valued at approximately $5 billion travels through West Sacramento annually (HDR, Inc. 2009). Flooding of this transportation and distribution infrastructure would cut off major statewide and interstate commerce corridors and cause severe statewide economic effects.

These flood-related effects on population, housing, and socioeconomic conditions would be significant. Post-flooding conditions could result in short-term increases in employment for post-flooding cleanup and restoration activities, but these increases would likely not offset the potential losses.

3.11.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effect on socioeconomics. A description of this effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect SOC-1: Temporary Increase in Employment in the Region during Construction	Beneficial	N/A	N/A

Effect SOC-1: Temporary Increase in Employment in the Region during Construction

Construction activities associated with implementation of the CHP Academy EIP would temporarily increase employment and personal income in the local area. Preliminary cost estimates anticipate that total construction-related expenditures associated with the CHP Academy APA would be approximately$5 million to $10 million (Vecchio pers. comm.), occurring in 2011. This is an estimate of direct costs only, and does not include indirect/induced changes in employment and personal income resulting from project construction. Project construction would benefit the local economy by temporarily increasing employment and personal income, although the increase in employment is not considered substantial when compared to total employment within the region. This effect on employment, however, would be beneficial.

3.11.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effect on socioeconomics. A description of this effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect SOC-1: Temporary Increase in Employment in the Region during Construction	Beneficial	N/A	N/A

Effect SOC-1: Temporary Increase in Employment in the Region during Construction

Construction-related expenditures and employment estimates associated with CHP Alternative B have not been calculated, but are anticipated to be similar to the numbers presented for the CHP Academy APA. Project construction would benefit the local economy by temporarily increasing employment and personal income, although the increase in employment is not considered substantial when compared to total employment within the region. This effect on employment, however, would be beneficial.

Section 3.12
Environmental Justice— CHP Academy Early Implementation Project

3.12.1 Introduction

This section describes the regulatory and environmental setting for environmental justice, effects on low-income and minority populations that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data used in the preparation of this section are listed below.

- *City of West Sacramento General Plan Policy Document* (City of West Sacramento 1990)
- U.S. Census Bureau QuickFacts (U.S. Census Bureau 2009a, 2009b, 2009c)

3.12.2 Affected Environment

This section describes the affected environment for environmental justice in the CHP Academy EIP project area, including regulatory and environmental settings.

3.12.2.1 Regulatory Environment

3.12.2.1.1 Federal

The following Federal policy related to environmental justice may apply to the implementation of the CHP Academy EIP.

Executive Order 12898: Environmental Justice

Federal Executive Order 12898, Environmental Justice, requires that, to the greatest extent practicable and permitted by law, "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Executive Order 12898 charges each cabinet department to "make achieving environmental justice part of its mission," with the U.S. Environmental Protection Agency (EPA) responsible for implementation of Executive Order 12898. The Council of Environmental Quality (CEQ) has oversight of the Federal government's compliance with Executive Order 12898 and NEPA.

3.12.2.1.2 State

Following the lead of Executive Order 12898, the State of California passed a series of environmental justice regulations in 2001. These laws define environmental justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."

3.12.2.2 Environmental Setting

This section discusses the environmental setting related to environmental justice in the CHP Academy EIP project area.

3.12.2.2.1 Study Area

The study area is in the city of West Sacramento, in Yolo County. For comparison, the same demographic information presented for West Sacramento is also presented for Yolo County and the State of California.

3.12.2.2.2 Demographics

Local Setting

In 2000, Caucasians and Asians made up the largest two populations in the state, accounting for 59.5% and 10.9% of the population, respectively, while 16.8% of respondents claimed "other race." Those of Hispanic origin made up 32.4%, almost one-third of the State's population (U.S. Census 2008).

The Federal government considers race and Hispanic origin to be two separate and distinct concepts. The Federal Office of Management and Budget's (OMB) standards for data on race generally reflect social definition recognized in this country, and do not conform to any biological, anthropological or genetic criteria. According to the revised OMB standards, race is considered a separate concept from Hispanic origin (ethnicity). For Census 2000, the questions on race and Hispanic origin were asked of every individual living in the United States. People who identify their origin as Spanish, Hispanic, or Latino may be of any race.

In 2000, Caucasians and Asians made up the largest two populations in Yolo County, accounting for 67.7and 9.9% respectively, while 13.8% of respondents claimed "other race." Those of Hispanic origin made up 25.9% of Yolo County (U.S. Census 2008).

In 2000, Caucasians and Asians made up the largest two populations in the city of West Sacramento accounting for 65% and 7.2% of the population respectively, while 16% claimed "other race." Those of Hispanic origin made up 30% of the city (U.S. Census 2008). Table 3.12-1 compares data regarding race in the study area in 2000 and 2005. Table 3.12-2 compares the household poverty status by city, county, and state.

Table 3.12-1. Race/Origin Characteristics by City/County/State, 2000 and 2005

	2000			2005		
	City of West Sacramento (percentage)	Yolo County (percentage)	State of California (percentage)	City of West Sacramento (percentage)	Yolo County (percentage)	State of California (percentage)
Race						
White	65.0	67.7	59.5	65.0	67	59.5
Black or African American	2.6	2	6.7	2.6	2	6.7
American Indian and Alaska Native	1.8	1.2	1.0	1.8	1	1.0
Asian	7.2	9.9	10.9	7.2	11	10.9
Native Hawaiian, other Pacific Islander	0.6	0.3	0.3	0.6	0.08	0.3
Some Other Race	16.0	13.8	16.8	16.0	12	16.8
Two or more races	6.9	5.2	4.7	6.9	5	4.7
Origin						
Hispanic	30.0	25.9	32.4	30.0	27.8	32.4

Source: U.S. Census Bureau 2000 and 2005 American Community Survey

Table 3.12-2. Household Poverty Status by City/County/State, 2000

City	City of West Sacramento	Yolo County	State of California
Percent below poverty level	22.3	18.4	14.2

Source: U.S. Census Bureau 2000; California Employment Development Department 2000

3.12.3 Environmental Consequences

This section describes the environmental consequences relating to environmental justice for the proposed CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.12.3.1 Assessment Methods

The following methodology is based on EPA's Environmental Justice Guidance (U.S. Environmental Protection Agency 1998), which states that "Minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of analysis." As such, demographic data for the City of West Sacramento in the local setting and in Yolo County in the regional setting were compared to demographic data from the next highest unit of analysis, the State of California, to determine whether that specific area had a "meaningfully greater" percentage of minority or low-income population.

Demographic information was gathered for the city, county and state level. Proposed environmental justice effects were analyzed by comparing census data from the local setting and regional setting with data for the State of California. Data were primarily collected from the U.S. Census Bureau 2000 Census and 2005 Census. The population data that are pertinent to the analysis of environmental justice include race, income, and age characteristics such as:

- the percent of minority population (Black or African American, American Indian and Alaskan Native, Asian, Native Hawaiian and Other Pacific Islander, some other race, and two or more races);
- the percent of persons of Hispanic origin;
- the percent of population below the poverty level; and
- the percent of population residing below the U.S. Census Bureau poverty threshold, defined as a single person with an income below $8,840, or a family of four with an income below $16,588.

The environmental justice effects of the proposed project were analyzed by comparing census data from the local setting and regional setting with data for the State of California.

3.12.3.2 Determination of Effects

Effects pertaining to environmental justice were considered significant if the proposed project would result in a disproportionate effect on minority or low-income communities.

3.12.4 Effects and Mitigation Measures

3.12.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection.

Given levee conditions, under the No Action Alternative levee failure and subsequent flooding and inundation could temporarily or permanently displace residents over a wide area. Flood depth calculations prepared for the City of West Sacramento show that low-income and minority neighborhoods would not be disproportionately affected by flood inundation (PB 2007). Flooding could also result in temporary or long-term decreases in agricultural, industrial, and other economic enterprise in the city of West Sacramento that could result in a loss of jobs. However, this would likely affect populations of all income and ethnic classifications and would not result in a disproportionately high or significant effect on minority or low-income populations.

3.12.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effect on environmental justice. A description of this effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect EJ-1: Disproportionate Effect on Minority or Low-Income Populations	No effect	N/A	

Effect EJ-1: Disproportionate Effect on Minority or Low-Income Populations

The CHP Academy APA would reduce the risk of flooding to existing residential, commercial, and industrial development in the WSAFCA service area. While there are low-income and minority populations present throughout the study area, the flood protection benefits of the proposed project would reach all segments of the population in the city of West Sacramento.

Section 3.6, Noise, anticipates that sensitive receptors could be exposed to significant levels of temporary construction-related noise along CHP Academy APA haul routes. However, there are few residences located along Reed Avenue and Harbor Boulevard, and the residences that do exist along these routes are not disproportionately low-income or minority (U.S. Environmental Protection Agency 2009). Furthermore, these noise effects would be temporary. The City of West Sacramento has identified these roads as designated haul routes in the General Plan, and no other routes may be used.

The CHP Academy APA construction area itself is not located in or near a residential area. No residents would be displaced as a result of the construction or operation of the CHP Academy APA, nor would the proposed project physically divide an established community. The CHP Academy APA would therefore not result in a significant disproportionate effect on minority or low-income populations.

3.12.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effect on environmental justice. A description of this effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect EJ-1: Disproportionate Effect on Minority or Low-Income Populations	No effect	N/A	

Effect EJ-1: Disproportionate Effect on Minority or Low-Income Populations

This effect is the same as described above under the CHP Academy APA. The CHP Academy Alternative B would not result in a significant disproportionate effect on minority or low-income populations.

Section 3.13

Visual Resources—
CHP Academy Early Implementation Project

3.13.1 Introduction

This section describes the regulatory and environmental setting for visual resources, the effects on visual resources that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- *City of West Sacramento General Plan* (City of West Sacramento 2004)
- City of West Sacramento Municipal Code
- *Sacramento Riverfront Master Plan*, July 2003
- *Yolo County General Plan*, July 1983, Open Space and Recreation Element last amended November 2002
- Zoning Regulations of the City of West Sacramento, March 2005

3.13.2 Affected Environment

This section describes the affected environment for visual resources in the CHP Academy EIP project area, including regulatory and environmental settings.

3.13.2.1 Regulatory Setting

3.13.2.1.1 Local

The following local policies related to visual resources may apply to implementation of the CHP Academy EIP.

City of West Sacramento General Plan

The *City of West Sacramento General Plan* (City of West Sacramento 1990) identifies the following goals and policies for the implementation plan.

Urban Structure and Design

- **Goal B:** To enhance the relationship between the City and the Sacramento River.
  - **Policy B1:** The City shall seek to preserve the trees and other vegetation along the banks of the Sacramento River for their aesthetic qualities and environmental and ecological values.

- **Policy B4:** The City shall promote the development of important visual and scenic areas along the riverfront, including around the barge canal, for public access, including water-related activities.

- **Goal D:** To maintain and enhance the quality of the City's landscape and streetscape.
  - **Policy D1:** The City shall endeavor to protect the tree canopy created by mature trees in existing developed areas and in newly developing areas.
  - **Policy D2:** The City shall require that all new development incorporate the planting of trees and other vegetation to extend the vegetation pattern of older adjacent neighborhoods into new development.

Yolo County General Plan

The *Yolo County General Plan* (Yolo County 1983) identifies the following goals, objectives, and policies for the implementation plan.

Scenic Highways Policies

Policy SH-5: Protection. Yolo County shall regulate and guide land uses, recreation, circulation, conservation, and open spaces and shall require retention or conservation of natural features and vegetation along both State and locally designated scenic highways.

Policy SH-6: River Roads. Yolo County shall consider designating "river roads" as designated scenic highways.

Policy SH-7: Natural Vegetation and Landscaping. Yolo County shall require retention, of existing trees and vegetation and natural landforms, and shall require landscaping to enhance scenic qualities and/or screen unsightly views, and shall implement regulations to prohibit removal of trees along public rights-of-way without consideration of their scenic or historic value, and shall implement tree conservation or enhancement in new development, with emphasis on oak preservation.

Recreation Policies

Policy REC-1: Recreation Basic. Yolo County acquires, maintains and provides a variety of park, open and natural areas for recreational and leisure pursuits at the regional, community and neighborhood level through means of California statute, established land use controls, regulations, real property transfer, and the advice, guidance and cooperation of other jurisdictions and through coordination with other elements of this general plan, as amended. It shall be the basic recreation policy of the County to: Protect and preserve as many of the County's recreational and scenic resources as possible.

Yolo County Open Space and Recreation Element

The Yolo County Open Space and Recreation Element (Yolo County 2002) of the general plan identifies the following goals, objectives, and policies for the implementation plan.

Goal OG-7: Preserve aesthetic resources and values.

Objective OO-8: Protection of identified areas of unique historical or cultural value within the county and preservation of those sites for educational, scientific and aesthetic purposes.

Objective OO-9: Identification and preservation of scenic corridors and viewsheds.

Policy OP-7: Development shall be directed away from naturally occurring riparian areas and wetlands.

3.13.2.1.2 Concepts and Terminology

Identifying a study area's visual resources and conditions involves three steps:

- Objective identification of the visual features (visual resources) of the landscape.
- Assessment of the character and quality of those resources relative to overall regional visual character.
- Determination of the importance to people, or *sensitivity*, of views of visual resources in the landscape.

Because evaluating visual effects is inherently subjective, Federal and professional standards of visual assessment methodology have been used to determine potential effects on aesthetic values of the study area (see Environmental Consequences, below). The aesthetic value of an area is a measure of its visual character and quality, combined with the viewer response to the area (Federal Highway Administration 1988). Scenic quality can best be described as the overall impression that an individual viewer retains after driving through, walking through, or flying over an area (U.S. Bureau of Land Management 1980). Viewer response is a combination of viewer exposure and viewer sensitivity. Viewer exposure is a function of the number of viewers, number of views seen, distance of the viewers, and viewing duration. Viewer sensitivity relates to the extent of the public's concern for a particular viewshed. These terms and criteria are described in detail below.

Visual Character

Natural and artificial landscape features contribute to the visual character of an area or view. Visual character is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. Urban features include those associated with landscape settlements and development, including roads, utilities, structures, earthworks, and the results of other human activities. The perception of visual character can vary significantly seasonally, even hourly, as weather, light, shadow, and elements that compose the viewshed change. The basic components used to describe visual character for most visual assessments are the elements of form, line, color, and texture of the landscape features (USDA Forest Service 1974, Federal Highway Administration 1988). The appearance of the landscape is described in terms of the dominance of each of these components.

Visual Quality

Visual quality is evaluated using the well-established approach to visual analysis adopted by Federal Highway Administration, employing the concepts of vividness, intactness, and unity (Federal Highway Administration 1988, Jones et al. 1975), which are described below.

- *Vividness* is the visual power or memorableness of landscape components as they combine in striking and distinctive visual patterns.
- *Intactness* is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, and in natural settings.

- *Unity* is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the landscape.

Visual quality is evaluated based on the relative degree of vividness, intactness, and unity, as modified by the visual sensitivity of the viewers. High-quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

Viewer Exposure and Sensitivity

The measure of the quality of a view must be tempered by the overall sensitivity of the viewer. Viewer sensitivity or concern is based on the visibility of resources in the landscape, proximity of viewers to the visual resource, elevation of viewers relative to the visual resource, frequency and duration of views, number of viewers, and type and expectations of individuals and viewer groups.

The importance of a view is related in part to the position of the viewer relative to the resource; therefore, visibility and visual dominance of landscape elements depend on their placement within the viewshed. A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail) (Federal Highway Administration 1983). To identify the importance of views of a resource, a viewshed must be broken into distance zones of foreground, middleground, and background. Generally, the closer a resource is to the viewer, the more dominant it is and the greater its importance to the viewer. Although distance zones in a viewshed may vary between different geographic regions or types of terrain, the standard foreground zone is 0.25 to 0.5 mile from the viewer, the middleground zone is from the foreground zone to 3 to 5 miles from the viewer, and the background zone is from the middleground to infinity (USDA Forest Service 1974).

Visual sensitivity depends on the number and type of viewers and the frequency and duration of views. Visual sensitivity is also modified by viewer activity, awareness, and visual expectations in relation to the number of viewers and viewing duration. For example, visual sensitivity is generally higher for views seen by people who are driving for pleasure, people engaging in recreational activities such as hiking, biking or camping, and homeowners. Sensitivity tends to be lower for views seen by people driving to and from work or as part of their work (USDA Forest Service 1974, Federal Highway Administration 1983, U.S. Soil Conservation Service 1978). Commuters and non-recreational travelers typically have fleeting views and tend to focus on commute traffic, not on surrounding scenery; therefore, they are generally considered to have low visual sensitivity. Residential viewers typically have extended viewing periods and are concerned about changes in the views from their homes; therefore, they are generally considered to have high visual sensitivity. Viewers using recreation trails and areas, scenic highways, and scenic overlooks are usually assessed as having high visual sensitivity.

Judgments of visual quality and viewer response must be made based in a regional frame of reference (U.S. Soil Conservation Service 1978). The same landform or visual resource appearing in different geographic areas could have a different degree of visual quality and sensitivity in each setting. For example, a small hill may be a significant visual element on a flat landscape but have very little significance in mountainous terrain.

3.13.2.1.3 Viewer Groups and Viewer Responses

The primary viewer groups in the study area are persons living or conducting business near levees; travelers using the interstates, highways, and smaller local roads (including those on levee crowns); and recreationists (boaters, beachgoers, and anglers using canals, creeks, and rivers; trail users; equestrians; bicyclists; joggers; and others). All viewer groups have direct views of the study areas described above.

Residents

Suburban and rural residents are located directly adjacent to levees or are separated from them by local streets or a similar corridor. Suburban residences mostly are oriented inward toward the developments, and only residences on the outer edge of the developments have middleground and background views of levees. The separation and orientation of rural residences allow inhabitants to have direct views over agricultural fields toward levees. Both suburban and rural residents are likely to have a high sense of ownership over their adjacent waterways, the open space that surrounds them, the recreational opportunities they provide, and their inherent scenic quality. Because of their potential exposure to such views, short distance from the study areas, and sense of ownership, these residents are considered to have high sensitivity to changes in the viewshed.

Businesses

Viewers from industrial, commercial, government, and educational facilities have semi-permanent views from their respective facilities. Situated in different locations throughout the study areas, these facilities' views range from views limited by the levees to sweeping views that extend out to the background. Employees and users of these facilities are likely to be occupied with their work activities and tasks at hand. However, some of these facilities depend on the waterways in the study area as a destination spot and source of income (e.g., Port of West Sacramento).

People using these facilities often travel to and from work and spend leisure time on the waterways and levees. For these reasons, their limited viewing times, their focus on tasks at hand, and the current use of the levees, this viewer group is considered to have moderate sensitivity to changes in views.

Roadway Users

Roadway users' vantages differ based on the roadway they are traveling and elevation of that roadway. The majority of views are mostly limited to the foreground by suburban, commercial, and industrial development; vegetation; and the levees themselves. Views to the middleground and background are present but are limited to areas where structures that otherwise would conceal background views from the roadway are set back. However, if the vantage is elevated, as on portions of Capital City Freeway, bridges crossing over the Sacramento River, levee roads (e.g., South River Road), and other local roadways, most views of the surrounding mountain ranges (Vaca Mountains, Coast Range, and Sierra Nevada), waterways (American and Sacramento Rivers, DWSC, Yolo Bypass when flooded) and open space areas (agriculture, parkways) are only partially obstructed by the rooflines and mature vegetation in the area.

Travelers use roadways at varying speeds; normal highway and roadway speeds differ based on the traveler's familiarity with the route and roadway conditions (e.g., presence/absence of rain). Single views typically are of short duration, except on straighter stretches where views last slightly longer.

Viewers who frequently travel these routes generally possess moderate visual sensitivity to their surroundings. The passing landscape becomes familiar to these viewers, and their attention typically is not focused on the passing views but on the roadway, roadway signs, and surrounding traffic. Viewers who travel local routes for their scenic quality generally possess a higher visual sensitivity to their surroundings because they are likely to respond to the natural environment with a high regard and as a holistic visual experience. Furthermore, there are scenic stretches of roadway passing through the study areas that offer sweeping views of the surrounding area that are of interest to motorists, especially when traveling on the bridges or levee tops. For these reasons, viewer sensitivity is moderate among most roadway travelers.

Recreationists

Recreational users view the study areas from parks, waterways, roadways, trails, and from the levees themselves. Recreational uses consist of boating and fishing, hunting in the bypasses, birding, walking, running, jogging, and bicycling along trails, levee crowns, and local roads. Users of the waterways are likely to seek out natural areas within the corridor, such as sand and gravel bars and beaches, in addition to using the waterways as a resource. Waterway users have differing views based on their location in the landscape and are accustomed to variations in the level of industrial, commercial, suburban, and recreational activities occurring within the study area. The amount of vegetation present along the levees creates a softened, natural edge that is enjoyed by all recreationists. Local recreationists also have a high sense of ownership over the waterways and corridors they use for recreation, and these areas are highly valued throughout the greater Sacramento area.

Viewer sensitivity is high among recreationists using the study areas because they are more likely to value the natural environment highly, appreciate the visual experience, have a high sense of ownership, and be more sensitive to changes in views.

3.13.2.2 Environmental Setting

This section discusses the environmental setting related to visual resources in the CHP Academy EIP project area.

3.13.2.2.1 CHP Academy EIP Study Area

The CHP Academy EIP is within the Sacramento Bypass Levee, which consists primarily of open space and flood conveyance land uses. No development or agricultural activities occur within the study area. While few activities take place within the bypass (i.e., hunting occurs during the appropriate seasons), its levees, including the study area are used for recreation. The CHP Academy is located immediately southeast of the study area, the Sacramento Bypass Wildlife Area is located to the west and northwest of the study area and the Sacramento Bypass Levee is located immediately to the north of the site, ultimately extending nearly to the left bank of the Sacramento River.

Viewers at the study area, atop the levee crown, have expansive views that, when haze is at a minimum, extend over agricultural fields in the foreground to the middleground and background to the west. The high-rise buildings of downtown Sacramento can be seen in the middleground, rising up above the tree line in the southeast. Background views to the Sierra Nevada foothills to the east are rare, while views of the Sutter Buttes to the north are more common. Some views are obscured by the CHP Academy facility, limited in certain directions to the foreground, depending on the viewer's location in the study area. Views also differ seasonally, offering more or fewer views when vegetation is dormant or in leaf or dependent on the weather and amount of haze.

While the visual quality of the bypass itself is moderate, the views offered from it are moderately high. Appealing views from the study area present both rural and urban scenes that are attractive. Views from the study area are moderately high in vividness. The artificial intrusions associated with the surrounding development and infrastructure are moderate, resulting in moderate intactness. The visual quality of the area is also moderate in unification because the landscape is disjunctive in its abrupt changes in land use.

3.13.2.2.2 Viewer Groups

The primary viewer groups in the CHP Academy study area are persons living or conducting business near levees; travelers using the interstates, highways, and smaller local roads (including those on levee crowns), those affiliated with Riverbank Elementary School; and recreationists (boaters, beachgoers, and fishermen using canals, creeks, and rivers; trail users; equestrians; bicyclists; joggers; etc.). All viewer groups have direct views of the study areas.

Residents

There are no residences in the immediate vicinity of the CHP Academy EIP project area. However, residents in Sacramento, across the Sacramento River from the project area, have limited views of the project area from their residences that are obstructed to varying degrees by riparian vegetation. Most suburban residences in the city of West Sacramento are located southeast of the site. Although there are no residences in the immediate vicinity, both suburban and rural residents in West Sacramento are likely to have a high sense of ownership over their waterways, the open space that surrounds them, the recreational opportunities they provide, and their inherent scenic quality. Because of their potential feeling of ownership, and exposure to project site views in transit or while enjoying recreation along the Sacramento Bypass Levee, these residents are considered to have high sensitivity to changes in the viewshed.

Businesses

There are no business facilities in the immediate vicinity of the CHP Academy project area. Viewers from the CHP Academy EIP have semi-permanent views of the project area from their facility some as close as about 100 feet away from the outer edge of the project's construction footprint. Views from the facility range from being limited by trees or distance when viewing from the eastern side of the facility, to sweeping views that include the expanse of the Sacramento Bypass when viewing from the west side of the facility. Employees and users of this facility are likely to be occupied with their work activities and tasks at hand and less focused on taking advantage of their view. Because of their limited viewing times and their focus on work-related tasks, this viewer group is considered to have moderate sensitivity to changes in views.

Roadway Users

The majority of roadway viewers would view the site from Old River Road, which runs perpendicular to the Sacramento Bypass Levee. Many people affiliated with the CHP Academy likely travel to and from the facility on this road. Views here are of the foreground, middleground, and background inclusive of the Sacramento Bypass, the Sacramento River, and the project site on the bypass levee.

Travelers use roadways at varying speeds; normal roadway speeds differ based on the traveler's familiarity with the route and roadway conditions (i.e., presence or absence of rain, sleet, or other precipitation). Single views typically are of short duration; however, on roads that are very straight, such as Harbor Boulevard/Old River Road, views are longer.

Viewers who frequently travel routes generally possess moderate visual sensitivity to their surroundings. The passing landscape becomes familiar to these viewers, and their attention typically is not focused on the passing views but on the roadway, roadway signs, and surrounding traffic. Viewers who travel local routes for their scenic quality generally possess a higher visual sensitivity to their surroundings because they are likely to respond to the natural environment with a high regard and as a holistic visual experience. Furthermore, there are scenic stretches of roadway passing through the project area that offer sweeping views of the surrounding area that are of interest to motorists (such as the Sacramento River). For these reasons, viewer sensitivity is moderate among most roadway travelers.

Recreationists

Recreational users view the project area from waterways, roadways, trails, and from the levees themselves. Recreational uses consist of boating and fishing along the Sacramento River, hunting in the bypass, bird watching, walking, running, and jogging along the Sacramento Bypass Levee crown and nearby roads. Waterway users on the Sacramento River would largely have views of the riparian vegetation along the river corridor, obstructing their view of the project site. The vegetation present along the levees creates a softened, natural edge that is enjoyed by all recreationists. Local recreationists also have a high sense of ownership over the waterways and corridors they use for recreation (including levees), being that these areas are highly valued throughout the greater Sacramento area.

Viewer sensitivity is high among recreationists in the project area because they are more likely to value the natural environment highly, appreciate the visual experience, have a high sense of ownership, and be more sensitive to changes in views.

3.13.3 Environmental Consequences

This section describes the environmental consequences relating to visual effects for the CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.13.3.1 Assessment Methods

The key effects were identified and evaluated based on the environmental characteristics of the CHP Academy EIP project area and the magnitude, intensity, and duration of activities related to the construction and operation of the proposed project.

This evaluation of visual effects is based on:

- direct field observation from vantage points, including neighboring buildings, property, and roadways (conducted November 28, 2007, February 5, 2009, and September 2009);
- photographic documentation of key views;
- professional standards (as described below);
- review of project construction drawings; and
- review of the project with regard to compliance with state and local ordinances and regulations and professional standards pertaining to visual quality.

3.13.3.2 Determination of Effects

For this analysis, an effect pertaining to visual resources was considered significant if it would result in any of the following environmental effects, which are based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.):

- cause a substantial, demonstrable negative aesthetic effect on a scenic vista or view open to the public;
- substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare that would adversely affect day or nighttime public views.

3.13.3.2.1 Professional Standards

According to professional standards, a project may be considered to have a significant effect if it would:

- conflict with local guidelines or goals related to visual quality;
- alter the existing natural viewsheds, including changes in natural terrain;
- alter the existing visual quality of the region or eliminate visual resources;
- increase light and glare in the project vicinity;
- result in backscatter light into the nighttime sky;
- result in a reduction of sunlight or introduction of shadows in community areas;
- obstruct or permanently reduce visually important features; or
- result in long-term (that is, persisting for 2 years or more) significant visual changes or contrasts to the existing landscape as viewed from areas with high visual sensitivity.

3.13.4 Effects and Mitigation Measures

3.13.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to visual resources would occur. Therefore there would be no effect on this resource attributable to implementation of the No Action Alternative.

However, without levee improvements there is the continued risk of levee failure and levee deterioration would continue to occur, and the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability or geometry issues would continue. A catastrophic levee failure would result in flooding and inundation that could significantly damage existing visual resources. Flood-fight or cleanup activities could introduce new visual elements into the project area. In addition, the bypass levee itself would be damaged irreparably or for an extended period of time which would remove a scenic vista the enjoyment derived by recreationists when viewing nature and wildlife scenery. Given the uncertainty of the occurrence or magnitude of such an event, potential effects on visual resources cannot be quantified based on available information.

No vegetation will be removed at the CHP Academy EIP project area to comply with the U.S. Army Corps of Engineer (USACE) vegetation policy as there is no woody vegetation within the specified corridor.

3.13.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on visual resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
VIS-1: New Source of Light or Glare	Significant	Significant and unavoidable	No feasible mitigation
VIS-2: Temporary Visual Effects as a Result of Construction Activities	Less than significant	N/A	N/A

Effect VIS-1: New Source of Light or Glare

The CHP Academy APA would not add any new permanent source of light or glare. It is expected that construction would occur at night, requiring temporary nighttime lighting. Equipment staging areas also would be lit at night for security reasons. Such nighttime lighting would be temporary through the duration of construction. The nearest residences to the CHP Academy APA project area are located to the east, across the Sacramento River in the Natomas Garden Highway area. There are also dormitories at the CHP academy, and the CHP Academy also holds occasional nighttime training exercises. Construction of the CHP Academy APA would significantly affect the viewshed of the Garden Highway residents and CHP Academy attendees as they are not accustomed to nighttime glare of this degree. This effect would be significant and unavoidable.

Effect VIS-2: Temporary Visual Effects as a Result of Construction Activities

CHP Academy APA construction activities would introduce considerable heavy equipment and associated vehicles into the views of residents in the Garden Highway area of Natomas, recreationists, motorists, and of the CHP Academy itself. The equipment would be visible throughout the construction season. Presence of the equipment would temporarily degrade the visual quality of the project area to low vividness, intactness, and unity.

Residential viewers in the Garden Highway area across the Sacramento River from the CHP Academy APA site are likely not accustomed to seeing construction activities and equipment, and sensitivity to such effects would be high. Other viewer groups are more accustomed to seeing construction activities and equipment from construction that has occurred in the business parks near the I Street Bridge, daily activities in the industrial areas, and local roadway construction projects and would have low sensitivity to construction effects.

However, because this effect would be temporary, would last no longer than the construction duration, and would be limited to a small area, it would not substantially degrade the overall visual quality in the study area. In addition, the implementation of an environmental commitment to provide temporary construction barriers, as needed, between construction zones and residences, as described in Section 2.5 of Chapter 2, Alternatives, would make this effect less than significant.

In addition, effects on roadway users would be less than significant because of the short intervals of time that roadway users are in visual contact with the project area and because of users' familiarity with construction along other roadways in the vicinity.

3.13.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on visual resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
VIS-1: New Source of Light or Glare	Significant	Significant and unavoidable	No feasible mitigation
VIS-2: Temporary Visual Effects as a Result of Construction Activities	Less than significant	N/A	N/A

Effect VIS-1: New Source of Light or Glare

This effect would be the same as described above under the CHP Academy APA. The CHP Academy Alternative B would create a new source of light and glare that would result in a significant and unavoidable effect on local residents.

Effect VIS-2: Temporary Visual Effects as a Result of Construction Activities

This effect would be the same as described above under the CHP Academy APA. Construction of the CHP Academy Alternative B would temporarily degrade the visual quality of the project area to low vividness, intactness, and unity. However, because this effect would be temporary, would last no longer than the construction duration, and would be limited to a small area, it would not substantially degrade the overall visual quality in the study area. In addition, the implementation of an environmental commitment to provide temporary construction barriers, as needed, between construction zones and residences, as described in Section 2.5 of Chapter 2, Alternatives, would make this effect less than significant.

Section 3.14
Recreation—
CHP Academy Early Implementation Project

3.14.1 Introduction

This section describes the regulatory and environmental setting for recreation, effects on recreation facilities and recreation opportunities that would result from the proposed project and the mitigation measures that would reduce significant effects.

The key sources of data and information used in the preparation of this section are listed below

- *West Sacramento General Plan*, (City of Sacramento 1990, last amended 2004)
- *City of West Sacramento Parks Master Plan (Smith Group 2003)*
- *Sacramento Riverfront Master Plan*, July 2003
- Dave Shpak, Park Development Manager, City of West Sacramento
- *West Sacramento Bicycle and Pedestrian Path Master Plan*, October 1991and 1995 Addendum
- *Yolo Bypass Wildlife Area Land Management Plan*, June 2008
- *Yolo County General Plan*, July 1983, Open Space and Recreation Element last amended November 2002

3.14.2 Affected Environment

This section describes the affected environment for recreation in the CHP Academy EIP project area, including the regulatory and environmental settings.

3.14.2.1 Regulatory Setting

3.14.2.1.1 Federal and State

No Federal or state plans, policies, regulations, or laws related to recreation resources apply to the CHP Academy EIP.

3.14.2.1.2 Local

The following local plans related to recreation apply to implementation of the CHP Academy EIP.

City of West Sacramento General Plan

The *West Sacramento General Plan* (City of West Sacramento 1990) identifies the following goals, objectives, and policies for the implementation plan.

Recreation and Cultural Resources

- **Goal A:** To establish and maintain a public park system and recreation facilities suited to the needs of West Sacramento residents and visitors.
    - **Policy A12:** The City shall identify appropriate open spaces, including areas within the Central Business District and along the Sacramento River, for development of safe community activity areas.
- **Goal B:** To promote the provision of private recreation facilities and opportunities.
    - **Policy B6:** The City supports the use of the barge canal for aquatic recreational activities, such as sailing, rowing, kayaking, and canoeing, and supports the establishment of a multi-use aquatic facility along the barge canal. Aquatic parks, boat houses, docks, and other support facilities for boating shall be deemed compatible uses along the Deep Water Ship Channel and the barge canal within all land use designations.
- **Goal D:** To provide and encourage, to the fullest extent possible, public access to the Sacramento River and Deep Water Ship Channel for recreation purposes.
    - **Policy D1:** The City shall ensure continuous public access to the Sacramento River for its full length within West Sacramento.
    - **Policy D2:** The City shall seek to ensure continuous public access to the Deep Water Ship Channel, within the limits imposed by safety considerations.
    - **Policy D3:** Linear access to the Sacramento River and Deep Water Ship Channel shall be linked to the city's overall system of parks, recreational pathways, and open space.
    - **Policy D4:** The city shall encourage the development of public and private marinas in appropriate locations on the Sacramento River and along the Deep Water Ship Channel. Siting and development of marinas shall avoid, as much as possible, areas of significant existing riparian vegetation.
    - **Policy D5:** The City shall support and encourage the development of public and private water-oriented park and recreation facilities along the Sacramento River and the Deep Water Ship Channel.
- **Goal E:** To provide a network of pedestrian and bicycle pathways connecting parks and open space areas with other destination points within and beyond the city of West Sacramento.
    - **Policy E2:** The City shall implement a *Riverfront Park Master Plan* that provides for a system of continuous pedestrian and bicycle pathways along the Sacramento River.
    - **Policy E4:** The City shall coordinate the development of the riverfront as envisioned in the 1997 *Sacramento Greenway Plan*.

Natural Resources

- **Goal C:** To protect sensitive native vegetation and wildlife communities and habitat in West Sacramento.
    - **Policy C5:** To minimize disturbance to wildlife, the City shall require the provision and maintenance of an adequate setback between significant wetland habitat and adjacent development. The buffer shall be landscaped with native or compatible introduced ornamental vegetation and may be used for passive recreation purposes.

- **Policy C12:** Public access and recreation facilities shall not eliminate or degrade riparian habitat values. Trails, picnic areas, and other developments shall be sited to minimize effects on sensitive wildlife habitat or riparian vegetation.

Transportation and Circulation

- **Goal G:** To promote pedestrian and bicycle travel as alternatives to automobile use.
  - **Policy G7:** To the extent practicable, bicycle and pedestrian pathways shall be included within open space areas and adjacent to waterways.

Urban Structure and Design

- **Goal B:** To enhance the relationship between the City and the Sacramento River.
  - **Policy B2:** The City shall protect and enhance public access to the Sacramento River along the entire riverfront within West Sacramento by providing for development of a continuous pedestrian and bicycle path along the river.
  - **Policy B4:** The City shall promote the development of important visual and scenic areas along the riverfront, including around the barge canal, for public access, including water-related activities.
  - **Policy B5:** The City shall promote and enhance open space and pedestrian links between the river and public schools, parks, and other major open space areas.

City of West Sacramento Parks Master Plan

The *West Sacramento Parks Master Plan* (Parks Master Plan) (Smith Group 2003) outlines the City's goals and policies with regard to the provision of parks and related recreation facilities for West Sacramento residents, and provides an inventory of current and proposed facilities.

As of April 2009, the City oversaw approximately 145 acres of developed parkland (City of West Sacramento 2009a). Based on the 2007 population of 44,928 (California Department of Finance 2007), this represents an 80-acre shortfall from the standard of 5 acres per 1,000 residents established in the General Plan. Based on this ratio, it is estimated that by 2025 population growth in West Sacramento would require the City to have a total of 375 acres of parkland available in order to meet this standard.

The Parks Master Plan lists underutilized assets, including the Sacramento River, DWSC, turning basin, barge canal, natural corridors, and riparian forests that are key opportunities for recreation development and protection.

West Sacramento Bicycle and Pedestrian Path Master Plan

The *West Sacramento Bicycle and Pedestrian Path Master Plan* (Callander Associates 1991) and *Addendum* (City of West Sacramento Parks and Community Services Department 1995) propose future recreation trails, bike paths, lanes, and routes along the majority of the study area. The plan identifies the following relevant objectives and policies:

Objective 2 Use of City Infrastructure: Utilize city infrastructure including streets, street and railroad rights-of-way, and utility and drainage easements for development of bicycle and pedestrian path system.

Policy 2.7: Utilize non-vehicular areas, wherever possible, for locating bicycle and pedestrian facilities away from motor vehicles, to enhance safety and enjoyment and minimize distances between destination points. Utilize Reclamation District rights-of-way and maintenance roads for paths wherever feasible, and negotiate easements for paths as needed.

Objective 3 Recreational Opportunities: Facilitate city-wide and regional recreation opportunities for bicycling, hiking, and jogging.

Policy 3.1: Link city parks, schools, riverfront, open space areas, and scenic areas to the system of bicycle and pedestrian paths.

Policy 3.2: Provide a system of continuous bicycle and pedestrian pathways along the Sacramento River and other waterways, where feasible.

Yolo County General Plan

The *Yolo County General Plan* (Yolo County Community Development Agency 1983) identifies the following goals, objectives, and policies for the implementation plan.

Circulation

Policy CIR-13: Bicycle Routes and Facilities. Yolo County shall promote and ensure opportunities for bicycle use. The following means shall be used to achieve this policy: Encouragement and establishment of bike routes along trails, on levees, along railroad levees, along drainage canals, and along transmission right-of-ways where feasible.

Recreation

Policy REC-7: Urban Waterfront Land Use. Yolo County shall require that a portion of urban waterfront, other than the Port of West Sacramento and existing industrial uses, should be used for water-dependent activities including, but not limited to, recreation, tourism, scenic public walkways, waterview restaurants, marinas, fishing access, small waterfront parks, and interpretation projects with retained and enhanced riparian vegetation and may include related residential development in a proportion established by conditional use permit but not to exceed one-half of the total land area of the project.

Urban waterfront overlay zoning shall be established to locate and define the extent of such areas and shall insure access to the river for all residents.

Open Space and Recreation Element

The revised Yolo County Open Space and Recreation Element (Yolo County Parks and Natural Resources 2002) identifies the following goals, objectives, and policies for the implementation plan:

Objective RO-2: Establishment of a variety of outdoor recreational and educational opportunities along Lower Cache Creek, the Sacramento River, Lower Putah Creek, and within the Yolo Bypass for use by the public.

Policy RP-8: The County shall encourage and support the development of private recreation facilities that preserve scenic and environmentally sensitive resources and that do not result in the creation of land use conflicts.

Policy RP-10: The County shall work with willing landowners to create a continuous corridor of natural open space along Lower Cache Creek, Lower Putah Creek, the Sacramento River and within the Yolo Bypass with provision for limited access at specific locations to recreational and educational uses from a County road or highway. The County shall also consider establishing bicycle access to select areas.

Policy RP-12: Recreational uses shall be clustered at locations along Cache Creek, Lower Putah Creek, and the Sacramento River, in order to minimize habitat disturbance and provide efficient and cost-effective management by the County. All access, whether by road or by trail, shall be through an entry point which can be controlled.

Policy RP-17: The County shall support improved access for bank fishing where safe and adequate parking can be provided and with acquisition of proper rights-of-access from the landowner. Adequate policing, garbage cleanup, sanitation facilities, and fire suppression for such access shall be provided.

3.14.2.2 Environmental Setting

The levee road that lies on top of the Sacramento Bypass Levee is an access road that provides pedestrian access to the Sacramento Bypass Wildlife Area. This Type C wildlife area is un-staffed and operated by California Department of Fish and Game. The wildlife area is open year-round for fishing and bird watching open for hunting September 1 to January 31. Occasional visitors access the area by riding bicycles along the levee road or parking in the gravel area just south of the Sacramento Weir and west of Old River Road and walk into the Sacramento Bypass Wildlife Area to fish (Shpak pers. comm. 2009). There are no formal recreation facilities on the Sacramento Bypass Levee itself which encompasses the CHP Academy EIP site, but it is used informally used by bicyclists and pedestrians.

3.14.3 Environmental Consequences

This section describes the environmental consequences relating to recreation resources for the CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.14.3.1 Assessment Methods

Effects on recreation related to implementation of the CHP Academy EIP were evaluated qualitatively. Generally, construction activities could result in a short-term loss of recreation opportunities by disrupting use of recreation areas or recreational boating corridors. A long-term effect could occur if a recreation opportunity is eliminated or the quality of that opportunity is severely reduced as a result of permanent project-related structures or operations. Long-term beneficial effects could occur if new or enhanced recreation opportunities are created through implementation of the project.

3.14.3.2 Determination of Effects

For this analysis, an effect pertaining to recreation was considered significant if it would result in any of the following environmental effects, which are based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.):

- increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated;
- include recreation facilities or require the construction or expansion of recreation facilities that might have a significant physical effect on the environment;
- substantially restrict or reduce the availability or quality of existing recreation opportunities in the project vicinity; or
- implement operational or construction-related activities related to the placement of project facilities that would cause a substantial long-term disruption of any institutionally recognized recreation activities. Institutionally recognized recreation activities are those associated with an established publicly or privately operated recreation facility, or those actively administered or promoted by a public or private entity.

3.14.4 Effects and Mitigation Measures

3.14.4.1 No Action Alternative

The No Action Alternative would continue the existing deficiencies along the portion of the Sacramento Bypass Levee reach encompassed by the CHP Academy EIP project area (i.e., no levee improvements would be implemented). This means continued or even potentially increased risk that the Sacramento Bypass Levee could fail due to seepage or slope stability or geometry issues, Levee failure at this site, depending on the magnitude of the event, could cause catastrophic flooding of the entire city.

A catastrophic levee failure would result in flooding and inundation that could significantly damage existing facilities and infrastructure, and erode soil, uproot plants, and otherwise damage substrate by hydraulic force. This would render recreation facilities, informal recreation areas, and trails unusable until cleanup and restoration activities could be undertaken. It is possible that after a catastrophic flood event, recreation facilities may never be fully restored to their former condition, permanently reducing the quality and/or quantity of recreation opportunities in the area. In addition, scenic vistas for existing and future recreation facilities could be damaged irreparably or for an extended period of time which would reduce the enjoyment derived by recreationists. Given the uncertainty of the occurrence or magnitude of such an event, potential effects on recreation cannot be quantified based on available information.

The Sacramento Bypass Wildlife Area (uses include hunting, wildlife viewing and fishing) is often accessed via the levee road atop the Sacramento Bypass Levee. Occasional bicycle and pedestrian access along this road would likely continue.

No vegetation will be removed at this EIP site to comply with the U.S. Army Corps of Engineers (USACE) vegetation policy under the No Action Alternative as there is no woody vegetation within the specified corridor.

3.14.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on recreation. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
REC-1: Temporary Disruption of Recreation Opportunities during Construction	Less than significant	N/A	N/A
REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor	Less than significant	N/A	N/A
REC-3: Long-Term Increase in Recreation Opportunities	Beneficial	N/A	N/A
REC-4: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities	Beneficial	N/A	N/A

Effect REC-1: Temporary Disruption of Recreation Opportunities during Construction

The road that lies on top of the Sacramento Bypass Levee is noted as a pedestrian access road on the California Department of Fish and Game's map for the Sacramento Bypass Wildlife Area. Visitors to the wildlife area use the levee road for access to the area for fishing, hunting, or wildlife viewing. Temporary disruption of access along the Sacramento Bypass Levee would occur during construction activities when the levee crown and adjacent construction and staging areas are closed to public access. Even if the recreation areas themselves are not closed, proximity to construction equipment and activities may degrade recreational experiences. However, this effect is temporary and there are alternative locations for fishing, hunting, and wildlife viewing within the city and Yolo County. With implementation of the environmental commitment requiring notification of construction area closure to ensure public safety and provide closure notice in advance of construction activities (described in Section 2.7, Chapter 2, Alternatives), this effect would be less than significant. No mitigation is required.

Effect REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor

The Sacramento Bypass Levee is, in general, already maintained to the new USACE standard for vegetation on levees, and full compliance with the policy would not require the removal of additional woody vegetation. However, the proposed slope flattening would require the levee footprint to be expanded landward and therefore extend the zone that must be maintained free of woody vegetation. This may require the removal of volunteer trees and shrubs in the future. Any effects that maintenance activities would have on the recreational view are considered less than significant. No mitigation is required.

Effect REC-3: Long-Term Increase in Recreation Opportunities

A paved pedestrian and bicycle trail would be constructed atop the Sacramento Bypass Levees as part of the CHP Academy APA. Although this segment is not part of the larger recreational corridor system proposed in the Parks Master Plan, this area is currently underused and construction of a trail in this area would improve recreation corridor connectivity and expand recreation opportunities in West Sacramento. It would also advance the policies of some of the planning documents listed above in the Regulatory Setting section. Since this area is already informally accessed for recreation use by bicycles and pedestrians, it would formalize this activity. This effect is considered beneficial.

Effect REC-4: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities

As a result of the incorporation of new recreation facilities in the CHP Academy APA, the opportunity for physical activity by project area residents would be increased. The proposed project would be consistent with The U.S. National Physical Activity Plan (2010). The plan is a comprehensive set of policies, programs, and initiatives that aim to increase physical activity in all segments of the American population. The plan is the product of a private-public sector collaborative. The goal of the plan is that "all Americans will be physically active and they will live, work, and play in environments that facilitate regular physical activity" (National Physical Activity Plan 2010).

The availability of open space, recreation areas, and parks has been linked with increased physical activity. In a scientific review of studies published prior to 2006, it was found that 14 of 20 articles addressing parks or open space reported at least some, if not an entirely positive association between park availability, access, use, or proximity and respondents' physical activity levels (Kaczynski and Henderson 2007). This effect would be beneficial.

3.14.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on recreation. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
REC-1: Temporary Disruption of Recreation Opportunities during Construction	Less than significant	N/A	N/A
REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor	Less than significant	N/A	N/A
REC-3: Long-Term Increase in Recreation Opportunities	Beneficial	N/A	N/A
REC-4: Increased Human Health Benefit as A Result of Increased Physical Activity Opportunities	Beneficial	N/A	N/A

Effect REC-1: Temporary Disruption of Recreation Opportunities during Construction

This effect would be the same as described above under the CHP Academy APA. With implementation of the environmental commitment requiring notification of construction area closure to ensure public safety and provide closure notice in advance of construction activities (described in Section 2.7, Chapter 2, Alternatives), temporary disruption of recreation opportunities at the CHP Alternative B site would be less than significant. No mitigation is required.

Effect REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor

The Sacramento Bypass Levee is, in general, already maintained to the new USACE standard for vegetation on levees, and full compliance with the policy would not require the removal of much additional woody vegetation. However, the proposed stability berm would require the levee footprint to be expanded landward and therefore extend the zone that must be maintained free of woody vegetation. This may require removal of some mature trees from the CHP Academy Alternative B project area. However, because the trees are part of an already marginal view of CHP Academy facilities and are currently inaccessible to visitors due to fencing, and because the Sacramento Bypass Levee is not known as a wildlife viewing spot, this effect would be less than significant. No mitigation is required.

Effect REC-3: Long-Term Increase in Recreation Opportunities

This effect is the same as described above under the CHP Academy APA. This effect is considered beneficial.

Effect REC-4: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities

This effect is the same as described above under the CHP Academy APA. This effect is considered beneficial.

Section 3.15
Utilities and Public Services—
CHP Academy Early Implementation Project

3.15.1 Introduction

This section describes the regulatory and environmental setting for utilities and public services, the effects on utilities and public services that would result from the proposed project, and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed and briefly described below.

- City of West Sacramento website (www.cityofwestsacramento.org)
- Yolo County website (ww.yolocounty.org)
- Utility Assessment for Basin-Wide Problem Identification Report, HDR, Inc. (HDR 2007)
- Communications with Yolo County Planning Department
- Communication with West Sacramento Fire/Police Departments (Arsenault pers. comm.; Moore pers. comm.)

3.15.2 Affected Environment

This section describes the affected environment for utilities and public services in the CHP Academy EIP project area, including regulatory and environmental settings.

3.15.2.1 Regulatory Setting

3.15.2.1.1 State

The following state policies or agencies related to utilities and public services may apply to implementation of The CHP Academy EIP**.**

California Public Utilities Commission

The California Public Utilities Commission (CPUC) regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies. CPUC is responsible for ensuring that California utility customers have safe, reliable utility service at reasonable rates, protecting utility customers from fraud, and promoting the health of California's economy. CPUC establishes service standards and safety rules and authorizes utility rate changes. CPUC enforces CEQA compliance for utility construction. CPUC also regulates the relocation of power lines by public utilities under its jurisdiction, such as The Pacific Gas and Electric Company (PG&E). CPUC works with other state and Federal agencies in promoting water quality, environmental protection, and safety.

California Integrated Waste Management Act

In 1989, Assembly Bill 939 (AB 939), known as the Integrated Waste Management Act, was passed into law. Enactment of AB 939 established the California Integrated Waste Management Board and set forth aggressive solid waste diversion requirements. Under AB 939, every city and county in California is required to reduce the volume of waste sent to landfills by 50% through recycling, reuse, composting, and other means. AB 939 requires counties to prepare a Countywide Integrated Waste Management Plan (CIWMP). An adequate CIWMP contains a summary plan that includes goals and objectives, a summary of waste management issues and problems identified in the incorporated and unincorporated areas of the county, a summary of waste management programs and infrastructure, existing and proposed solid waste facilities, and an overview of specific steps that would be taken to achieve the goals outlined in the components of the CIWMP.

3.15.2.1.2 Local

The following local policies related to utilities and public services may apply to implementation of the CHP Academy EIP.

City of West Sacramento

City of West Sacramento General Plan

The *City of West Sacramento General Plan Policy Document* defines the policies and objectives governing City responsibilities for public utilities and services.

Stormwater Drainage

City of West Sacramento General Plan Section IV, Goal C (City of West Sacramento 2004a) states that the City will maintain an adequate level of service in the storm drainage system to accommodate runoff from existing and future development and to prevent property damage from flooding. The policies to accomplish this goal are listed below.

1. Where practical and economical, the City shall upgrade existing drainage facilities as necessary to correct localized flooding problems.
2. The City shall continue to expand and develop storm drainage facilities to accommodate the needs of existing and planned development.
3. The City shall, through a combination of drainage improvement fees and other funding mechanisms, ensure that new development pays its fair share of the costs of drainage system improvements.
4. The City shall cooperate with other responsible agencies in ensuring that levees surrounding the city are maintained and improved to provide a minimum 200-year flood protection.

Water

The City provides water to its constituents in accordance with the *City of West Sacramento General Plan*, Section IV, Goal A. (City of West Sacramento 2004a) This goal states the City will maintain an adequate level of service in the water system to meet the needs of existing and future development. The policies associated with this statute follow.

1. The City shall continue to use treated surface water from the Sacramento River as the principal source of domestic water for the city, relying on treated groundwater only to supply the port pressure zone and as an emergency backup to the surface water source. The City shall pursue as expeditiously as possible, acquisition of additional surface water rights necessary to accommodate water demand.
2. The City shall continue to expand and develop water treatment, distribution, and storage facilities to accommodate the needs of existing and planned development.
3. To minimize the need for the development of new water sources and facilities and to minimize sewer flows, the City shall promote water conservation both in City operations and in private development.
4. The City shall replace or repair old, leaking water lines as financially feasible.
5. The City shall ensure the provision of adequate fire-flow rates in all new development.
6. The City shall maintain fire hydrants.
7. The City shall, through a combination of water development fees and other funding mechanisms, ensure that new development pays its fair share of the costs of water system improvements.

The Bryte Bend Treatment Plant is responsible for treatment of City's water and for reporting standards and findings regarding the City's drinking water to the California State Department of Health Services, Drinking Water Program. The Bryte Bend Water Treatment Plant Laboratory:

- monitors drinking water quality to ensure it is of a consistently high quality,
- provides laboratory services necessary to support the operating and monitoring requirements for the water treatment plant,
- responds to consumer water quality concerns,
- monitors water quality of the distribution system and watershed, and
- provides services to environmental programs.

Wastewater

The City of West Sacramento manages the wastewater according to the *City of West Sacramento General Plan*, Section IV, Goal B. The City states it will maintain an adequate level of service in the City's sewage collection and disposal system to meet the needs of existing and future development.

Solid Waste

Solid waste disposal is provided by Yolo County and governed by the *City of West Sacramento General Plan*, Section IV, Goal D in close consultation with Yolo County Department of Public Works. This plan defines the programs for recycling and reuse, resource recovery, and disposal. The City commits to provide for the collection and disposal of solid waste while minimizing the generation of waste (City of West Sacramento 2004a).

Public Services

The placement of public services in the City is authorized by the City of West Sacramento Planning Department in accordance the goals and policies established in the *City of West Sacramento General*

Plan, Section IV. The City of West Sacramento Public Works Department is responsible for operating and maintaining city roads, which serve as emergency vehicle routes.

3.15.2.2 Environmental Setting

This section discusses the environmental setting related to utilities and public services in the CHP Academy EIP project area.

3.15.2.2.1 Utilities and Service Systems

HDR, Inc. performed a preliminary assessment and review of known aboveground and underground utilities in the study area (Appendix E). The assessment was completed by obtaining encroachment permits from the State of California Central Valley Flood Protection Board (CVFPB) that describe underground and aboveground utilities which occur within, on top of, or above the current levee footprint. Overhead utilities (power lines and telephone lines) and underground utilities (telephone and fiber optic conduits, communication cables, and pipelines) occur in the study area. The listed utilities may not be in compliance with the CVFPB and U.S. Army Corps of Engineers (USACE) utility placement standards within levees.

Table 3.15-1 lists aboveground and underground utilities in the CHP Academy EIP project area.

Table 3-15-1. Utilities Located in the CHP Academy EIP Project Area

Approximate Stations	Utility	Size	Owner
14+00–64+78	Pole Line	N/A	PG&E
47+00–64+78	N/A	N/A	AT&T
50+50	Electric	N/A	PG&E
63+43	Culvert	30 inches	N/A
64+10	Electric	N/A	PG&E
64+10–64+78	Telephone Conduit	N/A	AT&T or Verizon
64+78	Fiber Optic Line	N/A	MCI, Level 3, Williams Communication

Source: HDR 2007 (Appendix E)

Electric Power Transmission and Communications

Electricity for the study area is provided by PG&E. Fiber optic lines owned by MCI, Level 3, and Williams Communication occur within the project area.

Water

The city's main water source is the Sacramento River. The intake structure is located at Bryte Bend, upstream of the confluence of the Sacramento and American Rivers. Water withdrawn from the Sacramento River is treated at the Bryte Bend Water Treatment Plant, which is operated 24 hours a day by state- certified water treatment plant operators.

Stormwater and Drainage

Stormwater drainage networks consist of both natural and human-made conveyance systems to collect, convey, and store runoff resulting from a storm event. The City manages the stormwater drainage system in the urban areas and in some rural areas.

Impervious surfaces in the project area are limited to roads, other small sections of pavement, urban residential and business structures, and rural residential and agricultural structures. A 30-inch culvert facilitates stormwater drainage in the project area.

Solid Waste

Solid waste disposal is governed by the *City of West Sacramento General Plan* in close consultation with Yolo County Department of Public Works. This plan defines the programs for recycling and reuse, resource recovery, and disposal. Solid waste currently is disposed of at the Yolo County Central Landfill located in the city of Davis. For 2009, the remaining capacity is 37.1 million cubic yards.

3.15.2.2.2 Public Services

Fire Protection

The City's Fire Department has the mission of protecting life, environment, and property within the city of West Sacramento. The primary fire station servicing the CHP EIP project area is Station 44 (Moore pers. comm.) It is open 24 hours a day, 7 days a week.

Police Protection

The Police Department provides a full range of police services to the residents of West Sacramento 24 hours a day, 7 days a week.

The Police Department is staffed with 75 sworn officers and 39 civilian full-time employees. Other positions include part-time police officers, parking enforcement officers, reserve police officers, and volunteers.

The department is divided into three geographic "beats". Beat 1 patrols the northern portion of the city, including the Bryte and Broderick areas, and is responsible for the CHP Academy EIP project area. Beat 2 encompasses the central city along West Capitol Avenue, and Beat 3 is responsible for the Southport area (Arsenault pers. comm.)

Emergency Medical Services

No hospitals are located in the city of West Sacramento. The nearest hospital is Sutter General Hospital, which is 3.7 miles from West Sacramento at 29th Street, Sacramento, CA.

3.15.3 Environmental Consequences

This section describes the environmental consequences relating to utilities and public services for the CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.15.3.1 Assessment Methods

This evaluation of utilities and public services is based on information obtained from the following sources:

- a review of relevant documents and Web sites to obtain information regarding known public services and utilities in the study area,
- the analysis of geographic map research to determine locations of existing utilities and public services for project components, and
- telephone calls and e-mail correspondence to area utility service providers.

3.15.3.2 Determination of Effects

For this analysis, an effect pertaining to utilities and public services was analyzed under NEPA and CEQA if it would result in any of the following environmental effects, which are based on NEPA standards, State CEQA Guidelines Appendix G (14 CCR 15000 *et seq.*), and standards of professional practice:

- require the construction or expansion of electrical or natural gas transmission or distribution facilities;
- require the construction or expansion of a water conveyance or wastewater treatment facility or require new or expanded water supply entitlements;
- require the construction of new or expanded stormwater drainage facilities;
- require the construction or expansion of wastewater treatment facilities;
- cause the capacity of a solid waste landfill to be reached sooner than it would without the project;
- require the construction or expansion of communications facilities (telephone, cell, cable, satellite dish);
- significantly affect public utility facilities that are located underground or aboveground along the local roadways from project construction activities;
- create an increased need for new fire protection, police protection, or ambulance services or significantly affect existing emergency response times or facilities; or
- intersect with major infrastructure components, such as bridges or overpasses, requiring relocation of the components.

3.15.3.2.1 Effects Assumptions

The following assumptions are made as part of the analysis of effects on utilities and public services:

- Implementation of the proposed project is not expected to create additional demand for electricity or natural gas and would not require the construction or expansion of electrical or natural gas transmission lines or public utilities.
- Implementation of the proposed project would not require the construction or expansion of wastewater treatment facilities, nor would it require the relocation of major infrastructure.

3.15.4 Effects and Mitigation Measures

3.15.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to utilities or service systems would occur and none of these services would therefore be interrupted or damaged. Therefore, there would be no effect on this resource under the No Action Alternative.

However, because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability and geometry issues would continue. Under the No Action Alternative, there would be a continued potential for levee failure at the Sacramento Bypass that could cause inundation from high flows and destruction or damage to utility lines, natural gas supply lines, and water or wastewater piping or facilities, all of which could lead to widespread contamination, temporary power outages, and interruptions of other utilities in the study area and surrounding areas. Effects on the water supply system could be particularly severe, as a single break in a water delivery pipe or main could contaminate the entire city's water supply. All breaks and leaks would need to be repaired and the pipes in every building would need to be flushed to remove contamination before residents and businesses could rely on safe water. Depending on the severity and location of the flooding and contamination, this effort could take a significant amount of time.

Varying levels of damage could be done to public service structures as well, causing delays in fire protection, police protection, or emergency medical assistance. A major flood event could also stress the region's emergency response and hospital services, as the likelihood of injury resulting from a flood event is high, and evacuees may not have access to their regular medications. However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related risks cannot be predicted. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made.

3.15.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on utilities and public services. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect PUB-1: Damage of Public Utility Infrastructure and Disruption of Service	Significant	Less than significant	PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training
Effect PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction	Less than significant	N/A	N/A
Effect PUB-3: Increase in Emergency Response Times	Less than significant	N/A	N/A

Effect PUB-1: Damage of Public Utility Infrastructure and Disruption of Service

Construction of the CHP Academy APA could necessitate the relocation of utility infrastructure, which could result in temporary loss of service. As described above in the Environmental Setting section, existing infrastructure in the CHP Academy APA project area includes telephone lines, electric lines, fiber optic lines, and a culvert.

Utility infrastructure could require significant actions to repair, relocate, or replace. Additionally, CHP Academy APA construction could necessitate that existing utilities be taken off line or could cause accidental damage to identified and unidentified infrastructure. Because the potential exists for damage and service interruptions to existing utilities, this potential construction effect is considered significant. Mitigation Measure PUB-MM-1 would reduce this potential effect to a less-than-significant level.

Mitigation

Mitigation Measure PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training

WSAFCA will ensure the following measures are implemented to avoid and minimize potential damage to utility and service disruptions during construction. Implementing these measures will help ensure existing utilities are not damaged and that service interruptions are minimized.

- Obtain utility excavation or encroachment permits as necessary before initiating any work with the potential to affect utility lines, and include all necessary permit terms in construction contract specifications.
- Before starting construction, coordinate with utility providers in the area to locate existing lines. Avoid the relocation of utilities when possible. Provide notification of potential interruptions in services to the appropriate agencies.
- Before starting construction, verify utility locations through field surveys and underground service alerts. Clearly mark any buried utility lines in the area of construction before any earthmoving activity.
- Before starting construction, prepare a response plan to address potential accidental damage to a utility line. The plan will identify chain-of-command rules for notifying authorities and appropriate actions and responsibilities to ensure the safety of the public and the workers. Contractors will conduct worker training to respond to these situations.
- Stage utility relocations to minimize service interruptions.

Effect PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction

Implementation of the CHP Academy APA may generate up to 89,000 cubic yards of levee material that would require disposal. A portion of the material could be disposed of on site and used for new levee construction, as long as it is suitable material. Disposal of the soil material would occur if soil characteristics make it infeasible for reuse as levee material, or the soil is determined to have contaminants that would require appropriate disposal. Embankment fill material excavated to construct levee improvements would be evaluated for reuse after excavation and prior to disposal. Soil requiring disposal as part of the CHP Academy APA would likely be transported to the Yolo County Central Landfill; however, the location of the landfill used for disposal of spoil material and other construction-related waste may be determined by the construction contractor at the time of construction activity based on capacity, type of waste, and other factors. Only those landfills determined to have the ability to accommodate the construction disposal needs of the CHP Academy APA would be used.

As of fall 2009, the remaining capacity for the Yolo County Central Landfill is 37.1 million cubic yards. Some of the disposed soils may be deemed suitable by the Yolo County Central Landfill for other beneficial uses. These soils would only be temporarily stored at the landfill and would not have an effect on its overcall capacity. The current landfill closure projection is in 2070, which takes into account disposal growth rate, including both beneficial and non-beneficial soil materials. Assuming all of the estimated 89,000 cubic yards of soil would require permanent disposal, CHP Academy APA implementation would represent less than 1% of the remaining capacity of the Yolo County Central Landfill. However, the option of beneficial re-use is likely to reduce the cubic yards of soil that require permanent disposal. These facts would make this effect less than significant. No mitigation is required. (Borrego pers. comm.)

Effect PUB-3: Increase in Emergency Response Times

Emergency access to the project vicinity could be affected by construction of the proposed project, and construction-related traffic could delay or obstruct the movement of emergency vehicles. However, execution of the environmental commitment to develop and implement a traffic control and road maintenance plan, described in Section 2.9.1.9 of Chapter 2, Alternatives, would minimize construction-related effects on emergency response times. This effect would be less than significant. No mitigation is required.

3.15.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on utilities and public services. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect PUB-1: Damage of Public Utility Infrastructure and Disruption of Service	Significant	Less than significant	PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training
Effect PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction	Less than significant	N/A	N/A
Effect PUB-3: Increase in Emergency Response Times	Less than significant	N/A	N/A
Effect PUB-4: Expansion of Stormwater Drainage Facilities	Less than significant	N/A	

Effect PUB-1: Damage of Public Utility Infrastructure and Disruption of Service

This effect is the same as described above under the CHP Academy APA. The CHP Academy Alternative B could result in damage or service interruptions to existing utilities. This potential construction effect is considered significant. Mitigation Measure PUB-MM-1 would reduce this potential effect to a less- than-significant level.

Effect PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction

Implementation of the CHP Academy Alternative B may generate up to 11,000 cubic yards of levee material that would require disposal. A portion of the material could be disposed of on site and used for new levee construction, as long as it is suitable material. Disposal of the soil material would occur if soil characteristics make it infeasible for reuse as levee material, or the soil is determined to have contaminants that would require appropriate disposal. Embankment fill material excavated to construct levee improvements would be evaluated for reuse after excavation and prior to disposal. Soil requiring disposal as part of the CHP Academy Alternative B would likely be transported to the Yolo County Central Landfill; however, the location of the landfill used for disposal of spoil material and other construction-related waste may be determined by the construction contractor at the time of construction activity based on capacity, type of waste, and other factors. Only those landfills determined to have the ability to accommodate the construction disposal needs of the CHP Academy Alternative B would be used.

As of fall 2009, the remaining capacity for the Yolo County Central Landfill is 37.1 million cubic yards. Some of the disposed soils may be deemed suitable by the Yolo County Central Landfill for other beneficial uses. These soils would only be temporarily stored at the landfill and would not have an effect on its overcall capacity. The current landfill closure projection is in 2070, which takes into account disposal growth rate, including both beneficial and non-beneficial soil materials. Assuming all of the estimated 11,000 cubic yards of soil would require permanent disposal, CHP Academy Alternative B implementation would represent less than 1% of the remaining capacity of the Yolo County Central Landfill. However, the option of beneficial re-use is likely to reduce the cubic yards of soil that require permanent disposal. These facts would make this effect less than significant. No mitigation is required. (Borrego pers. comm.)

Effect PUB-3: Increase in Emergency Response Times

Emergency access to the project vicinity could be affected by construction of the proposed project, and construction-related traffic could delay or obstruct the movement of emergency vehicles. However, execution of the environmental commitment to develop and implement a traffic control and road maintenance plan, described in Section 2.9.1.9 of Chapter 2, Alternatives, would minimize construction-related effects on emergency response times. This effect would be less than significant. No mitigation is required.

Effect PUB-4: Expansion of Stormwater Drainage Facilities

The operation of the proposed relief wells would result in new flows to the existing stormwater drainage facilities. In the case of CHP Academy Alternative B, there is sufficient capacity in the existing adjacent drainage ditch and pump station to pump the relief well discharge back into the Sacramento Bypass . Implementation of CHP Academy Alternative B would therefore not require the construction of new drainage facilities. This effect would be less than significant. No mitigation is required.

Section 3.16
Public Health and Environmental Hazards—CHP Academy Early Implementation Project

3.16.1 Introduction

This section describes the regulatory and environmental setting for public health and environmental hazards, including hazardous materials, emergency response and evacuation plans, the potential for wildland fires, and health hazards to the public in the city of West Sacramento. The effects on public health and environmental hazards that would result from the proposed project are described, as well as mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- *2030 Countywide General Plan* for Yolo County (Yolo County 2009)
- *West Sacramento General Plan Policy Document* (City of West Sacramento 1990)
- *West Sacramento EIP, Yolo County* (Environmental Data Resources 2007)

3.16.2 Affected Environment

This section describes the affected environment for public health and environmental hazards in the CHP Academy EIP project area, including regulatory and environmental settings.

3.16.2.1 Regulatory Setting

3.16.2.1.1 Federal

The principal Federal regulatory agency responsible for the safe use and handling of hazardous materials is the EPA. Two key Federal regulations pertaining to hazardous wastes are described below. Other applicable Federal regulations are contained primarily in CFR Titles 29, 40, and 49.

The following Federal policies related to public health and environmental hazards may apply to the implementation of The Rivers EIP.

Resource Conservation and Recovery Act

The Federal Resource Conservation and Recovery Act enables the U.S. Environmental Protection Agency (EPA) to administer a regulatory project that extends from the manufacture of hazardous materials to their disposal, thus regulating the generation, transportation, treatment, storage, and disposal of hazardous waste at all facilities and sites in the nation.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund) was passed to facilitate the cleanup of the nation's toxic waste sites. In 1986, the act was amended by the Superfund Amendment and Reauthorization Act Title III (community right-to-know laws). Title III states that past and present owners of land contaminated with hazardous substances can be held liable for the entire cost of the cleanup, even if the material was dumped illegally when the property was under different ownership.

3.16.2.1.2 State

California regulations are equal to or more stringent than Federal regulations. EPA has granted the State of California primary oversight responsibility to administer and enforce hazardous waste management programs. State regulations require planning and management to ensure that hazardous wastes are handled, stored, and disposed of properly to reduce risks to human and environmental health. Several key laws pertaining to hazardous wastes, emergency services, and mosquito abatement are discussed below.

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act, also known as the Business Plan Act, requires businesses using hazardous materials to prepare a plan that describes their facilities, inventories, emergency response plans, and training programs. Hazardous materials are defined as unsafe raw or unused material that is part of a process or manufacturing step. They are not considered hazardous waste. Health concerns pertaining to the release of hazardous materials, however, are similar to those relating to hazardous waste.

Hazardous Waste Control Act

The Hazardous Waste Control Act created the state hazardous waste management program, which is similar to but more stringent than the Federal Resource Conservation and Recovery Act program. The act is implemented by regulations contained in Title 26 CCR, which describes the following elements required for the proper management of hazardous waste:

- identification and classification;
- generation and transportation;
- design and permitting of recycling, treatment, storage, and disposal facilities;
- treatment standards;
- operation of facilities and staff training; and
- closure of facilities and liability requirements.

These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the Hazardous Waste Control Act and Title 26, the generator of hazardous waste must complete a manifest that accompanies the waste from generator to transporter to the ultimate disposal location. Copies of the manifest must be filed with the California Department of Toxic Substances and Control.

Emergency Services Act

Under the Emergency Services Act, the state developed an emergency response plan to coordinate emergency services provided by Federal, state, and local agencies. Rapid response to incidents involving hazardous materials or hazardous waste is an important part of the plan, which is administered by the California Office of Emergency Services. The office coordinates the responses of other agencies, including EPA, the California Highway Patrol, regional water quality control boards, (RWQCBs), air quality management districts, and county disaster response offices.

3.16.2.1.3 Local

The following local policies related to public health and environmental hazards may apply to the implementation of The Rivers EIP.

Yolo County

The Health and Safety Element of the *2030 Countywide General Plan* for Yolo County (Yolo County 2009) contains goals, policies, and actions aimed at reducing the risk associated with natural and human-made hazards within the county. Any violation of these goals, policies, and actions would constitute a significant effect.

Goals

GOAL HS-2: Flood Hazards. Protect the public and reduce damage to property from flood hazards.

Policies

Policy HS-2.2: Ensure and enhance the maintenance and integrity of flood control levees.

Policy HS-2.3: Actively update and maintain policies and programs to ensure consistency with state and Federal requirements.

Actions

Action HS-A5: Require a minimum of 100-year flood protection for new construction, and strive to achieve 200-year flood protection for unincorporated communities where such levels of protection are not provided, require new development to adhere to the requirements of state law and the County Flood Damage Prevention Ordinance.

Action HS-A14: Require a minimum 50-foot setback for all permanent improvements from the toe of any flood control levee.

Action HS-A16: Support the efforts of levee maintenance districts with efforts to secure state and federal funding for geotechnical studies of levees and implementation of associated improvements.

Action HS-A17: Encourage flood hazard reduction projects along the Sacramento River to be consistent with the guidelines of the Sacramento River Corridor Floodway Management Plan.

Action HS-A18: Coordinate with local, state and federal agencies to define existing and potential flood problem areas, including the possible effects associated with global climate change, and to maintain and improve levees and other flood control features.

Action HS-A19: Develop a detailed maintenance and funding plan for levees under County control, to ensure that levee safety is maintained.

Action HS-A20: Support and encourage responsible agencies to site new levees or major rehabilitation of levees at a distance from the river and from existing levees, where feasible. This would provide a degree of redundancy in the system, increase the land available for habitat and flood storage, reduce operation and maintenance costs, and help to ensure the integrity of the structures.

Action HS-A22: Ensure that the upgrade, expansion, or construction of any flood control levee demonstrates that it will not adversely divert flood water or increase flooding.

Action HS-A24: Improve the county's classification within the Federal Emergency Management Agency Community Rating System.

Action HS-A29: Pursuant to Section 8201 of the State Water Code, develop local plans for flood protection, including analysis of financing options to construct and maintain any needed improvements, to address how 100-year floodplain protection for each community may be provided. Those communities that are economically disadvantaged shall have priority in developing flood protection plans. The cities shall be consulted in development of the plans, which shall be consistent with the Central Valley Flood Protection Plan.

City of West Sacramento General Plan

The Central Valley Flood Protection Plan requires 200-year flood protection by the year 2025. The time and effort required to fully evaluate approximately 50 miles of levees, develop recommended strategies for improvement, and implement those improvements prompted action without further delay. In addition, within its General Plan, the City adopted a goal of achieving 200-year flood protection. The Health and Safety Section of the *City of West Sacramento General Plan Policy Document* (City of West Sacramento 1990) contains goals and policies aimed at reducing the risks associated with natural and human-made hazards within the county. Any violation of these goals and policies would constitute a significant effect.

Goal A: To prevent loss of life, injury, and property damage due to geologic and seismic hazards.

Policy 1: The City shall require preparation of geotechnical reports and impose appropriate mitigation measures to ensure, within the limits of technical and economic feasibility, that new structures are able to withstand the effects of seismic activity, including liquefaction.

Policy 3: The City shall request that responsible agencies regularly inspect and repair area levees, as needed, to ensure structural integrity in the event of seismic activity.

Goal B: To prevent loss of life, injury, and property damage due to flooding.

Policy 8: The City shall cooperate with area reclamation districts and other responsible agencies in the maintenance and improvement of levees and drainage channels.

Policy 9: The City shall support state and federal legislation which provides funding for the construction of flood control improvements in urbanized areas.

Policy 10: the City shall discourage uses that promote the erosion or structural deterioration of levees.

Goal C: To prevent loss of life, injury, and property damage due to wildland, cropland, and structural fires, explosions and release of hazardous materials.

Goal D: To ensure that City emergency response procedures are adequate in the event of natural or man-made disasters.

West Sacramento Area Flood Control Agency

WSAFCA is a Joint Powers Authority created in 1994 through a Joint Exercise of Powers Agreement by the City, RD 900, and RD 537. WSAFCA was established to coordinate the planning and construction of flood protection facilities and to finance the local share of flood control projects. WSAFCA is responsible for the operations and maintenance of the detention basins, pump stations, and levees that protect the city.

3.16.2.2 Environmental Setting

This section discusses the environmental setting related to public health and environmental hazards in the CHP Academy EIP project area.

3.16.2.2.1 Hazardous Materials

Hazardous materials are chemicals and other substances defined as hazardous by Federal and state laws and regulations. In general, these materials are substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may have harmful effects on public health or the environment during their use or when released to the environment. Hazardous materials also include waste chemicals and spilled materials. Hazardous materials occur in common contexts, including:

- pesticides, herbicides, and fertilizers;
- petroleum hydrocarbons;
- underground storage tanks;
- contaminated debris;
- lead;
- wastewater;
- pits or ponds;
- stormwater runoff structures; and
- transformers that may contain polychlorinated biphenyls (PCBs).

The West Sacramento EIP Environmental Data Resources report (Appendix I) noted no known occurrences of hazardous materials at the CHP Academy EIP project area.

3.16.2.2.2 Wildland Fires

The area surrounding the CHP Academy EIP project site is not considered a fire-prone area.

3.16.2.2.3 Emergency Response and Evacuation

Emergency response and evacuation services for the project area are provided by the various departments in the City of West Sacramento and through Yolo County Sheriff, Fire, and Emergency Services Departments. The City of West Sacramento and Reclamation District (RD) 537 have entered a joint flood operation agreement. The agreement has established procedures to protect the health, safety, welfare and property of the residents and landowners in the project area. Procedures described in the agreement document consist of flood preparedness, information management, monitoring, flood fighting, and flood evacuation.

3.16.2.2.4 Schools

There are no schools located within 0.25 mile of the CHP Academy EIP project area. This is relevant because the State CEQA Guidelines advise that hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school could constitute a significant environmental effect.

3.16.3 Environmental Consequences

This section describes the environmental consequences relating to public health and environmental hazards for the proposed CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.16.3.1 Assessment Methods

The evaluation of potential effects on public health and environmental hazards addresses the potential for health and safety hazards during construction of the CHP Academy EIP. The analysis includes evaluation of (1) the potential effects related to construction activities on workers, and (2) general safety of and hazards to both workers and the public posed by the construction and implementation of the levee alternatives.

3.16.3.2 Determination of Effects

Criteria used for determining the significance of an effect on public health and environmental hazards are based on the environmental checklist included in Appendix G (14 CCR 15000 *et seq*.) of the State CEQA Guidelines as well as professional standards and practices. The proposed project was considered to cause a significant effect if it would:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials to the environment;
- emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school;
- be located on a site that is on a list of hazardous materials sites compiled pursuant to California Government Code 65962.5, and as a result would create a significant hazard to the public or the environment;
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- place within a 100-year flood hazard area structures that would impede or redirect flood flows;

- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- significantly affect drinking water quality.

3.16.4 Effects and Mitigation Measures

3.16.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to public health and environmental hazards would occur.

Without improvements to the CHP Academy EIP site, the risk of levee failure would remain high. A levee failure in the city's levee system could result in flooding that could upset stored hazardous materials and spread agricultural pesticides, oil, gasoline, and other hazardous materials in flood waters, creating hazardous conditions for the public and the environment. Flood damage to homes and other structures can render them dangerous as a result of structural damage and contamination. Electrical systems could be damaged by flooding, posing the potential of fires, and natural gas leaks could result poisoning through inhalation of fumes, or could cause a sudden explosion if sparked. The likelihood of a significant amount of mold production is high after a flood event. Mold not only threatens the physical integrity of structures, but also poses its own health risks. Mold can cause lung infections, skin irritations, and other health dangers, especially for those with asthma, allergies, or suppressed immune systems. Additionally, the floodwaters themselves and ponds left behind could provide a wide breeding ground for mosquitoes, and the incidence of West Nile Virus and other diseases would likely increase.

Effects on the water supply system could be particularly severe in a flood event, as a single break in a water delivery pipe or main could contaminate the entire city's water supply. All breaks and leaks would need to be repaired and the pipes of every house would need to be flushed to remove contamination before residents and businesses could rely on safe water. Depending on the severity and location of the flooding and contamination, this effort could take a significant amount of time.

Varying levels of damage could be done to public service structures as well, causing delays in fire protection, police protection, or emergency medical assistance. A major flood event could also stress the region's emergency response and hospital services, as the likelihood of injury resulting from the flood event is high, and evacuees may not have access to their regular medications.

However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related risks cannot be predicted. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible.

3.16.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on public health and environmental hazards. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
PH-1: Incidental Release of Hazardous Materials during Construction	Less than significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
PH-2: Exposure to Hazardous Materials Encountered at Project Site	Significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering PH-MM-1: Complete Phase I and Phase II (If Necessary) Environmental Site Assessment Investigations and Implement Required Measures
PH-3: Safety Hazards from the Construction Site and Vehicles	Less than significant	N/A	N/A
PH-4: Protection of People or Structures from Flood Hazards	Beneficial	N/A	N/A

Effect PH-1: Incidental Release of Hazardous Materials during Construction

CHP Academy APA implementation would require the use of hazardous materials such as fuels and lubricants to operate construction equipment and vehicles such as excavators, compactors, haul trucks, and loaders. Bentonite (a non-hazardous material) would be transported to sites where slurry cutoff wall construction would occur. Construction contractors would be required to use, store, and transport hazardous materials in compliance with Federal, state, and local regulations during project construction. However, fuels, and lubricants could be accidentally released into the environment at the construction site and along haul routes, causing environmental or human exposure to these hazards. Risks to water quality (surface, ground, and drinking water) associated with incidental release of these materials are addressed in Section 3.2, Water Quality and Groundwater Resources.

As discussed in Section 2.7, Chapter 2, Alternatives, the implementation of environmental commitments, including a stormwater pollution protection plan (SWPPP), a bentonite slurry spill contingency plan (BSSCP), a spill prevention control and countermeasures plan (SPCCP), and the implementation of Mitigation Measures WQ-MM-1 and WQ-MM-2, would ensure that the risk of accidental spills and releases into the environment would be minimal and that the effect on water quality would be less than significant.

In addition, WSAFCA would be required to comply with applicable Federal, state, and local laws, which would reduce the potential for accidental release of hazardous materials during their transport and use. Consequently, the risk of incidental release of hazardous materials during their transport and use in CHP Academy APA construction activities is low and the effect is considered less than significant.

Mitigation

Mitigation Measure WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality

If an appreciable spill has occurred and results determine that project activities have significantly affected surface or groundwater quality, a detailed analysis will be performed by a registered environmental assessor or professional engineer to identify the likely cause of contamination. This analysis will conform to American Society for Testing and Materials (ASTM) standards and will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, WSAFCA and its contractors will select and implement measures to control contamination, with a performance standard that surface water quality and groundwater quality must be returned to baseline conditions.

Mitigation Measure WQ-MM-2: Implement Provisions for Dewatering

Before discharging any dewatered effluent to surface water, WSAFCA or its contractors will obtain a Low Threat Discharge and Dewatering NPDES permit from the Central Valley RWQCB. Depending on the volume and characteristics of the discharge, coverage under the Central Valley RWQCB's NPDES General Construction Permit or General Dewatering Permit is possible. As part of the permit, the permittee will design and implement measures as necessary so that the discharge limits identified in the relevant permit are met. For example, if dewatering is needed during the construction of the slurry wall, then the Low Threat Discharge and Dewatering NPDES permit would require proper disposal of the water. As a performance standard, these measures will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable. Implemented measures may include the retention of dewatering effluent until particulate matter has settled before it is discharged, use of infiltration areas, and other BMPs. Final selection of water quality control measures will be subject to approval by WSAFCA.

WSAFCA will verify that coverage under the appropriate NPDES permit has been obtained before allowing dewatering activities to begin. WSAFCA or its agent will perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained. WSAFCA will notify its contractors immediately if there is a non-compliance issue and will require compliance.

Effect PH-2: Exposure to Hazardous Materials Encountered at Project Site

There is the potential that known or previously undocumented hazardous materials could be encountered at the CHP Academy APA project site. Excavation and construction activities at or near areas of currently unrecorded soil or groundwater contamination could result in the exposure of construction workers, the general public, and the environment to hazardous materials such as petroleum hydrocarbons, pesticides, herbicides, fertilizers, contaminated debris, or elevated levels of other chemicals that could be hazardous. At this time, there are no known occurrences of hazardous materials at the CHP Academy APA project area. However, construction activities in the vicinity of potentially unknown recognized environmental concerns could result in public health hazards.

Implementation of Mitigation Measures PH-MM-1, described below, and WQ-MM-1, and WQ-MM-2 described in Section 3.2, Water Quality and Groundwater Resources, and the implementation of environmental commitments of a SWPPP, a BSSCP, and SPCCP, as described in Section 2.7 of

Chapter 2, Alternatives, would ensure that the effect on public health and the environment would be less than significant.

Mitigation

Mitigation Measure WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality

Mitigation Measure WQ-MM-2: Implement Provisions for Dewatering

Mitigation Measure PH-MM-1: Complete Phase I and Phase II (If Necessary) Environmental Site Assessment Investigations and Implement Required Measures

WSAFCA will conduct Phase I environmental site assessments (ESAs) and, if necessary, Phase II ESAs or other appropriate testing. If necessary, the assessment will include an analysis of soil or groundwater samples for the potential contamination sites that have not yet been covered by previous investigations before construction activities begin.

Recommendations in Phase I and Phase II ESAs to address any contamination that is found will be implemented before initiating ground-disturbing activities. In addition, WSAFCA will implement the following measures before ground-disturbing or demolition activities begin, in order to reduce health hazards associated with potential exposure to hazardous substances:

- Prepare a site plan that identifies any necessary remediation activities appropriate for proposed land uses, including excavation and removal of contaminated soils, and redistribution of clean fill material on the project site. The plan will include measures that ensure the safe transport, use, and disposal of contaminated soil and building debris removed from the site, as well as any other hazardous materials. In the event that contaminated groundwater is encountered during site excavation activities, the contractor will report the contamination to the appropriate regulatory agencies, dewater the excavated area, and treat the contaminated groundwater to remove contaminants before discharge into the sanitary sewer system. The contractor will be required to comply with the plan and applicable Federal, state, and local laws.
- Retain licensed contractors to remove all underground storage tanks.
- Notify the appropriate Federal, state, and local agencies if evidence of previously undiscovered soil or groundwater contamination is encountered during construction activities. Any contaminated areas will be cleaned up in accordance with the recommendations of Yolo County Environmental Health Division, Central Valley RWQCB, California Department of Toxic Substances Control, or other appropriate Federal, state or local regulatory agencies.
- Prepare a worker health and safety plan before the start of construction activities that indentifies, at a minimum, all contaminants that could be encountered during construction activity; all appropriate worker, public health, and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a site safety officer. The plan will describe actions to be taken should hazardous materials be encountered on site, including protocols for handling hazardous materials and preventing their spread, and emergency procedures to be taken in the event of a spill.

Effect PH-3: Safety Hazards from the Construction Site and Vehicles

Under the CHP Academy APA, construction workers would operate vehicles and other mechanical equipment that, if used improperly, could result in safety hazards at the construction site. WSAFCA would ensure that all workers are properly trained to operate equipment. Safety precautions would be followed at all times during construction to avoid accidents. WSAFCA also would require that all workers have a valid driver's license and insurance. These measures would ensure that this effect would be less than significant.

In addition, people may walk, ride bicycles, or otherwise use the levee during the construction period. The staging of the equipment when construction is not underway (i.e., weekends, holidays, or overnight, if construction is not performed 24 hours per day) may pose a threat to public safety if the equipment is not properly secured. Proper signage and detours would be provided as stated in the environmental commitment to provide notification of construction area closure (described in Section 2.7, Chapter 2, Alternatives). These measures would reduce the risk to the public when construction is underway and when it is not. Therefore, this effect would be less than significant. No mitigation is required.

Effect PH-4: Protection of People or Structures from Flood Hazards

All levees have the potential to fail, regardless of design. The U.S. Army Corps of Engineers (USACE) has set forth guidelines for levee design. Under the CHP Academy APA, the Sacramento Bypass Levee would be improved using methods that meet engineering requirements set forth by both USACE and the Reclamation Board. In addition, this levee would be improved to meet Federal Emergency Management Administration (FEMA) 200-year flood protection certification. This would be an improvement compared to the existing level of flood protection. Therefore, this effect would be beneficial.

3.16.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on public health and environmental hazards. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
PH-1: Incidental Release of Hazardous Materials during Construction	Less than significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
PH-2: Exposure to Hazardous Materials Encountered at Project Site	Significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering PH-MM-1: Complete Phase I and Phase II (If Necessary) Environmental Site Assessment Investigations and Implement Required Measures
PH-3: Safety Hazards from the Construction Site and Vehicles	Less than significant	N/A	N/A
PH-4: Protection of People or Structures from Flood Hazards	Beneficial	N/A	N/A

Effect PH-1: Incidental Release of Hazardous Materials during Construction

CHP Academy Alternative B implementation would require the use of hazardous materials such as fuels and lubricants to operate construction equipment and vehicles such as excavators, compactors, haul trucks, and loaders. Construction contractors would be required to use, store, and transport hazardous materials in compliance with Federal, state, and local regulations during project construction. However, fuels, and lubricants could be accidentally released into the environment at the construction site and along haul routes, causing environmental or human exposure to these hazards. Risks to water quality (surface, ground, and drinking water) associated with incidental release of these materials are addressed in Section 3.2, Water Quality and Groundwater Resources.

As discussed in Section 3.2, Water Quality and Groundwater Resources, the implementation of environmental commitments, including a SWPPP, an SPCCP, and the implementation of Mitigation Measures WQ-MM-1 and WQ-MM-2, would ensure that the risk of accidental spills and releases into the environment would be minimal and that the effect on water quality would be less than significant.

In addition, WSAFCA would be required to comply with applicable Federal, state, and local laws, which would reduce the potential for accidental release of hazardous materials during their transport and use. Consequently, the risk of incidental release of hazardous materials during their transport and use in CHP Academy Alternative B construction activities is low and the effect is considered less than significant.

Effect PH-2: Exposure to Hazardous Materials Encountered at Project Site

This effect is the same as described above under the CHP Academy APA. There is the potential that known or previously undocumented hazardous materials could be encountered at the CHP Academy Alternative B project site that could result in the exposure of construction workers, the general public, and the environment to hazardous materials. Implementation of Mitigation Measures PH-MM-1, WQ-MM-1, and WQ-MM-2 and the implementation of environmental commitments of a SWPPP and SPCCP, as described in Section 2.7 of Chapter 2, Alternatives, would ensure that the effect on public health and the environment would be less than significant.

Effect PH-3: Safety Hazards from the Construction Site and Vehicles

This effect is the same as described above under the CHP Academy APA. Under implementation of the CHP Academy Alternative B, construction workers would operate vehicles and other mechanical equipment that, if used improperly, could result in safety hazards at the construction site. WSAFCA would ensure that safety precautions would be followed at all times during construction to avoid accidents. This effect would be less than significant. No mitigation is required.

Effect PH-4: Protection of People or Structures from Flood Hazards

This effect is the same as described above under the CHP Academy APA. Under the CHP Academy Alternative B, the Sacramento Bypass Levee would be improved using methods that meet engineering requirements set forth by both USACE and the Reclamation Board. In addition, this levee would be improved to meet FEMA 200-year flood protection certification. This would be an improvement compared to the existing level of flood protection. Therefore, this effect would be beneficial.

Section 3.17
Cultural Resources—
CHP Academy Early Implementation Project

3.17.1 Introduction

This section describes the regulatory and environmental setting for cultural resources, the effects on cultural resources that would result from the proposed project, and mitigation measures that would reduce these effects. This section also discusses the prehistoric, ethnographic, and historic background to better define the context of the cultural resources associated with the study area.

The term *cultural resources* encompasses several types of resources, including archaeological, architectural, and traditional cultural properties (TCPs). Archaeological sites include both prehistoric and historic deposits, as well as submerged resources. Architectural properties are buildings, bridges, and infrastructure. TCPs are those locations of importance to a particular group. TCPs are frequently important to Native American groups because of the function the location serves in traditional ceremonies or other activities such as plant gathering. Cultural resources also include cultural landscapes, defined by McClelland et al. (1995:3) as "a geographic area that historically has been used by people, or shaped and modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features."

3.17.2 Affected Environment

3.17.2.1 Regulatory Setting

3.17.2.1.1 Federal

The following Federal policies related to cultural resources may apply to the implementation of the CHP Academy EIP.

Section 106 of the National Historic Preservation Act

The proposed project would require a permit from the U.S. Army Corps of Engineers (USACE). The permitting Federal agency is required to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations (36 CFR 800). Section 106 of the NHPA requires that, before beginning any undertaking, a Federal agency must take into account the effects of the undertaking on *historic properties* (cultural resources listed or eligible for listing on the National Register of Historic Places [NRHP]) and afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on these actions. The Section 106 process has five basic steps.

1. Initiate the Section 106 process, including the identification of consulting parties, such as Indian tribes.

2. Identify and evaluate cultural resources to determine whether they are historic properties.
3. Assess the effects of the undertaking on historic properties within the area of potential effect (APE).
4. If historic properties may be subject to an adverse effect, the Federal agency, the State Historic Preservation Officer (SHPO), and any other consulting parties (including Native American tribes and the ACHP) continue consultation to seek ways to avoid, minimize, or mitigate the adverse effect. A memorandum of agreement (MOA) is usually developed to document the measures agreed upon to resolve adverse effects. Alternatively, the Federal agency may prepare and execute a programmatic agreement (PA) with the aforementioned parties to comply with 36 CFR 800, particularly in the context of complex undertakings that entail years of implementation actions or where the undertaking's effects on historic properties cannot be well characterized during the planning phase.
5. Proceed in accordance with the terms of the MOA or PA.

Specific regulations regarding compliance with Section 106 state that, although the tasks necessary to comply with Section 106 may be delegated to others, the Federal agency (in this case, USACE) is ultimately responsible for ensuring that the Section 106 process is completed according to statute.

Federal Historic Significance Criteria

For Federal projects, cultural resource significance is evaluated in terms of eligibility for listing in the NRHP. NRHP criteria for eligibility are defined below. To be considered eligible for listing in the NRHP, a property need only meet one, not all, of the significance criteria outlined below.

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association, and that:

A. are associated with events that have made a contribution to the broad pattern of our history;

B. are associated with the lives of people significant in our past;

C. embody the distinct characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. have yielded, or are likely to yield, information important in prehistory or history (36 CFR 60.4).

3.17.2.1.2 State

The following state policy related to cultural resources applies to the implementation of the CHP Academy EIP. CEQA requires that public agencies that finance or approve public or private projects must assess the effects of the project on cultural resources. CEQA requires that, if a project results in significant effects on important cultural resources, alternative plans or mitigation measures must be considered; only impacts on significant cultural resources, however, need to be mitigated.

Therefore, before the level of significance of effects can be determined and appropriate mitigation measures developed, the significance of cultural resources must be determined. The following steps are normally taken in a cultural resources investigation to comply with CEQA:

1. Identify cultural resources.

2. Evaluate the significance of the cultural resources based on established thresholds of significance.
3. Evaluate the effects of a project on all cultural resources.
4. Develop and implement measures to mitigate the effects of the project on significant cultural resources.

Because the proposed project would be located on non-Federal land in California, it must comply with state laws pertaining to the inadvertent discovery of human remains of Native American origin. The procedures that must be followed if burials of Native American origin are discovered on non-Federal land in California are described in the Effects and Mitigation Measures section, below.

State Historic Significance Criteria

The State CEQA Guidelines define three ways that a cultural resource may qualify as a historical resource for the purposes of CEQA:

1. The resource is listed in or determined eligible for listing in the California Register of Historical Resources (CRHR).
2. The resource is included in a local register of historical resources, as defined in Public Resources Code (PRC) 5020.1(k), or is identified as significant in a historical resource survey meeting the requirements of PRC 5024.1(g), unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
3. The lead agency determines the resource to be significant as supported by substantial evidence in light of the whole record. (14 CCR 15064.5[a].)

For a historical resource to be eligible for listing in the California Register of Historic Resources (CRHR), it must be significant at the local, state, or national level under one or more of the following criteria from 14 CCR 15064.5(a)(3)(A–D).

1. It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. It is associated with the lives of persons important in our past.
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual or possesses high artistic values.
4. It has yielded, or may be likely to yield, information important in prehistory or history.

Historical resources automatically listed in the CRHR include those historic properties listed in, or formally determined to be eligible for listing in, the NRHP (PRC 5024.1).

In addition, CEQA distinguishes between two classes of archaeological resources: archaeological sites that meet the definition of a historical resource as defined above and "unique archaeological resources." An archaeological resource is considered unique if it:

- is associated with an event or person of recognized significance in California or American history or of recognized scientific importance in prehistory;
- can provide information that is of demonstrable public interest and is useful in addressing scientifically consequential and reasonable research questions; or

- has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind (PRC 21083.2).

Resources that qualify as unique archaeological resources also meet at least one of the CRHR criteria. It is current professional practice, therefore, to address the importance or significance of cultural resources by determining solely whether it qualifies as a historical resource, without the expressed distinction or determination as to its status as a unique archaeological resource. For the purposes of this project, significant cultural resources as defined by CEQA are defined as those resources that meet at least one of the CRHR eligibility criteria.

3.17.2.1.3 Local

The following local policies related to cultural resources may apply to the implementation of the CHP Academy EIP.

Yolo County General Plan

Yolo County strives to encourage the enhancement of cultural quality and education in Yolo County through the development of goals, objectives, and policies that the county has established in the Historic Preservation Element of the *Yolo County General Plan*, Part 1 (adopted July 1983) to preserve County history and historical sites.

HP 1—Goal: Yolo County shall support the preservation and enhancement of historic and prehistoric resources within the County when fiscally able.

HP 2—Objectives:

2.1: To preserve Yolo County's natural resources with historical significance by designating certain natural resources such as trees and vegetation as "historic" and by supporting a program to preserve them.

2.2: To preserve Yolo County's prehistoric resources by identifying and preserving Native American sites and other significant archaeological sites and by encouraging development of demonstration sites.

Yolo County adopted the following actions as means for helping achieve its goal and objectives:

- Identification of historic resources within the County;
- Recording the historic resources identified in the 1986 Yolo County Historic Resources Survey on the general plan map and maintenance and updating of the map for planning purposes;
- Adoption of a Historic Preservation Ordinance and the establishment of a Yolo County Historic Preservation Commission;
- Support for the conversion of older residential structures in commercial zones to commercial or office use and of older historically significant structures in agricultural areas to tourist uses through the use permit process while maintaining or enhancing their historical authenticity;
- Encouragement of County efforts to seek financing for the preservation of the County's historic resources;

- To encourage the property owners to revitalize their properties through incentives such as utilizing the Historic Building Code, easements, state and Federal tax exemptions as well as seeking Community Development Block Grant funds.

2.4: To promote museums to preserve the prehistorical, historical and agricultural heritage of Yolo County by the following actions:

- Continued support for the Yolo County Historic Museum;
- Promotion of museums within historic structures;
- Support for establishment of additional museums in the County.

2.5: To preserve the historical records of Yolo County and make them accessible to the public by maintaining the Yolo County Archives.

City of West Sacramento General Plan

The City of West Sacramento has adopted policies for identifying, evaluating and protecting historical resources in their general plan (revised and adopted December 2004) Section V Recreational and Cultural Resources Goals and Policies.

Goal F: To preserve and enhance West Sacramento's historical heritage.

Policies:

1. The City shall set as a high priority the protection and enhancement of West Sacramento's historically and architecturally significant buildings.
2. The City shall establish a historic district in the Old Broderick area and develop standards for preservation and rehabilitation of historic structures and compatible infill development.
3. The City shall cooperate in the expansion and updating of the Yolo County Historical Resources Survey.
4. The City shall work with property owners in seeking registration of historical structures and sites as State Historic Landmarks or listing on the National Register of Historic Places.
5. The City and Redevelopment Agency shall support the efforts of property owners to preserve and renovate historic and architecturally significant structures. Where such buildings cannot be preserved intact, the City shall seek to preserve the building façades.
6. Structures of historical, cultural, or architectural merit which are proposed for demolition shall be considered for relocation as a means of preservation. Relocation within the same neighborhood or to another compatible neighborhood shall be encouraged.
7. New development near designated historic landmark structures and sites shall be designed to be compatible with the character of the designated historic resource.
8. The City shall explore the possibility of establishing a city cultural center which might include a historical museum and an art gallery.
9. The City shall consider developing and maintaining the Stone Lock as a point of historical interest.

Goal G: To protect West Sacramento's Native American heritage.

Policies:

1. The City shall refer development proposals that may adversely affect archaeological sites to the California Archaeological Inventory, Northwest Information Center, at Sonoma State University.[1]
2. The City shall not knowingly approve any public or private project that may adversely affect an archaeological site without first consulting the California Archaeological Inventory [*sic*], Northwest Information Center, conducting a site evaluation as may be indicated, and attempting to mitigate any adverse effects according to the recommendations of a qualified archaeologist. City implementation of this policy shall be guided by Appendix K of the State CEQA Guidelines.[2]
3. Archaeological sites shall be protected by means of requirements in development permits requiring on-site monitoring by qualified personnel of excavation work in areas identified as archaeologically sensitive. Development work shall be required to cease in any place where artifacts or skeletal remains have been discovered until these have been examined and evaluated by a qualified archaeologist and arrangements have been made to avoid or otherwise protect valuable resources.

3.17.2.2 Environmental Setting

This section discusses the environmental setting related to cultural resources in the project study area for the CHP Academy EIP including the records searches and field survey methods used to evaluate cultural resource conditions, and a summary of known cultural resources.

3.17.2.2.1 Prehistoric Context

Although the Sacramento Valley may have been inhabited by humans as early as 10,000 years ago, the evidence for early human occupation is likely buried by deep alluvial sediments that accumulated rapidly during the late Holocene Epoch. Although rare, archaeological remains of this early period allegedly have been identified in and around the Central Valley. Johnson (1967:283–284) presents evidence for some use of the Mokelumne River area, under what is now Camanche Reservoir, during the late Pleistocene Epoch. These archaeological materials and similar materials in the region have been termed the Farmington Complex. Recent work in the vicinity of Camanche Reservoir, however, calls into question whether Farmington Complex exceeds an age of 10,000 Before Present (B.P.) (Rosenthal et al. 2007:151).

Preliminary results from Tremaine & Associates' recent excavations at Sacramento City Hall (Sacramento City Hall overlies the Nisenan village of Sacum' ne, CA-SAC-38) reveal the earliest confirmed habitation of the immediate Sacramento vicinity. Obsidian hydration readings on artifacts may represent use of the site from 3000–8000 B.P. Tremaine & Associates also ran three radiocarbon assays, which yielded conventional dates of 5870, 6690, and 6700 B.P. The radiocarbon assays were taken between 9.8 feet and 11.5 feet below ground surface (Tremaine 2008:99–101).

[1] Note: the name of the California Archaeological Inventory has been changed to California Historical Resources Inventory System.
[2] Appendix K no longer applies to cultural resources and the text within the original Appendix K has been stricken from CEQA statutes.

Later periods of prehistory are better understood because of their more abundant representation in the archaeological record. Fredrickson (1973) identified three general patterns of cultural manifestations for the period between 4,500 and 100 B.P.: the Windmiller, Berkeley, and Augustine Patterns.

The Windmiller Pattern (4500–2800 B.P.) shows evidence of a mixed economy consisting of the generalized hunting of game, fishing, and use of wild plant foods. Settlement strategies during the Windmiller period reflect seasonal occupation of valleys during the winter and of the foothills during the summer (Moratto 1984:201, 206).

Cultural changes are manifested in the Berkeley Pattern (3500–2500 B.P.). Technological changes in groundstone from handstones and milling slabs to the mortar and pestle indicate a greater dependence on acorns, and the presence of a wide variety of projectile points and atlatls indicates hunting was still an important activity (Fredrickson 1973).

The Berkeley Pattern was superseded by the Augustine Pattern around 1450 B.P., and reflects a change in subsistence and land use patterns similar to those of the ethnographically known people of the proto-historic era. This pattern exhibits a great elaboration of ceremonial and social organization, including the development of social stratification. Elaborate exchange systems, further reliance on acorns, and a wide variety of artifacts (flanged tubular smoking pipes, harpoons, clamshell disc beads, and an especially elaborate baked clay industry, which included figurines and pottery vessels called Cosumnes Brownware) are associated with the Augustine Pattern. Increased village sedentism, population growth, and an incipient monetary economy are also hallmarks of this pattern. (Moratto 1984:211, 213)

3.17.2.2.2 Ethnographic Context

The project vicinity is located at the interface of three Native American groups: the Patwin (or Wintun), the Nisenan, and the Plains Miwok. The banks of the Sacramento River and associated riparian and tule marshland habitats were inhabited by the River or Valley Patwin. The Plains Miwok and Nisenan (also called Southern Maidu), while primarily occupying territories east of the Sacramento River, used land west of the river as well (Johnson 1978:350, Figure 1; Levy 1978:Figure 1; Wilson and Towne 1978:Figure 1).

The material culture and settlement-subsistence behavior of these groups exhibit similarities, likely because of historical relationships and a shared natural environment. Historic maps and accounts of early travelers to the Sacramento Valley testify that tule marshes, open grasslands, and occasional oak groves (Jackson 1851; Ord 1843; Wyld 1849) characterized the project vicinity. The area was generally wet in the winter and often subject to flooding; the weather was exceedingly dry in summer. Much of the floodplain was presumably sparsely inhabited, and Native Americans typically situated their larger, permanent settlements on high ground along the Sacramento and American Rivers (Bennyhoff 1977; Kroeber 1925:351, 1932; Levy 1978:; Wilson and Towne 1978:388).

The Native American economy in the project vicinity was based principally on the use of natural resources from the riparian corridors, wetlands, and grasslands adjacent to the Sacramento River. Fish, shellfish, and waterfowl were important sources of protein in the diet of these groups (Johnson 1978:355; Kroeber 1932). Salmon, sturgeon, perch, chub, sucker, pike, trout, and steelhead were caught with nets, weirs, lines and fishhooks, and harpoons. Mussels were harvested from the gravels along the Sacramento River channel. Geese, ducks, and mudhens were hunted using decoys and various types of nets. The majority of important plant resources in the Patwin diet came from the grasslands of the Sacramento River floodplain (Stevens 2004a:Table 1). Plants important to California Indians were also obtained from and managed in valley wetlands (Stevens 2004b:7). In addition to the staple acorn, a number of plants were important secondary food sources, including sunflower, wild oat, alfalfa, clover, and bunchgrass (Johnson 1978:355).

3.17.2.2.3 Historic Context

Early History

The project area is located in Yolo County, one of the original 27 counties created when California became a state in 1850. Woodland serves as the county seat of Yolo County. (Hoover et al. 2002:566.)

Spanish explorers visited Yolo County as early as the 1700s in their search for suitable inland mission sites. In 1772, Pedro Fages passed through San Francisco Bay and the Delta and reached the San Joaquin and Sacramento Rivers. Between 1793 and 1817, several other mission site reconnaissance expeditions were conducted. The first European American to travel through the area was Jedediah Strong Smith who, in the late 1820s, reported to the Hudson’s Bay Company on the quantity and quality of furs in California. Joseph Walker and Ewing Young, during separate excursions, followed his general path in the 1830s. Mexican, American, and European settlers began to arrive and set down roots within the bounds of present-day Yolo County in the 1840s and 1850s (Hoover et al. 2002:566–567).

Sacramento River

The Sacramento River played an important role in the development of Yolo and Solano Counties prior to and including Euroamerican occupation of the region. The river was a convenient landmark for the early explorations that also facilitated reconnaissance of the Sacramento Valley. The Spanish, in 1817, were the first Europeans to traverse the portion of Sacramento River that passes through the project study area, having made an exploratory boat trip up the river as far as its confluence with the Feather River (Goldfried 1988:8). This expedition was followed by a series of Spanish, Russian, British, and American land and water forays up the Sacramento River from the 1820s through 1840s (Goldfried 1988:8–9).

River traffic through the project study area became more frequent between 1839 and 1848 with the establishment of John Sutter’s fort at his New Helvetia Rancho, as well other settlements upriver hosted by Peter Lassen, John Sinclair, John Bidwell’s, and others (Goldfried 1988:9; Lydecker and James 2009:9; Sutter et al. 1996 [1845–1848]:1–3). The 1848 gold discovery at Coloma, however, was responsible for the vast increase in Sacramento River traffic in the project study area through the 1850s, as Sutter’s embarcadero, at what is now Old Sacramento, served as the principal point of departure for persons and goods headed for the Sierra Nevada diggings. Crews frequently abandoned their ships at the embarcadero during the Gold Rush, leaving them to sink or be converted by others into warehouses, stores, and hotels on the river. (Goldfried 1988:11.)

The city of Sacramento and the communities of Washington and Riverbank/Bryte provided a lasting draw to river traffic through the 1920s because water transportation was a convenient and efficient way to move large amounts of goods and people to and from San Francisco and points beyond. River transportation from the mid-19th century through the early 20th century resulted in numerous marks along the river corridor, including ferries, wharves, shipwrecks, and numerous communities (Lydecker and James 2009:28, Figure 2-2).

Yolo County

The decline of the California Gold Rush resulted in disenchanted miners who realized they could make a greater fortune through farming and ranching rather than gold prospecting, transforming Yolo County from an isolated farming community into a booming agricultural region. Through both the mid-19th and 20th centuries, Yolo County commerce was generally agrarian in focus, the main crops being wheat, barley, and other grains. Commercial enterprises related to agriculture and livestock also sprang up during this period, furthering the development and growth of the region (Larkey and Walters 1987).

Settlement

Yolo County's first town was Fremont, founded in 1849 near the confluence of the Sacramento and Feather Rivers (south of present-day Knights Landing). It became the first county seat in 1850. After the damaging flood of 1851, the county seat was moved to the town of Washington (now part of present-day West Sacramento). Between 1857 and 1861, the county seat moved from Washington to Cacheville (present day Yolo) and back to Washington. However, in 1862, more flooding episodes had motivated the community voters to select the centrally located town of Woodland as the permanent county seat. (Hoover et al. 2002:566, 568–569.)

Present-day West Sacramento experienced little growth until the early 1900s when levee construction along the Sacramento River encouraged settlement and development of the area. Early settlers included Jan Lows de Swart (holder of the Rancho Nueva Flandria land grant), and James McDowell. In 1911, the West Sacramento Company laid out the community of Riverbank (later called Bryte) just west of the Sacramento River. Shortly thereafter, plans were underway for the establishment of the town of West Sacramento. (Corbett 1993; Hoover et al. 2002: 568.)

Irrigation

Between 1911 and 1918, hundreds of miles of levees were constructed in order to control flooding in the Sacramento Valley. As early as 1892, farmers of Yolo County came together to construct levees along the Sacramento River from the town of Washington to roughly 9 miles downstream. In March 1911, the Sacramento Land Company (formerly the West Sacramento Land Company) assisted with the establishment of Reclamation District (RD) 900 in what is now West Sacramento. The formation of this district created a framework for using public funds through bonds, levies, and taxes to drain the land (Corbett 1993; Walters 1987).

Under the direction of civil engineers Haviland & Tibbetts, formation of RD 900 began. The district spanned 11,500 acres from the east-west line of the Southern Pacific Railroad (SPRR) tracks, south to the vicinity of Riverview. Construction involved installing drainage canals, levees, and pumphouses. The canals carried drainage to the pumphouses, which, in turn, moved the water over the levees into the Yolo Bypass. As the land was drained of water, the fields of tules were removed, establishing acres of agricultural land (Corbett 1993). Reclamation districts such as RD 900 frequently result in historically and functionally cohesive, patterned modifications of rural areas through their networks of irrigation works, roads, boundary markers, and buildings. Such rural historic landscapes have been documented in the Sacramento Valley, some of which—such as RD 1000 in Sacramento and Sutter Counties—have been determined eligible for listing in the NRHP.

(Bradley and Corbett 1995; Jones & Stokes 2004:22; JRP Historical Consulting Services 1994; Peak 1997.)

Following World War I, West Sacramento remained an unincorporated area populated primarily by small farms and a handful of industries. By the 1920s, the main east-west transcontinental highway (U.S. Highway 40, now West Capitol Avenue) extended through West Sacramento; within a few years several hotels and motels were constructed along its route through town. During World War II, factories and other industries began to prosper along the west bank of the Sacramento River. Following the war, the region—like much of the state—experienced a housing boom that would last for several decades (Corbett 1993).

In 1987, after numerous previous attempts, the City of West Sacramento was officially incorporated. The new city included the former communities of Broderick, Bryte, and surrounding urban and rural areas on the west side of the Sacramento River into Southport (Walters 1987).

3.17.2.2.4 Records Search

ICF International (ICF) staff requested a records search in October 2007 at the Northwest Information Center and the North Central Information Center of the California Historical Resources Information System located at Sonoma State University and California State University, Sacramento, respectively. The research consisted of a database search of all previously recorded sites and studies within the study area, established as a 0.25-mile-wide corridor from the center of the river to along both shorelines for the entire length of the study area. The search also consulted the current listings for the NRHP, the CRHR, and pertinent historic inventories and historic maps (Anonymous 1877; Department of Parks and Recreation 1976, 1996; North Central Information Center n.d.; Office of Historic Preservation 2007a:12–14, 2007b:2, 11–14, 31, 2007c:21–70, 2007d:155–157; U.S. Geological Survey 1907, 1908).

The records search resulted in the findings that all of the project area has been surveyed for the presence of cultural resources (Bouey with Herbert 1990; Glover with Bouey 1990; Huberland and Westwood 2001; U.S. Army Corps of Engineers 2006; Wilson 1978). However, only portions of the project area have been surveyed within the last 10 years, necessitating a new survey in support of the proposed project (see Field Survey below).

The records search also resulted in the finding that two known cultural resources are located within the project area: YOL-HRI-8/242 (Sacramento Weir and Sacramento Bypass) and the Sacramento River Levee. No previously recorded resources are located within 0.25 mile of the project area.

3.17.2.2.5 Shipwrecks Database

ICF consulted the California State Lands Commission's Shipwrecks Database (2009) to determine whether historic shipwrecks may be present in the project area. The database was searched by selecting Yolo County in the search field, which generated a list of 12 shipwrecks in Yolo County. The database search yielded latitude and longitude coordinates for 11 of the shipwrecks, which were plotted using an online mapping program (http://www.itouchmap.com/latlong.html) to determine whether any of the shipwrecks were in the project area.

The wreck of the side-wheel steamer *Alviso*, burned at Brytes Bend on December 15, 1920, may be present in the project vicinity (California State Lands Commission 1988:109).

3.17.2.2.6 Field Survey

In October 2007, an ICF archaeologist conducted a reconnaissance-level survey of the project area. Although the records search indicated that the project area had been previously surveyed, an additional reconnaissance review was deemed necessary to confirm the previous findings and to confirm coverage of the entire project area. The project area is located within heavily a developed area of West Sacramento and very little, if any, natural ground surface remains. The project area has been graded, landscaped, and developed. No previously unidentified archaeological resources were noted within the project area as a result of the reconnaissance-level survey.

On February 5 and March 10, 2009, an ICF architectural historian conducted a field survey of the project area. As part of the field process, buildings, structures, and linear features 45 years old[3] or older were inspected, photographed, and documented (see Summary of Known Cultural Resources below).

3.17.2.2.7 Native American Consultation

In January 2008, ICF cultural resources staff contacted the Native American Heritage Commission (NAHC) to request a search of their Sacred Lands File. The NAHC staff responded in January 2008 with a list of Native American contacts for both Yolo and Solano Counties and the results of the sacred lands data base research that was negative for findings in the project area.

The NAHC contact list included the following federally recognized Indian tribes:

- Rumsey Indian Rancheria of Wintun Indians
- Cortina Band of Wintun Indians (including the Wintun Environmental Protection Agency)
- Ione Band of Miwok Indians
- Wilton Miwok Rancheria[4]

The NAHC also provided contact information for the following federally non-recognized Native American individual:

- Kesner Flores

ICF staff sent letters to the Native American contacts on the lists provided by NAHC. The correspondence included a map depicting the project corridor, a brief description of the proposed project, and a request for the contacts to share any knowledge or concerns they may have regarding cultural resources in or adjacent to the study area. ICF received a letter response dated April 2008 from Mr. Marshall McKay, Tribal Chairman for the Rumsey Band of Wintun Indians. Mr. McKay's letter stated his gratitude for the letter notification about the proposed levee alternatives at the CHP Academy EIP site and that he was not aware of any sites of religious or cultural importance in the project area. Mr. McKay also stated that the Rumsey Indian Rancheria of Wintun would like to be notified of any cultural finds unearthed during construction actions. ICF staff placed follow-up

[3] Although the NRHP typically only considers properties that are 50 years or older for listing, the Office of Historic Preservation (1995:2) employs a 45-year threshold for the recordation of cultural resources because "there is commonly a five year lag between resource identification and the date that planning decisions are made."

[4] The Wilton Miwok Rancheria regained federally recognized status on June 8, 2009 (see the *Federal Register* 74[132]:33,468).

telephone calls to the letter recipients on June 5, 2009. Voice messages were left with the contacts. To date, no return phone calls have been received.

3.17.2.2.8 Additional Research and Consultation

In an effort to identify important historic people, events, and trends that may have been associated with the project area, an ICF historian conducted archival research at the California State Library and the California State Archives, Sacramento. ICF also sent project notification letters to the Yolo County Historical Museum, the Yolo County Historical Society, the Sacramento Archives and Museum Collection Center, and the Portuguese Historical and Cultural Society requesting information regarding cultural resources that may be located within the project area. No responses have been received to date.

3.17.2.2.9 Summary of Known Cultural Resources

Three cultural resources 45 years old or older were identified in or immediately adjacent to the project area. These consist of HRI-8/242 (Sacramento Weir and Sacramento Bypass), the Sacramento River Levee, and a segment of the Sacramento Northern Railroad. HRI-8/242 is eligible for NRHP and CRHR listing (Les 1986; Jones & Stokes 2007:13). The two remaining resources (the levee and railroad segment) were evaluated for the NRHP and CRHR as part of this project. The results of the survey and evaluation of the architectural resources are documented in the technical report prepared for this project (ICF International 2010) and are summarized below.

HRI-8/242 (the Sacramento Weir and Sacramento Bypass)

The Sacramento Weir and Sacramento Bypass were constructed between 1916 and 1918 as part of the Sacramento Flood Control Project. The weir is located immediately adjacent to the proposed project on the west bank of the Sacramento River. The Sacramento Bypass is a diversion channel that extends nearly 2 miles west from the weir and Sacramento River. Earthen levees are located on either side of the bypass. The weir and bypass have been determined to be eligible under NRHP Criterion A and CRHR Criterion 1 for their role in Sacramento Valley flood control efforts (Jones & Stokes 2007:5; Les 1986:2; Office of Historic Preservation 2007:14).

Sacramento River Levee

A segment of the Sacramento River Levee is located in the project area. The Sacramento River Levee is an earthen levee extending in a roughly north-south direction along the west bank of the Sacramento River. The Sacramento River Levee is part of a conglomeration of water control structures constructed in the Sacramento Valley between the mid-19th and mid-20th century as a response to heavy flooding in the area, which occurred repeatedly between the 1850s and early 1910s. Construction and improvements on the levee began as early as the 1860s and continued until the early to mid-20th century as increasing development in the area led to a greater need for more substantial and extensive levees. The Sacramento River Levee appears to meet NRHP Criterion A and CRHR Criterion 1 for its association with flood control and land reclamation efforts in California.

Sacramento Northern Railroad Segment

A former Sacramento Northern Railway alignment extends through the project area in a roughly north-south direction and parallel to the Sacramento River West/North Levee segment of the

Sacramento levee system. The Sacramento Northern Railroad alignment was originally constructed in 1911 as part of the Sacramento and Woodland Railroad and later the Northern Electric Railroad. In 1918, Sacramento Northern Railway assumed ownership, which resulted in the incorporation of all electric lines in the Sacramento Valley. Over time, portions of the rail alignment, including the subject segment, were abandoned. Due to a lack of integrity, the railroad segment does not appear to meet NRHP or CRHR criteria.

3.17.3 Environmental Consequences

This section describes the environmental consequences relating to cultural resources in the proposed CHP Academy EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

3.17.3.1 Assessment Methods

Evaluation of effects on cultural resources is based on information provided by literature review, records searches, historic map research, and consultation with Native Americans. This information was then compared to the type and location of proposed flood control and recreation improvements to determine whether effects would occur.

3.17.3.2 Determination of Effects

3.17.3.2.1 Federal Criteria

According to 36 CFR 800.5, an undertaking would have an adverse effect on historic properties if the effect alters the characteristics[5] that make a property eligible for inclusion in the NRHP. Such effects also would be considered adverse under NEPA. Adverse effects can occur when prehistoric or historic archaeological sites, structures, or objects listed in or eligible for listing in the NRHP are subjected to the following phenomena:

- physical destruction of or damage to all or part of the property;
- alteration of the property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68) and applicable guidelines;
- removal of the property from its historic location;
- change in the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

[5] Cultural resource managers often refer to these characteristics as character-defining elements or features. Character-defining features are those characteristics of a historic property, historical resource, or unique archaeological resource that convey its significance; the loss of character-defining elements impedes a property's ability to convey its historical significance. The importance of character-defining elements in cultural resource assessments is made clear in *National Register* Bulletin 15, which mentions "character" in this context 42 times (Andrus and Shrimpton 1997).

- introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
- neglect of the property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; or
- transfer, lease, or sale of the property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

3.17.3.2.2 State Criteria

CEQA defines a significant impact on cultural resources in 14 CCR 15064.5(b) (1) and (2) as one with the potential to cause a substantial adverse change in the significance of a historical resource or unique archaeological resource. Substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired. The significance of a historical resource is materially impaired when a project results in demolition or material alteration in an adverse manner of those physical characteristics of a resource that:

- convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the CRHR;
- account for its inclusion in a local register of historical resources pursuant to PRC 5020.1(k) or its identification in a historical resources survey meeting the requirements of PRC 5024.1(g), unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
- convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

3.17.4 Effects and Mitigation Measures

3.17.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento Bypass Levee reach in the CHP Academy EIP project area. No levee improvements would be made to increase the level of protection. Under the No Action Alternative, it is presumed that no ground-disturbing activities associated with levee repair and alternatives would occur. Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability/geometry issues would continue. Failure of the Sacramento Bypass Levee, depending on the magnitude of the event, could cause catastrophic flooding of the entire city. If the Sacramento Bypass Levee were to fail, a cultural resource could be in the path of an inundation of debris and mud from that failure that could cause significant damage to or the complete destruction of the resource. Furthermore, emergency efforts to stop and repair a failed levee potentially would cause the same or more significant effects than those described for the proposed EIP. While the levee would be damaged, the extent of potential damage to the resource is unknown. It is also unknown whether these events would transpire and affect other cultural resources and therefore further analysis of effects on cultural would be speculative. Federal agencies responsible for levee repairs would be responsible for compliance with Section 106, as would local governments responsible for carrying out Federal programs.

3.17.4.2 CHP Academy Applicant Preferred Alternative

Implementation of the CHP Academy Applicant Preferred Alternative (APA) would result in the following effects on cultural resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes	Less than Significant	N/A	N/A
CR-2: Change in the Significance of an Archaeological Resource	Significant	Significant and unavoidable	CR-MM-1: Implement Inadvertent Discovery Procedures
CR-3: Disturbance of Native American and Historic-Period Human Remains	Significant	Significant and unavoidable	CR-MM-2: Implement Human Remains Discovery Procedures

Effect CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes

The Sacramento Weir and Bypass are eligible for NRHP and CRHR listing and the Sacramento River Levee appears to meet NRHP and CRHR criteria. The Sacramento Weir and Sacramento Bypass are located adjacent to proposed construction. Therefore, WSAFCA is not expected to cause the physical destruction, relocation, or alteration of these resources. Overall, WSAFCA would also not demolish or substantially alter the physical characteristics of the Sacramento River Levee or cause a major change to its engineering design or overall setting. The Sacramento Weir and Bypass and the Sacramento River Levee would continue to convey their historical significance. Consequently, on the effect on these resources as a result of the proposed construction would be less than significant. No mitigation is necessary.

Effect CR-2: Change in the Significance of an Archaeological Resource

Although the project area has been surveyed and no archaeological resources were identified in the project area, there is the possibility that construction would unearth archaeological materials from beneath the ground surface. Damage to such resources, if they meet the significance criteria of the NRHP and/or the CRHR, would constitute a significant effect under CEQA (14 CCR 15064.5), and an adverse effect under Section 106 of the NHPA and NEPA. Therefore, the effect on archaeological resources would be significant. While implementation of Mitigation Measure CR-MM-1 would reduce the intensity of the effect, the effect would still be significant and unavoidable.

Mitigation

Mitigation Measure CR-MM-1. Implement Inadvertent Discovery Procedures

In the event of an inadvertent discovery of cultural resources during implementation of the proposed project, the USACE and WSAFCA's contractors will immediately cease construction work within 100 feet of the discovery. The USACE is responsible to comply with the discovery provisions at 36 CFR 800.13(b)(3). An USACE cultural resources manager will examine the discovery and prepare a memorandum documenting it and the circumstances leading to its identification, as well as NRHP-eligibility recommendations (if possible to make based on field observations). These actions will be completed within 24 hours of the discovery. To determine whether the discovery is NRHP-eligible, test excavations may be necessary, as determined in consultation between the USACE, SHPO, ACHP, and other parties that may ascribe significance to the inadvertent discovery.

In construction contexts, visual inspection and excavation (in the sense of the excavation responsible for the initial identification of the resource) of properties usually reveal enough data to allow for a recommendation of potential NRHP eligibility. If a property appears to meet the appropriate eligibility criteria, the property may be assumed to be eligible and efforts can subsequently focus on the resolution of adverse effects pursuant to 36 CFR 800.13(c).

If USACE PQS recommends that the discovery is not eligible for listing in the NRHP, they will prepare a memorandum recording the circumstances leading to the discovery, the methods used to characterize the site and its significance, and a description of the site. These actions will be completed within 24 hours of the field recommendation of non-significance.

The USACE has 48 hours from the time of the discovery in which to prepare and provide the memorandum to SHPO, ACHP, and other parties that may ascribe significance to the property. The consulted parties have 48 hours from the receipt of the memorandum to present comments to the USACE; the USACE may regard lack of comment within 48 hours as concurrence with its recommendation of non-significance. (36 CFR 800.13[b][3].) Once these consultations have occurred, and if the USACE makes a determination of non-significance, construction may resume in the discovery area upon the receipt of the USACE's express authorization to proceed and under the direction of USACE PQS.

If USACE PQS recommends that a property is significant, the Contractor will be required to mobilize construction a minimum of 100 feet away from the discovery area at the direction of an USACE cultural resources manager. The same notification procedures described in the preceding two paragraphs will be undertaken. In addition, the USACE cultural resources manager, in preparing the discovery memorandum, will recommend treatment methods for the site. Preparation of the memorandum will take into account the principles, standards, and guidance set forth in Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 Federal Register 44716–44742). Once consultation between the USACE and the consulted parties is completed, treatment measures will be implemented.

Effect CR-3: Disturbance of Native American and Historic-Period Human Remains

The project area is located in an area that is considered of moderate to high sensitivity for archaeological cultural remains, including burials. The potential for buried human remains to be unearthed and disturbed during ground-disturbing activities that would be associated with levee repair and alternative construction within the study area is considered high. The disturbance of any human remains is considered a significant effect. Implementation of the human remains discovery provisions in Mitigation Measure CR-MM-2 would likely reduce the severity of this effect, but it would still be considered a significant and unavoidable effect.

Mitigation

Mitigation Measure CR-MM-2. Implement Human Remains Discovery Procedures

Response to human remains discoveries for the proposed project is governed California state law, as the proposed project is located on non-Federal land. In the event of a human remains discovery, an USACE cultural resources manager will immediately notify the Yolo County Coroner. The coroner, as required by the California Health and Safety Code (Section 7050.5), will make the final determination about whether the remains constitute a crime scene and are Native American in origin. The coroner may take 2 working days from the time of notification to make this determination.

If the coroner determines that the remains are of Native American origin, the coroner will contact the NAHC within 24 hours of the determination. The NAHC will immediately designate and contact the most likely descendant (MLD), who must make recommendations for treatment of the remains within about 48 hours from completion of their examination of the finds, as required by PRC 5097.98(a). The USACE will then contact the landowner.

It is likely that if a Native American burial is found, it will be found in the context of a prehistoric archaeological property. For a prehistoric property associated with burials, decisions must be made about how the remainder of the property will be treated for its archaeological (and possibly other) values. Not only must the MLD make decisions about the burials, but a plan must be devised also for evaluation and—if determined to be eligible for the NRHP—treatment of the property in consultation with the MLD, SHPO, and other consulting parties (see Mitigation Measure CR-MM-1 above).

If the remains are found not to be Native American in origin and do not appear to be in an archaeological context, construction shall proceed at the direction of the coroner and USACE cultural resources manager. It is likely that the coroner will exhume the remains. Once the remains have been appropriately and legally treated, construction may resume in the discovery area upon receipt of the USACE's express authorization to proceed and under the direction of an USACE cultural resources manager.

3.17.4.3 CHP Academy Alternative B

Implementation of the CHP Academy Alternative B would result in the following effects on cultural resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes	Less than Significant	N/A	N/A
CR-2: Change in the Significance of an Archaeological Resource	Significant	Significant and unavoidable	CR-MM-1: Implement Inadvertent Discovery Procedures

Effect	Finding	With Mitigation	Mitigation Measure
CR-3: Disturbance of Native American and Historic-Period Human Remains	Significant	Significant and unavoidable	CR-MM-2: Implement Human Remains Discovery Procedures

Effect CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes

This effect is the same as described above under the CHP Academy Applicant Preferred Alternative. Construction of the CHP Academy Alternative B is not expected to result in the physical destruction, relocation, or alteration of significant architectural resources. No mitigation is necessary.

Effect CR-2: Change in the Significance of an Archaeological Resource

This effect is the same as described above under the CHP Academy Applicant Preferred Alternative. There is a possibility that construction of the CHP Academy Alternative B would unearth archaeological materials from beneath the ground surface. Implementation of Mitigation Measure CR-MM-1 would reduce the intensity of this effect, but the effect would still be significant and unavoidable.

Mitigation

Mitigation Measure CR-MM-1. Implement Inadvertent Discovery Procedures

Effect CR-3: Disturbance of Native American and Historic-Period Human Remains

This effect is the same as described above under the CHP Academy Applicant Preferred Alternative. The disturbance of any human remains would be considered a significant effect. Implementation of Mitigation Measure CR-MM-2 would likely reduce the severity of this effect, but it would still be considered a significant and unavoidable effect.

Mitigation

Mitigation Measure CR-MM-2. Implement Human Remains Discovery Procedures

Chapter 4
The Rivers EIP: Affected Environment and Environmental Consequences

This chapter provides the affected environment and environmental consequences for The Rivers EIP. The baseline environmental conditions assumed in the preparation of this chapter consist of the existing physical environment as of January 28, 2009, when WSAFCA published the Notice of Preparation (NOP) to prepare an EIR with the State Clearinghouse. USACE published a Notice of Intent (NOI) to prepare an EIS in the *Federal Register* on January 27, 2009. The chapter contents are listed below.

- Section 4.1 Flood Control and Geomorphic Conditions
- Section 4.2 Water Quality and Groundwater Resources
- Section 4.3 Geology, Seismicity, Soils, and Mineral Resources
- Section 4.4 Transportation and Navigation
- Section 4.5 Air Quality and Climate Change
- Section 4.6 Noise
- Section 4.7 Vegetation and Wetlands
- Section 4.8 Fisheries and Aquatic Resources
- Section 4.9 Wildlife
- Section 4.10 Land Use and Agriculture
- Section 4.11 Socioeconomic and Community Effects
- Section 4.12 Environmental Justice
- Section 4.13 Visual Resources
- Section 4.14 Recreation
- Section 4.15 Utilities and Public Services
- Section 4.16 Public Health and Environmental Hazards
- Section 4.17 Cultural Resources

Section 4.1
Flood Control and Geomorphic Conditions—The Rivers Early Implementation Project

4.1.1 Introduction

This section presents the affected environment for hydrologic, hydraulic, geomorphic, and flood control conditions, including the regulatory setting associated with these conditions, the effects on flood control and geomorphic conditions that would result from the proposed project, and the mitigation measures that would reduce these effects of The Rivers EIP and the hydrologic, hydraulic, and geomorphic environmental setting.

Implications of The Rivers EIP for flood control and geomorphic conditions are also addressed within the context of the resources affected by the changes, most notably under Section 4.2, Water Quality and Groundwater Resources; Section 4.3, Geology, Seismicity, Soils, and Mineral Resources; Section 4.7, Vegetation and Wetlands; and Section 4.8, Fisheries and Aquatics.

The key sources of data and information used in the preparation of this chapter are listed below.

- *Historic Sediment Loads in the Sacramento–San Joaquin Delta*, California Department of Water Resources, October 1994
- *Assessment of Sediment Budget of Sacramento–San Joaquin Delta*, Northwest Hydraulic Consultants, 2003
- *North Delta Sedimentation Study,* Northwest Hydraulic Consultants, prepared for California Department of Water Resources, March 2006
- *Surficial Geologic Mapping and Geomorphic Assessment*, California Department of Water Resources Urban Levees, West Sacramento, California, William Lettis & Associates, April 2007
- *West Sacramento Levees System: Problem Identification Report, Erosion Assessment and Treatment Alternatives*, Draft for Review, Northwest Hydraulic Consultants, prepared for HDR, Inc./Jones & Stokes, September 2007
- *West Sacramento Levee Evaluation Project, Administrative Draft, Problem Identification Report*, HDR, Inc., prepared for the City of West Sacramento, January 2008
- *West Sacramento Levee Evaluation Program, Administrative Draft, Alternatives Analysis,* HDR, Inc., November 2009
- *Hydraulics Report for the City of West Sacramento* Levee Alternatives Analysis, MBK Engineers, March 28, 2007
- *Evaluating the Effects of the Sacramento River West Levee Setback at Oak Hall Bend,* MBK Engineers, April 18, 2007
- *Summary Report on Hydraulic Impacts of the West Sacramento Levee Improvement Project (Draft),* MBK Engineers, June 22, 2009

- *Hydraulic Impact Analysis of Cumulative Development in Sacramento River Corridor Floodway,* MBK Engineers, June 27, 2005
- *Report on Effects of Projected Sea-Level Change on West Sacramento Levee Improvement Project Design*, MBK Engineers, November 20, 2009

The following document is included as Appendix D of this document.

- *(Draft) Summary Report on Hydraulic Impacts of the West Sacramento Levee Improvement Project*, MBK Engineers, June 22, 2009

4.1.2 Affected Environment

This section describes the affected environment for hydrologic, hydraulic, geomorphic, and flood control issues in The Rivers EIP project area, including regulatory and environmental settings.

4.1.2.1 Regulatory Setting

4.1.2.1.1 Federal

The following Federal policies related to hydrologic, hydraulic, geomorphic, and flood control issues may apply to implementation of The Rivers EIP.

National Flood Insurance Program

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were intended to reduce the need for large, publicly funded flood control structures and disaster relief by restricting development on floodplains. The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to subsidize flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA issues Flood Insurance Rate Maps (FIRMs) for communities participating in the NFIP. These maps delineate flood hazard zones in the community. These maps are designed for flood insurance purposes only and do not necessarily show all areas subject to flooding. The maps designate lands likely to be inundated during a 100-year storm event and elevations of the base flood. They also depict areas between the limits affected by 100-year and 500-year events and areas of minimal flooding. These maps often are used to establish building pad elevations to protect new development from flooding effects. The locations of FEMA-designated floodplains in the project area are included in the Environmental Setting discussion below.

Requirements for Federal Emergency Management Agency Certification

For guidance on floodplain management and floodplain hazard identification, communities turn to FEMA guidelines, as defined in 44 Code of Federal regulations (CFR 59 through 77. In order for a levee to be recognized by FEMA under the NFIP, the community must provide evidence demonstrating that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood (1% or 100-year flood) exists. These specific requirements are outlined in 44 CFR 65.10, Mapping of Areas Protected by Levee Systems, and are summarized below.

Levee height. Riverine levees must provide a minimum freeboard (the height of the top of a levee above a given level of water in a river) of 3 feet above the water-surface level of the base flood. An additional 1 foot above the minimum is required within 100 feet of either side of structures (such as bridges) riverward of the levee or wherever the flow is constricted. An additional 0.5 foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, also is required.

Closures. All openings must be provided with closure devices that are structural parts of the system during operation and designed according to sound engineering practice.

Embankment protection. Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability.

Embankment and foundation stability. Engineering analyses that evaluate levee embankment stability must be submitted to FEMA. The analyses provided shall evaluate expected seepage during loading conditions associated with the base flood and shall demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability.

Settlement. Engineering analyses must be submitted that assess the potential and magnitude of future losses of levee height as a result of levee settlement and demonstrate that freeboard will be maintained within the minimum standards.

Interior drainage. An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and, if the average depth is greater than 1 foot, the water-surface elevation(s) of the base flood.

Operation plans. For a levee system to be recognized, a formal plan of operation must be provided to FEMA. All closure devices or mechanical systems for internal drainage, whether manual or automatic, must be operated in accordance with an officially adopted operational manual, a copy of which must be provided to FEMA.

Maintenance plans. For levee systems to be recognized as providing protection from the base flood, they must be maintained in accordance with an officially adopted maintenance plan. All maintenance activities must be under the jurisdiction of a Federal or state agency, an agency created by Federal or state law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance. The plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. At a minimum, maintenance plans must specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.

U.S. Army Corps of Engineers Levee Design Criteria

A majority of the levees included in the West Sacramento basin are federally authorized and fall within the jurisdiction of the U.S. Army Corps of Engineers (USACE). The levee evaluation for the project area conforms to the engineering criteria established by USACE for the assessment and repair of levees. The USACE technical criteria in the following bullet list should be used as guidance unless noted otherwise.

- Overtopping of Flood Control Levees and Floodwalls (Publication ETL 1110-2-299, August 22, 1986)
- Structural Design of Closure Structures for Local Flood Protection Projects (Publication EM 1110-2-2705, March 31, 1994)
- Design of Coastal Revetments, Seawalls, and Bulkheads (Publication EM 1110-2-1614, June 30, 1995)
- Design Guidance on Levees (Publication ETL 1110-2-555, November 30, 1997)
- Conduits, Culverts, and Pipes (Publication EM 1110-2-2902, March 31, 1998)
- Guidelines on Ground Improvement for Structures and Facilities (Publication ETL 1110-1-185, February 1, 1999)
- Engineering and Design for Civil Works Projects (Publication ER 1110-2-1150, August 31, 1999)
- Design and Construction of Levees (Publication EM 1110-2-1913, April 30, 2000)
- Geotechnical Investigations (Publication EM 1110-1-1804, January 1, 2001)
- USACE CESPK Levee Task Force, Recommendations for Seepage Design Criteria, Evaluation and Design Practices (2003)
- Slope Stability (Publication EM 1110-2-1902, October 31, 2003)
- Geotechnical Levee Practice (Publication SOP EDG-03, June 28, 2004)
- Engineering and Design—Design Guidance for Levee Underseepage (Publication ETL 1110-2-569, May 1, 2005)
- Quality Management (Publication ER 1110-1-12, September 30, 2006)
- Engineering Technical Letter (ETL) 1110-2-571 Guidelines For Landscape Planting And Vegetation Management At Levees, Floodwalls, Embankment Dams, and Appurtenant Structures

Sacramento River Flood Control Project Levee Height Requirements

As specified in the Design Memorandum, Volume I of II for the Sacramento River Flood Control Project, California, Mid-Valley Area, Phase III (U.S. Army Corps of Engineers 1996) and the Operation and Maintenance Manual for Channel and Levees, Sacramento River Deep Water Ship Channel Project (U.S. Army Corps of Engineers 1963), the following minimum levee height (freeboard) requirements apply to the various reaches[1].

- Sacramento River Levee: 3 feet
- Sacramento Bypass Levee: 6 feet
- Yolo Bypass Levee: 6 feet

[1] The freeboard requirements listed are for the Sacramento River Flood Control Project, specifically the 1957 profiles for Sacramento River, the Sacramento Bypass, and the Yolo Bypass, and the design elevations in referenced in U.S. Army Corps of Engineers (1963) for the DWSC, Port North, and Port South Levees.

- DWSC Levees, Port North Levee, and Port South Levee: 6 feet for the DWSC where it is adjacent to the Yolo Bypass and 3 feet for the Port (Turning Basin and Barge Canal).

Executive Order 11988 Floodplain Management

Executive Order 11988 addresses floodplain issues related to public safety, conservation, and economics. The order generally requires Federal agencies constructing, permitting, or funding actions meet the following requirements:

- avoid incompatible floodplain development,
- be consistent with the standards and criteria of the NFIP, and
- restore and preserve natural and beneficial floodplain values.

Section 401 of the Clean Water Act and State Regulations in Title 23 California Code of Regulations

This regulation establishes requirements for all dredging activities for navigable waters of the State of California.

Code of Federal Regulations, Title 40, Part 131, Water Quality Standards

This regulation establishes requirements for water quality, including activities related to in-channel construction, dredging, and long-term effects resulting in sediment transport and scouring.

Public Law 84-99 Delta Specific Standard

This Federal law specifies, among other findings, minimum standards to which the rehabilitation and construction of levees in the Delta should be constructed.

Section 408

This Federal law is covered in more detail in Chapter 1, Introduction, and Chapter 6, Compliance with Applicable Laws, Policies, Plans, and Regulatory Framework.

4.1.2.1.2 State

The following state policies related to hydrologic, hydraulic, geomorphic, and flood control issues may apply to implementation of The Rivers EIP.

Central Valley Flood Protection Board

The Central Valley Flood Protection Board (CVFPB) (formerly the California Reclamation Board) of the State of California regulates the modification and construction of levees and floodways in the Central Valley defined as part of the Sacramento Valley and San Joaquin Valley flood control projects. Rules promulgated in Title 23 of the California Code of Regulations (CCR) (Title 23, Division 1, Article 8 [Section 111 through 137]) regulate the modification and construction of levees to ensure public safety. The rules state that existing levees may not be excavated or left partially excavated during the flood season, which is generally November 1 through April 15 for the Sacramento River and Sacramento Bypass.

Title 23, CCR §§ 6 and 7 stipulate permitting authority to the Central Valley Flood Protection Board. Section 6(a) outlines the need to obtain a permit from the CVFPB for "Every proposal or plan of work, including the placement, construction, reconstruction, removal, or abandonment of any landscaping, culvert, bridge, conduct fence, projection, fill, embankment, building….that involves cutting into the levee wholly or in part within any area for which there is an adopted plan of flood control, must be approved by the board prior to the commencement of work." Section 7(a) requires that "Prior to submitting an encroachment permit application to the board, the application must be endorsed by the agency responsible for maintenance of levees within the area of the proposed work…."

The following CVFPB guidance has been followed during the levee evaluation:

> The California Reclamation Board has primary jurisdiction approval of levee design and construction. The Reclamation Board standards are found in Title 23, Division 1, Article 8 (Sections 111 through 137) of the California Code of Regulations (CCR), and constitute the primary state standard. Section 120 of the CCR directs that levee design and construction be in accordance with the USACE's Engineer Manual EM 1110-2-1913, Design and Construction of Levees. This document is the primary federal standard applicable to this project, as supplemented by additional prescriptive standards contained in Section 120 of the CCR. These additional standards prescribe minimum levee cross-sectional dimensions, construction material types, and compaction levels.

Delta Protection Act of 1992

This act declares that the basic goals of the state for the Delta are, among other findings, to improve flood protection, and therefore to ensure an increased level of public health and safety, by structural and non-structural means.

Safe, Clean, Reliable Water Supply Act

This act declares that the basic goals of the state for the Delta are, among other findings, to protect the integrity of the state's water supply system from catastrophic failure attributable to earthquakes and flooding.

4.1.2.1.3 Local

The following local policies and agencies related to hydrologic, hydraulic, geomorphic, and flood control issues may apply to implementation of The Rivers EIP.

Yolo County

The Health and Safety Element of the 2030 Countywide General Plan for Yolo County (Yolo County 2009) contains goals, policies, and actions aimed at reducing the risk of flooding within the county. Any violation of these goals, policies, and actions would constitute a significant effect.

Goals

GOAL HS-2: Flood Hazards. Protect the public and reduce damage to property from flood hazards.

Policies

Policy HS-2.2: Ensure and enhance the maintenance and integrity of flood control levees.

Policy HS-2.3: Actively update and maintain policies and programs to ensure consistency with state and Federal requirements.

Actions

Action HS-A5: Require a minimum of 100-year flood protection for new construction, and strive to achieve 200-year flood protection for unincorporated communities where such levels of protection are not provided, require new development to adhere to the requirements of state law and the County Flood Damage Prevention Ordinance.

Action HS-A14: Require a minimum 50-foot setback for all permanent improvements from the toe of any flood control levee.

Action HS-A16: Support the efforts of levee maintenance districts with efforts to secure state and federal funding for geotechnical studies of levees and implementation of associated improvements.

Action HS-A17: Encourage flood hazard reduction projects along the Sacramento River to be consistent with the guidelines of the Sacramento River Corridor Floodway Management Plan.

Action HS-A18: Coordinate with local, state, and federal agencies to define existing and potential flood problem areas, including the possible effects associated with global climate change, and to maintain and improve levees and other flood control features.

Action HS-A19: Develop a detailed maintenance and funding plan for levees under County control, to ensure that levee safety is maintained.

Action HS-A20: Support and encourage responsible agencies to site new levees or major rehabilitation of levees at a distance from the river and from existing levees, where feasible. This would provide a degree of redundancy in the system, increase the land available for habitat and flood storage, reduce operation and maintenance costs, and help to ensure the integrity of the structures.

Action HS-A22: Ensure that the upgrade, expansion, or construction of any flood control levee demonstrates that it will not significantly divert flood water or increase flooding.

Action HS-A24: Improve the county's classification within the Federal Emergency Management Agency Community Rating System.

Action HS-A29: Pursuant to Section 8201 of the State Water Code, develop local plans for flood protection, including analysis of financing options to construct and maintain any needed improvements, to address how 100-year floodplain protection for each community may be provided. Those communities that are economically disadvantaged shall have priority in developing flood protection plans. The cities shall be consulted in development of the plans, which shall be consistent with the Central Valley Flood Protection Plan.

City of West Sacramento

The Central Valley Flood Protection Plan (CVFPP) requires 200-year flood protection by the year 2025. The time and effort required to fully evaluate approximately 50 miles of levees, and develop recommended strategies for improvement, and implement those improvements prompted action without further delay. In addition, within its General Plan, the City adopted a goal of achieving 200-year flood protection.

The City of West Sacramento is a member of WSAFCA and has land use authority within WSAFCA's planning area. There is concern regarding structural development on levees and resultant effects on flood management operations and maintenance. To ensure that such development has appropriate land use controls, there are two controls in process by the City. One such control is the updated floodplain management ordinance, which is a substantial and robust revision of an existing ordinance from 1994. The ordinance has two major elements: (1) City review of development proposals within a designated levee protection zone, including and adjacent to the levee corridor, with the explicit purpose of ensuring the proposed development's compatibility with flood protection, and (2) a requirement of adherence to flood-smart building codes in FEMA-designated Special Flood Hazard Areas . This ordinance will be implemented with stronger enforcement measures.

The other such control in process is the update of the City's General Plan. The update will codify land use designations and development policies with consideration of floodplain restrictions and flood operations and management zones (with appropriate compatible uses).

Furthermore, the Health and Safety Section of the City of West Sacramento General Plan, Policy Document (City of West Sacramento 1990) contains goals and policies aimed at reducing the risk of flooding within the county. Any violation of these goals and policies would constitute a significant effect.

Goals

Goal B: To prevent loss of life, injury, and property damage due to flooding.

Policies

Policy 1: The City shall continue to participate in the National Flood Insurance Program. To this end, the City shall ensure that local regulations are in full compliance with standards adopted by the Federal Emergency Management Agency.

Policy 6: Construction of storm drainage improvements shall be required, as appropriate, to prevent flooding during periods of heavy rainfall.

Policy 8: The City shall cooperate with area reclamation districts and other responsible agencies in the maintenance and improvement of levees and drainage channels.

Policy 9: The City shall support state and federal legislation which provides funding for the construction of flood control improvements in urbanized areas.

Policy 10: The City shall discourage uses that promote the erosion or structural deterioration of levees.

West Sacramento Area Flood Control Agency

WSAFCA is proposing The Rivers EIP to improve the Sacramento River North Levee, a levee in Yolo County that protects the city of West Sacramento. WSAFCA is a Joint Powers Authority created in 1994 through a Joint Exercise of Powers Agreement by the City, Reclamation District (RD) 900, and RD 537. WSAFCA was established to coordinate the planning and construction of flood protection facilities and to finance the local share of flood control projects. WSAFCA is responsible for the operations and maintenance of the detention basins, pump stations, and levees that protect the city.

WSAFCA Freeboard Requirements for West Sacramento Levee System

WSAFCA has no minimum freeboard requirements. Because the intent of The Rivers EIP is to meet Corps levee design requirements and to provide protection for the 200-year flood event, WAFCA uses the minimum freeboard requirements set forth by USACE.

4.1.2.2 Environmental Setting

This section discusses the environmental setting related to hydrologic, hydraulic, geomorphic, and flood control issues in The Rivers EIP project area (Figure 4.1-1). For more detailed information about this resource, including climate, regional hydrology and geomorphic conditions, levee stability and levee height evaluations, see Appendix D, West Sacramento Levee System Environmental Setting and Summary of Study Results.

The Rivers EIP project area is approximately 4,500 feet long and is located on the Sacramento River North Levee, on the west bank of the Sacramento River just north of the confluence of the Sacramento and American Rivers. A portion of this reach runs adjacent to Riverbank Elementary School, and another portion intersects The Rivers Housing Development. Levee deficiencies at this site are related to geometry, stability, and under-seepage.

4.1.2.2.1 Regional Hydrology

The Sacramento River drainage basin upstream of the American River confluence encompasses approximately 23,500 square miles. The monthly minimum, average, and maximum mean daily flows on the Sacramento River near Verona (upstream of the American River) and at Freeport (downstream of the American River) are presented in Table 4.1-1. The West Sacramento basin extends past the American River watershed. The Sacramento River at Freeport gage more closely reflects the actual project flow around the southern end of the WSLIP area.

Table 4.1-1. Monthly Mean Daily Flow Statistics for Sacramento River at Verona and Sacramento River at Freeport for 1990 through 2008

	Sacramento River at Verona Station 11425500			Sacramento River at Freeport Station 11447650		
	Minimum	Average	Maximum	Minimum	Average	Maximum
January	6,460	29,888	95,600	6,560	34,311	113,000
February	6,200	34,008	76,300	6,030	39,647	94,100
March	7,730	31,811	80,700	8,300	36,793	99,500
April	3,920	22,552	73,600	4,340	26,786	91,800
May	3,870	19,199	69,600	4,640	23,511	88,600
June	3,590	16,028	60,500	6,120	19,810	70,500
July	3,830	15,051	28,400	7,030	18,434	44,500
August	4,890	14,582	22,800	7,230	16,669	26,400
September	7,350	13,525	24,700	8,150	15,188	28,600
October	4,820	9,449	18,900	5,100	11,065	23,600
November	5,230	10,239	30,700	5,530	11,912	34,800
December	5,600	19,452	73,700	6,250	22,289	96,400

Source: U.S. Geological Survey 2009. Available: <http://waterdata.usgs.gov/nwis/sw>.
Notes: Flow in cubic feet per second from January 1, 1990 to February 8, 2009.

Sacramento River Sites (Sacramento River North and South Levees—Reaches 1, 2, 7, and 8)

Daily streamflows have been recorded at the Sacramento River at Verona gage (gage 11425500) by the U.S. Geological Survey (USGS) since 1929. The gage is upstream of the project area at approximately river mile (RM) 78.6. The Sacramento River at Sacramento (I Street) gage (gage 11447500) was operated by USGS from 1948 to 1979; it is now operated by the California Department of Water Resources (DWR). The gage is located about 1,000 feet upstream of the I Street Bridge and about 0.5 mile downstream of the American River confluence at RM 59.5 in Reach 8. The Freeport gage (gage 11447650) is downstream of the project area, at about RM 46. Northwest Hydraulic Consultants (2007b) provides a detailed analysis of daily, seasonal, and peak flows at the I Street and Freeport gages.

Projected peak flows in the Sacramento and American Rivers were provided by MBK Engineers (2008a) based on the Sacramento and San Joaquin River basins California Comprehensive Study (Comprehensive Study) Sacramento River UNET model. In Table 4.1-2, the 100-year projected peak flow is based on a 145,000 American River peak flow and upstream Sacramento River levees overtopping without failing; the 200-year peak is based on 160,000 cubic feet per second (cfs) American River peak flow and the same levees overtopping without failing. See the section entitled Flooding, below, for longitudinal profile information with resulting maximum water surface elevation profiles (for the 1/100 and 1/200 Annual Exceedance Probabilities [AEPs]), the approximate tops of the levees, and the original 1957 Flood Control Project design floodplain for the Sacramento River, Sacramento Bypass, Yolo Bypass, and DWSC.

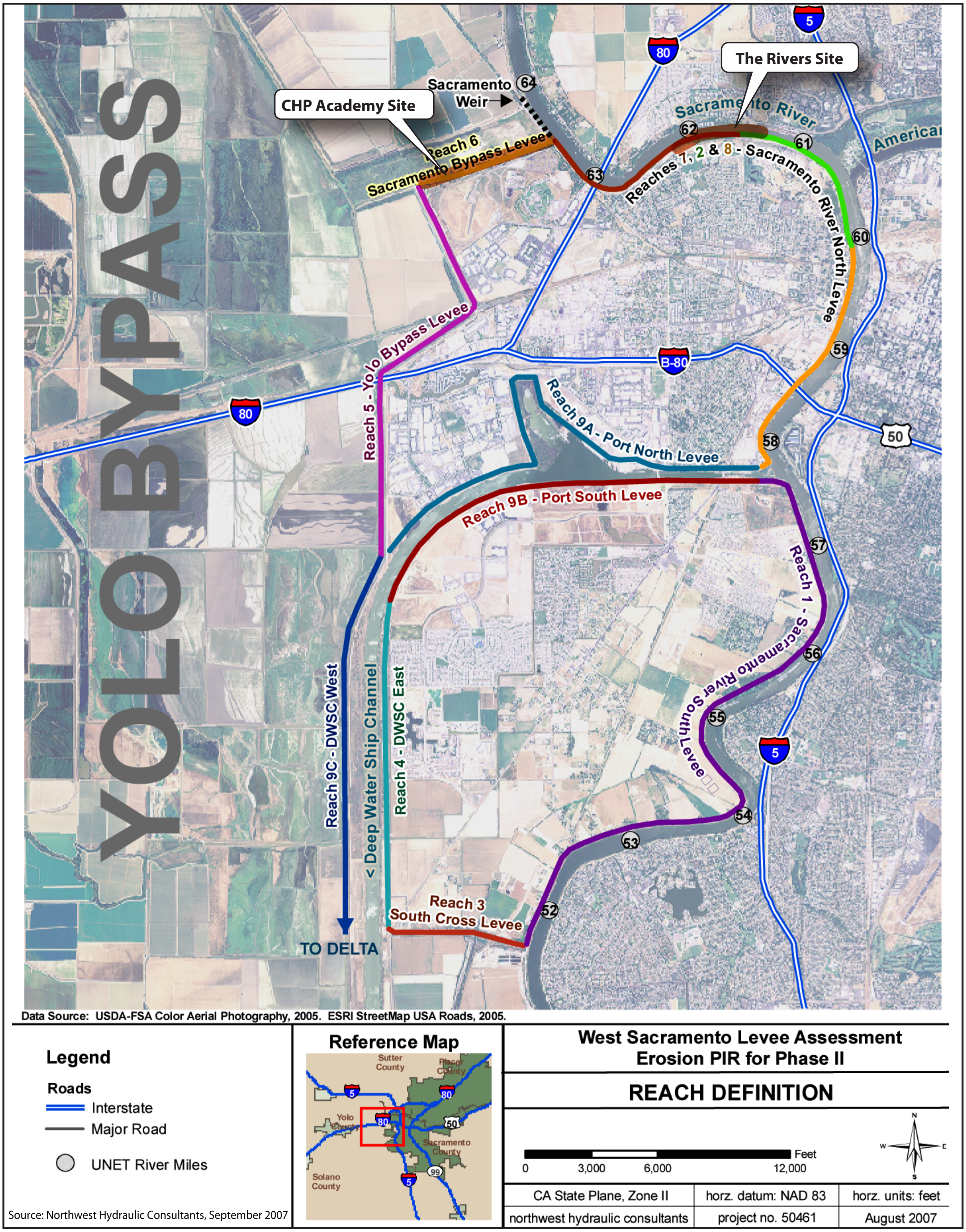

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Figure 4.1-1
Reach Definition

Table 4.1-2. Projected Peak Flows for Sacramento River Sites

	Projected Peak Flow (cfs)	
Location	100-year[1]	200-year[2]
Sacramento River at Verona Gage	117,500	142,600
Sacramento River at I Street	135,600	143,300
Sacramento River at Freeport Gage	135,200	143,000
American River at H Street	145,000	160,000

Source: MBK Sacramento River UNET hydraulic model June 2008 simulations documented in *Supplemental Report for the City of West Sacramento Levee Alternatives Hydraulic Analysis - Draft*, August 6, 2008.

[1] Assumes levees overtop without failing; existing conditions and operations.

[2] Assumes levees overtop without failing; urban levees have three feet of freeboard on 1/200 AEP water surface; non-urban levees satisfy Sacramento River Flood Control Project design freeboard requirements; Folsom Dam Joint Federal Project in place.

4.1.2.2.2 Geomorphic Conditions

Geomorphic Characteristics

Because of the low topographic position and proximity to the confluence of the Sacramento and American Rivers, the West Sacramento area has been subjected to repeated inundation by floodwaters during late Holocene time, and consequently is underlain by relatively thick alluvial deposits. The surface and subsurface distributions of sandy and clayey deposits are a function of former river alignments on the landscape, and present-day geomorphic processes adjacent to the river channels (i.e., flooding and deposition). In brief, the primary geomorphic features and associated surficial geological map units in the project area include abandoned paleochannels, meander scroll deposits, crevasse splay and overbank flood deposits, flood basin deposits, and other features commonly associated with large, active river systems. (William Lettis & Associates 2007)

The current geomorphology of The Rivers EIP project area is characteristic of Delta waterways. All waterways are bordered by levees. Channel alignments are preserved by ongoing levee maintenance and instream dredging. The Sacramento River in the vicinity of the project area is characterized by a low gradient and typical low-velocity flow and is composed almost entirely of deep, flat water with a sand bed. River stage is controlled by dam and weir release upstream and is subject to diurnal tidal fluctuation. Very little sediment is stored in bars, and the bank-building process typical of lowland alluvial rivers no longer occurs. The channel width varies in the project area but averages approximately 750 feet. For a complete review of the historic geomorphology of the Delta region, refer to the North *Delta Sedimentation Study* (Northwest Hydraulic Consultants 2006).

All geomorphic information described below (descriptions of hydraulic geometry, levee and bank geometry, and channel morphology) is derived and summarized from Northwest Hydraulic Consultants (2007a). The overall goals of this report were to (1) identify those sites in the West Sacramento area where erosion occurs and without intervention may significantly compromise the flood performance and integrity of the levee system, (2) assess the risk of erosion at these sites and determine whether repairs are required for FEMA certification, and (3) provide feasibility or concept level erosion protection alternatives for those sites where protection is required for certification.

Levee and Bank Geometry

West Levee of the Sacramento River

The earliest maps along the Sacramento River, from 1908, show a levee on about the same alignment as at present, along the top of the west bank of the Sacramento River. This levee has been raised, widened, upgraded, and set back at some sites over the years. The Sacramento River South Levee crest is now between 17 and 23 feet high above the landslide toe, with crown elevations between 34 and 40 feet. South River Road lies along most of the levee crest, and crest widths are usually just larger than the minimum of 20 feet. Kleinfelder (2007) discusses the stability berms, drains, and other remediation measures constructed along this levee reach.

Kleinfelder (2007) also describes the levee soils and underlying foundation materials based on borings. The levee soils are typically silty sand and poorly graded clean sand. Beneath the levee materials, the typical profile consisted of a layer of fine-grained silt or clay (interpreted to be overbank deposits) underlain by up to 100 feet of sand and gravel, with interbedded silty sand and clayey sand layers. The main exception to the above typical profile is near the downstream end of the South Levee reach, where the levee is on an old railway grade. Drilling here showed a blanket of silt and clay extending at least 20 feet below the levee materials underlain by sand and/or gravel. These were interpreted to be floodbasin deposits, which appear to extend into the stream bank, overlying alluvium. The bottom of the flood basin deposits is at or above the thalweg elevation of the Sacramento River. The presence of these less-erodible deposits is thought to explain the straight, stable bank and narrow river section through the Clay Bend just near the downstream end of the South Levee reach.

Crest elevations along the Sacramento River North Levee (Reaches 8, 2, and 7) range from 34 to 44 feet NGVD 29 (Figure 4.1-2). Reach 8, the most downstream section of the Sacramento River North Levee, includes high ground that extends from the Barge Canal upstream to the Tower Bridge. The high ground is as high, or higher, than adjacent levee crests and extends at least 300 feet landward (Jones & Stokes 2006). The high ground appears to be stable and generally consists of river dredge spoils placed more than 75 years ago. Bank erosion was observed along this part of Reach 8, but it is not a concern for levee failure as the high ground functions as a very wide levee. From the Tower Bridge toward the I Street Bridge, the levee has been set back and protected as part of the River Walk project. However, the upstream 2,000 feet of Reach 8—near the I Street Bridge—has a minimum crest width and sparse bank protection and is close to the river. The erosion sites in Reach 8 are in this section of the Sacramento River North Levee.

In the middle of the Sacramento River North Levee (Reach 2), bank erosion was observed primarily where the levee crest appears to be extremely wide or where there is a substantial berm to protect the levee. From the upstream end of Reach 2, downstream for about 4,000 feet, revetment of varying size and age has been placed on the bank and levee. This revetment is often extremely steep and does not appear to meet current sizing criteria. For the next 4,000 feet, Reach 2 has some erosion protection. The patches of existing revetment do not appear to be engineered; however, the materials on the bank are often reasonably large and the revetment appears to provide adequate protection against erosion.

The upstream end of the Sacramento River North Levee (Reach 7) includes both riprap-protected banks and wide levee crests. Downstream from the Sacramento Weir for about 7,000 feet, stream banks are generally steep; however, most are either adequately protected with riprap or the levee

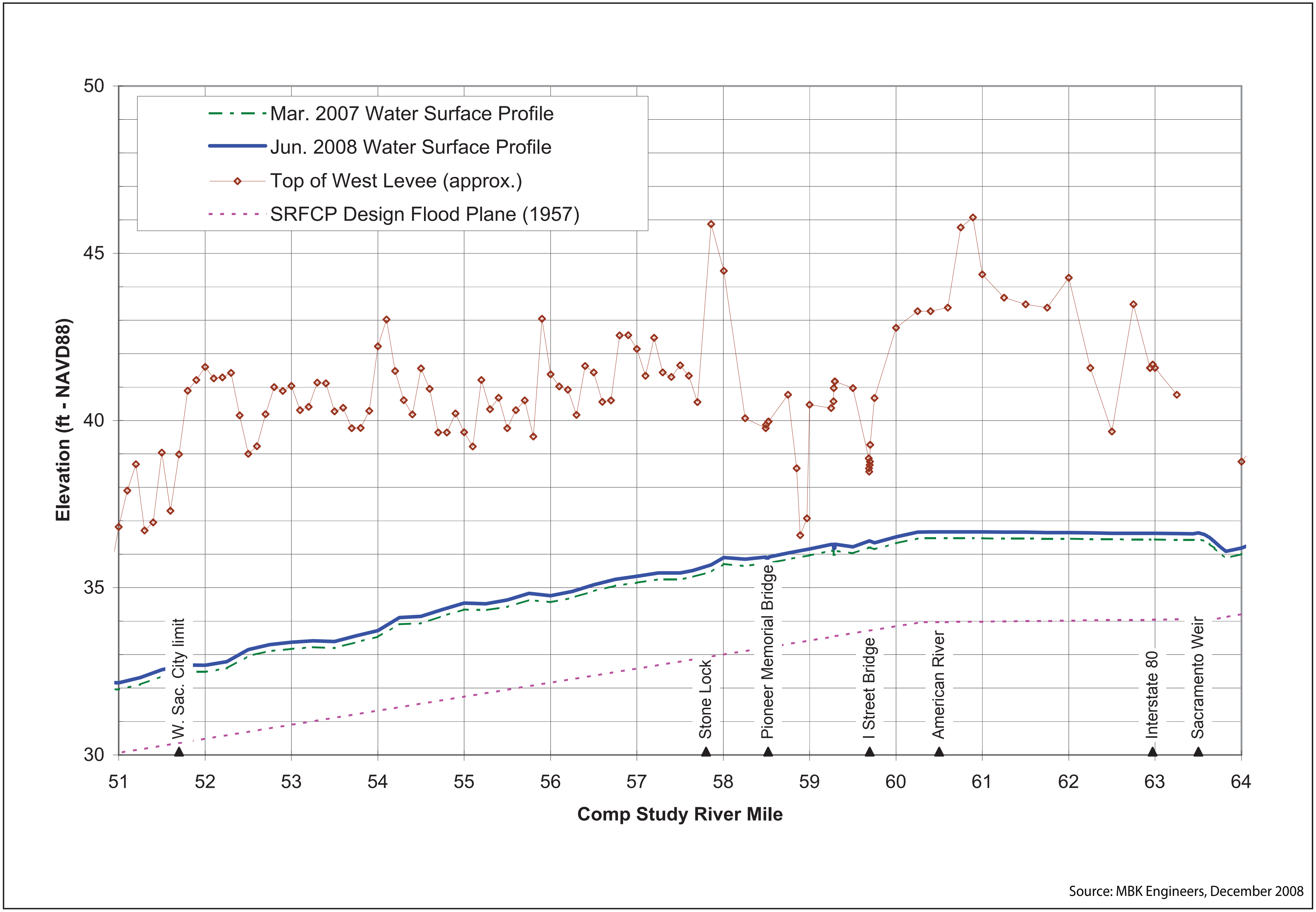

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Figure 4.1-2
Maximum Water Surface Elevation, Sacramento River

crest is wide. (This section includes USACE Emergency Levee Repair project at site 62.5R). At the downstream end of Reach 7, and extending for about 3,000 feet, a private contractor designed and built bank protection in the summer of 2006.

4.1.2.2.3 Levee Deficiency Analysis

Section 4 of HDR (2008a) includes the geotechnical assessment of the existing levees with regard to seepage, slope stability, and seismic vulnerabilities[2]. The information provided in HDR (2008a) is derived from two reports: *West Sacramento Levee System Problem Identification and Alternative Analysis: Volume 1—Geotechnical Problem Identification Solano and Yolo Counties, California* (Kleinfelder 2007), and *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento* Region (URS 2007).

Data collection included 323 borings drilled with standard penetration tests and soundings made using cone penetration test equipment along the levees within the basin. Approximate stationing endpoints have been determined by URS (2007) and Kleinfelder (2007) based on similar soil characteristics within the endpoints. Deficiencies identified within the approximate stationing endpoints do not indicate the entire stretch of levee contains said deficiency; rather, a deficiency has been identified within the endpoints (HDR 2008a).

Levee Seepage Analysis

Engineering analysis evaluating levee seepage along the Sacramento River North Levee has been performed by URS (2007), and the findings were presented in their report titled *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento Region* (URS 2007). URS (2007) performed their seepage analysis using water surface elevations that are different from the water surface elevations used in this chapter as determined by MBK Engineers (2007) and assumed a no-flow boundary at the center of the river (HDR 2008a).

Table 4.1-3 shows the seepage summary of the Sacramento River North Levee as completed by Kleinfelder (2007) and URS (2007) and summarized by HDR, Inc. (2008a). Exit gradients of 0.5 or greater for under-seepage require mitigation according to the USACE, and areas where through-seepage has been observed or projected based on soil conditions require mitigation.

Kleinfelder (2007) performed the engineering analysis evaluating levee seepage along the Sacramento River North Levee and presented their findings in a report titled *West Sacramento Levee System Problem Identification and Alternative Analysis: Volume 1—Geotechnical Problem Identification Solano and Yolo Counties, California* (Kleinfelder 2007). Kleinfelder performed their analysis using the water surface elevations determined by MBK Engineers (2007) and assumed a total head boundary at the center of the river.

The Sacramento River North Levee has a significant amount of under-seepage, whereas the other reaches have much less extensive under-seepage problems. See Figure 4 of HDR (2008b) for additional information.

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[2] Seismic vulnerabilities are discussed in Chapter 6, Geology, Seismicity, Soils, and Mineral Resources.

Table 4.1-3. Seepage Summary

	Through-seepage		Under-seepage	
Approximate Stationing	100-Year Event	200-Year Event	100-Year Event	200-Year Event
Sacramento River North Levee				
0+00 to 15+50		✓		
15+50 to 40+00	✓	✓	N	N
40+00 to 57+50		✓		
57+50 to 74+50	N	N	N	N
74+50 to 99+50	✓	✓	✓	✓
99+50 to 133+00				
133+00 to 141+50	✓	✓	✓	✓
141+50 to 186+50	✓	✓	✓	✓
186+50 to 217+00	✓	✓	✓	✓
217+00 to 294+00				

Source: HDR, Inc. 2008a (a compilation of data from URS 2007 and Kleinfelder 2007

Table 4.1-4. Reach Summary

	Seepage, 200-Year Event		Stability, 200-Year Event		
Approximate Stationing	Through Seepage	Under Seepage	Steady State	Rapid Drawdown	Seismic
Sacramento River North Levee					
0+00 to 15+50	X			N	
15+50 to 40+00	X	N	N	N	N
40+00 to 57+50	X		N	N	N
57+50 to 74+50	N	N	N	N	N
74+50 to 99+50	X	X	X	N	X
99+50 to 133+00			X	N	X
133+00 to 141+50	X	X	X	N	X
141+50 to 186+50	X	X	X	N	N
186+50 to 217+00	X	X		N	X
217+00 to 294+00			N	N	N
294+00 to 307+50					N

Source: HDR, Inc. 2008b
N = No Analysis; X = Deficiency; Blank Cell = No Deficiency

Levee Slope Stability Assessment

URS (2007) completed an engineering evaluation of levee slope stability and the effect of rapid drawdown for the Sacramento River North Levee and presented their findings in the report titled *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento Region* (URS 2007). As with the levee seepage analysis described above, URS (2007) used water surface elevations that are different from the water surface elevations determined by MBK Engineers (2007) in their analysis of slope stability[3]. Rapid drawdown calculations have been completed only for the 100-year event as recommended to URS by their Independent Consulting Board (HDR 2008a).

The slope stability results as completed by URS (2007) and Kleinfelder (2007) for the Sacramento River North Levee are shown in Table 4.1-5.

Kleinfelder (2007) performed the engineering analysis evaluating levee slope stability and the effect of rapid drawdown along the Sacramento River North Levee and presented their findings in a report titled *West Sacramento Levee System Problem Identification and Alternative Analysis: Volume 1—Geotechnical Problem Identification Solano and Yolo Counties, California* (Kleinfelder 2007). Kleinfelder (2007) performed their analysis using the water surface elevations determined by MBK Engineers (2007).

In brief, the Sacramento River North Levee has significant steady state stability deficiencies. The other reaches have less or none. See Figure 5 of HDR (2008b) for additional information.

Table 4.1-5. Slope Stability Summary

	Steady State		Rapid Drawdown	
Approximate Stationing	100-Year Event	200-Year Event	100-Year Event	200-Year Event
Sacramento River North Levee				
0+00 to 15+50			✓	N
15+50 to 40+00	N	N	N	N
40+00 to 57+50	N	N	N	N
57+50 to 74+50	N	N	N	N
74+50 to 99+50	✓	✓		N
99+50 to 133+00	✓	✓		N
133+00 to 141+50	✓	✓		N
141+50 to 186+50	✓	✓		N
186+50 to 217+00				N
217+00 to 294+00	N	N	N	N

Source: HDR, Inc. 2008a (a compilation of data from URS 2007 and Kleinfelder 2007)

Levee Geometry Evaluation

To evaluate the crown width and side slopes of the levees in the project area, HDR (2008a) generated topography data by means of Light Detection and Ranging (LIDAR) using the North American Vertical Datum of 1988 (NAVD88).

In brief, most of the levees in the West Sacramento area, including in The Rivers project area, have a geometry deficiency, and it is typically an over-steepened waterside slope that is the primary problem (HDR 2008b).

USACE requires that levees have a maximum steepness of 3:1 (H:V) waterside slopes and 3:1 (H:V) landside slope. The design criteria for The Rivers EIP conform with these requirements, unless site-

[3] Sections of the northern reaches have not been completed to date by URS; these sections will be completed in their final report projected to be issued at a later time.

specific conditions permit otherwise (and USACE approval is granted based on engineering analysis to support a slope steeper than 3:1). Crown widths for primary levees are to be a minimum of 20 feet. For The Rivers EIP, it is proposed that the waterside slope would be trimmed and reshaped to a 2.5:1 slope the full length of the site (pending USACE approval). Refer to Appendix B in HDR (2008a) for tables identifying sections of the levees that do not meet the design criterion. Appendix D in HDR (2008a) contains LIDAR cross sections that have been used to evaluate levee geometry. Also refer to Figure 9 of HDR (2008b), which shows the approximate locations where a geometry deficiency has been identified.

Erosion Evaluation

An inventory of current bank erosion sites has been performed to identify sections of the levee that might incur future stability or seepage problems because of bank erosion. The erosion sites have been identified by visual inspection of the project vicinity. Figure 7 of HDR (2008b) summarize the results of the erosion evaluation. The sites have been prioritized based on significance of repairs needed to meet FEMA certification. The Sacramento River North Levee has three high priority sites totaling more than 1,100 feet. With the exception of one other long reach along the Yolo Bypass, there were no other high priority sites located in the northern West Sacramento basin (HDR, Inc. 2008b).

For a complete summary of levee deficiencies, refer to Chapter 1, Introduction.

4.1.2.2.4 Flooding

Levees along the Sacramento River and other waterways provide flood control for the city of West Sacramento and conveyance for waters from upstream to the Delta. High winter flows can stress levees and berms. Longer flood durations can contribute to levee seepage and potentially structural levee failure. Flood water surface elevations can exceed levee heights and cause overtopping and partially controlled flooding of the protected areas behind the levee. Overtopped levees may maintain structural integrity and would not be considered failed levees. However, the erosive forces that occur during overtopping eventually may cause a structural failure and uncontrolled flooding in the protected areas behind the levee. To maintain the integrity of the flood control system, locations with the potential for failure have been and are being identified and remedied.

MBK Engineers (2007, 2008a, and 2008b) has developed water surface profiles for use in this analysis. Their reports describe and present the results of a hydraulic analysis that was made to determine 1/100 and 1/200 AEP (commonly referred to as 100-year and 200-year) water surface elevations in the surrounding waterways, as well as the potential worst case flood depth for the South Cross Levee. The MBK version of the Comprehensive Study Sacramento River UNET model adopted for the Natomas Levee Improvement Program was used for this analysis. This adopted version is capable of modeling anticipated levee breaks or of allowing levee overtopping without failures. UNET is a one-dimensional unsteady open-channel flow model with the ability to simulate exchange of flow over levees with storage areas. The MBK UNET model results were a maximum composite of simulations made using hydrologic data for two storm centering scenarios: Sacramento River at latitude of Sacramento and Feather River at Shanghai Bend. In addition, the American River peak flow in the 100-year flood was 145,000 cfs, the current FEMA condition and in the 200-year flood was 160,000 cfs, the expected future peak flow.

The resulting maximum water surface elevation profiles (for the 1/100 and 1/200 AEPs), the approximate tops of the levees, and the original 1957 Flood Control Project design floodplain for the Sacramento River and Sacramento Bypass are provided in Figures 4.1-2 through 4.1-5 and Table 4.1-6, below.

Table 4.1-6. Computed Maximum Water Surface Elevations

		Maximum Water Surface Elevation (feet NAVD 88)		
Reach	Comp Study River Mile	1/100 AEP [1]	1/200 AEP [2]	Note
Sacramento River	63.44	35.47	36.57	West Sacramento city limit
Sacramento River	62	35.47	36.67	
Sacramento River	60.5	35.47	36.67	American River
Sacramento River	59.695	35.17	36.37	I Street Bridge
Sacramento River	58	34.67	36.37	
Sacramento River	56	33.57	34.77	
Sacramento River	54	32.57	33.77	
Sacramento River	51.75	31.47	32.67	West Sacramento city limit
Sacramento Bypass	1.68	34.97	36.17	Downstream of Sacramento Weir
Sacramento Bypass	1.3	33.57	34.87	
Sacramento Bypass	0.93	33.27	34.37	
Sacramento Bypass	0.56	32.77	33.97	Yolo Bypass east levee
Yolo Bypass	44.8	32.27	33.47	West Sacramento city limit
Yolo Bypass	43.49	31.87	32.97	Willow Slough
Yolo Bypass	43.24	31.67	32.87	SPRR Bridge
Yolo Bypass	42.96	31.57	32.67	Interstate 80
Yolo Bypass	42	31.37	32.47	
Yolo Bypass	40	30.57	31.67	
Yolo Bypass	39.33	30.27	31.37	Putah Creek
Yolo Bypass	38.4	29.67	30.77	West Sacramento city limit
Yolo Bypass	36	28.57	29.57	
Yolo Bypass	34	27.67	28.77	
Yolo Bypass	32	26.57	27.67	
Yolo Bypass	30	25.27	26.37	
Yolo Bypass	28	23.07	24.27	
Yolo Bypass	26	21.67	22.97	
Yolo Bypass	24	21.37	22.67	
Yolo Bypass	23	20.37	21.57	
Deep Water Ship Channel	41.70	19.07	20.27	Carlin Drive (extended)
Deep Water Ship Channel	40.72	19.07	20.27	Marshall Road
Deep Water Ship Channel	39.79	19.07	20.27	Bevan Road
Deep Water Ship Channel	38.46	19.07	20.27	West Sacramento city limit

		Maximum Water Surface Elevation (feet NAVD 88)		
Reach	Comp Study River Mile	1/100 AEP [1]	1/200 AEP [2]	Note

Source: MBK Sacramento River UNET hydraulic model simulations documented in *Supplemental Report for the City of West Sacramento Levee Alternatives Hydraulic Analysis—Draft,* December 4, 2008.

[1] Assumes levees overtop without failing; existing conditions and operations.

[2] Assumes levees overtop without failing; urban levees have three feet of freeboard on 1/200 AEP water surface; non-urban levees satisfy SRFCP design freeboard requirements; Folsom Dam Joint Federal Project in place.

The MBK UNET model indicates no levee overtopping will occur along the Sacramento River or the Sacramento Bypass for the 100-year or the 200-year design floodflows. Nonetheless, levee height design criteria are not met for the Sacramento River North Levee. More information is provided in MBK Engineers' *Hydraulics Report for the City of West Sacramento Levee Alternatives Analysis* (2007) and Northwest Hydraulic Consultants' *West Sacramento Levees System: Problem Identification Report, Erosion Assessment and Treatment Alternatives, Draft for Review* (2007a).

Refer to Appendix D for a description of flood elevations and levee height evaluation by reach and for a complete description of modeling of hydraulic effects.

4.1.2.2.5 Past Sea-Level Rise

MBK Engineers (2009b) applied the USACE sea-level rise guidance (U.S. Army Corps of Engineers 2009b) to the WSLIP area in order to determine the effects of potential sea-level rise on the West Sacramento basin. Since the sea-level rise analysis is in support of the pre-existing project design, many of the points in the USACE policy guidance do not apply, particularly those that refer to the comparison of project alternatives. The MBK Engineers (2009b) report uses the procedure for calculating sea-level rise that is identified in the USACE guidance, and applies that procedure to the proposed project design.

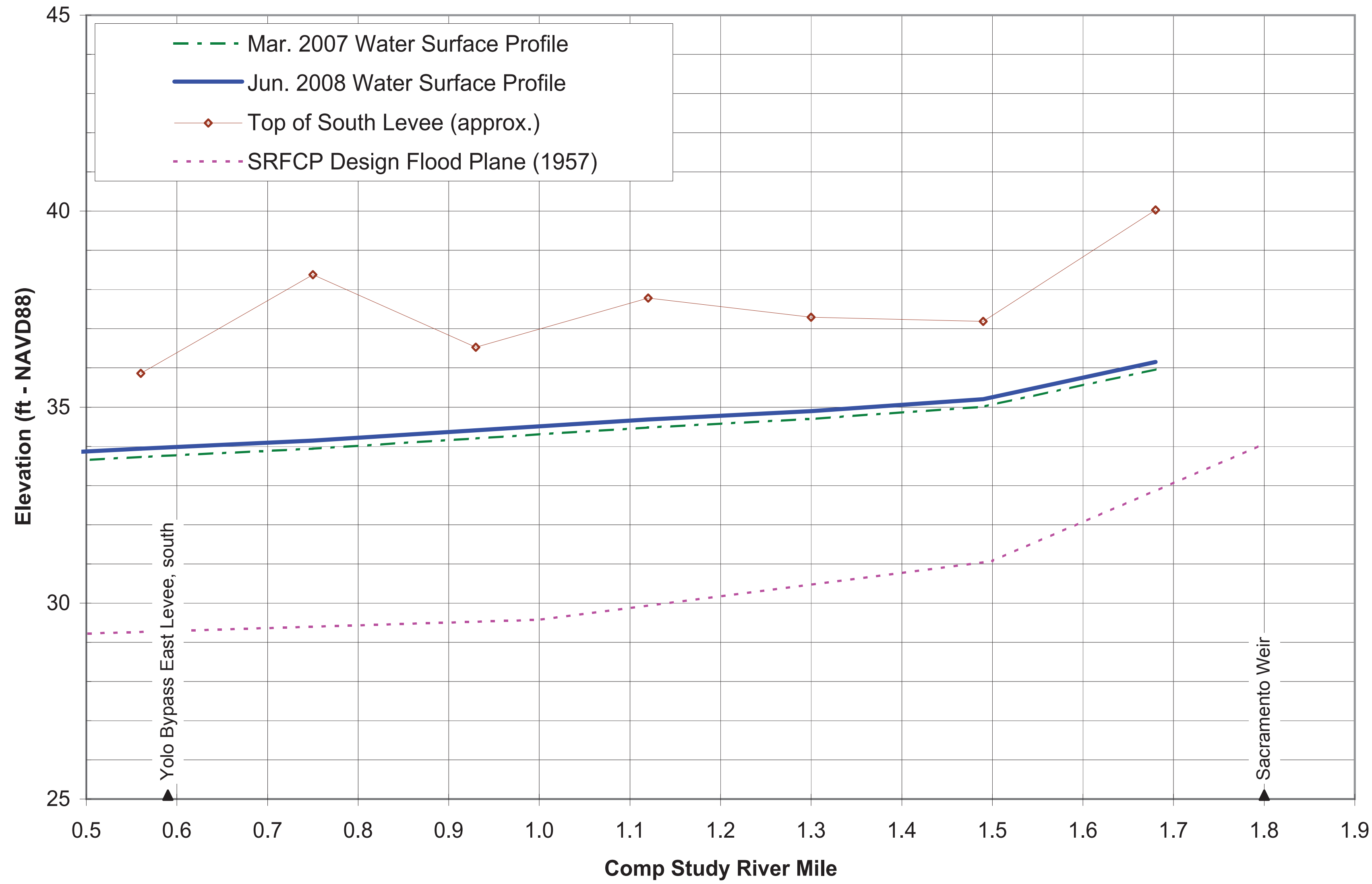
Analysis of Historic Mean Sea Level Change

As described in the MBK Engineers (2009b) report, the nearest tide station with sufficient period of record (40+ years recommended) is the National Oceanic and Atmospheric Administration (NOAA) station 9414290 at San Francisco, CA. Tidal records for this station have been maintained back to the 1850s.

The NOAA Center for Operational Oceanographic Products and Services (CO-OPS) has analyzed the historic mean sea level for this site has been shown to be increasing at a rate of 2.01millimeters per year (California Climate Change Center 2009 as cited in MBK Engineers 2009b).

4.1.3 Environmental Consequences

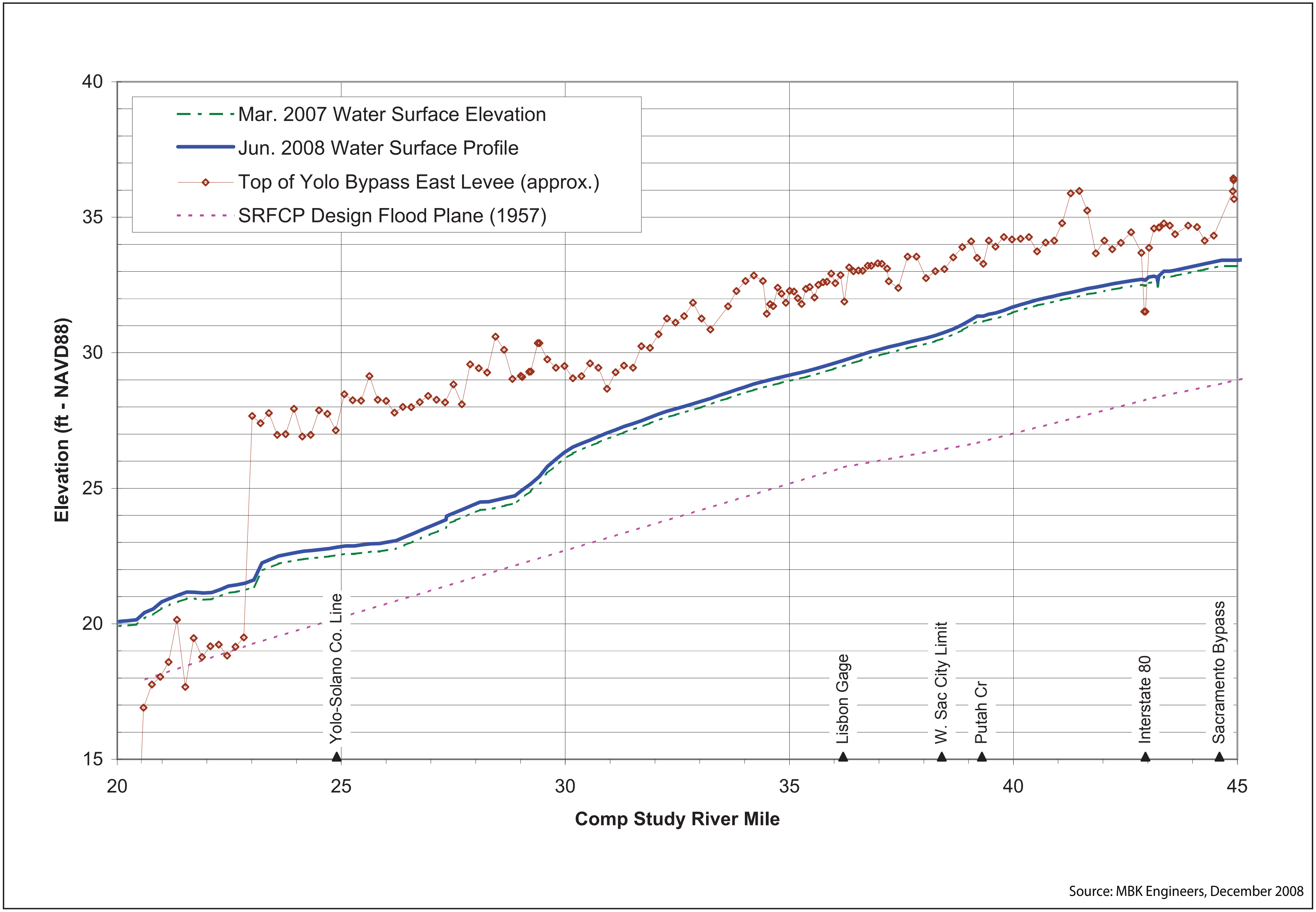
This section describes the environmental consequences relating to hydrologic, hydraulic, geomorphic, and flood control issues for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.



00875.07 EIS/EIR (03-10) AB

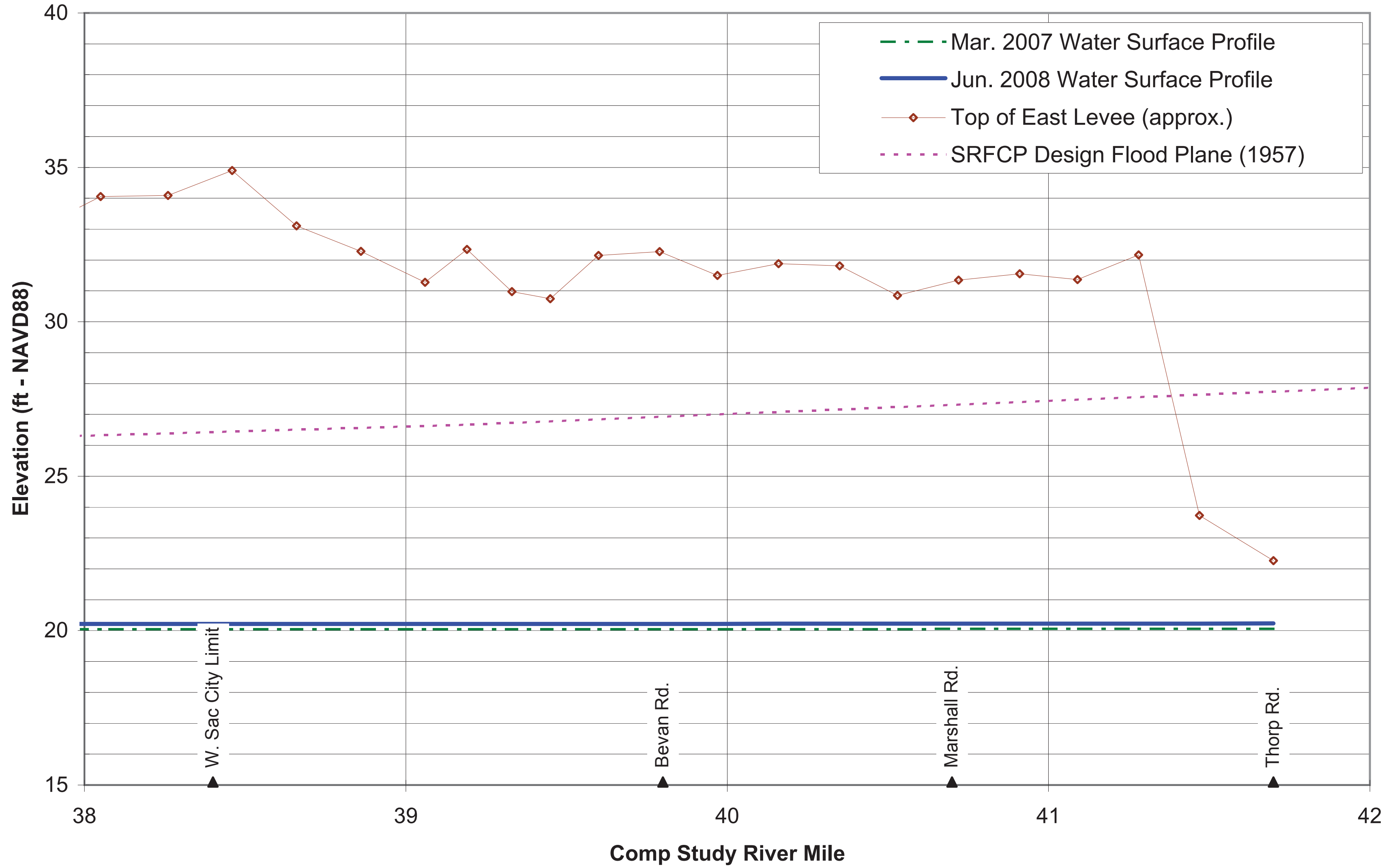
Source: MBK Engineers, December 2008

Figure 4.1-3
Maximum Water Surface Elevation, Sacramento Bypass



00875.07 EIS/EIR (03-10) AB

Figure 4.1-4
Maximum Water Surface Elevation, Yolo Bypass



Source: MBK Engineers, December 2008

00875.07 EIS/EIR (03-10) AB

Figure 4.1-5
Maximum Water Surface Elevation, Sacramento River Deep Water Ship Channel

4.1.3.1 Assessment Methods

Assessment of environmental effects associated with hydrology, hydraulics, geomorphology, and flood control issues was based on the following:

- MBK Engineers (2009) quantitative modeling of the West Sacramento basin,
- MBK Engineers (2007) quantitative modeling of the effects of Sacramento River West Levee Setback at Oak Hall Bend,
- MBK Engineers (2005) hydraulic analysis of the effects of potential cumulative development in the Sacramento River corridor floodway between Verona and Courtland on flood stages and flows,
- an evaluation of existing conditions of project-area levees and projected incision and scour estimates in the adjacent waterways,
- qualitative assessments of sedimentation/scour potential based on existing Federal and state channel hydraulic design standards and guidelines, and
- professional judgment.

4.1.3.2 Determination of Effects

The criteria used for determining the significance of an effect on hydrology, hydraulics, geomorphology, and flood control are based on NEPA standards, Appendix G of the State CEQA Guidelines (Environmental Checklist) and standards of professional practice.

Effects on hydrologic or geomorphic conditions may be considered significant if implementation of an alternative would:

- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off site;
- substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site;
- place within a 100-year flood hazard area structures that would impede or redirect floodflows; or
- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

Effects on flood control may be considered significant if implementation of an alternative would:

- significantly raise flood stage elevations;
- increase the frequency and duration of inundation of lands; or
- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee.

An effect on the levee system is considered significant if an alternative would substantially increase any of the following:

- seepage,
- levee settlement,
- wind erosion,
- bank erosion or bed scour,
- sediment deposition, or
- subsidence of land adjacent to levees.

In addition, an effect on the levee system is considered significant if an alternative would substantially decrease any of the following:

- levee stability,
- inspection, maintenance, or repair capabilities,
- current level of levee slope protection,
- emergency response capabilities,
- channel conveyance capacity, or
- the ability of the levees to withstand seismic forces.

4.1.4 Effects and Mitigation Measures

Effects related to mean sea level change are only addressed in the No Action Alternative because the West Sacramento basin is relatively insensitive to the rates of sea-level rise. Of all the scenarios analyzed, only the high sea-level rise rate 100 years after the project is constructed shows greater than one-tenth of a foot stage increase in the Sacramento River, Yolo Bypass, or Sacramento Bypass in the West Sacramento basin.

4.1.4.1 No Action Alternative

The No Action Alternative represents the continuation of the existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. Current levee operations and maintenance activities would continue, but there would be no change in the geomorphic and flood control regimes relative to existing conditions.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento River North Levee could fail due to seepage or slope stability or geometry issues would continue. Failure of the Sacramento River North Levee, depending on the magnitude of the event, could cause catastrophic flooding of the magnitude. In summary, those effects could include excessive saturation and weakening of all of the city's levees, reducing levee integrity and resulting in an even greater risk of levee collapse, failure and further flooding and damage. Additionally, proposed levee strengthening projects in upstream areas may transfer flood risk to the study area if the Sacramento River North Levee remains below current engineering standards while other upstream levees are improved to meet or exceed current standards. However, given the uncertainty of the occurrence or magnitude of such an event, potential effects on geomorphic and flood control conditions cannot be quantified based on available information. Compliance with future vegetation policy enforcement on the Sacramento River North Levee would not have any noteworthy effects on the geomorphic and/or flood control regimes of the Sacramento River North Levee.

4.1.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on hydrologic, hydraulic, geomorphic, and flood control issues. A description of the effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
FC-1: Alteration of the Existing Drainage Pattern of the Site or Area	Significant	Less than significant	FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design
FC-2: Decrease in Through- and Under-Seepage	Beneficial	N/A	N/A
FC-3: Transfer of Seepage to Upstream or Downstream Levees	Less than significant	N/A	N/A
FC-4: Increase in Levee Slope Stability	Beneficial	N/A	N/A

Effect FC-1: Alteration of the Existing Drainage Pattern of the Site or Area

Implementation of slope flattening will involve earthwork on the landward side of the levee. The new material on the landside could alter surface runoff patterns. Because interference with drainage could cause or exacerbate local flooding, this effect may be significant. The implementation of Mitigation Measure FC-MM-1 would reduce this effect to less than significant.

Mitigation

Mitigation Measure FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design

WSAFCA and their primary contractors for engineering design and construction will ensure that the following measures are implemented to avoid significant effects associated with disruption of local drainage systems.

During project design, project engineers will coordinate with owners and operators of local drainage systems and landowners served by the systems to evaluate pre- and post-project drainage needs and design features to remediate any project-related substantial drainage disruption or alteration in runoff that would increase the potential for local flooding. If substantial alteration of runoff patterns or disruption of a local drainage system could result from a project feature, a drainage study will be prepared as part of project design. The study will consider the design flows of any existing facilities that would be crossed by project features and develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure equivalent functioning of the system during and after construction. If no drainage facilities (e.g., ditches, canals) would be affected, but project features would have a substantial significant effect on runoff amounts and/or patterns, new drainage systems will be included in the design of project alternatives to ensure that the project would not result in new or increased local flooding. Any necessary features to remediate project-induced drainage problems will be constructed before the project is completed or as part of the project, depending on site-specific conditions.

Effect FC-2: Decrease in Through and Under-Seepage

Through- and under-seepage has the potential to weaken levee foundations. The implementation of a slurry cutoff wall would reduce or eliminate the potential for seepage. Slurry cutoff walls create walls of impermeable material that act as a barrier to water moving laterally through a levee, greatly reducing or eliminating the potential for through-seepage. Implementation of a slurry wall would result in beneficial effects on flood conditions in the study area.

Effect FC-3: Transfer of Seepage to Upstream or Downstream Levees

Installation of a DSM cutoff wall at The Rivers project area may have a slight effect on the potential for seepage to occur through levee sections immediately upstream or downstream, as a result of redirection of hydraulic force. However, the change in hydrologic conditions resulting from this treatment is not expected to result in a substantial increase in seepage through or under adjacent levees because any upstream or downstream levee will be engineered appropriately to an equal level of protection. Incremental improvements to the system will be made over a period of years and these improvements would reduce or eliminate any seepage problems. This effect would be less than significant.

Effect FC-4: Increase in Levee Slope Stability

The proposed slope flattening would repair and reshape slopes that are too steep and do not meet current standards. This would result in an increase in levee slope stability and a beneficial effect for geomorphic and flood conditions.

4.1.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on hydrologic, hydraulic, geomorphic, and flood control issues. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
FC-1: Alteration of the Existing Drainage Pattern of the Site or Area	Significant	Less than significant	FC-MM-1: Coordinate with Owners and Operators, Prepare Drainage Studies as Needed, and Remediate Effects through Project Design
FC-2: Decrease in Through- and Under-Seepage	Beneficial	N/A	N/A
FC-3: Transfer of Seepage to Upstream or Downstream Levees	Less than significant	N/A	N/A
FC-4: Increase in Levee Slope Stability	Beneficial	N/A	N/A

Effect FC-1: Alteration of the Existing Drainage Pattern of the Site or Area

Implementation of slope flattening would involve earthwork on the landward side of the levee. The new material on the landside could alter surface runoff patterns. Because interference with drainage could cause or exacerbate local flooding, this effect may be significant. The implementation of Mitigation Measure FC-MM-1, as described above under The Rivers APA would reduce this effect to less than significant.

Effect FC-2: Decrease in Through and Under-Seepage

Through- and under-seepage has the potential to weaken levee foundations. The implementation of a slurry cutoff wall would reduce or eliminate the potential for seepage. Slurry cutoff walls create walls of impermeable material that act as a barrier to water moving laterally through a levee, greatly reducing or eliminating the potential for through-seepage. Implementation of a slurry wall would result in beneficial effects on flood conditions in the study area.

Effect FC-3: Transfer of Seepage to Upstream or Downstream Levees

Installation of a deep sheet pile wall at The Rivers project area may have a slight effect on the potential for seepage to occur through levee sections immediately upstream or downstream, as a result of the redirection of hydraulic force.

However, the change in hydrologic conditions resulting from this treatment is not expected to result in a substantial increase in seepage through or under adjacent levees because any upstream or downstream levee will be engineered appropriately to an equal level of protection. Incremental improvements to the system will be made over a period of years and these improvements would reduce or eliminate any seepage problems. This effect would be less than significant.

Effect FC-4: Increase in Levee Slope Stability

The proposed slope flattening would repair and reshape slopes that are too steep and do not meet current standards. This would result in an increase in levee slope stability and a beneficial effect for geomorphic and flood conditions.

Section 4.2

Water Quality and Groundwater Resources—The Rivers Early Implementation Project

4.2.1 Introduction

This section describes the affected environment for water quality and groundwater resources, including the regulatory setting associated with water quality and groundwater resources, the effects on water quality and groundwater resources that would result from the proposed project and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below:

- *Central Valley Regional Water Quality Control Board Water Quality Control Basin Plan* (2007)
- List of water quality constituents obtained from the California Data Exchange Center website (California Data Exchange Center 2009)
- *Yolo County General Plan* (Yolo County 2002)
- *City of West Sacramento General Plan Policy Document* (City of West Sacramento 2004)
- *Solano County General Plan* (Solano County 2008)

4.2.2 Affected Environment

This section described the affected environment for water quality and groundwater resources in The Rivers EIP project area, including the regulatory and environmental settings.

4.2.2.1 Regulatory Setting

4.2.2.1.1 Federal

The following Federal regulations related to water quality and groundwater resources may apply to the implementation of The Rivers EIP.

Clean Water Act

The State Water Resources Control Board (State Water Board) is the state agency with primary responsibility for implementing the Federal Clean Water Act (CWA), which establishes regulations relating to water resource issues. Typically, all regulatory requirements are implemented by the State Water Board through nine regional water quality control boards (RWQCBs) established throughout the state. The Central Valley RWQCB is responsible for regulating discharges to the Sacramento River and its tributaries.

The CWA is the primary Federal law that protects the quality of the nation’s surface waters, including lakes, rivers, and coastal wetlands. It operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit. Permit review is the CWA's primary regulatory tool. The following sections provide additional details on specific sections of the CWA.

Section 404: Permits for Fill Placement in Waters and Wetlands

CWA Section 404 regulates the discharge of dredged and fill materials into "waters of the United States," which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. Project proponents must obtain a permit from the U.S. Army Corps of Engineers (USACE) for all discharges of dredged or fill material into waters of the United States before proceeding with a proposed activity. Before any actions that may affect surface waters are implemented, a delineation of jurisdictional waters of the United States must be completed, following USACE protocols, to determine whether the project area contains wetlands or other waters of the United States that qualify for CWA protection. These areas include:

- sections within the ordinary high water mark (OHWM) of a stream, including non-perennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned; and
- seasonal and perennial wetlands, including coastal wetlands.

Wetlands are defined for regulatory purposes as areas "inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3, 40 Code of Federal Regulations [CFR] 230.3).

Applicants must obtain a permit from USACE for all discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed activity. As stated by the Counsel for the U.S. Environmental Protection Agency's (EPA's) January 19, 2001, determination in response to the Solid Waste Agency of Northern Cook County *v.* U.S. Army Corps of Engineers ruling, non-navigable, isolated waters may not be regulated by USACE. As part of the wetland delineation and verification process, USACE will determine whether the wetlands in the project area are isolated and therefore not regulated under Section 404.

USACE may issue either an individual permit evaluated on a case-by-case basis or a general permit evaluated at a program level for a series of related activities. General permits are pre-authorized and are issued to cover multiple instances of similar activities expected to cause only minimal significant environmental effects. Nationwide permits (NWPs) are a type of general permit issued to cover particular fill activities. Each NWP specifies particular conditions that must be met for the NWP to apply to a particular project. Potential waters of the United States in the project area are under the jurisdiction of USACE's Sacramento District.

Compliance with Section 404 requires compliance with several other environmental laws and regulations. USACE cannot issue an individual permit or verify the use of a general permit until the requirements of the National Environmental Policy Act (NEPA), the Federal Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) (see Section 4.17, Cultural Resources) have been met. In addition, USACE cannot issue or verify any permit until a water quality certification or a waiver of certification has been issued pursuant to CWA Section 401.

Certain activities are exempt from the Section 404 permitting process:

- farming, ranching, and forestry activities that are considered normal and ongoing (as of 1985 conditions), such as plowing, harvesting, and minor drainage of upland areas to waters of the United States;
- construction and maintenance of stock ponds and irrigation ditches;
- maintenance of drainage ditches;
- construction of temporary sedimentation basins in upland areas;
- construction and maintenance of farm, forest, and mining roads in accordance with best management practices (BMPs); and
- other activities regulated by an approved program of BMPs authorized by CWA Section 208(b)(4).

Section 404 permits may be issued for only the least environmentally damaging practical alternative (i.e., authorization of a proposed discharge is prohibited if there is a practical alternative that would have fewer significant effects and lacks other significant consequences). Section 404 may apply to the proposed project if construction would occur within waters of the United States.

Section 402: Permits for Discharge to Surface Waters

CWA Section 402 regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by EPA. In California, the State Water Board is authorized by EPA to oversee the NPDES program through the RWQCBs (see related discussion in this section under Porter-Cologne Water Quality Control Act). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits.

Construction Activities

Most construction activities that disturb 1 acre of land or more are required to obtain coverage under the NPDES General Permit for Construction Activities (General Construction Permit), which requires the applicant to file a notice of intent (NOI) to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP). The SWPPP includes a site map and a description of proposed construction activities, along with a demonstration of compliance with relevant local ordinances and regulations, and an overview of the BMPs that would be implemented to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. Permittees are further required to conduct annual monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants. The City will need to file an NOI with the Central Valley RWQCB to obtain the General Construction Permit before any construction activities begin.

Dewatering Activities

While small amounts of construction-related dewatering are covered under the General Construction Permit, the Central Valley RWQCB has also adopted a General Order for Dewatering and Other Low Threat Discharges to Surface Waters (General Dewatering Permit). This permit applies to various categories of dewatering activities and likely would apply to the proposed project, if construction required dewatering in greater quantities than that allowed by the General Construction Permit and discharged the effluent to surface waters. The General Dewatering Permit contains waste discharge limitations and prohibitions similar to those in the General Construction Permit. To obtain coverage, the applicant must submit an NOI and pollution prevention and monitoring program (PPMP) to the Central Valley RWQCB. The PPMP must include a description of the discharge location, discharge characteristics, primary pollutants, receiving water, treatment systems, spill prevention plans, and other measures necessary to comply with discharge limits. A representative sampling and analysis program must be prepared as part of the PPMP and implemented by the permittee, along with recordkeeping and quarterly reporting requirements during dewatering activities. For dewatering activities that are not covered by the General Dewatering Permit, an individual NPDES permit and waste discharge requirements (WDRs) must be obtained from the Central Valley RWQCB. However, the amount of dewatering needed for the proposed project likely would fall under the General Dewatering Permit because excavation activities associated with construction of the project elements such as the slurry cutoff walls and sheet pile walls may reach the groundwater table.

Section 401: Water Quality Certification

Under CWA Section 401, applicants for a Federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a Federal component and may affect the quality of the state's waters (including projects that require Federal agency approval, such as the issuance of a Section 404 permit) also must comply with Section 401. The City will obtain a Section 401 certification or waiver from the Central Valley RWQCB.

Section 303: Impaired Waters

California adopts water quality standards to protect beneficial uses of state waters as required by CWA Section 303 and the Porter-Cologne Water Quality Control Act of 1969. Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop a list of water quality-limited segments. In California, the State Water Board develops the list of water quality-limited segments; the EPA approves each state's list. Waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. Section 303(d) also establishes the total maximum daily load (TMDL) process to guide the application of state water quality standards.

4.2.2.1.2 State

The following policies or agencies related to water quality and groundwater resources may apply to the implementation of The Rivers EIP.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, passed in 1969, articulates with the CWA. It established the State Water Board and divided the state into nine regions, each overseen by an RWQCB. The State Water Board is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, although much of its daily implementation authority is delegated to the RWQCBs, which are responsible for implementing CWA Sections 402 and 303(d). In general, the State Water Board manages both water rights and statewide regulation of water quality, while the RWQCBs focus exclusively on water quality within their regions.

Central Valley Regional Water Quality Control Board

The Central Valley RWQCB is responsible for implementing its Water Quality Control Plan (Basin Plan) (2007) for the Sacramento River and its tributaries. The Basin Plan identifies beneficial uses of the river and its tributaries and water quality objectives to protect those uses. Numerical and narrative criteria are contained in the Basin Plan for several key water quality constituents, including dissolved oxygen (DO), water temperature, trace metals, turbidity, suspended material, pesticides, salinity, radioactivity, and other related constituents.

The methods the Central Valley RWQCB uses to implement the Basin Plan criteria include issuing WDRs. WDRs are issued to any entity that discharges to a surface water body and does not meet certain water quality criteria such as those related to sediment. The WDR/NPDES permit also serves as a federally required NPDES permit (under the CWA) and incorporates the requirements of other applicable regulations.

Basin Plans and Water Quality Objectives

The Porter-Cologne Water Quality Control Act provides for the development and periodic review of basin plans that designate beneficial uses of California's major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters. Beneficial uses represent the services and qualities of a water body (i.e., the reasons the water body is considered valuable), while water quality objectives represent the standards necessary to protect and support those beneficial uses. Basin plans are implemented primarily by using the NPDES permitting system to regulate waste discharges so that water quality objectives are met (see discussion of the NPDES system under CWA above). Basin plans are updated every 3 years and provide the technical basis for determining WDRs and taking enforcement actions. The Central Valley RWQCB Basin Plan was last updated in 2007.

Water Quality Objectives by Region

The RWQCBs have set water quality objectives for all surface waters in their respective regions (including the Sacramento River basin) for the following substances and parameters: ammonia, bacteria, biostimulatory substances, chemical constituents, color, DO, floating material, oil and grease, pH, pesticides, radioactivity, salinity, sediment, settleable material, suspended material, tastes and odors, temperature, toxicity, and turbidity.

State Implementation Plan

In 1994, the State Water Board and EPA agreed to a coordinated approach for addressing priority toxic pollutants in inland surface waters, enclosed bays, and estuaries of California. In March 2000, the State Water Board adopted a state implementation plan (SIP) for priority toxic pollutant water quality criteria contained in the California Toxics Rule (CTR). EPA promulgated the CTR in May 2000. The SIP also implements National Toxics Rule (NTR) criteria and applicable priority pollutant objectives in the basin plans. In combination, the CTR and NTR and applicable basin plan objectives, existing RWQCB beneficial use designations, and SIP compose water quality standards and implementation procedures for priority toxic pollutants in non-ocean surface waters in California, such as the Sacramento River.

4.2.2.1.3 Local

The following local policies related to water quality and groundwater may apply to the implementation of The Rivers EIP.

City of West Sacramento General Plan

The City is in the process of updating the *City of West Sacramento General Plan* adopted in 1990. The Natural Resources section of the existing general plan contains a number of goals and polices related to water quality.

Goal A: To protect water quality in the Sacramento River, Sacramento Deep Water Ship Channel, Lake Washington, and the area's groundwater basin.

Policies

1. The City shall prohibit the establishment of any new septic systems within areas where City sewer and water service are available within one air mile and shall require that new septic tank installation elsewhere be limited to one acre or larger parcels.
2. The City shall seek the elimination of existing septic tanks in urbanized areas.
3. The City shall not approve new development that has a significant potential for adversely affecting water quality in the Sacramento River, the Deep Water Ship Channel, Lake Washington, or the area's groundwater basin.
4. The City shall regularly monitor water quality in City wells for evidence of toxics, saltwater intrusion, and other contaminants.
5. The City shall utilize the CEQA process to identify and avoid or mitigate potential groundwater pollution problems resulting from new commercial and industrial development.
6. The City shall support efforts on a county, regional, or statewide basis to reduce runoff of toxic agricultural chemicals into the Sacramento River.
7. The City shall implement measures to minimize the discharge of sediment into its watercourses.
8. The City shall continue to encourage responsible state agencies to prohibit the discharge of saltwater ballast into the Deep Water Ship Channel.

Yolo County General Plan

The *Yolo County General Plan* is also in the process of being updated, and a draft revised General plan is available on the County website. The Conservation and Open Space Element contains goals on polices in regard to water resources. The following goal and polices are included in the *Yolo County General Plan*:

Goal CO-5: Water Resources. Ensure an abundant, safe, and sustainable water supply to support the needs of existing and future generations.

Policy CO-5.6. Improve and protect water quality for municipal, agricultural, and environmental uses.

Policy CO-5.7. Support mercury regulations that are based on good science and reflect an appropriate balancing of sometimes competing public values including health, food chain, reclamation and restoration of Cache Creek, sustainable and economically viable Delta agriculture, necessary mineral extraction, flood control, erosion control, water quality, and habitat restoration.

Policy CO-5.8. Support efforts to reduce the accumulation of methyl mercury in fish tissue in Cache Creek and the Delta, as well as the consumption of fish with high levels of methyl mercury.

Policy CO-5.12. Support the integrated management of surface and groundwater, stormwater treatment and use, the development of highly treated wastewater, and desalinization where feasible.

Policy CO-5.17. Require new development to be designed such that nitrates, lawn chemicals, oil, and other pollutants of concern do not impair groundwater quality.

Policy CO-5.21. Encourage the use of water management strategies, biological remediation, and technology to address naturally occurring water quality problems such as boron, mercury, and arsenic.

Policy CO-5.22. Work with other agencies and non-profit organizations to provide educational and technical assistance programs to encourage farmers to adopt agricultural methods that improve water quality.

Policy CO-5.23. Support efforts to meet applicable water quality standards for all surface and groundwater resources.

Policy CO-5.24. Pursue funding to remediate historic mines and other sources of mercury contamination on the Cache Creek watershed.

4.2.2.2 Environmental Setting

This section discusses the existing conditions related to surface water quality and groundwater quality in the greater West Sacramento area. This is followed by a more specific discussion on water quality directly related to The Rivers EIP site.

4.2.2.2.1 Surface Water Quality

Water management operations at Shasta Dam and other flow-regulating facilities substantially influence the flow regime of the Sacramento River. Water quality dynamics also have been influenced by the operation of these flow-regulating facilities. The water quality of the Sacramento River is good to excellent, with relatively cool water temperatures, low biochemical oxygen demand (BOD), medium to high DO, and low mineral and nutrient content. In general, the surface water quality of the Sacramento River is representative of agricultural return flows, urban runoff, and natural sedimentation from scouring.

CWA Section 303(d) establishes the TMDL process to assist in guiding the application of state water quality standards. It requires the states to identify streams in which water quality is impaired (i.e., affected by the presence of pollutants or contaminants) and to establish the TMDL—the maximum quantity of a particular contaminant that a water body can assimilate without experiencing adverse effects. The 303(d) list breaks up the Sacramento River into four sections: Keswick Dam to Cottonwood Creek, Cottonwood Creek to Red Bluff, Red Bluff to Knights Landing, and Knights Landing to the Delta. All sections of the Sacramento River are listed on the 303(d) list for unknown toxicity, and the Knights Landing to the Delta section is listed for mercury. Mercury is primarily a legacy of gold mining.

The following sections discuss specific contaminants of concern in relation to the implementation of the proposed project on the Sacramento River.

Total Suspended Sediment and Turbidity

Total suspended sediment (TSS) is indicative of upstream scouring, bank erosion, and agricultural return flow transporting and depositing sediment. Sediment is considered a pollutant by the Central Valley RWQCB and can transport other contaminants, such as phosphorus, and hydrophobic contaminants, such as organochlorine pesticides. Data were downloaded from the U.S. Geological Survey (USGS) web site from 1997 to 2007 for the Sacramento River at Freeport. Note that more recent flow data (2007 to 2009) are available; however, there is no matching TSS data available for this more recent time frame. Therefore, the most recent available data (2007 to 2009) were used to calculate sediment loads. Monthly average data points are presented in Table 4.2-1. The average January flow on the Sacramento River from 1997 to 2007 is 41,414 cubic feet per second (cfs), and the average loading of sediment during January is equal to 11,670 (conversion factor*TSS*flow/ton) tons per day.

Although sedimentation is a natural part of the flow regime for rivers, the Central Valley RWQCB also considers it a pollutant. Excessive sedimentation from construction practices such as placement of riprap on levees or constructing slurry cutoff walls can smother filter-feeding organisms and cause other serious water quality related issues.

Turbidity is another measurement of how much sedimentation is in the water and is done using an optical light probe. Turbidity is measured in nephelometric turbidity units (NTUs). The Basin Plan states that where ambient turbidity is between 5 and 50 NTUs, projects shall not increase turbidity on the Sacramento River by more than 20% above the ambient conditions. Furthermore, if the ambient diurnal variation in turbidity fluctuates in and out of the 5 and 50 NTUs threshold, the Basin Plan states that averaging periods can be applied to data to determine compliance. For example, during the summer months, the Sacramento River turbidity may be less than 50 NTUs, and during the winter months, the turbidity may be more than 50 NTUs because of the higher flow rate causing more river scouring. Thus, monthly average was calculated using hourly California Data Exchange Center (CDEC) data and is presented in Table 4.2-1 below. Where the ambient turbidity is between 50 and 100 NTUs, a project must not exceed 10 NTUs above ambient conditions. This threshold would apply to the months of January and February (Table 4.2-1).

The proposed project would need to comply with the above-stated thresholds for turbidity. However, it is important to note that these thresholds may not be the same during the construction period because the turbidity data presented in Table 4.2-1 are averaged out over only about 1.5 years, and conditions might change.

Table 4.2-1. Monthly Average Total Suspended Solids and Turbidity on the Sacramento River at Freeport from 1997 to 2007

Month	Discharge (cfs)[1]	TSS (mg/L)[1]	TSS Load (tons)	Turbidity (NTU)[2]
January	41,414	104	11,670	64
February	44,084	83	9,839	68
March	39,586	70	7,476	15
April	28,552	51	3,946	11
May	25,152	48	3,279	12
June	21,461	30	1,741	17
July	20,432	37	2,019	21
August	18,235	27	1,332	9
September	16,121	29	1,266	10
October	11,950	29	940	6
November	13,612	24	868	8
December	25,105	81	5,463	12

Sources:

[1] U.S. Geological Survey data: <www.usgs.gov>

[2] California Data Exchange Center data: <http://cdec.water.ca.gov>

Notes:

Flow and TSS data are from the USGS and are presented as monthly average from 1997 to 2007. Turbidity data are from CDEC from March 2007 to January 2009 and also are presented as a monthly average. Turbidity data are from the Sacramento River at Hood, a few river miles downstream from the USGS station

Dissolved Oxygen, Temperature, Electrical Conductivity, and pH

DO is a critical component for all forms of aquatic life. It also can be highly variable and subject to large oscillations in short time periods. With calm waters and low flows, water bodies can thermally stratify, causing deeper zones to have very low DO concentrations. Additionally, high levels of nutrient loading can cause algal blooms. These blooms can cause large swings in DO levels as the algae populations fluctuate in size, producing oxygen while growing and consuming it while decaying. When DO concentrations fall below certain limits, the resulting low-DO zones can act as a barrier to fish migration and potentially adversely affect spawning success. In extreme cases, persistent low concentrations of DO can result in mortality of benthic organisms and other less-mobile aquatic species. The Basin Plan objective for DO in the Sacramento River from the I Street Bridge to the Delta is 7.0 milligrams per liter (mg/L) (Central Valley Regional Water Quality Control Board 2007). The Sacramento River DO concentrations near Hood from 2003 to 2009 are typically 10 mg/L during the storm season and 8 mg/L or more during the dry season when flow is lower (Table 4.2-2).

Water temperature is a critical constituent from the standpoint of aquatic life. The Basin Plan objective requires that the Sacramento River temperature not exceed 68°F from Hamilton City to the I Street Bridge in Sacramento during periods when temperature increases would be detrimental to the fishery. In addition, the Basin Plan objective for temperature also requires that it not deviate more than 5°F from ambient river temperature (Central Valley Regional Water Quality Control Board 2007). During the summer months of July and August, the temperature of the Sacramento at

Hood was approximately 71°F (Table 4.2-2). However, this location is downstream of the I Street Bridge, and with the cold water inflow of the American, the I Street Bridge temperature may be within Basin Plan standards. While an unlikely scenario, excessive sedimentation in large quantities could affect the temperature of the Sacramento River.

The concentration of hydrogen ion activity in water is reported on a pH scale from 0 to 14. If a solution measures less than 7, it is considered acidic. If a solution measures more than 7, it is considered basic, or alkaline. If a solution measures 7, it is considered neutral. Many biological functions can occur only within a narrow range of pH values. The Basin Plan objective for pH is between 6.5 and 8.5. Furthermore, discharges cannot result in changes of pH that exceed 0.5. The monthly average pH of the Sacramento River from 2003 to 2009 remained stable throughout the year (Table 4.2-2). Construction materials such as concrete or other chemicals could affect the pH of the Sacramento River if a discharge were to occur.

Electrical conductivity (EC) is a measure of the degree to which a given water sample conducts an electrical current. The amount of total dissolved solids (TDS) in water is related directly to EC (i.e., high EC is an indicator of high TDS). TDS and EC are general indicators of salinity and are regulated under the Basin Plan. Basin Plan objectives for EC on the Sacramento River are 340 microSiemens per centimeter (μS/cm). It is clear in Table 4.2-2 that monthly average EC levels in the Sacramento River remain below this threshold.

Table 4.2-2. Monthly Average Physical Data for the Sacramento River at Freeport from 2003 to 2009

Month	Temperature (°F)	pH (Standard)	DO (mg/L)	EC (μs/cm)
January	48.7	7.5	10.5	170
February	50.9	7.4	10.1	170
March	55.3	7.5	9.7	154
April	58.3	7.4	9.6	138
May	64.3	7.4	8.6	145
June	68.8	7.3	8.2	139
July	71.1	7.3	7.9	134
August	71.0	7.4	7.8	156
September	67.9	7.5	8.0	166
October	62.5	7.2	8.6	145
November	55.9	7.4	8.9	186
December	49.5	7.4	10.2	186

Source: California Data Exchange Center data: <http://cdec.water.ca.gov/>

In summary, the water quality of the Sacramento River is good to excellent, with relatively cool water temperatures, low BOD, medium to high DO, and low mineral and nutrient content. In general, the surface water quality of the Sacramento River is representative of agricultural return flows, urban runoff, and natural sedimentation from scouring. Water quality issues of concern within the Sacramento River include TSS and turbidity, DO, temperature, electrical conductivity, and pH. The Sacramento Bypass diverts Sacramento River flood flows around the city of West Sacramento.

Groundwater Resources Quality

The California Department of Water Resources (DWR) delineates groundwater basins throughout California under the state's Groundwater Bulletin 118. The Rivers EIP is located in the Sacramento Valley Groundwater Basin, Yolo Sub-basin (Basin No. 5-21.67). The total surface area of the Yolo Sub-basin is 256,000 acres. The Yolo Sub-basin is bounded on the east by the Sacramento River, on the west by the Coast Range, on the north by Cache Creek, and on the south by Putah Creek. The sub-basin is roughly bisected by an anticlinal structure, but otherwise it is gently sloping from west to east with elevations ranging from 400 feet at the base of the Coast Range, to close to sea level near the eastern portion of the sub-basin (California Department of Water Resources 2004).

Younger alluvium in the sub-basin consists of flood basin deposits and recent stream channel deposits. Flood basin deposits occur along the eastern margin of the sub-basin. The deposits consist of silts and clay, but along the eastern portion of the sub-basin, the interbedded deposits are connected with deposits of the Sacramento River. Older alluvium generally consists of loose to moderately compacted silt, silty clay, sand, and gravel deposited in alluvial fans during the Pliocene and Pleistocene (California Department of Water Resources 2004).

The anticlinal structure, which is expressed at the surface as the Dunnigan Hills and Plainfield Ridge, impedes subsurface flow from east to west. Subsurface groundwater outflow sometimes occurs from the Yolo Sub-basin into the Solano Sub-basin to the south. Subsurface outflow and inflow also may occur beneath the Sacramento River (California Department of Water Resources 2004).

Groundwater levels in the sub-basin are affected by periods of drought, a result of increased groundwater pumping and less surface water recharge. However, data indicate that the recovery of the aquifer is fast during wet years. Data indicate that long-term trends do not show any significant groundwater decline (California Department of Water Resources 2004). However, there are localized groundwater depressions in the vicinity of the Davis, Woodland, and Dunnigan/Zamora areas. Past studies have shown that the Yolo Sub-basin is subject to overdraft; however, the completion of Indian Valley Reservoir in 1976 provided a significant amount of surface water deliveries to be blended with groundwater in the urbanized areas located in the sub-basin (California Department of Water Resources 2004).

Many studies have been conducted to determine the groundwater storage capacity of the sub-basin. Several of these studies refer to Scott and Scalmanini in their 1975 report, *Investigations of Groundwater Resources, Yolo County*. Groundwater storage capacity for the Yolo Sub-basin can be estimated at 6,455,940 acre-feet for the depths between 20 and 420 feet. Based on the Scott report, groundwater storage in the Yolo Sub-basin in 1974 was estimated at 6,074,220 acre-feet (California Department of Water Resources 2004).

Groundwater quality in the sub-basin is characterized as a sodium magnesium, calcium magnesium, or magnesium bicarbonate type. The quality is considered good for both agricultural and municipal uses, despite the elevated hardness in the basin. The hardness is generally above 180 mg/L calcium carbonate ($CaCO_3$). Selenium and boron are found in high concentrations locally (California Department of Water Resources 2004). TDS range from 107 parts per million (ppm) to 1,300 ppm and average 574 ppm based on Title 22 data obtained from public supply wells (California Department of Water Resources 2004). Localized impairments include elevated concentrations of boron (as high as 2 to 4 ppm) in groundwater along Cache Creek and the Cache Creek Settling Basin area, increased levels of selenium present in groundwater supplies for the city of Davis, and localized areas of nitrate contamination (California Department of Water Resources 2004). Along the Sacramento River North Levee near Riverbank Road, Bryte Park, and The Rivers site, there is a known groundwater petroleum plume that will be affected by construction activities for The Rivers EIP. The effects from this construction are evaluated below

In summary, groundwater levels in the Yolo Sub-basin are affected by drought, pumping, and reduced surface water discharge. Groundwater quality is considered good for agricultural and municipal purposes, although the water is hard.

4.2.3 Environmental Consequences

This section describes the environmental consequences relating to surface water and groundwater quality for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.2.3.1 Assessment Methods

This evaluation of surface water quality and groundwater quality is based on professional standards and information obtained from the Central Valley RWQCB, State Water Board, and DWR.

The key effects were identified and evaluated based on the physical characteristics of The Rivers EIP project area and the magnitude, intensity, and duration of activities related to the construction of this proposed project.

4.2.3.2 Determination of Effects

For this analysis, an effect pertaining to surface water quality and groundwater quality was considered analyzed under NEPA and CEQA if it would result in any of the following environmental effects, which are based on NEPA standards, State CEQA Guidelines Appendix G (14 California Code of Regulations [CCR] 15000 *et seq.*), and standards of professional practice:

- violate water quality standards or waste discharge requirements,
- substantially deplete groundwater supplies or interfere substantially with ground water recharge,
- substantially degrade water quality, and
- alter regional or local hydrology resulting in substantial increases in erosion or sedimentation.

4.2.4 Effects and Mitigation Measures

4.2.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee alternatives would be made to increase the level of protection. No construction-related effects relating to water quality such as earthmoving that result in increased turbidity, or incidental releases of construction-related contaminants would occur. Therefore, there would be no effect on surface or groundwater quality or resources attributable to the implementation of the No Action Alternative.

However, without levee improvements, there is the continued risk of levee failure and continuing under seepage and loss of levee foundation soils would be expected to continue. If a levee overtopping or breach were to occur, floodwaters could be pumped back over levees or recede back through the levee breach into the Sacramento River, Deep Water Ship Channel (DWSC), or the Yolo or Sacramento Bypasses. Flooded areas may contain contaminants from stored chemicals, septic systems, and flooded vehicles—all of which would be released into floodwaters and subsequently contaminate the Sacramento River and the Delta surface waters and potentially soil and groundwater. These contaminants would likely exceed acceptable established water quality standards and impair beneficial uses of the Sacramento River and Delta, including downstream drinking water intakes. A catastrophic levee failure could result in collapse of miles of levee slopes and alteration of regional and local hydrology that would result in substantial increases in erosion and sedimentation. Loss of eroded levee foundation and eroded topsoil from inundated areas would increase turbidity and total dissolved solids in the Sacramento River and ultimately, the Delta; again, impairing beneficial uses. Furthermore, if a levee breach were to occur, emergency construction and repair activities would be implemented without the use of best management practices and could result in the release of hazardous construction materials such as oil and other petroleum-related products.

4.2.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on water quality and groundwater resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids	Less than significant	N/A	
WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials	Less than significant	N/A	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality
WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation	Significant	Less than significant	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering

Effect WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids

Construction of The Rivers APA would require earth-disturbing activities that could cause erosion and sedimentation to adjacent water bodies. Because this type of construction would occur close to the Sacramento River, sedimentation and turbidity could occur in the river. Two environmental commitments (see Section 2.7 of Chapter 2, Alternatives, for a full description) are included as part of the project that would reduce the likelihood that this effect would occur, or reduce the effect should it occur. These commitments include developing the SWPPP prior to beginning construction, and monitoring turbidity during construction activities. Site-specific erosion control measures would be developed as part of a SWPPP, a requirement of the NPDES General Construction Permit. A SWPPP typically contains, but is not limited to, the following described BMPs:

- **Timing of construction.** Conduct earthwork during the typical construction season.
- **Staging of construction equipment and materials.** Stage construction equipment and materials on the landside of the subject levee reaches. To the extent possible, stage equipment and materials in areas that already have been disturbed.
- **Soil and vegetation disturbance.** Minimize ground and vegetation disturbance during construction by establishing designated equipment staging areas, ingress and egress corridors, spoils disposal and soil stockpile areas, and equipment exclusion zones prior to the commencement of any grading operations.
- **Grading spoils.** Stockpile soil and grading spoils on the landside of the subject levee reaches, and install sediment barriers (e.g., silt fences, fiber rolls, straw bales) around the base of stockpiles to intercept runoff and sediment during storm events. If necessary, cover stockpiles with geotextile fabric to provide protection against wind and water erosion.
- **Sediment barriers.** Install sediment barriers on graded or otherwise-disturbed slopes as needed to prevent sediment from leaving the project site and entering nearby surface waters.
- **Site stabilization.** Install native plant materials to stabilize cut and fill slopes and other disturbed areas once construction is complete. Plant materials may include an erosion control seed mixture or shrub and tree container stock. Temporary structural BMPs, such as sediment barriers, erosion control blankets, mulch, and a mulch tackifier, may be installed as needed to stabilize disturbed areas until vegetation becomes established.

As part of a turbidity monitoring program, WSAFCA or its contractor will monitor turbidity in the adjacent water bodies, where applicable criteria apply, to determine whether turbidity is being affected by construction and ensure that construction does not result in a rise in turbidity levels above ambient conditions, in accordance with the Central Valley RWQCB Basin Plan turbidity objectives. The monitoring program will include monitoring ambient turbidity conditions upstream and 200 feet downstream of construction activities. Grab samples will be collected at a downstream location that is representative of the flow near the construction site. If there is a visible sediment plume being created from construction, the sample should represent this plume. Since construction is not proposed to encroach upon the Sacramento River, monitoring should occur once a week on a random basis.

If turbidity limits exceed Basin Plan standards, construction-related earth-disturbing activities will slow to a point that results in alleviating the problem. WSAFCA or its contractor will notify the Central Valley RWQCB of the issue and provide an explanation of the cause. The implementation of these environmental commitments would reduce any potential effects to a less-than-significant level.

Effect WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials

Project actions may involve storage, use, or discharge of toxic and other harmful substances near the Sacramento River (or in areas that drain to the Sacramento River or other water bodies).

Construction activities would involve the use of heavy equipment, cranes, compactors, and other construction equipment that uses petroleum products (e.g., fuels, lubricants, hydraulic fluids, coolants). All of these materials may be toxic to fish and other aquatic organisms. An accidental spill or inadvertent discharge of these materials could affect the water quality of the river or water body.

There are three environmental commitments included in the project description that would reduce the effect of such a release should it occur, or reduce the likelihood that a release would occur. These environmental commitments include the development of the SWPPP, a spill prevention, control, and countermeasures plan (SPCCP), and a bentonite slurry spill contingency plan (BSSCP). Typical elements of the SWPPP are described under Effect WQ-1, above. All three environmental commitments are described in detail in Section 2.7 of Chapter 2, Alternatives, and are summarized below. All plans would be prepared prior to the commencement of construction activities.

An SPCCP is intended to prevent any discharge of oil into navigable water or adjoining shorelines. WSAFCA or its contractor will develop and implement an SPCCP to minimize the potential for and effects from spills of hazardous, toxic, or petroleum substances during construction and operation activities. The SPCCP will be completed before any construction activities begin. Implementation of this measure will comply with state and Federal water quality regulations. The SPCCP will describe spill sources and spill pathways in addition to the actions that would be taken in the event of a spill (e.g., an oil spill from engine refueling would be immediately cleaned up with oil absorbents). The SPCCP will outline descriptions of containments facilities and practices such as doubled-walled tanks, containment berms, emergency shut-offs, drip pans, fueling procedures and spill response kits. It will also describe how and when employees are trained in proper handling procedure and spill prevention and response procedures.

A BSSCP is typically developed for activities that involve the use of bentonite materials (e.g., the construction of slurry walls). The BSSCP is intended to minimize the potential for a frac-out associated with excavation and tunneling activities, provide for timely detection of frac-outs, and ensure and “minimum-effect” response in the event of a frac-out and release of excavation fluid (i.e., bentonite used for the construction of slurry walls).

Release of contaminants into adjacent water bodies could result in significant effects. Adherence to these environmental commitments and the implementation of Mitigation Measure WQ-MM-1 should spills occur would reduce this effect to less than significant.

Mitigation

Mitigation Measure WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality

If an appreciable spill has occurred and results determine that project activities have significantly affected surface or groundwater quality, a detailed analysis will be performed by a registered environmental assessor or professional engineer to identify the likely cause of contamination. This analysis will conform to American Society for Testing and Materials (ASTM) standards and will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, WSAFCA and its contractors will select and implement measures to control contamination, with a performance standard that surface water quality and groundwater quality must be returned to baseline conditions.

Effect WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation

Trenching and excavation associated with slurry wall construction may reach a depth that could expose the water table, in which case an immediate and direct path to the groundwater basin would become available for contaminants to enter the groundwater system. Primary construction-related contaminants that could reach groundwater include increased sediment, oil and grease, and hazardous materials.

In addition, while dewatering of the construction area (e.g., trenches dug for slurry wall construction that may be filled with groundwater) is not expected to occur to implement the proposed project, if it became necessary, it could result in the release of contaminants to surface or groundwater.

The construction of a slurry cutoff wall is not expected to require digging or trenching at depths where groundwater aquifers are used for drinking water. If trenching activities were to incidentally reach a groundwater aquifer used for drinking water, the slurry wall material is relatively benign and would not remain in a liquid state long enough to allow for significant lateral movement within the aquifer.

As discussed in Section 4.16, Public Health and Environmental Hazards, prior to all construction activities, WSAFCA will complete Phase I and, if necessary, Phase II Environmental Site Assessment Investigations that will include analysis of soil and/or groundwater samples for the potential contamination sites that have not yet been covered by previous investigations. If hazardous substances are found, WSAFCA or its contractor will implement required measures for the proper transport and disposal of such materials in accordance with the appropriate local, state, and Federal laws and regulations.

Currently, there is a known plume of groundwater contamination near The Rivers EIP project area (Figure 4.2-1). The plume is a result of multiple leaking underground storage tanks, removed in 1994, located at the DWR Maintenance Yard. There are some private drinking water wells in this area. DWR has installed and uses monitoring wells to continue to monitor the plume to determine its flow patterns and to ensure minimal effects on drinking water wells. The leaking storage tanks were discovered in 1994 and have since been fixed (California Department of Water Resources 2009).

Of the multiple monitoring wells shown on Figure 4.2-1, three are used for groundwater quality sampling (MW-1, MW-2, and MW-3). The three on-site wells were routinely sampled for aromatic volatile organic compounds benzene, toluene, ethylbenzene, and total xylenes (BTEX), along with gasoline additive oxygenate compounds. These oxygenates include methyl tertiary butyl ether (MTBE), di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), and tertiary butyl alcohol (TBA) (California Department of Water Resources 2009).

The latest quarterly monitoring report results showed no detectable concentrations of contaminants of concern at or above laboratory reporting limits. However, past sampling and analysis have determined that MTBE is the main contaminant of concern on the site (California Department of Water Resources 2009). No other contaminants of concern were ever detected at or above the laboratory reporting limits from any of the monitoring wells.

In addition to groundwater quality sampling, groundwater elevation is also monitored. Groundwater elevations were measured ranging from 6.71 feet on June 3, 2009 (MW-13) (eastern

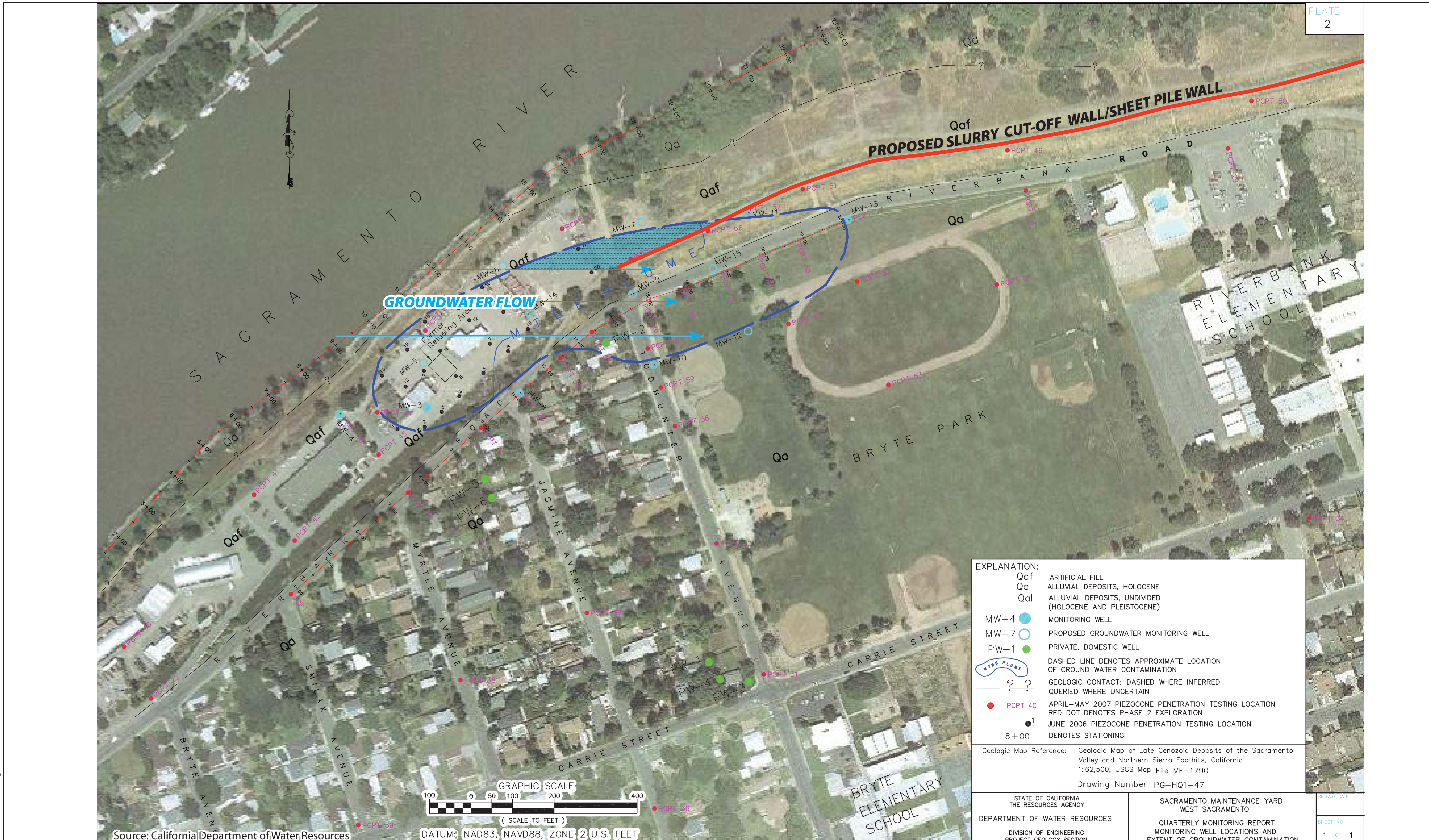


Figure 4.2-1
Groundwater Plume

00875.07 West Sac Program EIR/Groundwater Plume (11-09) SS

most portion of the plume on the land side of the levee), to 9.21 feet on April 27, 2009 (MW-8, northern south side of the plume) (California Department of Water Resources 2009). During that same period the depth to groundwater was approximately 29 to 35 feet below ground surface (bgs) on the levee, and 13 to 15 feet bgs south of the levee and the plume (California Department of Water Resources 2009). DWR concluded that groundwater levels correlate to the Sacramento River stage and data from the levels indicate that the groundwater appears to flow east (see Figure 4.2-1 for flow direction).

The slurry wall is expected to be 2 to 3 feet wide and reach a depth from 80 to 135 feet bgs, which is much deeper than the 29- to 35-foot depth to groundwater. In addition, the slurry wall would bisect a small portion of the north side of the groundwater plume (Figure 4.2-1). Based on the groundwater flow direction (Figure 4.2-1), the slurry wall would not redirect the contaminated plume to any known drinking water wells in the area. In addition, the small area of the plume (see shaded area on Figure 4.2-1) on the river side of the slurry wall would be blocked by the slurry wall from migrating toward the elementary school. This portion of the plume would likely travel along the north side of the slurry wall with the flow direction of the Sacramento River because, as previously mentioned, the natural flow direction of the groundwater plume is away from the Sacramento River (in the eastern direction), and indicates that the groundwater is recharged by the river rather than the river being recharged by groundwater. Exact travel time is unknown, so it is unclear as to how long it would take this portion of the plume to pass the slurry wall approximately 2,000 feet downstream. However, because groundwater travel time is extremely slow, potential contamination would be slowly diluted by river water over a long period of time.

DWR recommends that groundwater quality and elevation sampling continue indefinitely on a quarterly basis along with installation of new monitoring wells in strategic locations following the groundwater flow direction to characterize any potential movement of the plume (California Department of Water Resources 2009). The Central Valley RWQCB (lead agency) and Yolo County Environmental Health Services receive quarterly groundwater quality monitoring and sampling reports from DWR for the Sacramento Maintenance Yard Underground Storage Tank and Groundwater Site Investigation (T0611300022). The most recent letter of correspondence from the Central Valley RWQCB requires a reduction from quarterly groundwater monitoring to semi-annual or less frequent monitoring at all underground storage tank sites. All correspondence and project documents are available to the public via the State Water Resources Control Board GeoTracker online database.

Effects on groundwater and drinking water quality from operation and construction may be significant. The proposed project would adhere to environmental commitments of the SWPPP, the SPCCP, and the BSSCP, as summarized above under Effects WQ-1 and WQ-2, and notification of excavation near groundwater plume. Adherence to those environmental commitments and the implementation of Mitigation Measures WQ-MM-1 and WQ-MM-2 would reduce any effects to less than significant.

Mitigation

Mitigation Measure WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality

Mitigation Measure WQ-MM-2: Implement Provisions for Dewatering

Before discharging any dewatered effluent to surface water, WSAFCA or its contractors will obtain a Low Threat Discharge and Dewatering NPDES permit from the Central Valley RWQCB. Depending on the volume and characteristics of the discharge, coverage under the Central Valley RWQCB's NPDES General Construction Permit or General Dewatering Permit is possible. Under the permit, discharging activities involve extensive water quality monitoring in order to adhere to the strict effluent and receiving water quality criteria outlined in the permit. As part of the permit, the permittee will design and implement measures as necessary so that the discharge limits identified in the relevant permit are met. For example, if dewatering is needed during the construction of the slurry wall at The Rivers EIP project area, the Low Threat Discharge and Dewatering NPDES permit would require treatment or proper disposal of the water due to the known petroleum plume present in the area. As a performance standard, these measures will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable. Implemented measures may include the retention of dewatering effluent until particulate matter has settled before it is discharged, use of infiltration areas, and other BMPs. Final selection of water quality control measures will be subject to approval by WSAFCA. WSAFCA will verify that coverage under the appropriate NPDES permit has been obtained before allowing dewatering activities to begin. WSAFCA or its agent will perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained. WSAFCA will notify its contractors immediately if there is a non-compliance issue and will require compliance.

4.2.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on water quality and groundwater resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids	Less than significant	N/A	
WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials	Less than significant	N/A	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality
WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation	Significant	Less than significant	WQ-MM-1 Implement Measures to Maintain Surface Water Quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering

Effect WQ-1: Effects on Surface Water Quality from Excessive Turbidity or Total Suspended Solids

This effect is the same as described above under The Rivers APA. This effect is considered less than significant. No mitigation is required.

Effect WQ-2: Release of Contaminants into Adjacent Surface Water Bodies from Construction-Related Hazardous Materials

This effect is the same as described above under The Rivers APA. This effect is considered less than significant. Adherence to the other environmental commitments and the implementation of Mitigation Measure WQ-MM-1 should spills occur would reduce this effect to less than significant. No further mitigation is required.

Effect WQ-3: Effects on Groundwater or Drinking Water Quality Resulting from Construction and Operation

This effect is the same as described above under The Rivers APA. This effect is considered less than significant with the implementation of mitigation measures WQ-MM-1 and WQ-MM-2, also described above.

Section 4.3

Geology, Seismicity, Soils, and Mineral Resources—The Rivers Early Implementation Project

4.3.1 Introduction

This section describes the regulatory and environmental setting for geology, seismicity, soils, and mineral resources; the effects on geology, soils, and mineral resources that would result from the project; and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed a below.

- Maps and reports prepared by the USGS, California Geological Survey, Natural Resources Conservation Service, and the California Division of Mines and Geology
- *Yolo County General Plan* (Yolo County 2002)
- *City of West Sacramento General Plan* (City of West Sacramento 2004a)
- *Problem Identification Report* (HDR, Inc. on behalf of the City of West Sacramento 2008)

4.3.2 Affected Environment

This section describes the affected environment for geology, seismicity, soils, and mineral resources in The Rivers EIP project area, including the regulatory and environmental setting.

4.3.2.1 Regulatory Setting

4.3.2.1.1 State

The following state policies related to geology, seismicity, soils, and mineral resources may apply to the implementation of The Rivers EIP.

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code [PRC] Section 2621 *et seq.*), originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, giving legal weight to terms such as *active*, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned, and construction along or across faults is strictly regulated if they are sufficiently active and well defined. A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during the Holocene

Epoch (considered present time and defined for purposes of the act as approximately the last 11,000 years). A fault is considered well defined if its trace can be clearly identified by a trained geologist at the ground surface or in the shallow subsurface using standard professional techniques, criteria, and judgment. (Hart and Bryant 1997)

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act: the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped seismic hazard zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within seismic hazard zones until appropriate site-specific geologic and geotechnical investigations have been carried out and measures to reduce potential damage incorporated into the development plans.

California Building Standards Code

The State of California's minimum standards for structural design and construction are given in the California Building Standards Code (CBSC) (24 CCR). The CBSC is based on the Uniform Building Code (UBC) (International Code Council 1997), which is used widely throughout the United States (generally adopted on a state-by-state or district-by-district basis). For the CBSC, the UBC has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC requires that "classification of the soil at each building site shall be determined when required by the building official" and that "the classification shall be based on observation and any necessary test of the materials disclosed by borings or excavations."

In addition, the CBSC states that "the soil classification and design-bearing capacity shall be shown on the [building] plans, unless the foundation conforms to specified requirements." The CBSC provides standards for various aspects of construction, including excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with California law, certain aspects of the proposed project would be required to comply with all provisions of the CBSC.

California Surface Mining and Reclamation Act

The Surface Mining and Reclamation Act of 1975 (SMARA) (PRC Sections 2710–2719) is the principal legislation addressing mineral resources in California. SMARA was enacted in response to land use conflicts between urban growth and essential mineral production. Its stated purpose is to provide a comprehensive surface mining and reclamation policy that will encourage the production and conservation of mineral resources while ensuring that:

- significant environmental effects of mining are prevented or minimized;
- mined lands are reclaimed and residual hazards to public health and safety are eliminated; and

- consideration is given to recreation, watershed, wildlife, aesthetic, and other related values.

SMARA governs the use and conservation of a wide variety of mineral resources, although some resources and activities are exempt from its provisions, including excavation and grading conducted for farming, construction, or recovery from flooding or other natural disaster.

SMARA provides for the evaluation of an area's mineral resources using a system of mineral resource zone (MRZ) classifications that reflect the known or inferred presence and significance of a given mineral resource. The MRZ classifications are based on available geologic information, including geologic mapping and other information on surface exposures, drilling records, and mine data; and socioeconomic factors such as market conditions and urban development patterns. The MRZ classifications are defined as follows.

- **MRZ-1**: Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- **MRZ-2:** Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists.
- **MRZ-3:** Areas containing mineral deposits, the significance of which cannot be evaluated from available data.
- **MRZ-4:** Areas where available information is inadequate for assignment into any other MRZ.

The State of California is responsible for mineral resources zoning under SMARA, but SMARA implementation and enforcement authority rests with the local jurisdiction and is carried out through the county or city land use planning process and codes. Yolo County's SMARA implementing regulations are contained in Chapter 3 of Title 10 of the County Code. Solano County's SMARA implementing regulations are contained in Chapter 29 of the County Code.

4.3.2.1.2 Local

The following local policies related to geology, seismicity, soils, and mineral resources may apply to the implementation of The Rivers EIP.

Yolo County

The Health and Safety Element of the *Draft 2030 Countywide General Plan* for Yolo County (Yolo County 2008) contains goals, policies, and actions aimed at reducing the risk of geologic or seismic hazards in the county. Any violation of these goals, policies, and actions would constitute a significant effect.

Goals

Goal HS-1 Geologic and Seismic Hazards: Protect the public and reduce damage to property from earthquakes and other geologic hazards.

Policies

Policy HS-1.1: Regulate land development to avoid unreasonable exposure to geologic hazards.

Policy HS-1.2: All development and construction proposals shall be reviewed by the County to ensure conformance to applicable building standards.

Policy HS-1.3: Require environmental documents prepared in connection with CEQA to address seismic safety issues and to provide adequate mitigation for existing and potential hazards identified.

Actions

Action HS-A1: Require a geotechnical analysis for construction in areas with potential geological hazards and/or for purposes of environmental analysis. Recommendations of the geotechnical analysis shall be implemented.

Action HS-A2: Rely upon the most current and comprehensive geological hazard mapping available in the evaluation of potential seismic hazards associated with proposed new development.

Action HS-A3: Continue to participate in the Yolo County Subsidence Network and implement its recommendations.

City of West Sacramento General Plan

In 1990, the City of West Sacramento adopted the *City of West Sacramento General Plan*. The plan was last revised and adopted on December 8, 2004. The *City of West Sacramento General Plan* outlines goals and policies related to natural resources within the study area. The following objectives, policies, and implementation procedures are relevant to the study area.

Health and Safety

Goal A: To prevent loss of life, injury, and property damage due to geologic and seismic hazards.

Policy

1. The City shall require preparation of geotechnical reports and impose appropriate mitigation measures to ensure, within the limits of technical and economic feasibility, that new structures are able to withstand the effects of seismic activity, including liquefaction.
2. Underground utilities, particularly water and natural gas mains, shall be designed to withstand seismic forces.
3. The City shall require post-earthquake building replacement, reconstruction, and rehabilitation to conform to the latest City code requirements.

Grading and Erosion Control Ordinances

Many counties and cities have grading and erosion control ordinances. These ordinances are intended to control erosion and sedimentation caused by construction activities. A grading permit typically is required for construction-related projects in West Sacramento. As part of the permit, the project applicant usually must submit a grading and erosion control plan, project vicinity and site maps, and other supplemental information. Standard conditions in the grading permit include an extensive list of BMPs similar to those contained in an SWPPP.

The City's relevant regulations can be found in the Municipal Code, Title 15 (City of West Sacramento 2004b). Chapter 15.08 establishes standards and procedures for grading and excavation to minimize hazards to life and limb; protect against erosion; maintain the natural environment; and protect the safety, use, and stability of public rights-of-way and drainage channels. It ensures that projects approved under this chapter will be free from harmful effects of runoff, including inundation and erosion, and that neighboring and downstream properties will be protected from drainage problems resulting from new developments. It also ensures proper restoration of vegetation and soil systems disturbed by grading or fill activities authorized under this chapter. It is intended through this chapter to maintain an attractive and healthy landscape and to control against dust and erosion and their consequent effects on soil structure and water quality.

4.3.2.2 Environmental Setting

This section discusses the environmental setting related to soil characteristics, mineral resources, and seismic hazards for The Rivers EIP.

4.3.2.2.1 Study Area

Regional Physiographic Setting of the Study Area

The study area is located in the southern portion of the Sacramento Valley within the northern portion of California's Great Valley Geomorphic Province. The Great Valley is a narrow, elongated topographic depression that is approximately 450 miles long and 40 to 70 miles wide. The basin is bordered by the Sierra Nevada plutonic complex to the east and the California Coast Ranges to the west, and the Klamath and Cascade Mountains to the north. The Sacramento Valley contains thousands of feet of accumulated fluvial, overbank, and fan deposits resulting from erosion of these surrounding ranges. The sediments vary from a thin veneer at the edges of the valley to 50,000 feet in the west-central portion and are estimated to be about 8,000 feet thick in the study area. (Northwest Hydraulic Consultants 2007)

The Sacramento River is the main drainage of the region flowing generally south from the Klamath Mountains to its discharge point into the Suisun Bay in the San Francisco Bay Area. In the Sacramento area the Sacramento and American Rivers have been confined by human-made levees since the turn of the 19th century. In the study area, these levees generally were constructed on Holocene age (less than 11,000 years old) alluvial and fluvial deposits deposited by the current and historic Sacramento River and its tributaries. (Kleinfelder 2007)

Geology and Topography

The surface and subsurface distributions of sandy and clayey deposits in The Rivers EIP project area are a function of former river positions on the landscape, present-day geomorphic processes adjacent to the river positions on the landscape, and present-day geomorphic processes adjacent to the river channel (i.e., flooding and deposition) (William Lettis & Associates 2007). Helley and Harwood (1985) compiled previous regional studies of the quaternary geology of the Sacramento Valley. Previous geologic mapping in the West Sacramento study area generalized the surficial deposits as Quaternary alluvium (Qa) proximal to the modern river channel and undifferentiated Quaternary basin (Qb) deposits away from the modern river channel. Helley (1985) differentiates basin deposits from alluvium on the basis of composition, including only those deposits that are finer-grained and frequently organic-rich, and suggests these deposits were distal deposits where energy conditions were much lower. Both of these map units are considered Holocene age.

Quaternary sediments exposed near West Sacramento in smaller inclusions are described as (Kleinfelder 2007):

- undivided older alluvium deposits (Qal): undivided gravel, sand, and silt deposited during the Holocene and Pleistocene;
- Modesto formation (upper and lower member) (Qmu and Qml): unconsolidated, unweathered to slightly weathered gravel, sand, silt, and clay (the stream channel, alluvial, basin, and peat deposits lie conformably above this unit); and
- Riverbank formation (upper and lower member) (Qru and Qrl): unconsolidated but compact to semi-consolidated, dark brown to red gravel, sand, and silt with some clay.

The Qru/Qrl and the Qmu/Qml deposits represent ancestral river channels and alluvial fans. These semi-consolidated to unconsolidated deposits are characterized by localized paleochannels and lateral and vertical stratigraphic complexity related to past fluvial processes and buried paleo-topography. These formations are mantled by unconsolidated deposits of Holocene age that comprise most of the surficial geologic deposits within the West Sacramento area. Deposits laid down by the Sacramento River between the mid- to late 1800s probably were derived from hydraulic mining debris. (William Lettis & Associates 2007)

4.3.2.2.2 Soils

The Rivers EIP project area comprises two distinct soil map units as identified by the USDA Conservation Service (U.S. Department of Agriculture Soil Conservation Service 1972): Lang sandy loam and Sycamore silt loam (Figure 4.3-1). These soil types are characterized in Table 4.3-1. The under-seepage deficiencies identified at The Rivers project area are caused primarily by the presence at depth of coarse, permeable soils (sands and gravels) that translate hydraulic pressure during flood stage beneath the levees and destabilize them. In other words, the coarse-textured soil material common to the Lang and Sycamore soil series found at The Rivers project area facilitates seepage pathways, which compromise levee integrity.

Table 4.3-1. Soils in the Study Area

Soil Series Name	Reach	Depth (inches)	USDA Texture	Color	Shrink-Swell Potential	Hydrologic Group	Erosion Hazard	Runoff
Lang sandy loam, deep (Lb)	Sacramento Bypass 6 Yolo Bypass 5 Sacramento River South Levee 1	0–13	Sandy loam and loamy fine sand	Pale brown	Low at 0 to 40 inches, High at 40 to 60 inches	B, drained; C, undrained	None to slight	Very slow
		13–19	Loamy fine sand	Mottled light brownish-gray to brownish-yellow				
		19–40	Fine sand to loamy fine sand	Light brownish gray				
		40–60	Clay to heavy clay	Pale brown				
		40–60	Clay to heavy silty clay loam	Pale brown				

Soil Series Name	Reach	Depth (inches)	USDA Texture	Color	Shrink-Swell Potential	Hydrologic Group	Erosion Hazard	Runoff
Sycamore silt loam (So)	Sacramento Bypass 6 Sacramento River South Levee 1 South Cross Levee 3	0–14	Silty clay loam or silt loam	Grayish brown	High	C	None to slight	Very slow
		14–30	Silty clay loam	Mottled light yellowish-brown				
		30–60	Loam	Pale olive				

Sources: Andrews 1972; Bates 1977.

4.3.2.2.3 Mineral Resources

No commercial mining operations are known to have occurred in West Sacramento. Most of the area is classified as MRZ-1 by the California Division of Mines and Geology, which indicates no significant mineral deposits are present. The portion of the West Sacramento area that borders the Sacramento River (and henceforth the study area vicinity) is classified as MRZ-3, which means aggregate deposits of undetermined significance occur there. Lands classified as MRZ-1 or MRZ-3 are not affected by state policies pertaining to the maintenance of access to regionally significant mineral deposits under the California Surface Mining and Reclamation Act of 1975.

4.3.2.2.4 Seismic Hazards

Seismic hazards refer to earthquake fault ground rupture and ground shaking (primary hazards), as well as liquefaction and earthquake-induced slope failure (secondary hazards). Localized ground shaking and liquefaction are the most significant seismic hazards in Yolo County (Yolo County 1983).

Primary Seismic Hazards—Surface Fault Rupture[1] and Groundshaking

The project area is located in a region of California characterized by low seismic activity. The UBC recognizes no active seismic sources in the project vicinity (International Conference of Building Officials 1997), and no active faults are known to cross the project area. The project area is located within UBC Seismic Hazard Zone 3. The Zone 3 designation indicates that earthquakes in the region have the potential to make standing difficult and to cause stucco and some masonry walls to fall. Structures must be designed to meet the regulations and standards associated with Zone 3 hazards.

Three pre-Quaternary faults/fault zones are located within an approximately 20-mile radius of the study area. The Willows fault zone runs northwest to southeast of the study area; the East Valley fault runs to the west of the study area; and the Midland fault zone runs to the southeast of the study area (City of West Sacramento Department of Community Development 1990; Jennings 1994). None of these faults/fault zones are within an Alquist-Priolo Special Studies Zone (Hart and Bryant 1997).

[1] *Surface fault rupture* is a rupture at the ground surface along an active fault, caused by earthquake or creep activity.

The active fault nearest to the study area is the Dunnigan Hills fault, which is 30 miles to the northwest (City of West Sacramento Department of Community Development 1990; Jennings 1994). This fault is within an Alquist-Priolo Special Studies Zone (Hart and Bryant 1997). The critical earthquake for West Sacramento would originate at the nearest point of the Midland fault zone or the Dunnigan Hills fault (City of West Sacramento Department of Community Development 1990).

Based on a probabilistic seismic hazard map that depicts the peak horizontal ground acceleration values exceeded at a 10% probability in 50 years (California Geological Survey 2003, Cao et al. 2003), the probabilistic peak horizontal ground acceleration values for the study area are 0.1 to 0.2g (where g equals the acceleration speed of gravity). As a point of comparison, probabilistic peak horizontal ground acceleration values for the San Francisco Bay Area range from 0.4g to more than 0.8g. This indicates that the ground-shaking hazard in the study area is low. Farther to the west, the ground shaking hazard increases, coinciding with the increase in abundance of associated faults and fault complexes (California Geological Survey 2003; Cao et al. 2003).

Additionally, URS evaluated northern reaches of the basin for seismic vulnerability and liquefaction of the levees in the report *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento Region,* dated September 2007.

Preliminary seismic evaluations have been completed in the form of two reports; *West Sacramento Levee System Problem Identification and Alternative*

Analysis: Volume 1—Geotechnical Problem Identification Solano and Yolo Counties, California completed by Kleinfelder (September 2007) and *Phase 1 Geotechnical Evaluation Report (P1GER) West Sacramento Region* completed by URS (November 2007) for DWR. Data collection included 323 borings drilled with SPTs and soundings made using CPTs along the levees within the basin. Approximate stationing endpoints have been determined by URS and Kleinfelder based on similar soil characteristics within the endpoints (HDR, Inc. 2008).

Liquefaction

Poorly consolidated, water-saturated fine sands located within 30 to 50 feet of the surface typically are considered the most susceptible to liquefaction. Soils and sediments that are not water-saturated and that consist of coarser or finer materials are generally less susceptible to liquefaction (California Division of Mines and Geology 1997).

URS performed a liquefaction-triggering analysis to evaluate whether any levee or underlying foundation materials potentially would liquefy during the considered earthquake events. Criteria for susceptibility to liquefaction included soil type, liquid limit, plasticity index, water content, and fines content. If the material was considered to be susceptible to liquefaction, steps were completed to further evaluate the liquefaction potential of the material considering the earthquake loading. In contrast, if the plasticity of the material was high enough to preclude liquefaction, the material was classified as non-liquefiable, irrespective of the earthquake loading (URS 2007). The Sacramento River North Levee may exhibit liquefaction during a seismic event (HDR, Inc. 2008a).

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Figure 4.3-1
Soil Types at The Rivers Early Implementation Site

4.3.3 Environmental Consequences

This section describes the environmental consequences relating to geology, seismicity, soils, and mineral resources for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.3.3.1 Assessment Methods

Evaluation of the geology, seismicity, and soils effects in this section is based on the information provided by technical maps, reports, and other documents that describe the geologic, seismic, and soil conditions of the study area. This information was then compared to the type and location of proposed flood and recreation alternatives to determine whether effects would occur.

4.3.3.2 Determination of Effects

Criteria for determining the significance of effects related to geology, soils, and mineral resources were developed based on the environmental checklist form in Appendix G of the State CEQA Guidelines (14 CCR 15000 *et seq.*). An effect related to geology, soils, and seismicity was considered significant if it would:

- expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the state geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42);
  - strong seismic ground shaking;
  - seismic-related ground failure, including liquefaction; or
  - landslides;
- result in substantial soil erosion or the loss of topsoil;
- be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial risks to life or property;
- have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater;
- result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or
- result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

4.3.3.2.1 Effect Assumptions

The following assumptions were made regarding project effects on geology, seismicity, and soils in the study area.

- Fill or borrow material would be obtained from a quarry or other authorized (i.e., permitted) location.
- WSAFCA would conform to the latest CBSC standards, city and county standards, and National Pollutant Discharge Elimination System (NPDES) requirements.
- There are no active faults, potentially active faults, or Alquist-Priolo Earthquake Fault Zones located in or adjacent to the study area.

4.3.4 Effects and Mitigation Measures

4.3.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects involving direct ground-disturbing activities or changes to flood control facilities that could result in changes in geology, seismicity, soils, or mineral resources would occur. Current levee operations and maintenance activities would continue. Therefore, there would be no construction-related effects on these resources attributable to implementation of the No Action Alternative.

Without levee alternatives, there is the continued risk of levee failure and continuing underseepage and loss of levee foundation soil would be expected to continue. If a levee overtopping or breach were to occur, floodwaters would likely erode topsoil which could either be pumped back into the Sacramento River, DWSC, or the Yolo or Sacramento Bypasses, or recede back through the levee breach. A catastrophic levee failure could result in the collapse of miles of levee slopes, alteration of regional and local hydrology, and a substantial increase in erosion and sedimentation. This condition would cause severe damage to local soils, areas of scour holes, and eroded and unstable landforms. Moreover, subsequent flooding could occur prior to levee repair that would resulting in additional erosion and loss of topsoil. It is assumed that these effects would be significant; however, given the uncertainty of the occurrence or magnitude of such an event, the effects cannot be quantified based on available information.

Furthermore, the beneficial effects attributable to project implementation such as improved levee stability and decrease of levee bank erosion would not be realized under the No Action Alternative.

4.3.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on geology, seismicity, soils, and mineral resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
GEO-1: Effects on Levee Stability	Beneficial	N/A	N/A
GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction	Less than significant	N/A	N/A
GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance	Less than significant	N/A	N/A

Effect GEO-1: Effects on Levee Stability

The proposed slope flattening would improve the stability of the Sacramento Bypass Levee by further reducing seepage and the potential for seepage-related failures by reducing hydrostatic exit gradients, creating more stable slopes, and reducing erosion. Therefore, this effect would be beneficial.

Effect GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction

Based on available knowledge of fault location and locations of earthquake epicenters, the risk of groundshaking in the study area is low. Nonetheless, a large earthquake on a nearby fault could cause groundshaking in the study area, which could result in liquefaction or associated ground failure, such as lateral spreading or differential settlement which could in turn result in structural loss, injury, and death.

The Sacramento River North Levee contains soils that may be subject to liquefaction. Implementation of The Rivers APA would not substantially alter the composition of the subject levees or foundation soils or increase their susceptibility to liquefaction. The Rivers APA does propose the construction of a slurry cutoff wall to reduce seepage and increase flood control that might sustain damage from groundshaking or liquefaction and endanger people during a seismic event.

However, the potential for failure of this structure from groundshaking would depend on the degree of levee saturation during an earthquake. A high level of saturation would likely only occur during a major flood event. The probability that a large regional earthquake would occur during a major flood event is relatively low, but such coincidence is not impossible. Nonetheless, because of the relative small likelihood of such coincidental events, and because the expected magnitude of groundshaking from large regional earthquakes is relatively low in the study area, the potential for failure or damage of the slurry cutoff wall is considered to be less than significant. No mitigation is required.

Effect GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance

The grading, trenching, and other earthwork that would be conducted during construction of The Rivers APA would result in substantial ground and vegetation disturbance. These disturbances would increase the hazard of erosion and could temporarily increase erosion and sedimentation rates above existing levels. Because most of the earthwork would be conducted on and immediately adjacent to the levee, accelerated erosion and sedimentation resulting from construction-related ground and vegetation disturbance would not result in the loss of appreciable quantities of topsoil resources. In addition, most ground-disturbing activities would occur during the typical construction season, when conditions are generally dry, further reducing the potential for construction-related erosion.

Site-specific measures that would control erosion would be described in more detail in the SWPPP, which is included in the environmental commitments of the project, described in further detail in Section 2.7 of Chapter 2, Alternatives, and summarized in Section 4.2, Water Quality and Groundwater Resources. The SWPPP is a requirement of the NPDES General Construction Permit.

In addition, WSAFCA or its contractor would monitor turbidity in the Sacramento River to determine whether turbidity is being affected by construction and ensure that construction does not affect turbidity levels or acceptable sedimentation loads (as discussed in Section 4.2, Water Quality and Groundwater Resources). With these project-level actions, erosion and sediment-related effects would be less than significant. No mitigation is required.

4.3.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on geology, seismicity, soils, and mineral resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
GEO-1: Effects on Levee Stability	Beneficial	N/A	N/A
GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction	Less than significant	N/A	N/A
GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance	Less than significant	N/A	N/A

Effect GEO-1: Effects on Levee Stability

This effect is the same as that described under The Rivers APA, above. This effect is considered beneficial.

Effect GEO-2: Effects Resulting from Seismic Groundshaking and Liquefaction

This effect is the same as that described under The Rivers APA, above, except that the structure that could potentially sustain damage is a sheet pile wall rather than a slurry cutoff wall. This effect is considered less than significant. No mitigation is required.

Effect GEO-3: Accelerated Erosion and Sedimentation Resulting from Construction-Related Ground Disturbance

This effect is the same as that described under The Rivers APA, above. This effect is considered less than significant. No mitigation is required.

Section 4.4
Transportation and Navigation—The Rivers Early Implementation Project

4.4.1 Introduction

This section describes the affected environment for transportation and navigation, the regulatory setting associated with transportation and navigation, the effects on transportation and navigation that would result from the proposed project, and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below:

- *City of West Sacramento General Plan*, revised December 2004
- *City of West Sacramento General Plan Background Report*, revised June 2000

4.4.2 Affected Environment

This section describes the affected environment for transportation and navigation in The Rivers EIP project area, including the regulatory and environmental settings.

4.4.2.1 Terminology

The following are definitions of key traffic and transportation terms used in this section.

- **Level of service (LOS)**: A scale used to determine the operating quality of a roadway segment or intersection based on volume-to-capacity (V/C) ratios or average delay experienced by vehicles on the facility. The levels range from A to F, with LOS A representing free-flow traffic and LOS F representing severe traffic congestion. Agencies adopt LOS standards that define the level of operations that are acceptable within their jurisdiction.
- **V/C ratio**: The number of vehicles that travel on a transportation facility divided by the vehicular capacity of that facility (the number of vehicles the facility was designed to convey).
- **Delay**: The additional travel time experienced by a vehicle or traveler because of inability to travel at optimal speed and/or stops due to congestion or traffic control.
- **Average daily traffic (ADT)**: Average traffic volume on the roadway section during a typical 24-hour day.
- **Annual average daily traffic (AADT)**: AADT is the total traffic volume for the year divided by 365 days.
- **Peak Hour:** This is an estimate of the peak hour traffic at all points on the state highway system.

- **Back and Ahead**: Back AADT, Peak Month, and Peak Hour usually represent traffic south or west of the count location. Ahead AADT, Peak Month, and Peak Hour usually represent traffic north or east of the count location.

Table 4.4-1 summarizes the ranges of V/C values and typical driving conditions for each LOS.

Table 4.4-1. Level of Service Definitions for Urban Streets

LOS	Intersection	Roadways
A	Uncongested operations, all queues clear in a single signal cycle. V/C = 0.00–0.60	Free flow, vehicle unaffected by other vehicles in traffic stream.
B	Uncongested operations, all queues clear in a single signal cycle. V/C = 0.61–0.70	Higher speed range of stable flow. Volume 50% of capacity or less.
C	Light congestion; occasional back-ups on critical approaches. V/C = 0.71–0.80	Stable flows with volumes not exceeding 75% of capacity.
D	Significant congestion of critical approaches, but intersection functional. Cars required to wait though more than one cycle during short peaks. No long queues formed. V/C = 0.81–0.90	Upper end of stable flow conditions. Volumes do not exceed 90% of capacity.
E	Severe congestion with some long-standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersections upstream of critical approaches. V/C = 0.91–1.00	Unstable flow at roadway capacity. Operating speeds 25 to 30 miles per hour (mph) or less.
F	Total breakdown; stop-and-go traffic operation. V/C > 1.00	Stop-and-go with operating speeds less than 30 mph.

Source: City of West Sacramento 2000.

4.4.2.2 Regulatory Setting

4.4.2.2.1 Federal

The following Federal policies related to transportation and navigation may apply to the implementation of The Rivers EIP.

River and Harbors Appropriation Act of 1899

The River and Harbors Appropriation Act of 1899 addresses activities that involve the construction of dams, bridges, dikes, and other structures that cross any navigable water; that place obstructions to navigation outside established Federal lines; and that excavate from or deposit material in such waters. Such activities require permits from the U.S. Army Corps of Engineers (USACE. Navigable waters are defined in Section 329.4 as:

> Those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the water body, and is not extinguished by later actions or events which impede or destroy navigable capacity.

In the USACE Sacramento District, navigable waters of the United States in the project vicinity that are subject to the requirements of the River and Harbors Appropriation Act include Sacramento

River, American River, the Deep Water Ship Channel (DWSC), and all waterways in the Sacramento–San Joaquin drainage basin affected by tidal action (U.S. Army Corps of Engineers 2003). Sections of the River and Harbors Act applicable to the proposed project are summarized below.

Section 9

Section 9 (33 United States Code [USC] 401) prohibits the construction of any dam or dike across any navigable water of the United States in the absence of Congressional consent and approval of the plans by the Chief of Engineers and the Secretary of the Army. Where the navigable portions of the water body lie wholly within the limits of a single state, the structure may be built under authority of the legislature of that state, if the location and plans or any modification thereof are approved by the Chief of Engineers and by the Secretary of the Army.

Section 10

Section 10 (33 USC 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters, is unlawful unless the work has been authorized by the Chief of Engineers.

4.4.2.2.2 Local

The following local policies related to transportation and navigation may apply to the implementation of The Rivers EIP.

City of West Sacramento General Plan

Cities and counties use various criteria to determine acceptable LOS on their roadway systems. The Transportation and Circulation Element of the *City of West Sacramento General Plan* contains the following policy that may apply to the proposed project.

Goal A: To create and maintain a roadway network which will ensure the safe and efficient movement of people.

Policy 2: The City shall endeavor to maintain a Level of Service “C” on all streets within the city**,** except at intersections and on roadway segments within one-quarter mile of a freeway interchange or bridge crossing of the Deep Water Ship Channel [DWSC], barge canal, or Sacramento River, where a Level of Service “D” shall be deemed acceptable (City of West Sacramento 2004).

Table 4.4-2 quantifies the acceptable ADT of urban streets for corresponding LOS and roadway width.

Table 4.4-2. LOS Criteria for Roadway Segments

Facility Type	No. of Lanes	Maximum ADT per LOS A	B	C	D	E
Residential	2	600	1,200	2,000	3,000	4,500
Residential collector with access	2	1600	3,200	4,800	6,400	8,000
Residential collector without access	2	6,000	7,000	8,000	9,000	10,000
Arterial, low access control (4+ stops/mile, many driveways, 25–35 mph)	2	9,000	10,500	12,000	13,500	15,000
	4	18,000	21,000	24,000	27,000	30,000
	6	27,000	31,500	36,000	40,500	45,000
Arterial, moderate access control (2–4 stops/mile, few driveways, 35–45 mph)	2	10,800	12,600	14,400	16,200	18,000
	4	21,600	25,200	28,800	32,400	36,000
	6	32,400	37,800	43,200	48,600	54,000
Arterial, high access control (1–2 stops/mile, no driveways, 45–55 mph)	2	12,000	14,000	16,000	18,000	20,000
	4	24,000	28,000	32,000	36,000	40,000
	6	36,000	42,000	48,000	54,000	60,000
Rural, 2-lane highway	2	2,400	4,800	7,900	13,500	22,900
Rural, 2-lane road, 24–36 feet, paved, shoulder	2	2,200	4,300	7,100	12,200	20,000
Rural, 2-lane road, 24–36 feet, paved, no shoulder	2	1,800	3,600	5,900	10,100	17,000

Source: City of West Sacramento 2006.

Policy 8: On-street truck parking shall be prohibited where such parking restricts adequate sight distances or otherwise poses a potentially hazardous situation.

Policy 10: The City shall attempt to confine truck traffic to designated truck routes. The City shall consider the additional weight and turning requirements of trucks in selecting truck routes.

Goal G: To promote pedestrian and bicycle travel as alternatives to automobile use.

Policy 1: The City shall create and maintain a safe and convenient system of pedestrian and bicycle pathways which encourages walking or bicycling as an alternative to driving.

Policy 3: Bicycle routes shall emphasize paths separated from vehicle traffic to the maximum extent possible, but shall also include bicycle lanes within public streets; bikeways may, however, be combined with pedestrian and vehicle routes, where appropriate.

Policy 4: The City shall limit on-street bicycle routes to those streets where the available roadway width and traffic volumes permit safe coexistence of bicycle and motor vehicle traffic.

Policy 7: To the extent practicable, bicycle and pedestrian pathways shall be included within open space areas and adjacent to waterways.

4.4.2.3 Environmental Setting

This section discusses the environmental setting related to transportation and navigation in The Rivers EIP project area.

4.4.2.3.1 Roadways

Existing freeways within or near the project area are described below.

- **Interstate 80 (I-80)** is a major freeway that runs northeast to southwest, west of the project area. I-80 heads towards Reno to the east and San Francisco to the west. The freeway runs above the Sacramento River North Levee.
- **Highway 50 (US 50)** is a major highway that runs east to west, south of the project area. US 50 heads toward Carson City to the east and merges with I-80 on the western side of West Sacramento as it heads toward San Francisco.

Table 4.4-3 shows the Back and Ahead AADT for the highway segments that would be most affected by project-related traffic.

Table 4.4-3. AADT for Highways in The Rivers Project Area

Highway	Segment	Back AADT	Ahead AADT
I-80	Junction with Route 50	145,000	85,000
I-80	Junction with Route 84 (Reed Avenue)	85,000	90,000
I-80	West El Camino Avenue Interchange	90,000	87,000
US 50	Junction with Route 80	–	85,000
US 50	Harbor Boulevard Interchange	85,000	116,000
US 50	Junction with Route 84	116,000	109,000
US 50	Junction with Route 5	177,000	226,000

Source: California Department of Transportation 2009

The major arterial streets that serve the study area or that may be affected by project implementation are:

- **West Capitol Avenue (SR 275)** is an east-west arterial that runs between I-80 near the western city limits of West Sacramento and the Tower Bridge at the Sacramento River. The roadway width varies between two, four, and six lanes.
- **Reed Avenue/Sacramento Avenue/C Street (SR 84)** runs east-west, between I-80 near the western city limits and the I Street Bridge at the Sacramento River, and lies 0.75 mile south of the project area. The roadway width varies between two and four lanes. Under LOS Criteria for Roadway Segments, Reed Avenue is classified as a four-lane arterial with moderate access control for the four-lane sections. Sacramento Avenue is classified as a four- and two-lane arterial with moderate access control.
- **Harbor Boulevard** is a north-south arterial that runs through the western portion of the city. The roadway width varies between two and four lanes, and has moderate access control.
- **Jefferson Boulevard (SR 84)** is a major arterial that extends from Sacramento Avenue to south of city limits. Jefferson Boulevard is a four-lane road with moderate access control from Sacramento Avenue to just south of South Linden Road.

Local roads that would provide access to The Rivers project area include Fifth Street, Lighthouse Drive, and River Crest Drive. Fifth Street begins near the eastern end of West Capitol Avenue and heads north to where it becomes Lighthouse Drive. Fifth Street is classified as a four-lane arterial road with moderate access control. Lighthouse Drive starts at A Street and runs north, then curves to the west. The section of Lighthouse Drive that runs south to north is classified as a four-lane arterial road with low access control, and then becomes a two-lane residential collector road with access as it runs east to west. River Crest Drive runs along the crown of the Sacramento River North Levee, and lies within The Rivers gated community. River Crest Drive is classified as a residential road. The levee road that runs along the Sacramento River North levee crown would provide access as well; however, this road is used for maintenance purposes and has no public access. Table 4.4-4 shows the ADT, peak-hour traffic, and LOS for the major roadways in the project area.

Table 4.4-4. ADT, Peak-Hour Traffic, and LOS for Roadways in The Rivers Project Area

Street	Limits	ADT	AM Peak	PM Peak	LOS	Count Year
West Capitol Avenue	Riske Lane to 3rd Street	4,337	251	408	A	2005
Reed Avenue	Riverside Parkway to Sunset Avenue	15,930	1,036	1,229	A	2005
Sacramento Ave	Sunset Ave to Kegle Dr	10,437	995	885	A	2006
Sacramento Ave	Kegle Dr. to 6th St	9,517	541	812	A	2007
Harbor Boulevard	Rice Ave to West Capitol Ave	15,464	1,050	1,257	A	2008
Harbor Boulevard	Reed Ave to Rice Ave	15,399	869	1,195	A	2007
Harbor Boulevard	West Capitol Ave to Industrial Blvd	30,135	2,413	2,110	D	2007
Jefferson Boulevard	Sacramento Ave to West Capitol Ave	21,176	1,773	1,849	A	2006
Jefferson Boulevard	West Capitol Ave to 15th St	33,705	2,199	2,545	E	2006
5th Street	A Street to West Capitol Avenue	5,358	377	580	A	2008
Lighthouse Drive	Fountain Drive to A Street	2,890	167	149	A	2006

Source: City of West Sacramento 2007.

According to the City of West Sacramento's Level of Service standards, all roads that lie within or near the project area are of an acceptable level of service, with the exception of Harbor Boulevard (West Capitol Avenue to Industrial Boulevard) and Jefferson Boulevard (West Capitol Avenue to 15th Street).

4.4.2.3.2 Parking

On-street parking in the project area is limited to the shoulders of the local roads, including Riverbank Road, Rivercrest Road, and Fountain Drive. At the eastern end of Riverbank Road, near its terminus, there are two parking lots. One parking lot is for the Club West Teen Center, and the other is for Riverbank Elementary School. Both parking lots are only accessible via Riverbank Road. The City does not have any public parking lots in the project area. Construction projects are subject to off-street parking standards as defined in the City's Zoning Ordinance (City of West Sacramento 2000).

4.4.2.3.3 Railroads

No railroads lie within the project area. The closest railroad tracks to the project area belong to the Union Pacific Railroad, which lie approximately 0.75 mile southwest of the project area.

4.4.2.3.4 Transit Facilities

No bus lines or other transit facilities are located within the project area.

4.4.2.3.5 Bikeways

Bicycle facilities are currently available in the project vicinity. Major arterial roads as well as several minor arterial roads throughout the city have bike lanes or bike accessible shoulders. Bike accessible areas that run adjacent to or on top of levees in the project area include Riverbank Road, Rivercrest Road, and Fountain Drive (Sacramento River North Levee) (City of West Sacramento 2009a).

4.4.2.3.6 Airports

Airports in the area include Sacramento International Airport, Sacramento Executive Airport, Mather Airport, and Franklin Field. Sacramento International Airport is Sacramento County owned and is located approximately 7 miles to the north of the city, between Sacramento and Woodland along I-5. The Executive Airport is owned by Sacramento County and is located 1.5 mile to the east of the City, within the city of Sacramento. Mather Field is a military airfield located approximately 11 miles east of the City in Rancho Cordova. Franklin Field is owned by Sacramento County and is located approximately 16 miles south of the City in Elk Grove.

4.4.2.3.7 Navigation

The Sacramento River is the only permanent waterway that lies adjacent to the project area. The river flows in a generally southward direction past the Sacramento River North Levee. The river is approximately 600 feet wide where it passes the project area; however, widths vary depending on water elevations. Navigation in the Sacramento River is limited to recreational watercraft because the river is too small and fluctuating water levels prevent the accommodation of large commercial vessels.

On the West Sacramento bank, within the project vicinity, there are no docks or other access points to the river for watercraft. On the city of Sacramento side, there are several private docks that belong to homeowners living on top of or adjacent to the levee. The closest access point for watercraft on the West Sacramento side of the river is the Broderick boat ramp, which is approximately 1.5 miles downriver from the eastern edge of the project area.

4.4.3 Environmental Consequences

This section describes the environmental consequences relating to transportation and navigation for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.4.3.1 Assessment Methods

The proposed project would construct levee alternatives along a section of the Sacramento River North Levee. Because of the earthwork involved and the need for materials deliveries, construction would intermittently generate substantial volumes of traffic. Once the construction is completed, maintenance needs would be similar to existing conditions. Analysis of traffic effects therefore concentrated on the construction of levee alternatives.

The effects of these project activities were analyzed according to truck and worker trip effects on roadway operation and circulation. Haul routes for The Rivers EIP are shown on Figure 4.4-1.

The analysis used estimated construction traffic generation (expressed as average trips per day) to develop a qualitative evaluation of short-term effects on the local and regional roadway in the project vicinity. Table 4.4-5 summarizes construction-related trips anticipated for The Rivers APA and The Rivers Alternative B, which includes trips generated by trucks hauling away excavated materials, and trucks delivering construction equipment and materials. Daily truck trips required to haul away excavated spoils and import fill materials are estimated based on a typical capacity of 20 cubic yards per truck. Each truck and each work would generate two construction-related trips. A detailed list of construction equipment, construction areas, daily and total excavation, and daily and total imported material for each phase are included in Appendix F.

The key effects were identified and evaluated based on the environmental characteristics of The Rivers EIP project area and the magnitude, intensity, and duration of activities related to the construction of this project.

Table 4.4-5. Estimated Daily Construction Traffic by Alternative and Construction Phase

Phase of Construction	Duration (Days)	Daily Exported Spoils and Imported Material (cy)	Workers per day	Estimated Maximum Daily Truck Trips	Estimated Maximum Daily Worker Trips	Maximum Total Daily Trips
PREFERRED ALTERNATIVE						
Road demolition	2	N/A	15	24	30	54
Clearing and grubbing	6	1,867	26	186	52	238
Levee degrade	27	2,152	25	216	50	266
Slope flattening	7	1,600	26	160	52	212
Slurry wall construction	21	N/A	20	2	40	42
DSM wall construction	44	N/A	17	2	34	36
Fill placement	31	2,968	36	296	72	368
Road construction	2	N/A	21	32	42	74
ALTERNATIVE B						
Road demolition	2	N/A	15	24	30	54
Clearing and grubbing	6	1,867	26	186	52	238
Slope flattening	23	2,378	30	238	60	298
Sheet pile wall construction	18	N/A	9	2	18	20
Road construction	2	N/A	21	32	42	74
THE RIVERS TRAIL IMPROVEMENT						
Clearing and pruning	5	0	5	0	10	10
Grading	8	0	10	0	20	20
Install pathways and signs	12	191	10	20	20	40

Source: HDR Engineering, Inc.

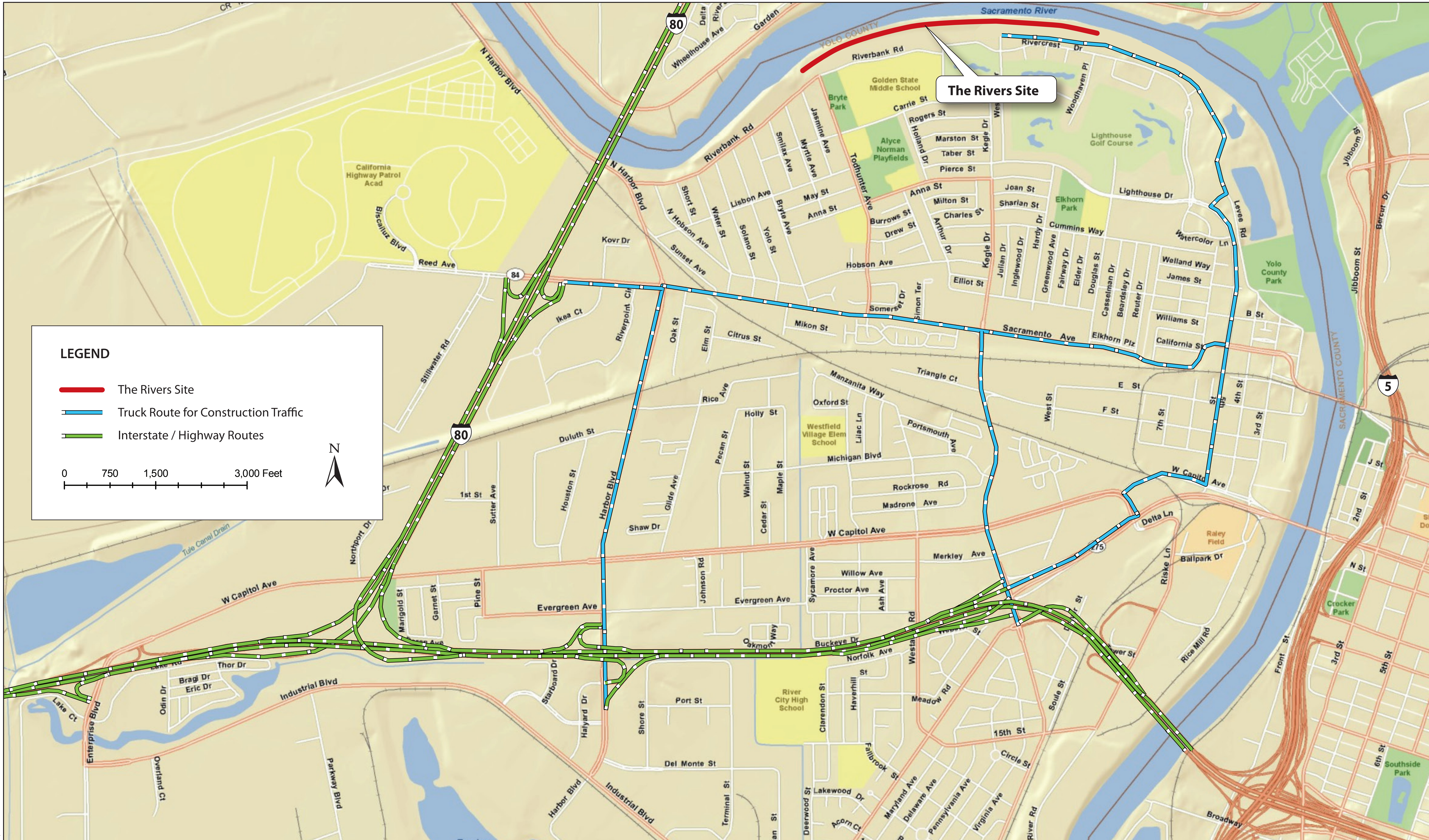

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Figure 4.4-1
The Rivers EIP Haul Routes

4.4.3.2 Determination of Effects

For this analysis, a transportation effect was considered significant if it would result in any of the following outcomes, which are based on professional practice, State CEQA Guidelines Appendix G, *City of West Sacramento General Plan Policy Document*, and the City's LOS policies:

- cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in the number of vehicle trips, the V/C ratio on roads, or congestion at intersections);
- cause, either individually or cumulatively, exceedance of a LOS standard established by the City and/or the California Department of Transportation (Caltrans) for designated roads or highways;
- substantially alter present patterns of circulation or movement;
- substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., slow-moving vehicles);
- result in inadequate emergency access;
- result in inadequate parking capacity; or
- conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks); or substantially impede navigation of watercraft as a result of the installation of cofferdams or the staging of barges within navigable sections of the surrounding waterways.

4.4.4 Effects and Mitigation Measures

4.4.4.1 No Action Alternative

The No Action Alternative represents the continuation of the existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. Under the No Action Alternative, there would be no temporary construction-related traffic effects

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento River North Levee could fail due to seepage or slope stability or geometry issues would continue. Levee failure would trigger widespread flooding and damage to the city's utilities, roadways, major interstate transportation corridors, and other infrastructure systems. The severity and magnitude would depend on the location of the levee breach, severity of the storm, and river flows at the time of a potential levee failure. A catastrophic flood event in West Sacramento would disrupt state and interstate highway, rail, and shipping traffic, causing long-term effects on the region's and state's economy and ability to move people and goods in normal circulation patterns. As stated in Chapter 2, West Sacramento has one of the most comprehensive transportation networks on the west coast. Its central geographic location and extensive north-south, east-west highway access has made it a major distribution center. High volumes of truck and passenger traffic pass through the city on I- 80 and US-50/Business 80 every day, with truck traffic transporting approximately $63 billion worth of cargo annually through West Sacramento. Major transcontinental rail lines also pass through the city (transporting $5 billion in goods annually) and the Port of West Sacramento runs domestic and international shipping services. The normal circulation patterns of all of these transportation modes would be significantly affected if widespread flooding were to occur. In addition, flooding could result in substantial disruption to critical facilities and the city's emergency response capacity and critical lifelines of West Sacramento.

4.4.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on transportation and navigation. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic	Less than significant	N/A	N/A
TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee	Significant	No feasible mitigation	Significant and unavoidable
TN-3: Temporary Restriction of Access to Parking	Less than significant	N/A	N/A
TN-4: Increase in Emergency Response Times	Less than significant	N/A	N/A
TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers	Less than significant	N/A	N/A
TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures	Less than significant	N/A	N/A

Effect TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic

Implementation of The Rivers APA would require hauling of construction equipment and materials to The Rivers EIP project area along major highways and over surface streets in the city (Figure 4.4-1).

The use of highways to haul construction equipment and materials to and from The Rivers EIP project area would increase daily traffic. Additionally, many of the construction-generated trips would involve slow-moving trucks, which would further affect highway traffic. However, the increase in AADT would be relatively small. With the addition of the maximum daily construction-generated traffic shown in Table 4.4-5 to the AADT counts in Table 4.4-3, the maximum increase in traffic along any of the segments would be 0.43%. This increase in AADT is not expected to significantly degrade the operation of highways near the project area. This effect is considered less than significant.

Table 4.4-6 shows the existing ADT levels on the surface streets to be used as haul routes for The Rivers APA with the maximum daily construction-generated traffic shown in Table 4.4-5.

Table 4.4-6. Existing and Projected ADT on Haul Routes for The Rivers APA

Street	Limits	Existing ADT	Existing LOS	Max Trips/Day	ADT During Construction
West Capitol Avenue	Riske Lane to 3rd Street	4,337	A	368	4,705
Reed Avenue	Riverside Parkway to Sunset Avenue	15,930	A	368	16,298
Sacramento Ave	Sunset Ave to Kegle Dr	10,437	A	368	10,805
Sacramento Ave	Kegle Dr. to 6th St	9,517	A	368	9,885
Harbor Boulevard	Rice Ave to West Capitol Ave	15,464	A	368	15,832
Harbor Boulevard	Reed Ave to Rice Ave	15,399	A	368	15,767
Harbor Boulevard	West Capitol Ave to Industrial Blvd	30,135	D	368	30,503
Jefferson Boulevard	Sacramento Ave to West Capitol Ave	21,176	A	368	21,544
Jefferson Boulevard	West Capitol Ave to 15th St	33,705	E	368	34,073
5th Street	A Street to West Capitol Avenue	5,358	A	368	5,726
Lighthouse Drive	Fountain Drive to A Street	2,890	A	368	3,258

The construction traffic generated by The Rivers APA would temporarily increase the daily and peak hour traffic along specified routes shown in Table 4.4-6; however, traffic levels on haul route roads would return to normal levels once construction is completed. These routes would operate well within the City's LOS standard, with the exception of Jefferson Boulevard from West Capitol Avenue to 15th Street, which would maintain an LOS of E. Harbor Boulevard from West Capitol Avenue to Industrial Boulevard would have an LOS of D; however, the segment is located within 0.25 mile of a freeway interchange, which means the lower LOS is acceptable according to the City's standards.

Should The Rivers APA be constructed concurrently with the CHP Academy APA, traffic would increase along Reed Avenue from Riverside Parkway to Sunset Avenue as this is the only haul route segment that is shared by the two sites. If the projects are constructed concurrently, it would add a maximum of 724 additional truck trips per day, of which 368 trips would result from The Rivers APA and 356 trips would result from the CHP Academy APA. However, this increase in traffic along Reed Avenue would not reduce the LOS to an unacceptable level.

Although this addition of construction-related traffic would not be expected to degrade the LOS on most haul route roads to an unacceptable level, slow-moving heavy trucks could affect traffic flow on these roadways, particularly if numerous trips occur during the morning or afternoon peak traffic periods. Implementation of the traffic control and road maintenance plan environmental commitment, described in Section 2.7,9 Chapter 2, Alternatives, would reduce the effects of construction traffic on all haul routes to a less-than-significant level.

Effect TN-2: Temporary Road Closures on the Levee Crown or Roads that Run Adjacent to the Levee

Implementation of The Rivers APA would result in the temporary closure of Riverbank Road north of Bryte Park, the western section of Fountain Drive, and the western section of Rivercrest Drive. The section of Riverbank Road that is located in the project area provides access only to a parking lot at Riverbank Elementary School before it reaches a dead end, and provides no through-access to any other streets.

The temporary closure of sections of Fountain Drive and Rivercrest Road would prevent home access and parking for 15 residences. During periods of time when construction is directly adjacent to their homes, the residents would be temporarily relocated. Therefore, the temporary closure of these roads would not result in inadequate emergency access or parking, or substantially alter present patterns of circulation as the affected residents would not be in their homes, and neighboring residential roads could be used without affecting emergency access, parking, or circulation to homes adjacent to the project area. Additionally, the closure of roads would be temporary as they would be opened upon completion of the project. Implementation of the traffic control and road maintenance plan environmental commitment, described in Section 2.7.9 of Chapter 2, Alternatives, would aid in maintaining traffic standards during construction. However, because residents would lose daily access to their properties, this effect is considered significant and unavoidable. There is no feasible mitigation.

Effect TN-3: Temporary Restriction of Access to Parking

The temporary closure of the section of Riverbank Road north of Bryte Park would remove access to the parking lot on the northern side of Riverbank Elementary School, as well as the parking lot for the Club West Teen Center. However, the school has a parking lot on its southern side, and on-street parking is available in front of the school during periods of construction; therefore, the project would not result in inadequate parking capacity. Access to the northern parking lot would be available again after construction of the project is complete and Riverbank Road is reopened. Implementation of the traffic control and road maintenance plan environmental commitment, described in Chapter 2, Alternatives, would not be needed to reduce the intensity of this effect; however, it would aid in maintaining traffic standards during construction. This effect is less than significant.

Effect TN-4: Increase in Emergency Response Times

Emergency access to The Rivers project vicinity could be affected by construction of the proposed project, and construction-related traffic could delay or obstruct the movement of emergency vehicles. However, execution of the environmental commitment to develop and implement the Traffic Control and Road Maintenance Plan, described in Section 2.7.9 of Chapter 2, Alternatives, would minimize construction-related effects on emergency response times. This effect would be less than significant.

Effect TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers

A parking area for construction workers and trucks would be provided at staging areas adjacent to a work site or areas within the levee right-of-way; therefore, this effect would be less than significant.

Effect TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures

Although most of the construction of the proposed project would take place within the project right-of-way, temporary road closures would be needed in some areas, which could interfere with transit services or bicycle travel along these roads. Implementation of the Traffic Control and Road Maintenance Plan environmental commitment, described in Section 2.7.9 of Chapter 2, Alternatives, would minimize construction-related traffic conflicts with alternative modes of transportation. Therefore, this effect would be less than significant. No mitigation is required.

4.4.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on transportation and navigation. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic	Less than significant	N/A	N/A
TN-2: Temporary Road Closures or Restricted Access to Parking on the Levee Crown or Roads that Run Adjacent to the Levee	Significant and unavoidable	Significant and unavoidable	No feasible mitigation
TN-3: Temporary Restriction of Access to Parking	Less than significant	N/A	N/A
TN-4: Increase in Emergency Response Times	Less than significant	N/A	N/A
TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers	Less than significant	N/A	N/A
TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures	Less than significant	N/A	N/A

Effect TN-1: Temporary Increase in Traffic Volumes from Construction-Generated Traffic

Implementation of The Rivers Alternative B would require hauling of construction equipment and materials to The Rivers EIP project area along major highways and over surface streets in the city (Figure 4.4-1).

The use of highways to haul construction equipment and materials to and from The Rivers EIP project area would increase daily traffic. Additionally, many of the construction-generated trips would involve slow-moving trucks, which would further affect highway traffic. However, the increase in AADT would be relatively small. With the addition of the maximum daily construction-generated traffic shown in Table 4.4-5 to the AADT counts, the maximum increase in traffic along any of the segments would be 0.35%. This increase in AADT is not expected to significantly degrade the operation of highways near the project area. This effect would be less than significant.

Table 4.4-7 shows the existing ADT levels on the surface streets to be used as haul routes for The Rivers Alternative B with the maximum daily construction-generated traffic shown in Table 4.4-5.

Table 4.4-7. Existing and Projected ADT on Haul Routes for The Rivers Alternative B

Street	Limits	Existing ADT	Existing LOS	Max Trips/Day	ADT During Construction
West Capitol Avenue	Riske Lane to 3rd Street	4,337	A	298	4,635
Reed Avenue	Riverside Parkway to Sunset Avenue	15,930	A	298	16,228
Sacramento Ave	Sunset Ave to Kegle Dr	10,437	A	298	10,735
Sacramento Ave	Kegle Dr. to 6th St	9,517	A	298	9,815
Harbor Boulevard	Rice Ave to West Capitol Ave	15,464	A	298	15,762
Harbor Boulevard	Reed Ave to Rice Ave	15,399	A	298	15,697
Harbor Boulevard	West Capitol Ave to Industrial Blvd	30,135	D	298	30,433
Jefferson Boulevard	Sacramento Ave to West Capitol Ave	21,176	A	298	21,474
Jefferson Boulevard	West Capitol Ave to 15th St	33,705	E	298	34,003
5th Street	A Street to West Capitol Avenue	5,358	A	298	5,656

The construction traffic generated by The Rivers Alternative B would temporarily increase the daily and peak hour traffic along specified routes shown in Table 4.4-7; however, traffic levels on haul route roads would return to normal levels once construction is completed. These routes would operate well within the City's LOS standard, with the exception of Jefferson Boulevard from West Capitol Avenue to 15th Street, which would maintain an LOS of E. Harbor Boulevard from West Capitol Avenue to Industrial Boulevard would have an LOS of D; however, the segment is located within 0.25 mile of a freeway interchange, which means the lower LOS is acceptable according to the City's standards.

Should The Rivers Alternative B be constructed concurrently with the CHP Academy APA or CHP Academy Alternative B, traffic would increase along Reed Avenue from Riverside Parkway to Sunset Avenue. This would be similar to the concurrent project construction mentioned under The Rivers APA, but to a lesser extent because fewer truck trips would be required for both The Rivers Alternative B and the CHP Academy Alternative B.

Although this addition of construction-related traffic would not be expected to degrade the LOS on most haul route roads to an unacceptable level, slow-moving heavy trucks could affect traffic flow on these roadways, particularly if numerous trips occur during the morning or afternoon peak traffic periods. Implementation of the Traffic Control and Road Maintenance Plan environmental commitment, described in Section 2.7.9 of Chapter 2, Alternatives, would reduce the effects of construction traffic on all haul routes to a less-than-significant level.

Effect TN-2: Temporary Road Closures on the Levee Crown or Roads that Run Adjacent to the Levee

Implementation of The Rivers Alternative B would result in the temporary closure of Riverbank Road north of Bryte Park, the western section of Fountain Drive, and the western section of Rivercrest Drive. The section of Riverbank Road that is located in the project area provides access only to a parking lot at Riverbank Elementary School before it reaches a dead end, and provides no through-access to any other streets.

The temporary closure of sections of Fountain Drive and Rivercrest Road would prevent home access and parking for approximately 15 residences. During periods of time when construction is directly adjacent to their homes, the residents would be temporarily relocated. Therefore, the temporary closure of these roads would not result in inadequate emergency access or parking, or substantially alter present patterns of circulation as the affected residents would not be in their homes, and neighboring residential roads could be used without affecting emergency access, parking, or circulation to homes adjacent to the project area. Additionally, the closure of roads would only be temporary as they would be opened upon completion of the project. Implementation of the Traffic Control and Road Maintenance Plan environmental commitment, described in Section 2.7.9 of Chapter 2, Alternatives, would aid in maintaining traffic standards during construction. However, because residents would lose daily access to their properties, this effect is considered significant and unavoidable. There is no feasible mitigation.

Effect TN-3: Temporary Restriction of Access to Parking

The temporary closure of the section of Riverbank Road north of Bryte Park would remove access to the parking lot on the northern side of Riverbank Elementary School, as well as the parking lot for the Club West Teen Center. However, the school has a parking lot on its southern side, and on-street parking is available in front of the school during periods of construction; therefore, the project would not result in inadequate parking capacity. Access to the northern parking lot would be available again after construction of the project is complete and Riverbank Road is re-opened. Implementation of the Traffic Control and Road Maintenance Plan environmental commitment, described in Section 2.7.9 of Chapter 2, Alternatives, would not be needed to reduce the intensity of this effect; however, it would aid in maintaining traffic standards during construction. This effect is less than significant. No mitigation is necessary.

Effect TN-4: Increase in Emergency Response Times

This effect is the same as that described under The Rivers APA, above. This effect is considered less than significant. No mitigation is required.

Effect TN-5: Inadequate Parking Supply to Meet Parking Demand for Construction Equipment and Construction Workers

This effect is the same as that described under The Rivers APA, above. This effect is considered less than significant. No mitigation is required.

Effect TN-6: Disruption of Alternative Transportation Modes as a Result of Temporary Road Closures

This effect is the same as that described under The Rivers APA, above. This effect is considered less than significant. No mitigation is required.

Section 4.5
Air Quality and Climate Change—The Rivers Early Implementation Project

4.5.1 Introduction

This section describes the regulatory and environmental setting for air quality and climate change, the effects on air quality and climate change that would result from the proposed project, and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below. Additional information is available in Appendix F.

- *Handbook for Assessing and Mitigating Air Quality Impacts* (Yolo-Solano Air Quality Management District 2007)
- *Guide to Air Quality Assessment in Sacramento County* (Sacramento Metropolitan Air Quality Management District 2009a)
- *CEQA and Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act* (California Air Pollution Control Officers Association 2008)

4.5.2 Affected Environment

This section describes the affected environment for air quality and climate change in The Rivers EIP project area, including the regulatory and environmental settings.

4.5.2.1 Air Quality Regulatory Setting

The study area and surrounding areas are subject to air quality regulations developed and implemented at the Federal, state, and local levels. At the Federal level, the U.S. Environmental Protection Agency (EPA) is responsible for implementation of the Clean Air Act (CAA). Some portions of the CAA (e.g., certain mobile-source and other requirements) are implemented directly by EPA. Other portions of the CAA (e.g., stationary-source requirements) are implemented by state and local agencies.

Responsibility for attaining and maintaining air quality in California is divided between the California Air Resources Board (CARB) and regional air quality districts. Areas of control for the regional districts are set by CARB, which divides the state into air basins. These air basins are defined by topography that limits air flow access, or by county boundaries. Plans, policies, and regulations relevant to the proposed project are discussed below.

4.5.2.1.1 Federal

The following Federal policies related to air quality and climate change may apply to the implementation of The Rivers EIP.

Clean Air Act

The CAA establishes Federal air quality standards, known as National Ambient Air Quality Standards (NAAQS), and specifies future dates for achieving compliance. The standards are divided into primary and secondary standards; the former are set to protect human health within an adequate margin of safety, and the latter to protect environmental values, such as plant and animal life.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and an incorporation of additional sanctions for failure to attain or meet interim milestones. The sections of the CAA that are most applicable to the proposed project are Title I (Non-attainment Provisions) and Title II (Mobile Source Provisions). Title I of the CAA identifies attainment, non-attainment, and unclassifiable areas with regard to criteria pollutants and sets deadlines for all areas to reach attainment for the following criteria pollutants: ozone, carbon monoxide (CO), respirable particulates (PM10, particulate matter less than 10 microns in diameter), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. The NAAQS were amended in July 1997 to include the 8-hour ozone standard and a NAAQS for fine particulates (PM2.5, particulate matter less than 2.5 microns in aerodynamic diameter). Applicable NAAQS for these criteria pollutants are presented in Table 4.5-1.

Table 4.5-1. National and California Ambient Air Quality Standards

		Federal [1]		
Pollutant	**Averaging Time**	**Primary**	**Secondary**	**California** [2]
Ozone	8 hour [3]	0.075 ppm	0.075 ppm	0.07 ppm
	1 hour	No standard	No standard	0.09 ppm
Carbon monoxide—CO	8 hour	9 ppm	No standard	9 ppm
	1 hour	35 ppm	No standard	20 ppm
Respirable particulate matter—PM10	24 hour [4]	150 $\mu g/m^3$	150 $\mu g/m^3$	50 $\mu g/m^3$
	Annual	No standard	No standard	20 $\mu g/m^3$
Fine particulate matter—PM2.5	24 hour [5]	35 $\mu g/m^3$	35 $\mu g/m^3$	35 $\mu g/m^3$
	Annual	15 $\mu g/m^3$	15 $\mu g/m^3$	12 $\mu g/m^3$
Nitrogen dioxide—NO_2	Annual	0.053 ppm	0.053 ppm	0.03 ppm
	1 hour	No standard	No standard	0.18 ppm
Sulfur dioxide—SO_2	Annual	0.03 ppm	No standard	No standard
	24 hour	0.14 ppm	No standard	0.04 ppm
	3 hour	No standard	0.50 ppm	No standard
	1 hour	No standard	No standard	0.25 ppm
Lead	30 day	No standard	No standard	1.5 $\mu g/m^3$
	Calendar quarter	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	No standard
	Rolling 3 month	0.15 $\mu g/m^3$	0.15 $\mu g/m^3$	No standard

Source: California Air Resources Board 2009a
ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.
[1] National standards are not to be exceeded more than once a year.

		Federal [(1)]		
Pollutant	**Averaging Time**	**Primary**	**Secondary**	**California [(2)]**

[2] California standards for ozone, CO, PM10, PM2.5, NO_2, and SO_2 (1 and 24 hour) are values that are not to be exceeded. All others are not to be equaled or exceeded.

[3] To attain the Federal ozone standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.

[4] To attain the Federal PM10 standard, the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ must be equal to or less than 1.

[5] To attain the Federal PM2.5 standard, 98% of the daily concentrations, averaged over 3 years, must be equal to or less than 35 $\mu g/m^3$.

The CAA requires states to submit a state implementation plan (SIP) for areas in non-attainment for Federal standards. The SIP, which is reviewed and approved by EPA, must demonstrate how the Federal standards would be achieved. Failing to submit a plan or secure approval could lead to denial of Federal funding and permits. In cases where the SIP is submitted by the state but fails to demonstrate achievement of the standards, EPA is directed to prepare a Federal implementation plan.

Title II of the CAA contains a number of provisions regarding mobile sources, including requirements for reformulated gasoline, new tailpipe emission standards for cars and trucks, oxides of nitrogen (NO_X) standards for heavy-duty vehicles, and a program for cleaner fleet vehicles.

General Conformity Regulation

EPA enacted the Federal General Conformity regulation (40 CFR Parts 5, 51, and 93) in 1993. The General Conformity rule applies to Federal actions located in non-attainment areas that do not include stationary industrial sources requiring preconstruction air quality permits from local air pollution control agencies. The purpose is to ensure that Federal actions do not generate emissions that interfere with state and local agencies' SIPs and emission-reduction strategies.

The General Conformity rule applies in air quality non-attainment or maintenance areas, and only to direct and indirect emissions associated with the portions of any Federal action for which a Federal permitting agency has the authority to impose emission reductions. Since the project is within the U.S. Army Corps of Engineers (USACE) jurisdiction and would require a permit from USACE, all direct and indirect emissions generated by the project construction are subject to General Conformity.

The proposed project would generate air pollutant emissions from construction sites in Yolo County and would generate indirect on-road emissions in both Yolo County and Sacramento County, both of which are designated a severe non-attainment area for ozone NAAQS and a non-attainment area for PM2.5 NAAQS. Sacramento County is a moderate non-attainment area for PM10 NAAQS. Based on those designations, the General Conformity thresholds are:

- 25 tons/year of NO_X,
- 25 tons/year of reactive organic gasses (ROG),
- 100 tons/year of PM2.5, and
- 100 tons/year of PM10.

All emission sources include in-water equipment, on-land non-road equipment, on-road haul trucks, and on-road commute vehicles that operate on project components are required to comply with the General Conformity thresholds. If the annual emissions exceed the applicability thresholds, then the applicant must consult with the air quality district to confirm that the county-wide emission budget prepared for the SIP included the general types of activity proposed by the applicant.

Federal Tailpipe Emission Standards

To reduce emissions from off-road diesel equipment, on-road diesel trucks, and harbor craft, EPA established a series of increasingly strict emission standards for new engines. New construction equipment used for the project, including heavy-duty trucks, off-road construction equipment, tugboats, and barges, will be required to comply with the emission standards.

4.5.2.1.2 State

The following state policies or agencies related to air quality and climate change may apply to the implementation of The Rivers EIP.

California Clean Air Act

In 1988, the state legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. The CCAA requires all areas of the state to achieve and maintain the California Ambient Air Quality Standards (CAAQS) by the earliest practical date. The CAAQS incorporate additional standards for most criteria pollutants and set standards for other pollutants recognized by the state. In general, the CAAQS are more stringent than the corresponding NAAQS.

CARB and local air districts bear responsibility for achieving California's air quality standards, which are to be achieved through district-level air quality management plans that would be incorporated into the SIP. In California, EPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

Responsibilities of air districts include overseeing stationary source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA.

The CCAA of 1988 substantially added to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA focuses on attainment of the CAAQS, which, for certain pollutants and averaging periods are more stringent than the comparable Federal standards.

The CCAA requires designation of attainment and non-attainment areas with respect to CAAQS. The CCAA also requires that local and regional air districts expeditiously adopt and prepare an Air Quality Attainment Plan if the district violates state air quality standards for ozone, CO, NO_2, or SO_2. These plans are specifically designed to attain these standards and must be designed to achieve an annual 5% reduction in district-wide emissions of each non-attainment pollutant or its precursors. No locally prepared attainment plans are required for areas that violate the state PM10 standards.

The CCAA requires that the state air quality standards be met as expeditiously as practicable but, unlike the Federal CAA, does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that would require more time to achieve the standards.

Idling Limit Regulation

CARB has adopted a regulation for in-use off-road diesel vehicles that became effective under California law on June 15, 2008. This regulation is designed to reduce toxic air contaminants (TACs) from diesel-powered construction and mining vehicles operating in California. Fleet owners are subject to retrofit or accelerated replacement/repower requirements for which CARB must obtain authorization from EPA prior to enforcement under the CAA. However, this regulation also imposes idling limitations on owners, operators, and renters or lessees of off-road diesel vehicles, which CARB is authorized to enforce.

The idling limits are effective and enforceable as of June 15, 2008. The regulation requires an operator of applicable off-road vehicles (self-propelled diesel-fueled vehicles of 25 horsepower and greater that were not designed for on-road driving) to limit idling to no more than 5 minutes. These requirements are specified in 13 CCR 2449(d)(3).

Control of Airborne Asbestos

CARB has adopted an asbestos Airborne Toxic Control Measure (ATCM) for construction, grading, quarrying, and surface mining operations. The measure requires use of best available dust control measures to prevent off-site migration of asbestos-containing dust from road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas of asbestos, serpentine, or ultramafic rock.

State Tailpipe Emission Standards

To reduce emissions from off-road diesel equipment, on-road diesel trucks, and harbor craft, CARB established a series of increasingly strict emission standards for new engines. New construction equipment used for the project, including heavy duty trucks, off-road construction equipment, tugboats, and barges, will be required to comply with the standards.

State NO_X Reduction Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The program is a partnership between the CARB and the local air districts throughout the state. Locally, the air districts administer the Carl Moyer program. The purpose of the program is to reduce air pollution emissions from heavy-duty engines. Grants are available for projects that:

- install particulate traps,
- replace older heavy-duty engines with newer and cleaner engines and add a particulate trap,
- purchase new vehicles or equipment that is cleaner than the law requires,

- replace heavy-duty equipment with electric equipment, and
- install electric idling-reduction equipment.

4.5.2.1.3 Local

At the local level, responsibilities of air quality districts include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality-related sections of environmental documents required by CEQA. The air quality districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of Federal and state air quality laws and for ensuring that NAAQS and CAAQS are met.

The following local policies or agencies related to air quality and climate change may apply to the implementation of The Rivers EIP.

Yolo-Solano Air Quality Management District

The project construction site is located in Yolo County, where the Yolo-Solano Air Quality Management District (YSAQMD) has local air quality jurisdiction over the project components. YSAQMD has adopted CEQA emission thresholds in the *Handbook for Assessing and Mitigating Air Quality Impacts* (Yolo-Solano Air Quality Management District 2007) to determine the level of significance of project-related emissions. Table 4.5-2 summarizes applicable thresholds that are used in the analysis of project-related construction and operational emissions. Emissions that exceed the designated threshold levels are considered potentially significant and should be mitigated.

Table 4.5-2. YSAQMD Significance Thresholds for Construction and Operational Emissions

Pollutant	Construction and Operation Significance Threshold
ROG	10 tons/year
NO_X	10 tons/year
PM10	80 lbs/day
CO	Violation of a CAAQA for CO

Source: Yolo-Solano Air Quality Management District 2007.
ROG = reactive organic gas.
NO_X = oxides of nitrogen.
PM10 = particulate matter 10 microns or less in diameter.
CO = carbon monoxide.

All projects located in Yolo County are subject to the YSAQMD regulations in effect at the time of construction. Specific regulations applicable to the proposed project components may involve diesel construction equipment emissions, fugitive dust, on-road haul truck emissions, and general permit requirements. List below are description of YSAQMD rules that would be applicable to the project.

- Dust emissions must be prevented from creating a nuisance to surrounding properties as regulated under Rule 2.5, Nuisance.

- Portable equipment greater than 50 horsepower, other than vehicles, must be registered with either the CARB Portable Equipment Registration Program (PERP) or with the YSAQMD.
- Architectural coating and solvents used at the project shall be compliant with Rule 2.14, Architectural Coatings.
- Cutback and emulsified asphalt application shall be conducted in accordance with Rule 2.28, Cutback and Emulsified Asphalt Paving Materials.

Sacramento Metropolitan Air Quality Management District

The project would generate direct air pollutant emissions from on-site construction equipment in Yolo County; however, the indirect on-road emissions would be generated from delivery trucks and commute vehicles in both Yolo County and Sacramento County. For the indirect on-road emissions that would occur in Sacramento County, the Sacramento Metropolitan Air Quality Management District (SMAQMD) has local air quality jurisdiction over the air pollutant emissions.

SMAQMD has adopted CEQA emission thresholds in the *Guide to Air Quality Assessment* (Sacramento Metropolitan Air Quality Management District 2009a) to determine the level of significance of project-related emissions. Table 4.5-3 summarizes applicable thresholds that are used in the analysis for project-related on-road vehicle emissions. Emissions that exceed the designated threshold levels are considered potentially significant and should be mitigated.

Table 4.5-3. SMAQMD Significance Thresholds for Construction and Operational Emissions

Pollutant	Construction Significance Threshold	Operation Significance Threshold
ROG	No threshold	65 lbs/day
NO_X	85 lbs/day	65 lbs/day
PM10	Violation of a CAAQA for PM10	
CO	Violation of a CAAQA for CO	

Source: Sacramento Metropolitan Air Quality Management District 2009a

All projects occurring in Sacramento County are subject to the SMAQMD regulations in effect at the time of construction. All construction projects, regardless of size, are required to implement standardized BMPs for fugitive dust control and reduction of tailpipe emissions. If the construction emission exceeds the NO_X threshold, the contractor will be required to provide a plan, for approval by SMAQMD, demonstrating that the heavy-duty off-road equipment to be used in the project sites will achieve a project-wide fleet-average 20% NO_X reduction and 45% diesel particulate reduction compared to the most recent CARB fleet average at time of construction. Because the project would not generate construction emissions from non-road equipment within the SMAQMD, this reduction measure is not applicable. For this project, if the on-road NO_X emissions generated within the SMAQMD exceed the CEQA threshold, the project proponent will be required to pay an offsite mitigation fee of $16,000 per ton of mitigated on-road construction emissions exceeding the NO_X threshold.

4.5.2.2 Climate Change Regulatory Setting

4.5.2.2.1 Federal

The following Federal policies related to climate change may apply to the implementation of The Rivers EIP.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA released its final Greenhouse Gas Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year (FY) 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110-161), that required EPA to develop "… mandatory reporting of greenhouse gasses above appropriate thresholds in all sectors of the economy…." The Reporting Rule would apply to most entities that emit 25,000 metric tons of carbon dioxide equivalents (CO_2e) or more per year. Starting in 2010, facility owners are required to submit an annual greenhouse gas (GHG) emissions report with detailed calculations of facility GHG emissions. The Reporting Rule would also mandate recordkeeping and administrative requirements in order for EPA to verify annual GHG emissions reports.

Environmental Protection Agency Endangerment and Cause and Contribute Findings

On December 7, 2009, EPA signed the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the CAA. Under the Endangerment Finding, EPA finds that the current and projected concentrations of the six key well-mixed GHGs, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride in the atmosphere threaten the public health and welfare of current and future generations. Under the Cause or Contribute Finding, EPA finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing the EPA's proposed new Corporate Average Fuel Economy standards for light-duty vehicles, which EPA proposed in a joint proposal including the Department of Transportation's proposed Corporate Average Fuel Economy standards on September 15, 2009.

On February 19, 2010, the CEQ issued draft NEPA guidance on the consideration of the effects of climate change and GHG emissions. This guidance advises Federal agencies that they should consider opportunities to reduce GHG emissions caused by Federal actions, adapt their actions to climate change impacts throughout the NEPA process; and address these issues in their agency NEPA procedures. Where applicable, the scope of the NEPA analysis should cover the GHG emissions effects of a proposed action and alternatives action and the relationship of climate change effects to a proposed action or alternatives.

4.5.2.2.2 State

The following state policies or agencies related to climate change may apply to the implementation of The Rivers EIP.

Executive Order S-3-05

Signed by Governor Arnold Schwarzenegger on June 1, 2005, Executive Order S-3-05 asserts that California is vulnerable to the effects of climate change. The executive order puts forth that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established total GHG emissions targets. Executive Order S-3-05 established the following GHG emissions reduction targets for California.

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

The executive order directed the secretary of the California Environmental Protection Agency (CalEPA) to initiate a multi-agency effort to reduce GHG emissions to target levels. To comply with the executive order, the secretary of CalEPA created a Climate Act Team (CAT) composed of members of various state agencies and commissions. CAT released its first report in March 2006 (California Environmental Protection Agency 2006). The report proposes achieving GHG targets through the voluntary actions of California businesses, local government and community actions, and state incentive and regulatory programs.

Assembly Bill 32, California Climate Solutions Act of 2006

In September 2006, the California State Legislature adopted Assembly Bill 32, the California Global Warming Solutions Act of 2006 (AB 32). AB 32 establishes a cap on statewide GHG emissions and sets forth the regulatory framework to achieve the corresponding reduction in statewide emission levels. Under AB 32, GHGs are defined as CO_2, methane, NO_X, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 requires that CARB takes the following actions.

- Adopt early action measures to reduce GHG.
- Establish a statewide GHG emissions cap for 2020 based on 1990 emissions.
- Adopt mandatory report rules for significant GHG sources.
- Adopt a scoping plan indicating how emission reductions would be achieved through regulations, market mechanisms, and other actions.
- Adopt regulations needed to achieve the maximum technologically feasible and cost-effective reductions in GHGs.

In December 2007, CARB approved the 2020 emission limit (1990 level) of 427 million metric tons of CO_2e. The 2020 target requires the reduction of 169 million metric tons of CO_2e, or approximately 30% below the state's projected "business-as-usual" 2020 emissions of 596 million metric tons of CO_2e.

Also in December 2007, CARB adopted mandatory reporting and verification regulations pursuant to AB 32. The regulations became effective January 1, 2009, with the first reports covering 2008 emissions. The mandatory reporting regulations require reporting for major facilities, those that generate more than 25,000 metric tons/year of CO_2e. To date, CARB has met all of the statutorily mandated deadlines for promulgation and adoption of regulations.

Climate Change Scoping Plan

On December 11, 2008, pursuant to AB 32, CARB adopted the Climate Change Scoping Plan. This plan outlines how emissions reductions from significant sources of GHGs will be achieved via regulations, market mechanisms, and other actions. Six key elements, outlined in the scoping plan, are identified to achieve emissions reduction targets:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards.
- Achieving a statewide renewable energy mix of 33%.
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system.
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard.
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gasses, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

The Climate Change Scoping Plan also described recommended measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately affect low-income and minority communities. These measures put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80% below 1990 levels. The measures in the approved Climate Change Scoping Plan will be developed over the next 2 years and be in place by 2012.

Senate Bill 97

Senate Bill 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under CEQA. The bill directs the California Office of Planning and Research (OPR) to prepare, develop, and transmit to CARB the guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, by July 1, 2009. SB 97 directs the State Resources Agency (now Natural Resources Agency), the agency charged with adopting the CEQA Guidelines, to certify and adopt such Guidelines by January 2010.

In June 2008, OPR issued a Technical Advisory on CEQA and Climate Change (California Office of Planning and Research 2008). For projects subject to CEQA, this document recommends that emissions be calculated and mitigation measures be identified to reduce those emissions. The OPR report does not identify emission thresholds for GHGs but instead recommends that each lead agency develop their own thresholds. On December 30, 2009 the Natural Resources Agency adopted amendments to the CEQA Guidelines for Greenhouse gas emission. Those amendments became effective on March 18, 2010. The amendments provide guidance on the analysis and mitigation of the effects of GHG emissions, including determining significance and significance thresholds.

Actions Taken by California Attorney General's Office

The California Attorney General (AG) has filed comment letters under CEQA about a number of proposed projects. The AG also has filed several complaints and obtained settlement agreements for CEQA documents covering general plans and individual programs that the AG found either failed to analyze GHG emissions or failed to provide adequate GHG mitigation. The AG's office prepared a report listing the measures that local agencies should consider under CEQA to offset or reduce global warming effects. The AG's office also has prepared a chart of modeling tools to estimate GHG emissions effects of projects and plans. Information on the AG's actions can be found on the California Department of Justice, Office of Attorney General web site (California Department of Justice 2008).

California Air Pollution Control Officers Association Guidance

The California Air Pollution Control Officers Association (CAPCOA) released a report in January 2008 that describes methods to estimate and mitigate GHG emissions from projects subject to CEQA. The CAPCOA report evaluates several GHG thresholds that could be used to evaluate the significance of a project's GHG emissions. The CAPCOA report, however, does not recommend any one threshold. The report is designed as a resource for public agencies as they establish agency procedures for reviewing GHG emissions from projects subject to CEQA. (California Air Pollution Control Officers Association 2008)

Executive Order S-13-08

Executive Order S-13-08, issued November 14, 2008, directs the California Natural Resources Agency, Department of Water Resources, Office of Planning and Research, Energy Commission, State Water Resources Control Board, State Parks Department, and California's coastal management agencies to participate in a number of planning and research activities to advance California's ability to adapt to the impacts of climate change. The order specifically directs agencies to work with the National Academy of Sciences to initiate the first California Sea Level Rise Assessment and to review and update the assessment every 2 years after completion; to immediately assess the vulnerability of the California transportation system to sea level rise; and to develop a California Climate Change Adaptation Strategy.

4.5.2.3 Air Quality Environmental Setting

The environmental setting for air quality in The Rivers EIP project area is described below.

4.5.2.3.1 Regional Climate and Meteorology

The study area is in Yolo County, which is located in the Sacramento Valley Air Basin (SVAB). The SVAB includes Sacramento, Shasta, Tehama, Butte, Glenn, Colusa, Sutter, Yuba, Yolo, and parts of Solano and Placer Counties. The SVAB is bounded on the north by the Cascade Range, on the south by the San Joaquin Valley Air Basin, on the east by the Sierra Nevada, and on the west by the Coast Range.

The SVAB has a Mediterranean climate characterized by hot, dry summers and cool, rainy winters. During winter, the North Pacific storm track intermittently dominates Sacramento Valley weather, and fair weather alternates with periods of extensive clouds and precipitation. Periods of dense and persistent low-level fog, which is most prevalent between storms, are also characteristic of winter weather in the valley. The frequency and persistence of heavy fog in the valley diminishes with the approach of spring. The average yearly temperature range for the Sacramento Valley is 20°F to 115°F, with summer high temperatures often exceeding 90°F and winter low temperatures occasionally dropping below freezing.

In general, the prevailing winds are moderate in strength and vary from moist clean breezes from the south to dry land flows from the north. The mountains surrounding the SVAB create a barrier to airflow, which can trap air pollutants under certain meteorological conditions. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells collect over the Sacramento Valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with temperature inversions that trap pollutants near the ground.

The ozone season (May through October) in the Sacramento Valley is characterized by stagnant morning air or light winds with the delta sea breeze arriving in the afternoon out of the southwest. Usually the evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. During about half of the days from July to September, however, a phenomenon called the "Schultz Eddy" prevents this from occurring. Instead of allowing for the prevailing wind patterns to move north carrying the pollutants out, the Schultz Eddy causes the wind pattern to circle back to the south. Essentially, this phenomenon causes the air pollutants to be blown south toward the Sacramento Valley and Yolo County. This phenomenon has the effect of exacerbating the pollution levels in the area and increases the likelihood of violating Federal or state standards. The eddy normally dissipates around noon when the delta sea breeze arrives. (Yolo-Solano Air Quality Management District 2007)

4.5.2.3.2 Background Information on Air Pollutants

Air quality studies generally focus on five pollutants most commonly measured and regulated, and referred to as criteria air pollutants: ozone, CO, inhalable PM (PM10 and PM2.5), NO_2, and SO_2. Because ozone, a photochemical oxidant, is not emitted into the air directly from sources, emissions of ozone precursors, including NO_X and ROG, are regulated with the aim of reducing ozone formation in the lowermost region of the troposphere.

Ozone and NO_2 are considered regional pollutants because they (or their precursors) affect air quality on a regional scale: NO_2 reacts photochemically with ROG to form ozone, and this reaction occurs at some distance downwind of the source of pollutants. Pollutants such as CO, PM10, and PM2.5 are considered to be local pollutants because they tend to disperse rapidly with distance from the source.

The principal characteristics surrounding these pollutants are discussed below. TACs and GHGs are also discussed below, although no air quality standards exist for these pollutants.

Ozone

Ozone is an oxidant that attacks synthetic rubber, textiles, and other materials and causes extensive damage to plants by leaf discoloration and cell damage. It is also a severe eye, nose, and throat irritant and increases susceptibility to respiratory infections. Ozone is not emitted directly into the air: it forms from a photochemical reaction in the atmosphere. Ozone precursors, including ROG and NO_X, are emitted by mobile sources and stationary combustion equipment and react in the presence of sunlight to form ozone. Because reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summertime problem.

Carbon Monoxide

CO is essentially inert to most materials and to plants but can significantly affect human health because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. Effects on humans range from slight headaches to nausea to death. Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter, when periods of light wind combine with the formation of ground-level temperature inversions—typically from evening through early morning. These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

Particulate Matter

PM suspended in the atmosphere can reduce visibility, retard plant growth, corrode materials, and affect human health. Health concerns focus on particles small enough to reach the lungs when inhaled (inhalable PM). NAAQS and CAAQS for PM apply to two classes of inhalable particulates: PM10 and PM2.5.

Nitrogen Dioxide

NO_2 is a brownish gas that contributes to the formation of ground-level ozone pollution. NO_2 increases respiratory disease and irritation and may reduce resistance to certain infections. The majority of ambient NO_2 is not directly emitted but is formed rather quickly from the reaction of nitric oxide (NO) and oxygen in the atmosphere. NO and NO_2 are the primary pollutants that make up the group of pollutants referred to as NO_X. In the presence of sunlight, complex reactions of NO_X with ozone and other air pollutants produce the majority of NO_2 in the atmosphere. NO_2 is one of the NO_X emitted from high-temperature combustion processes, such as those occurring in trucks, cars, and power plants. Indoors, home heaters and gas stoves also produce substantial amounts of NO_2.

Sulfur Dioxide

SO_2 is a colorless, irritating gas with a “rotten egg” smell formed primarily by the combustion of sulfur-containing fossil fuels. SO_2 is formed when sulfur-containing fuel is burned by mobile sources, such as locomotives and off-road diesel equipment. SO_2 also is emitted from several industrial processes, such as petroleum refining and metal processing.

Toxic Air Contaminants

TACs are a category of air pollutants that have been shown to affect human health but are not classified as criteria pollutants. TACs are generated by various kinds of sources, including stationary sources such as dry cleaners and gas stations; combustion sources; mobile sources such as diesel trucks, ships, and trains; and area sources such as farms, landfills, and construction sites. Significant health effects of TACs can be carcinogenic (cancer-causing), short-term (acute) non-carcinogenic, and long-term (chronic) non-carcinogenic. To date, CARB has identified 21 TACs and adopted EPA’s list of hazardous air pollutants (HAPs) as TACs. In August 1998, diesel particulate matter (DPM) was added to the CARB list of TACs (California Air Resources Board 1998).

Diesel Particulate Matter

DPM is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, result from diluted and cooled exhaust gasses. DPM in California is a significant part of the total TAC level in the state. In September 2000, CARB approved a Diesel Risk Reduction Plan (California Air Resources Board 2000) to reduce PM emissions from diesel-fueled engines and vehicles. The plan outlines a comprehensive and ambitious program to reduce emissions from new and existing on-road vehicles (e.g., heavy-duty trucks and buses); off-road equipment (e.g., graders, tractors, forklifts, sweepers, and boats); portable equipment (e.g., pumps); and stationary engines (e.g., stand-by power generators). According to the plan, CARB will work with the heavy-duty equipment manufacturing companies and operators to develop an emissions reduction program for construction equipment.

4.5.2.3.3 Existing Air Quality Conditions

Air quality monitoring data for the last 3 years (2006–2008) are presented in Table 4.5-4. Although the project is located in Yolo County, the nearest monitoring stations in both Yolo County and Sacramento County are selected to present air quality of project vicinity. Air quality concentrations typically are expressed in terms of ppm or micrograms per cubic meter (μg/m^3). The nearest monitoring stations to the study area are the West Sacramento 15th Street station, which monitors PM10, the Sacramento T Street station, which monitors ozone and PM2.5; and the Sacramento Del Paso Manor station, which monitors CO.

As indicated in Table 4.5-4, the 15th Street monitoring station has experienced 19 violations of the state 24-hour PM10 standard during the last 3 years. The T Street monitoring station has experienced 15 violations of the state 1-hour ozone standard and 39 violations of the state 8-hour ozone standard. There were 37 violations of the Federal 24-hour PM2.5 standard at the T Street monitoring station. There were no violations of the CO standards during this period.

Table 4.5-4. Ambient Air Quality Monitoring Data from the West Sacramento and Sacramento Stations (2006–2008)

Pollutant Standard	2006	2007	2008
Ozone—Sacramento T Street Station			
National maximum 1-hour concentration (ppm)	0.106	0.109	0.107
National maximum 8-hour concentration (ppm)	0.090	0.089	0.092
Number of days standard exceeded [a]			
CAAQS 1-hour (>0.09 ppm)	6	2	7
NAAQS 8-hour (>0.075 ppm)	6	2	9
CAAQS 8-hour (>0.07 ppm)	14	7	18
CO—Sacramento Del Paso Manor Station			
National maximum 8-hour concentration (ppm)	3.5	2.9	2.5
National maximum 1-hour concentration (ppm)	4.4	3.5	2.9
Number of days standard exceeded [a]			
NAAQS 8-hour (≥9.0 ppm)	0	0	0
CAAQS 8-hour (≥9.0 ppm)	0	0	0

Pollutant Standard	2006	2007	2008
NAAQS 1-hour (≥35 ppm)	0	0	0
PM10[b]—West Sacramento 15th Street Station			
National maximum 24-hour concentration (μg/m³) [c]	77	61	61
State maximum 24-hour concentration (μg/m³) [d]	78.0	66.0	61.6
National annual average concentration (μg/m³)	28	21	29
State annual average concentration (μg/m³) [e]	28.8	21.7	–
Number of days standard exceeded [a]			
NAAQS 24-hour (>150 μg/m³) [f]	0	0	0
CAAQS 24-hour (>50 μg/m³) [f]	9	5	5
PM2.5[b]— Sacramento T Street Station			
National maximum 24-hour concentration (μg/m³) [c]	54.0	58.0	66.1
State maximum 24-hour concentration (μg/m³) [d]	54.0	58.0	78.9
National annual average concentration (μg/m³)	12.4	11.9	9.8
State annual average concentration (μg/m³) [e]	12.9	–	–
Number of days standard exceeded [a]			
NAAQS 24-hour (>35 μg/m³) [f]	14	19	4

Sources: California Air Resources Board 2009b, U.S. Environmental Protection Agency 2009a
– = insufficient data available to determine the value.
[a] An exceedance is not necessarily a violation.
[b] Measurements usually are collected every 6 days.
[c] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using Federal reference or equivalent methods.
[d] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California-approved samplers.
[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
[f] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored.

4.5.2.3.4 Air Quality Attainment Status

The air quality attainment status for criteria pollutants in Yolo County and Sacramento County are summarized in Table 4.5-5. Areas are classified as in attainment or in non-attainment with respect to CAAQS and NAAQS. These classifications are made by comparing actual monitored air pollutant concentrations to state and Federal standards. If a pollutant concentration is lower than the state or Federal standard, the area is considered to be in attainment of the standard for that pollutant. If pollutant levels exceed a standard, the area is considered a non-attainment area. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated as unclassified. This typically occurs in non-urbanized areas, where pollutant levels may be less closely monitored.

On December 22, 2008, EPA classified Yolo County as a partial non-attainment area for the PM2.5 standard. With the new designation, an attainment plan will be submitted to EPA by 2012.

Table 4.5-5. Yolo County and Sacramento County Air Quality Attainment Status

Pollutant	Averaging Time	State Standards	National Standards
Yolo County			
Ozone	1-Hour	Serious Non-attainment	No Designation
	8-Hour	Non-attainment	Severe Non-attainment
CO		Attainment	Attainment
PM10	24-Hour	Non-attainment	Unclassified
PM2.5	24-Hour	Unclassified	Partial Non-attainment
Sacramento County			
Ozone	1-Hour	Serious Non-attainment	No Designation
	8-Hour	Non-attainment	Severe Non-attainment
CO		Attainment	Attainment
PM10	24-Hour	Non-attainment	Moderate Non-attainment
PM2.5	24-Hour	Non-attainment	Non-attainment

Source: California Air Resources Board 2009c

4.5.2.3.5 Sensitive Receptors

The NAAQS and CAAQS apply at publicly accessible areas, regardless of whether those areas are populated. For the purposes of air quality analysis, sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (e.g., 24-hour, 8-hour, and 1-hour). Typical sensitive receptors are residences, hospitals, and schools.

Sensitive land uses in the vicinity of The Rivers EIP project area are primarily single-family residential, schools (e.g., Riverbank Elementary School), and public parks (e.g. Bryte Park). Single-family homes are located on Todhunter Avenue adjacent to the southwest corner of the project area, and on Rivercrest Drive and Fountain Drive adjacent to the eastern portion of the project area. Bryte Park and the playground of Riverbank Elementary School are located within 500 feet of the project area.

There are approximately 30 to 40 residences within the immediate vicinity of construction activities. At times, construction activities would be directly adjacent to their homes.

4.5.2.4 Climate Change Environmental Setting

This section describes the environmental setting related to climate change in The Rivers EIP project area.

4.5.2.4.1 Background Information on Climate Change

Global warming refers to the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to by unequivocal (Intergovernmental Panel on Climate Change 2007) with global surface temperature increasing approximately 1.33°F over the last 100 years. Continued warming is projected to increase the average global temperature between 2°F and 11°F over the next 100 years. The causes of this warming have been identified as both natural processes and as the result of human actions. The Intergovernmental Panel on Climate Change (IPCC) concludes that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. However, after 1950, increasing GHG concentrations resulting from human activity such as fossil fuel burning and deforestation have been responsible for most of the observed temperature increase.

Increases in 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. Some GHGs occur naturally and are necessary for keeping the Earth's surface inhabitable. However, increases in the concentrations of these gasses in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

The principal GHGs are CO_2, CH_4, N_2O, sulfur hexafluoride (SF_6), perfluorocarbons, hydrofluorocarbons, and water vapor. Each of the principal greenhouse gasses has a long atmospheric lifetime (1 year to several thousand years). In addition, the potential heat trapping ability of each of these gasses varies significantly. Methane is 23 times as potent as CO_2, while SF_6 is 22,200 times more potent than CO_2. The most common GHG is CO_2, which constitutes approximately 84% of all emissions of GHGs in California. GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors) and TACs, which are pollutants of regional and local concern.

Conventionally, GHGs have been reported as CO_{2e}, an equivalency measure that takes into account the relative potency of non-CO_2 GHGs and converts their quantities to an equivalent amount of CO_2 so that all emissions can be reported as a single quantity. The primary human-made processes that release these gasses include burning of fossil fuels for transportation, heating and electricity generation; agricultural practices that release methane such as livestock grazing and crop residue decomposition; and industrial processes that release smaller amounts of high global warming potential gasses such as SF_6, perfluorocarbons, and hydrofluorocarbons. Deforestation and land cover conversion have also been identified as contributing to global warming by reducing the Earth's capacity to remove CO_2 from the air and altering the Earth's albedo or surface reflectance, allowing more solar radiation to be absorbed.

4.5.2.4.2 Global Climate Trends and Associated Impacts

The rate of increase in global average surface temperature over the last 100 years has not been consistent; the last three decades have warmed at a much faster rate – on average 0.32°F per decade. Eleven of the twelve years from 1995 to 2006 rank among the twelve warmest years in the instrumental record of global average surface temperature (going back to 1850) (Intergovernmental Panel on Climate Change 2007).

During the same period over which this increased global warming has occurred, many other changes have occurred in other natural systems. Sea levels have risen on average1.8 millimeters per year; precipitation patterns throughout the world have shifted, with some areas becoming wetter and others drier; tropical cyclone activity in the North Atlantic has increased; peak runoff timing of many glacial and snow-fed rivers has shifted earlier; as well as numerous other observed conditions. Although it is difficult to prove a definitive cause and effect relationship between global warming and other observed changes to natural systems, there is high confidence in the scientific community that these changes are a direct result of increased global temperatures (Intergovernmental Panel on Climate Change2007).

4.5.2.4.3 California Climate Trends

Maximum (daytime) and minimum (nighttime) temperatures are increasing almost everywhere in California but at different rates. The annual *minimum* temperature averaged over all of California increased 0.33°F per decade from 1920 to 2003, while the average annual *maximum* temperature increased 0.1°F per decade (Moser et al. 2009).

With respect to California's water resources, the most significant impacts of global warming have been changes to the water cycle and sea level rise. Over the past century, the precipitation mix between snow and rain has shifted in favor of more rainfall and less snow (Mote et al. 2005, Knowles 2006) and snow pack in the Sierra Nevada is melting earlier in the spring (Kapnick and Hall 2009). The average early spring snowpack in the Sierra Nevada has decreased by about 10% during the last century, a loss of 1.5 million acre-feet of snowpack storage (California Department of Water Resources 2008). These changes have significant implications for water supply, flooding, aquatic ecosystems, energy generation, and recreation throughout the state. During the same period, sea levels along California's coast rose 7 inches (California Department of Water Resources 2008). Sea level rise associated with global warming will continue to threaten coastal lands and infrastructure, increase flooding at the mouths of rivers, place additional stress on levees in the Sacramento-San Joaquin Delta, and will intensify the difficulty of managing the Sacramento-San Joaquin Delta as the heart of the state's water supply system.

4.5.3 Air Quality Environmental Consequences

This section describes the environmental consequences relating to air quality and climate change for the proposed Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.5.3.1 Air Quality Assessment Methods

Almost all increased air pollutant emissions associated with The Rivers EIP would be generated by construction-related activities. Therefore, the focus of the air quality analysis is to evaluate whether the construction-related emissions would exceed emission thresholds as established by YSAQMD, SMAQMD, and General Conformity thresholds. Construction emissions from the project implementation would result in localized, short-term effects on ambient air quality in the area. These short-term emissions, especially PM10, ROG, and NO_X, have the potential to represent a significant air quality effect. Fugitive dust emissions are associated primarily with site preparation, excavation, and levee reconstruction earthwork, and vary as a function of factors such as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled on site and off site. For the construction of the project, ROG and NO_X emissions are associated primarily with diesel equipment exhaust and asphalt paving.

After The Rivers EIP is constructed, maintenance of the project facilities generally would be performed as needed. Maintenance work is less extensive than the construction activities and takes place over a few days per year. In addition, maintenance and operational activities are part of the existing environmental baseline and thus would not create a substantial source of new emissions.

To assist in the determination of effects, various quantitative models are available to predict emissions and particulate matter generation. Two such models are URBEMIS and SacRCEM. While SacRCEM has typically been used for other recent levee improvement projects in the Sacramento Valley, both models have been applied to simulate the project-level air quality effects of The Rivers EIP. Given the similarity in the architecture of the two models, for ROG, NO_X, and CO_2, the outputs from the two models are very similar and any variance is considered not statistically significant. For PM, the URBEMIS outputs are considered more conservative (meaning the production values are higher) based on the model's internal methods and assumptions for treatment of earthwork. As the project proponent, WSAFCA has selected this more conservative approach to not under-predict potential project effects. URBEMIS further allows application of mitigation measures to fine-tune and predict quantitative effectiveness of available measures and assist in determining post-mitigation findings. For these reasons, WSAFCA has selected to use the results of URBEMIS for quantitative determination of effects, effect findings, and mitigation efficacy. The results of both models for The Rivers EIP are in Appendix F.

Construction-related emissions were estimated using URBEMIS 2007 model (Version 9.2.4), which uses EPA, CARB, and air district emissions factors to estimate emissions from construction activities. Construction emissions (tailpipe emissions and fugitive dust) were modeled using the conceptual construction schedule, phases, and equipment usage based on the most current available project design information.

4.5.3.2 Air Quality Determination of Effects

For this analysis, an effect pertaining to air quality was analyzed based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.). An effect was considered significant if it would:

- conflict with, or obstruct implementation of, the applicable air quality plan;
- violate any air quality standard or substantial contribution to existing or projected air quality violation;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment area under NAAQS and CAAQS;
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

The appropriate district-recommended emission thresholds as published in their respective CEQA guidance documents also apply to individual projects under their jurisdiction. An air quality effect is considered to be significant if the project's construction emissions would exceed the General Conformity thresholds. For construction and operational activities that would occur in Yolo County, an air quality effect is considered to be significant if the air pollutant emissions would exceed YSAQMD's thresholds of significance as shown in Table 4.5-2.

For portions of the construction activities that would occur in Sacramento County (i.e., haul trucks and commute vehicles traveling on public roads in the County), an air quality effect is considered to be significant if the air pollutant emissions would exceed SMAQMD's thresholds of significance as shown in Table 4.5-3.

4.5.4 Air Quality Effects and Mitigation Measures

4.5.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. Current levee operations and maintenance activities would continue, but there would be no construction-related emissions from project implementation or maintenance.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento River North Levee could fail due to under-seepage, slope stability, or geometry issues would continue. Failure of the Sacramento River North Levee, depending on the magnitude of the event, could cause catastrophic flooding of the entire city. If a catastrophic flood were to occur, emergency flood fighting and clean-up actions would require the use of a considerable amount of heavy construction equipment. Timing and duration of use would directly correlate with flood fighting needs, but it is likely that pollutants emitted would violate air quality standards for pollutants (including those for which the area is already considered non-attainment), increase GHG emissions, and expose sensitive receptors to toxic air emissions. Depending on the magnitude of the flood, flood fighting could last for weeks or even months. Furthermore, because of the unpredictable nature of an emergency response, no BMPs to manage emissions would be in place. All of these effects could be considered significant. However, the timing, duration, and magnitude of a flood event are speculative and unpredictable, and therefore a precise determination of significance is not possible. A discussion of the potential exposure to ruptured gas lines and utilities is provided in Section 4.16, Public Health and Environmental Hazards.

4.5.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in effects as a result of construction phases and schedule, which are summarized in Table 4.5-6.

As described in Chapter 2, Alternatives, construction of the proposed project is anticipated to take place in 2011 and would be completed during the typical construction season. For the air quality impact analysis, it is assumed that the construction work for each section would occur progressively by phases. For each construction phase, construction equipment uses at the site, exported spoils, and imported materials are provided by the project engineers and summarized in Table 4.5-6. Detailed operation hours and horsepower ratings of construction equipment used for each construction phase, and URBEMIS model results are included in the Appendix F.

Based on the construction activities described above, construction-related emissions were estimated using the URBEMIS 2007 model. It is anticipated that on-site equipment operations would generate the highest daily diesel exhaust and site earthmoving activities would result in the highest daily fugitive dust generation. The estimated construction emissions are shown in Table 4.5-7. To comply with YSAQMD, SMAQMD, and General Conformity thresholds, annual emissions are estimated for ROG, NO_X, CO, PM10, and PM2.5 and the maximum daily emission is estimated for NO_X and PM10. Detailed construction emissions for each construction phase are summarized in the Appendix F.

As described in Chapter 2, Alternatives, in order to complete the project before the flood season, the contractors would be allowed to construct on a 24/7 work schedule. Depending on the daily construction activities, the 24/7 work schedule could result in higher daily NO_X and PM10 emissions than the estimated emissions shown in Table 4.5-7, which are based on the standard construction schedule (10 hours per day and 5 days per week). The annual emissions for ROG, NO_X, CO, PM10, and PM2.5 would be the same for both the standard schedule and the 24/7 schedule because the project would be completed in 2011 under either schedule.

Table 4.5-6. Construction Phases, Activities, Schedule, and Equipment: The Rivers APA

Phase	Duration (days)	Area (acres)	Excavated Spoils (cy)	Import Material (cy)	Construction Equipment
Flood Control Alternative					
Road demolition	2	0.6	1,000	–	6 dump trucks, 1 loader, 2 bulldozers, 1 excavator
Clearing and grubbing	6	6.9	11,200	–	18 dump trucks, 2 bulldozers, 1 excavator
Levee degrade	27	6	58,100	–	18 dump trucks, 1 bulldozer, 1 excavator
Slope flattening	7	6.9	–	11,200	14 dump trucks, 2 bulldozers, 2 excavators, 1 compactor, 1 maintainer, 1 water truck
Slurry wall construction	21	–	12,333	500	1 dump truck, 9 delivery trucks, 1 loader, 2 bulldozers, 1 long reach track hoe, 1 rough terrain forklift
DSM wall construction	44	–	–	1,000	9 delivery trucks, 1 loader, 1 crane with augers, 1 rough terrain forklift
Fill placement	31	6.9	–	92,000	22 dump trucks, 4 bulldozers, 1 excavator, 2 compactors, 1 maintainer, 1 water truck
Road construction	2	0.6	–	1,000	8 dump trucks, 1 skip loader, 1 blade, 1 sheepsfoot compactor, 1 pneumatic compactor, 1 roller compactor, 1 distributor, 1 asphalt paver, 1 water truck
Recreation Alternative					
Clear and pruning	5	1.2	–	–	1 scraper, 1 wheel loader, 1 motor grader, 1 dump truck, 1 steel wheel loader, 1 water truck

Phase	Duration (days)	Area (acres)	Excavated Spoils (cy)	Import Material (cy)	Construction Equipment
Grading	8	2.4	–	–	1 scraper, 1 wheel loader, 1 motor grader, 1 dump truck, 1 steel wheel loader, 1 water truck
Install pathways and signs	12	1.6	–	2,300	1 dump truck, 1 asphalt paver, 1 asphalt sealer, 1 striping truck, 1 small front loader, 1 skid steer loader, 1 small roller
cy = cubic yards					

Table 4.5-7. Estimated Construction Emissions: The Rivers APA

Construction Emissions	ROG (tons/year)	NO_X (lbs/day)	NO_X (tons/year)	CO (tons/year)	PM10 (lbs/day)	PM10 (tons/year)	PM2.5 (tons/year)	CO2 (tons/year)
Project Construction without Mitigations								
Project-wide								
Maximum daily emissions	–	494	–	–	372	–	–	–
Total annual Emissions	1.6	–	15.4	5.7	–	12.4	3.0	1,786
Within YSAQMD								
Maximum daily emissions	–	448	–	–	370	–	–	–
Total annual Emissions	1.5	–	14	5	–	12.3	3	1,589
Within SMAQMD								
Maximum daily emissions	–	47	–	–	2	–	–	–
Total annual Emissions	0.1	–	1.4	0.7	–	0.1	0.1	197
Project Construction with Mitigations								
Project-wide								
Maximum daily emissions	–	325	–	–	46	–	–	–
Total annual emissions	1.6	–	10.1	5.7	–	2.2	0.6	1,786
Within YSAQMD								
Maximum daily emissions	–	278	–	–	44	–	–	–
Total annual Emissions	1.5	–	8.7	5	–	2.1	0.6	1,589
Within SMAQMD								
Maximum daily emissions	–	47	–	–	2	–	–	–
Total annual Emissions	0.1	–	1.4	0.7	–	0.1	0.1	197
Construction Thresholds								
Federal General Conformity (Project-wide emissions)	25	–	25	–	–	100	100	–
YSAQMD (Emissions in YSAQMD)	10		10	–	80		–	–
SMAQMD (Emissions in SMAQMD)	–	85	–	–	–	–	–	–

Construction and operation of The Rivers APA would result in the following effects. A description of these effects follows the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
AQ-1: Causes Conflicts with or Obstruction of an Applicable Air Quality Plan	Less than significant	N/A	N/A
AQ-2: Construction Emissions to Exceed Applicable Thresholds	Significant	Less than significant to significant and unavoidable	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-2: Implement Fugitive Dust Control Plan If Unmitigated Emissions Exceed PM10 and PM2.5 Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents AQ-MM-4: Pay Required Fees to SMAQMD to Offset NO_X Emissions
AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10	Less than significant	N/A	N/A
AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds
AQ-5: Exposure to Objectionable Odors from Diesel Exhaust	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents

Effect AQ-1: Causes Conflict with or Obstruction of an Applicable Air Quality Plan

A project is deemed inconsistent with an air quality plan if it would result in population or employment growth that exceeds the growth estimates in the applicable air quality plan—thus generating emissions not accounted for in the applicable air quality plan emissions budget. Consequently, proposed projects need to be evaluated to determine whether they would generate population and employment growth and, if so, whether that growth would exceed the growth rate included in the relevant air quality plan.

As described in Chapter 5, Growth-Inducing and Cumulative Effects, the implementation of the project, combined with implementation of future levee improvement projects, might remove an obstacle for undeveloped lands in West Sacramento and make development easier or more attractive for these lands, which might result in population growth in these areas in the long term. The City is currently in the process of updating its 1994 General Plan. It is expected that the new

General Plan will include the land use changes in these areas. Additionally, the 2035 Metropolitan Transportation Plan (Sacramento Area Council of Government 2008) has included the population projection of 278,786 people for Yolo County and 87,402 people for West Sacramento, which has accounted for the land development and population growth of these areas through 2035. The air quality conformity analysis as part of the 2035 Metropolitan Transportation Plan meets the emission conformity test for the Sacramento ozone non-attainment area. Therefore, the project would not conflict with or obstruct the implementation of air quality plans. This effect would be less than significant. No mitigation is required.

Effect-AQ-2: Construction Emissions to Exceed Applicable Thresholds

Without mitigation, construction-related emissions under The Rivers APA would exceed YSAQMD's emission thresholds for NO_X and PM10 and would result in a significant effect. Mitigation measures for this effect are AQ-MM-1 through AQ-MM-4, described below.

Table 4.5-7 shows the mitigated NO_X and PM10 emissions with these mitigation measures. After mitigation, the NO_X and PM10 emissions would be less than YSAQMD's significance thresholds.

The 24/7 work schedule could result in higher daily NO_X and PM10 emissions than the standard schedule, depending on the daily construction activities. The implementation of AQ-MM-2, which includes all applicable and feasible fugitive dust control measures required by YSAQMD, will reduce PM10 emissions below the YSAQMD's significance threshold. The implementation of AQ-MM-4, which includes the NO_X mitigation fee required by the SMAQMD, would reduce NO_X emissions below the SMAQMD's significance threshold.

It is possible the CHP Academy EIP could be constructed simultaneously with The Rivers EIP. Depending on whether APA or Alternative B for each project is constructed at the same time, it is possible the combined emissions from the simultaneous projects could exceed the annual average YSCAQMD threshold for NOx, annual General Conformity threshold for NOx, and/or the maximum-daily SMAQMD threshold for NO_X. In either case, Mitigation Measure AQ-MM-1 would be implemented. SMAQMD's requirement for NO_X offset purchases would reduce the impact in Sacramento County to less than significant. However, YSAQMD does not require purchase of offsets, so after implementation of the mitigation measure the impact of simultaneous projects could still be significant and unavoidable in Yolo County. Nevertheless, the construction contractor should implement all feasible, cost-effective mitigation measures to prevent exceedance of YSAQMD thresholds.

Mitigation Measures

Mitigation Measure AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds

Unmitigated NO_X and ROG emissions from construction equipment tailpipes could potentially exceed the YSAQMD CEQA thresholds. Therefore, WSAFCA will require the construction contractor to implement feasible and reasonable measures to reduce public nuisance and tailpipe emissions from diesel-powered construction equipment. This requirement will be incorporated into the construction contracts.

Depending on the exceedance amounts of NO_X and ROG emissions, the WSAFCA will require the construction contractor to implement either or both of the following mitigation options.

Mitigation Measure AQ-MM-1a

According to the YSAQMD guidelines (Yolo-Solano Air Quality Management District 2007), the project lead agency is encouraged to explore and incorporate mitigation measures as technology advances and less emissive products become available at lower costs.

The measures recommended by the YSAQMD are listed below.

- Reduce use, trips, and unnecessary idling of heavy equipment. Shut down idling equipment that is not used for more than 5 consecutive minutes as required by California law.
- Maintain all construction equipment in proper tune according to manufacturer's specifications.
- Use a modern equipment fleet meeting CARB's 1996 or newer certification standard for off-road heavy-duty diesel engines.
- Install emission control devices on older equipment to reduce CO, ROG, and NO_X emissions to levels equivalent to CARB's 1996 or newer certification standard.
- Locate stationary diesel-powered equipment and haul truck staging areas as far as practicable from sensitive receptors.
- Use existing power sources (e.g., power lines) or clean fuel generators rather than conventional diesel generators, when feasible
- Substitute gasoline-powered for diesel-powered equipment when feasible.
- Use reformulated and emulsified diesel fuels where feasible.
- Use alternatively fueled construction equipment on site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel.
- Use aqueous diesel fuel where feasible.
- Use CARB and/or EPA-verified particulate traps and other appropriate controls (i.e., diesel oxidation catalyst or diesel particular filters) where feasible to reduce emissions of NO_X, DPM, and other pollutants at the construction site.

Mitigation Measure AQ-MM-1b

In addition to above measures, the construction contractor could provide a plan, for approval by WSAFCA, demonstrating that the heavy-duty off-road equipment to be used at the project sites, including owned, leased, and subcontractor equipment, will achieve a project-wide fleet-average reduction of 20% for NO_X and 45% for diesel particulate, compared to the most recent CARB fleet average at time of construction. A construction mitigation calculator may be downloaded from the SMAQMD web site to perform the fleet average evaluation (Sacramento Metropolitan Air Quality Management District 2009b).

Mitigation Measure AQ-MM-2: Implement Fugitive Dust Control Plan if Unmitigated Emissions Exceed PM10 and PM2.5 Thresholds

The construction contractor will implement all applicable and feasible fugitive dust control measures required by YSAQMD including those listed below. This requirement will be incorporated into the construction contract.

- Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person would respond and take corrective action within 48 hours. The phone number of YSAQMD also will be visible to ensure compliance with the YSAQMD Rule 2.5, Nuisance.
- Water active unpaved areas at all construction sites at least twice daily in dry conditions, with the frequency of watering based on the type of operation, soil, and wind exposure.
- Prohibit all grading activities and water all areas of disturbed soil under windy conditions (winds more than 20 miles per hour).
- Limit on-site vehicles to a speed that prevents visible dust emissions to extend beyond unpaved roads.
- Cover all trucks hauling dirt, sand, or loose materials.
- Cover active and inactive storage piles where appropriate.
- Cover or hydroseed unpaved areas that will remain inactive for extended periods.
- Apply soil stabilizers to active and inactive areas where appropriate.
- Install wheel washers at the entrance to construction sites for all exiting trucks.
- Sweep streets if visible soil material is carried out from the construction site.
- Install wind fencing and phase grading operations where appropriate.

Fugitive dust emissions from the construction of the project would be reduced to a less-than-significant level with the implementation of above mitigation. However, with the implementation of above mitigations, fugitive dust emissions from the simultaneous construction of CHP Academy EIP and The Rivers EIP still might exceed YSAQMD thresholds, depending on whether APA or Alternative B for each project is constructed. The construction contractor should implement all feasible, cost-effective mitigation measures to prevent exceedance of YSAQMD thresholds.

Mitigation Measure AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents

WSAFCA will provide advance written notification of the proposed construction activities to all residences and other air quality-sensitive uses within 500 feet of the construction site. Notification will include a brief overview of the proposed project and its purpose, as well as the proposed construction activities and schedule. It will also include the name and contact information of WSAFCA's project manager or a representative for ensuring that reasonable measures are implemented to address the problem.

Mitigation Measure AQ-MM-4: Pay Required Fees to SMAQMD to Offset NO_X Emissions

It is possible that on-road construction emissions, for vehicles traveling within the Sacramento County, could exceed the SMAQMD NO_X threshold. If on-road construction emissions exceed SMAQMD threshold levels, WSAFCA will be required to pay an offsite mitigation fee. Prior to the approval of project plans or the issuance of grading permits, the WSAFCA will submit proof that the offsite air quality mitigation fee of $16,000 per ton of NO_X has been paid to SMAQMD and that the construction air quality mitigation plan has been approved by SMAQMD and the lead agency. SMAQMD already has enacted a well-defined program to use NO_X offset fees received from applicants to fund regional NO_X emission reduction projects. Therefore, with the implementation of this mitigation, the air quality impact to SMAQMD would be reduced to a less-than-significant level.

Effect AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10

After The Rivers APA is constructed, the project facilities would be generally maintained as needed. Maintenance work would be less extensive and would take place over a few days per year. In addition, maintenance and operational activities are part of the existing environmental baseline and thus would not create a substantial source of new emissions. This effect would be less than significant.

Effect AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions

Construction of the proposed project would result in short-term diesel exhaust emissions from on-site heavy duty equipment. Particulate exhaust emissions from diesel-fueled engines (DPM) were identified as a TAC by CARB in 1998. Construction of alternatives would result in the generation of DPM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities.

The assessment of health risks associated with exposure to diesel exhaust typically is associated with chronic exposure, in which a 70-year exposure period is often assumed. However, while cancer can result from exposure periods of less than 70 years, acute exposure periods (i.e., exposure periods of 2 to 3 years) to diesel exhaust are not anticipated to result in an increased health risk, as health risks associated with exposure to diesel exhaust are typically seen in exposures periods that are chronic. Construction of the project is not expected to take place at the same construction site for more than 1 to 2 years and would be expected to use a limited number of pieces of heavy equipment at the same construction site. Furthermore, as required by CARB regulation, no in-use off-road diesel vehicles may idle for more than 5 consecutive minutes.

This effect would be less than significant. In addition, implementation of Mitigation Measure AQ-MM-1 would further reduce exhaust emissions during construction. No further mitigation is required.

Effect AQ-5: Exposure to Objectionable Odors from Diesel Exhaust

The proposed project would not result in any major sources of odor, and the project would not involve operation of any of the common types of facilities that are known to produce odors (e.g., landfill, wastewater treatment facility). In addition, odors associated with diesel exhaust from the use of on-site construction equipment would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance.

Furthermore, as required by CARB regulation, no in-use off-road diesel vehicles may idle for more than 5 consecutive minutes. Implementation of Mitigation Measures AQ-MM-1 and AQ-MM-3 would further reduce exhaust emissions during construction. This effect would be less than significant. No mitigation is required.

4.5.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result effects on air quality construction phases and schedule, as summarized in Table 4.5-8.

As described in Chapter 2, Alternatives, construction of the proposed project is anticipated to take place in 2011 and would be completed during the typical construction season (April 15 to November 1). Construction work would be conducted on the land side; no in-water and nearshore work is anticipated. For the air quality impact analysis, it is assumed that the construction work for each section would occur progressively by phases. For each construction phase, construction equipment uses at the site, exported spoils, and imported materials are provided by the project engineers and summarized in Table 4.5-8. Detailed operation hours and horsepower ratings of construction equipment used for each construction phase are included in Appendix F.

Table 4.5-8. Construction Phases, Activities, Schedule, and Equipment: The Rivers Alternative B

Phase	Duration (days)	Area (acres)	Excavated Spoils (cy)	Import Material (cy)	Construction Equipment
Flood Control Alternative					
Road demolition	2	0.6	1,000	–	6 dump trucks, 1 loader, 2 bulldozers, 1 excavator
Clearing and grubbing	6	6.9	11,200	–	18 dump trucks, 2 bulldozers, 1 excavator
Slope flattening	23	6.9	–	54,700	18 dump trucks, 2 bulldozers, 2 excavators, 1 compactor, 1 maintainer, 1 water truck
Sheet pile wall construction	18	–	–	200	1 long bed truck, 2 cranes, 1 impact hammer
Road construction	2	0.6	–	1,000	8 dump trucks, 1 skip loader, 1 blade, 1 sheepsfoot compactor, 1 pneumatic compactor, 1 roller compactor, 1 distributor, 1 asphalt paver, 1 water truck
Recreation Alternative					
Clear and pruning	5	1.2	–	–	1 scraper, 1 wheel loader, 1 motor grader, 1 dump truck, 1 steel wheel loader, 1 water truck
Grading	8	2.4	–	–	1 scraper, 1 wheel loader, 1 motor grader, 1 dump truck, 1 steel wheel loader, 1 water truck
Install pathways and signs	12	1.6	–	2,300	1 dump truck, 1 asphalt paver, 1 asphalt sealer, 1 striping truck, 1 small front loader, 1 skid steer loader, 1 small roller

cy = cubic yards

Based on the construction activities described above, construction-related emissions were estimated using the URBEMIS 2007 model. The estimated construction emissions are shown in Table 4.5-9. Detailed construction emissions for each construction phase are summarized in Appendix F.

Table 4.5-9. Estimated Construction Emissions: The Rivers Alternative B

Construction Emissions	ROG (tons/year)	NO_X (lbs/day)	NO_X (tons/year)	CO (tons/year)	PM10 (lbs/day)	PM10 (tons/year)	PM2.5 (tons/year)	CO2 (tons/year)
Project Construction without Mitigations								
Project-wide								
Maximum daily emissions	–	369	–	–	298	–	–	–
Total annual Emissions	0.6	–	6	2.3	–	5	1.2	702
Within YSAQMD								
Maximum daily emissions	–	332	–	–	296	–	–	–
Total annual Emissions	0.6	–	5.4	2	–	4.9	1.2	619
Within SMAQMD								
Maximum daily emissions	–	37	–	–	2	–	–	–
Total annual Emissions	0	–	0.6	0.3	–	0.1	0	84
Project Construction with Mitigations								
Project-wide								
Maximum daily emissions	–	369	–	–	298	–	–	–
Total annual emissions	0.6	–	6	2.3	–	5	1.2	702
Within YSAQMD								
Maximum daily emissions	–	332	–	–	296	–	–	–
Total annual Emissions	0.6	–	5.4	2	–	4.9	1.2	619
Within SMAQMD								
Maximum daily emissions	–	37	–	–	2	–	–	–
Total annual Emissions	0	–	0.6	0.3	–	0.1	0	84
Construction Thresholds								
Federal General Conformity (Project-wide emissions)	25	–	25	–	–	100	100	–
YSAQMD (Emissions in YSAQMD)	10		10	–	80		–	–
SMAQMD (Emissions in SMAQMD)	–	85	–	–	–	–	–	–

As described in Chapter 2, Alternatives, in order to complete the project before the flood season, the contractors would be allow to construct on a 24/7 work schedule. Depending on the daily construction activities, the 24/7 work schedule could result in higher daily NO_X and PM10 emissions than the estimated emissions shown in Table 4.5-9, which are based on the standard construction schedule (10 hours per day and 5 days per week). The annual emissions for ROG, NO_X, CO, PM10, and PM2.5 would be the same for both the standard schedule and the 24/7 schedule because the project would be completed in 2011 under either schedule.

Implementation of The Rivers Alternative B would result in the following effects on air quality. A description of these effects follows the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
AQ-1: Cause Conflicts with or Obstruction of an Applicable Air Quality Plan	Less than significant	N/A	N/A
AQ-2: Increase in Construction Emissions to Exceed Applicable Thresholds	Significant	Less than significant to significant and unavoidable	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-2: Implement Fugitive Dust Control Plan If Unmitigated Emissions Exceed PM10 Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents AQ-MM-4: Pay Required Fees to the SMAQMD to Offset NO_X Emissions
AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10	Less than significant	N/A	N/A
AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds
AQ-5: Exposure to Objectionable Odors from Diesel Exhaust	Less than significant	Less than significant	AQ-MM-1: Implement Measures to Reduce Exhaust Emissions of NO_X and ROG if Unmitigated Emissions Exceed NO_X and ROG Thresholds AQ-MM-3: Provide Advance Notification of Construction Schedule and 24-Hour Hotline to Residents

Effect AQ-1: Cause Conflicts with or Obstruction of an Applicable Air Quality Plan

This effect is the same as described above under The Rivers APA. The effect is considered less than significant. No mitigation is required.

Effect AQ-2: Increase in Construction Emissions to Exceed Applicable Thresholds

Without mitigation, construction-related emissions under the proposed project may exceed YSAQMD's emission threshold for PM10 and would result in a significant effect. Mitigation measures for this effect are are AQ-MM-1 through AQ-MM-4, described above under The Rivers APA. Table 4.5-9 shows the mitigated PM10 emissions with the above fugitive dust control measures. After mitigation, the controlled PM10 emissions would be less than YSAQMD's 80 pounds/day significance threshold.

The 24/7 work schedule could result in higher daily NO_X and PM10 emissions than the standard schedule, depending on the daily construction activities. The implementation of AQ-MM-2, which includes all applicable and feasible fugitive dust control measures required by YSAQMD, will reduce PM10 emissions below the YSAQMD's significance threshold. This effect would be less than significant. The implementation of AQ-MM-4, described above under The Rivers APA, which includes the NO_X mitigation fee required by the SMAQMD, would reduce NO_X emissions below the SMAQMD's significance threshold.

It is possible the CHP Academy EIP could be constructed simultaneously with The Rivers EIP. Depending on whether APA or Alternative B for each project is constructed at the same time, it is possible the combined emissions from the simultaneous projects could exceed the annual average YSCAQMD threshold for NO_X, annual General Conformity threshold for NOx, and/or the maximum-daily SMAQMD threshold for NO_X. In either case, Mitigation Measure AQ-MM-1 would be implemented. SMAQMD's requirement for NO_X offset purchases would reduce the impact in Sacramento County to less than significant. However, YSAQMD does not require purchase of offsets, so after implementation of the mitigation measure the impact of simultaneous projects could still be significant and unavoidable in Yolo County.

Effect AQ-3: Long-Term Operation and Maintenance Emissions of ROG, NO_X, and PM10

This effect is the same as described above under The Rivers APA. This effect is considered less than significant. No mitigation is required.

Effect AQ-4: Exposure of Sensitive Receptors to Toxic Air Emissions

This effect is the same as described above under The Rivers APA. This effect is considered less than significant. No mitigation is required, although AQ-MM-1 will further reduce effects.

Effect AQ-5: Exposure to Objectionable Odors from Diesel Exhaust

This effect is the same as described above under The Rivers APA. This effect is considered less than significant. No mitigation is required, although AQ-MM-1 and AQ-MM-3 will further reduce effects.

4.5.5 Climate Change Environmental Consequences

This section describes the environmental consequences relating to climate change for The Rivers EIP. It describes the methods used to determine the effects of the project and lists the thresholds used to conclude whether an effect would be significant.

4.5.5.1 Climate Change Assessment Methods

Almost all increased GHG emissions associated with the proposed project would be generated by construction-related activities. Therefore, the focus of the GHG analysis is to evaluate construction-related emissions. The principal source of GHG associated with would be temporary tailpipe emissions from construction equipment and haul trucks; the principal GHG produced would be CO_2. Neither YSAQMD nor SMAQMD has formally adopted a significant threshold for analyzing GHG or CO_2 emissions generated by a proposed project or a methodology for analyzing air quality effects related to global warming. However, CARB and South Coast Air Quality Management District (SCAQMD)have published draft thresholds for defining the significance of GHG emissions from construction projects and operational projects. Bay Area Air Quality Management District (BAAQMD) has also adopted CEQA thresholds of significance for operational-related GHG emissions and San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted the guidance for addressing operational-related GHG impacts under CEQA. Those thresholds and mitigation measures were utilized in the analysis of effects related to climate change.

To assist in the determination of effects, various quantitative models are available to predict emissions; URBEMIS and SacREM. Those two models were utilized for quantitative determination of effects, effect findings, and mitigation efficacy.

4.5.5.2 Climate Change Determination of Effects

For this analysis, an effect pertaining to air quality was analyzed based on professional practice, draft NEPA Guidance published by CEQ, and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.). An effect was considered significant if it would:

- generate GHG emission that may have a significant impact on the environment, or
- conflict with an applicable plan adopted for the purpose of reducing GHG emissions.

4.5.6 Climate Change Effects and Mitigation Measures

4.5.6.1 No Action Alternative

The No Action Alternative is the same as that described above in Section 4.5.4.1, Air Quality No Action Alternative.

4.5.6.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on climate change as outlined in the summary table provided. A description of these effects follows the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
CC-1: Increase in Greenhouse Gas Emissions during Construction	Less than significant	Less than significant	CC-MM-1: Implement Measures to Minimize Greenhouse Gas Emissions during Construction
CC-2: Causes Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of GHGs	Less than significant	N/A	N/A
CC-3: Changes in Flood Frequency and Floodwater Elevation Caused by Global Climate Change	Less than significant	N/A	N/A

Effect CC-1: Increase in Greenhouse Gas Emissions during Construction

Both SMAQMD and YSAQMD have not formally adopted GHG thresholds for projects such as The Rivers EIP. Therefore, a presumptive threshold of 7,000 metric tons per year (the lowest threshold of any formally adopted GHG threshold) is compared against the CO_2 emissions for The Rivers APA. As noted in Table 4.5-7, the CO_2 emissions project-wide without mitigation would be 1,786 metric tons per year. Within YSAQMD and SMAQMD, respectively, CO_2 emissions without mitigation would be 1,589 and 197 metric tons per year. These emissions are well below the presumptive threshold and the effects of GHG emissions during construction are considered less than significant. However, before YSAQMD and SMAQMD publish their significance thresholds for GHG emissions, the project lead agency is encouraged to implement Mitigation Measure CC-MM-1 to reduce GHG emissions.

It is possible that CHP Academy EIP and The Rivers EIP could be constructed concurrently. The CHP Academy EIP project-wide emissions without mitigation would be 1,290 metric tons per year, and The Rivers EIP would be 1,786 metric tons per year. These two totals combined would be 3,086 metric tons per year without mitigation. These combined project-wide emissions fall below the presumptive threshold of 7,000 metric tons per year and the combined effect would be considered less than significant.

Mitigation

Mitigation Measure CC-MM-1: Implement Measures to Minimize Greenhouse Gas Emissions during Construction

The following measures could be considered to lower GHG emissions during the construction. These mitigation measures combine the most stringent aspects of the currently proposed mitigation measures published by BAAQMD (2010) and SCAQMD (2008).

- Comply with all applicable future GHG regulations at the time of project-level permitting and construction.
- Use biodiesel fuel to fuel a substantial portion of the diesel-powered equipment and vehicles (e.g., 15% of the vehicles, as proposed by the BAAQMD). However, it is important to note that according to a recent EPA report (U.S. Environmental Protection Agency 2009b), some renewable fuels (e.g., ethanol and recycled vegetable oil biodiesel) could result in less GHG emissions than petroleum fuels, while some renewable fuels (e.g., soy-based biodiesel) might increase GHG emissions. Therefore, the construction contractors should be cautious with the use

of appropriate biodiesel fuels, and should avoid using soy-based biodiesel as an attempt to reduce GHG emissions.

- Encourage construction workers to carpool.
- Recycle at least 50% of construction waste and demolition debris.
- Purchase at least 10% of the building materials and imported soil from sources within 100 miles of the project site.
- Use electricity from utility power lines rather than fossil fuel, where appropriate.
- Purchase GHG offset for project-wide GHG emissions (direct emissions plus indirect emissions from on-road haul trucks plus commute vehicles) exceeding future state or Federal or local significance thresholds applicable at the time of construction. If no GHG significance thresholds have been formally adopted at the time of permitting, then a presumptive GHG threshold of 7,000 metric tons per year of CO_2-equivalent (amortized over the 50-year life of the levee program) should be used to define the offset requirement. The 7,000 metric ton/year presumptive threshold matches the lowest industrial project threshold that has been proposed by any air quality agency in California as of the date of this study. All purchased offsets must be verifiable under protocols set by the California Climate Action Registry, the Chicago Climate Exchange, or comparable auditing programs.

Effect CC-2: Causes Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases

The Rivers APA does not pose any apparent conflict with the goals of AB 32, the key elements and GHG reduction measures in the Climate Change Scoping Plan, or any other plans for reduction or mitigation of GHGs. To date, no federal, state, or local agency with jurisdiction over the proposed project has adopted plans or regulations that set specific goals for emission limits or emission reductions applicable to the proposed levee improvement project. As described in Effect CC-1, the average forecast emissions from the implementation of the proposed project were compared to conservatively low presumptive significance thresholds that were derived from the draft GHG guidelines published by several local air quality agencies. The forecast emission rates are well below the presumptive significant threshold. Therefore, the proposed project would not conflict with or obstruct the implementation of greenhouse gas emission reduction plans. This effect is less than significant.

Effect CC-3: Changes in Flood Frequency and Floodwater Elevation Caused by Global Climate Change

Global climate change could affect the hydrology of the Sacramento River, including the frequency of future flood events and the intensity of future flood events. As described under Projections of Future Mean Sea Level Change in Appendix C, Environmental Setting and Study Results for the West Sacramento Levee System, the entire West Sacramento levee system (including the Sacramento River in the area of the Rivers project) is relatively insensitive to the projected changes in sea level rise. This effect is less than significant.

4.5.6.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on climate change. A description of these effects follows the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
CC-1: Increase in Greenhouse Gas Emissions during Construction	Less than significant	Less than significant	CC-MM-1: Implement Measures to Minimize Greenhouse Gas Emissions during Construction
CC-2: Causes Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of GHGs	Less than significant	N/A	N/A
CC-3: Changes in Flood Frequency and Floodwater Elevation Caused by Global Climate Change	Less than significant	N/A	N/A

Effect CC-1: Increase in Greenhouse Gas Emissions during Construction

Both SMAQMD and YSAQMD have not formally adopted GHG thresholds for projects such as The Rivers EIP. Therefore, a presumptive threshold of 7,000 metric tons (the lowest threshold of any formally adopted GHG threshold) is compared against the CO_2 emissions for The Rivers APA. As noted in Table 4.5-9, the CO_2 emissions project-wide without mitigation would be 702 metric tons per year. Within YSAQMD and SMAQMD, respectively, CO_2 emissions without mitigation would be 619 and 84 metric tons per year. These emissions are well below the presumptive threshold and the effects of GHG emissions during construction are considered less than significant. However, before YSAQMD and SMAQMD publish their significance thresholds for GHG emissions, the project lead agency is encouraged to implement Mitigation Measure CC-MM-1 to reduce GHG emissions.

Effect CC-2: Causes Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases

This effect is the same as described above under The Rivers APA. This effect is considered less than significant. No mitigation is required.

Effect CC-3: Changes in Flood Frequency and Floodwater Elevation Caused by Global Climate Change

This effect is the same as described above under The Rivers APA. This effect is considered less than significant. No mitigation is required.

Section 4.6
Noise—
The Rivers Early Implementation Project

4.6.1 Introduction

This section describes the affected environment for noise, including the regulatory setting associated with noise, the effects on noise that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- *City of Sacramento General Plan* Noise Element (City of Sacramento 1988)
- City of Sacramento noise ordinance (City of Sacramento 1977)
- *City of West Sacramento General Plan* Noise Element (City of West Sacramento 2004)
- City of West Sacramento noise ordinance (City of West Sacramento 1994)
- *Yolo County General Plan* Noise Element (County of Yolo 1983)
- Roadway Construction Noise Model User's Guide (Federal Highway Administration 2006)
- Noise control for buildings, manufacturing plants, equipment, and products (Hoover & Keith 2008)

4.6.2 Affected Environment

This section describes the affected environment for noise in The Rivers EIP project area, including the regulatory and environmental settings.

4.6.2.1 Fundamentals of Noise and Vibration

4.6.2.1.1 Noise

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary enormously within the range of human hearing, the logarithmic decibel scale is used to keep sound intensity numbers at a convenient and manageable level.

The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called A-weighting. Since humans are less sensitive to low frequency sound than to high frequency sound, A-weighted decibel (dBA) levels de-emphasize low frequency sound energy to better represent how humans hear. Table 4.6-1 summarizes typical A-weighted sound levels.

Table 4.6-1. Typical A-weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: California Department of Transportation 1998

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (L_{xx}), the day-night sound level (L_{dn}), and the community noise equivalent level (CNEL). Below are brief definitions of these measurements and other terminology used in this section:

- **Sound.** A vibratory disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Ambient noise.** The composite of noise from all sources near and far in a given environment exclusive of particular noise sources to be measured.

- **Decibel (dB).** A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
- **A-weighted decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent sound level (L_{eq}).** The average of sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period.
- **Exceedance sound level (L_{xx}).** The sound level exceeded XX percent of the time during a sound level measurement period. For example, L_{90} is the sound level exceeded 90 percent of the time, and L_{10} is the sound level exceeded 10 percent of the time. L_{90} is typically considered to represent the ambient noise level.
- **Maximum and minimum sound levels (L_{max} and L_{min}).** The maximum or minimum sound level measured during a measurement period.
- **Day-night level (L_{dn}).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
- **Community noise equivalent level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

L_{dn} and CNEL values rarely differ by more than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment. In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving sound level.

For a point source such as a stationary compressor, sound attenuates based on geometry at rate of 6 dB per doubling of distance. For a line source such as free- flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance. Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travel over a hard surface such as pavement. The increased attenuation is typically in the range of 1 to 2 dB per doubling of distance. Barriers such as buildings and topography that block the line of site between a source and receiver also increase the attenuation of sound over distance.

Auditory and non-auditory effects can result from excessive or chronic exposure to elevated noise levels. Auditory effects of noise on people can include temporary or permanent hearing loss. Non-auditory effects of exposure to elevated noise levels include sleep disturbance, speech interference, and psychological effects, such as annoyance. Land use compatibility standards for noise are typically based on research related to these non-auditory effects.

4.6.2.1.2 Vibration

Operation of heavy construction equipment, particularly pile driving and other impulsive devices such as pavement breakers, create seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Vibration from operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance will result in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes will decrease with increasing distance.

As seismic waves travel outward from a vibration source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second [in/sec]) at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the peak particle velocity (ppv). Table 4.6-2 summarizes typical vibration levels generated by construction equipment (Federal Transit Administration 2006).

Table 4.6-2. Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 feet
Pile driver (impact)	0.644 to 1.518
Pile drive (sonic)	0.170 to 0.734
Vibratory roller	0.210
Hoe ram	0.089
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003

Source: Federal Transit Administration 2006

Vibration amplitude attenuates over distance and is a complex function of how energy is imparted into the ground and the soil conditions through which the vibration is traveling. The following equation can be used to estimate the vibration level at a given distance for typical soil conditions. PPV_{ref} is the reference ppv at 25 feet from Table 4.6-2:

$$PPV = PPV_{ref}\left(\frac{25}{distance}\right)^{1.5}$$

Table 4.6-3 summarizes typical human response to steady state vibration such as that produced by typical non-impact construction activity.

Table 4.6-3. Human Response to Steady State Vibration

PPV	Human Response
3.6 (at 2 Hz) – 0.4 (at 20 Hz)	Very disturbing
0.7 (at 2 Hz) – 0.17 (at 20 Hz)	Disturbing
0.10	Strongly perceptible
0.035	Distinctly perceptible
0.012	Slightly perceptible

Source: California Department of Transportation 2004.

Table 4.6-4 summarizes typical human response to transient vibration that is usually associated with transitory impact construction sources such as pile driving activity.

Table 4.6-4. Human Response to Transient Vibration

PPV	Human Response
2.0	Severe
0.9	Strongly perceptible
0.24	Distinctly perceptible
0.035	Barely perceptible

Source: California Department of Transportation 2004.

4.6.2.2 Regulatory Setting

4.6.2.2.1 Federal

There are no Federal noise regulations applicable to the proposed project.

4.6.2.2.2 State

There are no state noise standards that would apply directly to the proposed project. The *General Plan Guidelines* published by the Governor's Office of Planning and Research (2003) include recommendations for maximum noise exposure based on type of land use. These recommendations are available for counties and cities to adopt as part of their state-mandated requirement in establishing policies and standards in their general plans regarding incompatibility issues between land uses as it relates to noise exposure.

There are no applicable Federal, state, or local quantitatively-defined regulations relating to vibration resulting from construction activities. Thresholds for annoyance and structural damage reported by Caltrans (2004) are used in this analysis. Tables 4.6-3 and 4.6-4 summarize human response/annoyance thresholds. Table 4.6-5 summarizes vibration damage thresholds.

Table 4.6-5. Maximum Vibration Levels for Preventing Damage to Structures

Type of Situation	Limiting Velocity (in/sec)
Historic sites or other critical locations	0.1
Residential buildings, plastered walls	0.2 to 0.3
Residential buildings in good repair with gypsum board walls	0.4 to 0.5
Engineered structures, without plaster	1.0 to 1.5

Source: California Department of Transportation 2004

4.6.2.2.3 Local

The following local policies related to noise may apply to the implementation of The Rivers EIP.

City of West Sacramento Noise Ordinance

The City noise ordinance is the primary enforcement tool for the operation of locally regulated noise sources, such as construction activity or outdoor recreation facilities, and is set forth in Chapter 17.32 of the City Code. The City noise ordinance sets noise level performance standards for non-transportation noise sources, which are summarized in Table 4.6-6. Examples of non-transportation noise sources include construction equipment, industrial operations, outdoor recreation facilities, HVAC units, and loading docks. The City of West Sacramento's noise ordinance does not specify an exemption for temporary daytime construction activity, so all construction associated with the proposed project must comply with the daytime and nighttime noise limits listed in Table 4.6-6. City performance standards for transportation noise are summarized in Table 4.6-7.

Table 4.6-6. City of West Sacramento Non-Transportation Noise Level Standards

		Exterior Noise Levels		Interior Noise Levels	
Land Use	Noise Level Descriptor	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Residential	Hourly L_{eq}, dBA	50	45	45	35
	Max. Level, dBA	70	65	–	–
Transient Lodging	Hourly L_{eq}, dBA	–	–	45	35
Hospital, nursing homes	Hourly L_{eq}, dBA	–	–	45	35
Theatres, auditoriums, music halls	Hourly L_{eq}, dBA	–	–	35	35
Churches, meeting halls	Hourly L_{eq}, dBA	–	–	40	40
Office buildings	Hourly L_{eq}, dBA	–	–	45	45
Schools, libraries, museum	Hourly L_{eq}, dBA	–	–	45	45

Source: City of West Sacramento 1994

Note: Each of the noise levels specified above will be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercials uses (e.g., caretaker dwellings)

Table 4.6-7. City of West Sacramento Maximum Allowable Noise Exposure—Transportation Noise Sources

		Interior Spaces	
Land Use	Outdoor Activity Areas[1] L_{dn}/CNEL, dB	L_{dn}/CNEL, dB	L_{eq}, dB[2]
Residential	60[3]	45	–
Transient Lodging	60[3]	45	–
Hospitals, nursing homes	60[3]	45	–
Theatres, auditoriums, music halls	–	–	35
Churches, meeting halls	60[3]	–	40
Office buildings	–	–	45
Schools, libraries, museum	–	–	45
Playgrounds, neighborhood parks	70	–	–

Note:

[1] Where the location of outdoor activity is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.

[2] As determined for a typical worst-case hour during period of use.

[3] Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn/CNEL may be allowed, provided that practical exterior noise level reduction measures have been implemented and that interior noise levels are in compliance with this table. An exterior noise level of 70 dB Ldn/CNEL shall be allowed in the triangle specific plan area and the Washington specific plan area.

In addition, the City code stipulates that no operation shall be installed which by its construction or nature habitually or consistently produces noticeable vibration beyond the property line. As is discussed above, vibration from non-impact construction equipment (which typically produces steady state vibration) is not anticipated to result in a significant effect. As indicated in Table 4.6-4, human response to transient vibration sources (such as impact pile driving) typically becomes "distinctly perceptible" at or above 0.24 in/sec ppv (California Department of Transportation 2004).

West Sacramento General Plan

The primary purpose of the Noise Element of the *West Sacramento General Plan* is to protect city residents from the harmful effects of excessive noise (City of West Sacramento 1990). To this end, the Noise Element serves to set acceptable limits for the land use compatibility of new developments or land uses as it relates to noise exposure. The Noise Element sets the following policies for new development and planning purposes that may relate to the proposed project.

Policies

Policy 2: Where proposed non-residential land uses are likely to produce noise levels exceeding the performance standards if Table II-4 at existing or planned uses shown in Table II-4, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design. Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table II-4 as measured immediately within the property line of land uses designated in Table II-4.

Policy 4: New development of land uses contained in Table II-6 will not be permitted in areas exposes to existing or projected levels of noise from transportation noise sources which exceed the levels specified in Table II-6. Where the land uses contained in Table II-6 are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels specified in Table II-6, an acoustical analysis shall be required and appropriate mitigation shall be included in the project design.

Policy 7: Where noise mitigation measures are required to achieve the standards of Tables II-4 and II-6, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered a means of achieving the noise standards only after all other practical design-related noise mitigation measures have been integrated into the project.

In addition to the policies set forth in the *West Sacramento General Plan*, the *City of West Sacramento General Plan Background Document* states that "Sporting events such as softball games are conducted at city parks, with some games played at night. Public reaction to the noise produced by such activities may range from supportive to antagonistic, depending upon individual perceptions. In any case, late-night games with their attendant crowd noise and traffic can be annoying to nearby residents. To guard against adverse public reaction to nighttime sporting events at city parks, activities and use of public address systems should be limited to 10:00 p.m. or 11:00 p.m., depending upon neighborhood reactions. New facilities for sporting events should be designed to control crowd and public address system impacts."

Yolo County

To date, Yolo County has not adopted a noise ordinance that sets numerical or qualitative limits on the construction noise that would be generated by the proposed project. The *Yolo County General*

Plan sets forth policies relating to noise, including a policy that Yolo County will adopt a comprehensive noise ordinance. Yolo County is currently in the process of a general plan update.

City of Sacramento Noise Ordinance

The City of Sacramento's noise ordinance limits described below have been used in this EIR as a noise impact criterion for homes inside the city.

The City of Sacramento noise ordinance is the primary enforcement tool for the operation of locally regulated noise sources, such as construction activity, and is set forth in Chapter 8.68 of the City Code. The noise ordinance sets exterior noise level standards for noise sources that affect residential or agricultural property. These exterior noise level performance standards are summarized in Table 4.6-8. Noise associated with the erection (including excavation), demolition, alteration, or repair of any structure occurring between 7:00 a.m. and 6:00 p.m., Monday through Saturday, and between 9:00 a.m. and 6:00 p.m. on Sunday is exempted from the provisions of the City noise ordinance.

Table 4.6-8. City of Sacramento Exterior Noise Level Standards

Cumulative Duration of the Intrusive Sound in Any One Hour	Daytime[1] (7:00 a.m. to 10:00 p.m.)	Nighttime[1] (10:00 p.m. to 7:00 a.m.)
30 Minutes	55	50
15 Minutes	60	55
5 Minutes	65	60
1 Minute	70	65
Level not to be exceeded	75	70
Resultant 1-hour L_{eq}	59	54

Source: City of Sacramento 1977

Notes:

Each of the noise limits specified shall be reduced by five dBA for impulsive or simple tone noise, or for noises consisting of speech or music;

If the ambient noise level exceeds that permitted by any of the first four noise level categories, the allowable noise limit shall be increased in five dB increments in each category to encompass the ambient noise level. If the ambient noise level exceeds the fifth noise level category, the maximum ambient noise level shall be the noise limit for that category.

City of Sacramento General Plan

The Noise Element of the *City of Sacramento General Plan* establishes interior and exterior noise level standards for planning purposes to ensure land use compatibility for new zoned developments as it relates to noise exposure. The City of Sacramento is currently in the process of a general plan update. The Noise Element sets noise level standards for new development and planning purposes, which do not pertain directly to the proposed project.

4.6.2.3 Environmental Setting

This section presents additional setting information specifically related to noise for The Rivers EIP.

Noise-sensitive land uses in the project area are primarily residential uses and schools. The following project-specific noise-sensitive receivers were used for this analysis:

- Waterfront homes across in river in the City of Sacramento, roughly 900 to 1,000 feet from the top of the levee.
- The Rivers housing development (in the City of West Sacramento) consisting of and single-family residences located west of the intersection of Riverbank Road and Todhunter Avenue. The closest dwellings are roughly 200 feet from the western terminus of the levee reach.
- Bryte Elementary School and Riverbank Elementary School (in the City of West Sacramento), with the closest classrooms roughly 450 feet from the levee reach. The City of West Sacramento noise ordinance sets a limit on indoor noise levels at schools caused by non-transportation noise sources, so the indoor classrooms were included as noise sensitive receivers. However, outdoor parks and recreation areas are not included as protected areas under the City of West Sacramento noise ordinance, and the ordinance does not list an allowable exterior noise level for schools. Therefore, the outdoor recreational facilities at the schools were not considered noise sensitive receivers for this analysis.
- Single-family homes on the south side of Riverbank Road and Fountain Drive (in the City of West Sacramento), roughly 150 feet from the top of the levee.
- Single-family homes on the north side of Rivercrest Drive (in the City of West Sacramento), roughly 50 feet from the centerline of the levee crest.

Bryte Park includes outdoor baseball fields, a soccer fields, and swimming pools within 200 feet of the levee reach. However, outdoor parks and recreation areas are not included as protected areas under the City of West Sacramento noise ordinance. Therefore, the outdoor recreational facilities at Bryte Park were not considered noise sensitive receivers for this analysis.

Primary noise sources in the project vicinity include vehicular traffic on local roadways and I-80. Secondary noise sources include boating traffic on the Sacramento River, schoolyard activities at Riverbank Elementary/Bryte Elementary, and airplane flyovers (to and from regional airports and facilities).

4.6.2.3.1 Ambient Noise Survey

An ambient noise survey was conducted by ICF Jones & Stokes on Thursday, February 5, 2009, to characterize the existing ambient noise environment in the project area. Short-term attended measurements were made at two locations using a Larson Davis 812 Type I integrating sound level meter (SLM). The SLM was calibrated before and after ambient measurements using a Larson Davis CAL200. The microphone of the meter was situated at a height of 5 feet above the ground during both measurements, which were conducted for a continuous duration of at least 10 minutes. The SLM was set to “slow” time response and A-weighting (dBA). Meteorological conditions were mild during short-term noise measurements, with measured temperatures between 60 and 63° F and measured wind speeds from 1 to 4 miles per hour. Accordingly, meteorological conditions were suitable for noise measurements (i.e., there were no conditions such as high wind that would distort the measurement data).

The first short-term measurement (ST1) was located adjacent to the northern Bryte Elementary/Riverbank Elementary School parking lot on the east end of Riverbank Road. Noise sources included schoolyard activity, distant highway traffic and a small plane flyover. The second short-term measurement (ST2) was located at the intersection of Riverbank Road and Todhunter Avenue. Noise sources included local vehicular traffic, distant highway traffic and birds. The results of the ambient noise survey are summarized in Table 4.6-9.

Table 4.6-9. Ambient Noise Survey Results, The Rivers EIP Project Area

Location	Start Time	L_{eq}	L_{max}
ST1 (Riverbank Elementary School)	1:41 p.m.	51	66
ST2 (Todhunter Avenue)	2:04 p.m.	54	70
Note: All noise levels reported in terms of dBA. February 2009			

4.6.3 Environmental Consequences

This section describes the environmental consequences relating to noise for The Rivers EIP. It describes the methods used to determine the effects of the project and lists the thresholds used to conclude whether an effect would be significant.

4.6.3.1 Assessment Methods

This analysis focuses on the potential construction-related and operational noise effects associated with The Rivers EIP. Methods recommended by the Federal Transit Administration (2006) have been used to assess construction noise. Potential noise effects associated with construction activities have been evaluated by assuming the simultaneous operation of multiple pieces of heavy equipment as a reasonable upper bound for noise effects.

4.6.3.2 Determination of Effects

The environmental checklist in the State CEQA Guidelines Appendix G (14 CCR 15000 et seq.) provides guidance to be used in determining the significance of noise effects. A noise effect is normally considered significant if it would:

- expose persons to or generate noise levels in excess of applicable standards;
- result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- expose persons to vibration or generation of excessive groundborne noise levels;
- expose people residing or working in the area to excessive noise levels, for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport; or
- expose people residing or working in the project area to excessive noise levels, for a project within the vicinity of a private airstrip.

For the purposes of this analysis, a noise or vibration effect is considered to be significant if:

- construction noise levels exceed allowable numerical limits specified by the City of West Sacramento or the City of Sacramento, for receivers in those jurisdictions.
- construction noise levels at receivers located where there are no numerical noise limits (i.e., other than the cities of West Sacramento or Sacramento) exceed 70 dBA L_{eq} during the day, or 60 dBA L_{eq} at night. Those noise criteria were established for this analysis based on recommended values by the Federal Transit Administration 2006, adjusted downward by 10 dBA to account for the relatively quiet baseline conditions throughout the study area.
- construction vibration ppv would exceed 0.2 in/sec (potential damage at plaster-walled structures) or 0.24 in/sec (human response threshold for "distinctly perceptible" due to transient vibration sources) at any structure or occupied building. 0.2 in/sec will be the governing threshold for assessing the significance of vibration.

The noise-sensitive receivers considered for this analysis are in two separate cities, each of which has enacted its own noise ordinance. The daytime and nighttime noise ordinance limits for each city were applied as significance criteria for the noise sensitive in that city, even though all of the construction activity would be conducted within the City of West Sacramento. It is possible that construction activity for levee improvements might have to be conducted at night to respond to expedited schedule requirements. Therefore, the noise analyses described in this section assumes the project must comply with both the daytime and nighttime noise ordinance limits for the two local jurisdictions.

The Rivers EIP does not propose to introduce any new noise- sensitive uses where people would reside or work. Therefore, the effects of noise from public or private airports are not discussed further.

4.6.3.2.1 Effect Assumptions

The following assumptions regarding project effects on noise in The Rivers project area have been made for this analysis:

- The project does not propose to introduce any new noise-sensitive uses where people would live or work into the project area. There are no significant sources of groundborne vibration associated with operation of the project. Therefore, operation of the project would have no effect related to the exposure of persons to, or generation of excessive groundborne vibration or groundborne noise levels.
- Groundborne noise occurs when groundborne vibration causes the ground surface and structures to radiate audible acoustical energy. It is primarily an issue for underground rail systems and is not a concern for groundborne noise generated by construction or maintenance equipment because airborne noise from construction and maintenance equipment typically overshadows the groundborne noise generated by the equipment. Accordingly, groundborne noise is not considered further in this analysis.
- The maintenance of certain levee alternatives would involve intermittent vehicular trips to inspect the proper functioning of the alternative and/or light mechanical equipment operation to conduct vegetative weeding, irrigation, repair, or cleaning activities as needed. These intermittent vehicular trips and light maintenance activities, by their very nature and frequency, are considered less than significant.

- There are no significant sources of groundborne vibration associated with operation of the proposed project. Therefore, operation of the proposed project would have no effect related to the exposure of persons to, or generation of excessive groundborne vibration or groundborne noise levels and evaluation of this effect is not applicable, and is not discussed further.

4.6.4 Effects and Mitigation Measures

4.6.4.1 No Action Alternative

The No Action Alternative represents the continuation of the existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. Current levee operations and maintenance activities would continue, but there would be no noise or vibration associated with new construction or operational activities.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability or geometry issues would continue. Failure of the Sacramento Bypass Levee, depending on the magnitude of the event, could cause catastrophic flooding. Without improvements to the levee system, the risk of levee failure would remain high. Under these conditions, any of the levee deficiencies could cause portions of the levees to fail, triggering widespread flooding and extensive damage. If a catastrophic flood were to occur, emergency flood fighting and clean-up actions would require the use of a considerable amount of heavy construction equipment. Timing and duration of use would directly correlate with flood fighting needs, but could last for days, weeks, even months. Depending on the magnitude of the flood, people may or may not be present during flood fighting activities. If flooding occurred only in West Sacramento, nearby Sacramento residents could still be residing and working near a clean-up area, exposing them to excessive noise and vibration levels for extended periods of time.

Furthermore, because of the unpredictable nature of an emergency response, compliance with local noise ordinances and implementation of BMPs to manage noise levels would not be possible. All of these effects could be considered significant. However, the timing, duration and magnitude of a flood event are speculative and unpredictable, and therefore a precise determination of significance is not possible.

4.6.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following noise-related effects. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise	Less than significant	N/A	N/A
NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations	Less than significant	N/A	N/A

Effect	Finding	With Mitigation	Mitigation Measure
NZ-3: Exposure of Sensitive Receptors to Temporary Construction-Related Vibration	Significant	Less than significant	NZ-MM-1: Employ Measures to Prevent Exposure of Buildings and Structures to Excessive Groundborne Vibration

Effect NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise

The Rivers APA would construct cutoff walls using the standard slurry trench method along the western half of the reach and using deep soil mixing along the eastern half of the reach. The Rivers APA would also implement slope flattening. The staging area would be on the north side of the existing levee, so homes on the south side of the levee would be shielded from staging area noise. Construction equipment on top of the levee would be visible and audible from homes throughout the study area.

Table 4.6-10 lists the construction noise levels at each representative noise sensitive receiver during each of the major stages of The Rivers APA construction, for the condition when the construction activity is closest to the receiver. That table compares the construction noise levels to the daytime and nighttime noise ordinance limits that are used to define significance. Spatial trends in noise levels caused by each category of construction activity were used to derive the values in Table 4.6-10.

Table 4.6-10. Modeled Construction Noise Levels for The Rivers Applicant Preferred Alternative

Noise Sensitive Receiver	Closest Distance to Noise Source (feet)	Modeled Noise Level (dBA)		Daytime Noise Ordinance Limit (dBA)[1]		Nighttime Noise Ordinance Limit (dBA)[1]	
		L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}
Combined Slurry Cutoff Wall (Western Segment) and Staging/Mixing Area							
City of Sacramento Homes	1,100	52	48	75	59	70	54
Todhunter Ave. neighborhood	200	71	66	**70**	**50**	**65**	**45**
Riverbank Elementary School Classrooms (Indoor levels, see Note 2)	450	42	37	No Std.	45 (Indoors)	No Std.	45 (Indoors)
Fountain Drive Homes	150	75	70	**70**	**50**	**65**	**45**
Rivercrest Drive Homes	800	55	50	70	50	65	45
Combined Deep Soil Mixing (Eastern Segment) and Staging/Mixing Area							
City of Sacramento Homes	950	58	51	75	59	70	54
Todhunter Ave. neighborhood	2,400	47	41	70	50	65	45
Riverbank Elementary School Classrooms (Indoor levels)	900	39	32	No Std.	45 (Indoors)	No Std.	45 (Indoors)
Fountain Drive Homes	150	88	81	**70**	**50**	**65**	**45**
Rivercrest Drive Homes	50	92	85	**70**	**50**	**65**	**45**

Noise Sensitive Receiver	Closest Distance to Noise Source (feet)	Modeled Noise Level (dBA)		Daytime Noise Ordinance Limit (dBA)[1]		Nighttime Noise Ordinance Limit (dBA)[1]	
		L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}
Landside Levee Flattening							
City of Sacramento Homes	1,200	41	36	75	59	70	54
Todhunter Ave. neighborhood	150	76	71	**<u>70</u>**	**<u>50</u>**	**<u>65</u>**	**<u>45</u>**
Riverbank Elementary School Classrooms (Indoor levels)	400	43	38	No Std.	45 (Indoors)	No Std.	45 (Indoors)
Fountain Drive Homes	100	79	74	**<u>70</u>**	**<u>50</u>**	**<u>65</u>**	**<u>45</u>**
Rivercrest Drive Homes	100	79	74	**<u>70</u>**	**<u>50</u>**	**<u>65</u>**	**<u>45</u>**

[1] Bolded/underlined values indicate the noise ordinance limit is exceeded at the listed receiver

[2] Indoor noise levels were estimated assuming the classroom windows are closed, which provides an assumed 20 dBA reduction compared to exterior noise levels (Federal Highway Administration 1995)

Key conclusions based on the modeling results in Table 4.6-10 are as follows:

- Construction of The Rivers APA would not cause noise levels at the waterfront homes in the City of Sacramento to exceed that City's nighttime noise ordinance limit. Therefore, impacts across the river would be less than significant even if nighttime construction is required.
- Indoor noise levels at Riverbank Elementary School would not exceed noise ordinance limits during the loudest construction activity.
- Construction noise would exceed the nighttime noise ordinance limit at the homes west of Todhunter Avenue only for brief periods when slurry cutoff wall construction or slope flattening is done along the western half of the reach.
- Both the daytime and nighttime noise ordinance limits would be exceeded for extended periods while levee improvements are done along the eastern half of the levee reach, near the Fountain Drive homes and the Rivercrest Drive homes.

As described in Section 2.7.7 of Chapter 2, Alternatives (Noise-Reducing Construction Practices and Provide for Temporary Resident Relocation, respectively), the City has committed to implement best management practices (BMPs) to ensure that noise during construction does not cause significant effects at nearby homes. The contractor will obtain a temporary construction noise variance from the City, including all requirements for environmental review and public notification and comment. In this case, the contractor will implement aggressive noise reduction measures. The contractor will conduct community noise monitoring, and the City will provide assistance and compensation for residents to temporarily relocate if construction noise levels exceed noise ordinance limits. Based on these project-specific commitments, it is concluded that although construction noise would exceed noise ordinance limits, the effects of the high noise levels would be less than significant.

Similarly, construction-related haul trucks and commute vehicles traveling along public streets are not expected to cause 24-hour day-night (L_{dn}) noise levels exceeding the City's noise limits for transportation noise sources. The highest truck traffic volumes along residential streets would occur along the two-block segment of 5th Street (between A Street and C Street), where there are single-family and multi-family dwellings along the road. As described in Section 4.4, Transportation and Navigation, temporary construction activity could generate up to 296 haul truck trips per day and

72 worker commute trips per day. If the haul trucks and commute vehicles were used 24 hours per day, the project-related traffic noise level at the existing dwellings along 5th Street would be 61 dBA-L_{dn}. That project-related L_{dn} noise level is less than the 65 dBA-L_{dn} limit set by the City's noise ordinance. If haul trucks usage could be restricted to daytime hours, then the resulting L_{dn} noise levels would be lower. Therefore, this impact would be less than significant. No mitigation is required.

Effect NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations

There would be no additional ongoing flood control-related levee maintenance activities beyond what is currently undertaken to control vegetation. Recreation trail maintenance would include sweeping, pavement repair, removal of obstacles, and periodic asphalt overlays. These maintenance activities would not have a significant effect on noise or vibration. Levee patrol roads (where permanent bike/paths and trails would be installed) are currently used for biking and walking and noise levels as a result of the use of improved paths would likely be similar to existing conditions. Therefore, this effect would be considered less than significant. No mitigation is required.

Effect NZ-3: Exposure of Sensitive Receptors to Temporary Construction-Related Vibration

The operation of heavy equipment may generate groundborne vibration that could be perceptible at residences or other sensitive land uses close to construction activity. Based on vibration reference levels from Federal Transit Administration (2006), vibration from construction activity would attenuate to less than 0.1 in/sec ppv within about 50 feet under typical conditions. Because sensitive receptors in The Rivers residential community would potentially be located within this distance, this effect is considered to be potentially significant. Implementation of Mitigation Measure NZ-MM-1 would reduce this effect but it would still be significant and unavoidable.

Mitigation

Mitigation Measure NZ-MM-1: Employ Measures to Prevent Exposure of Buildings and Structures to Excessive Groundborne Vibration

WSAFCA or its contractor will, to the extent feasible, maintain a minimum distance of 50 feet between construction equipment and occupied or vibration-sensitive buildings or structures. For cases where this is not feasible, the resident or property owner will be notified in writing prior to construction activity, and where necessary, relocated to temporary housing for the duration of construction activity. WSAFCA will inspect the interior walls of those homes prior to construction to inventory existing cracks in paint and plaster and will retain a qualified acoustical consultant or engineering firm to conduct vibration monitoring at that building to measure the actual vibration levels during construction. Following completion of construction, WSAFCA will conduct a second inspection to inventory new damage to paint and plaster, if any, that occurred as a result of construction-induced vibration. If new damage is found, then WSAFCA will promptly arrange to have the damaged repaired, or will reimburse the property owner for appropriate repairs.

In addition, if construction activity is required within 100 feet of residences or other vibration-sensitive buildings, a designated complaint coordinator will be responsible for handling and responding to any complaints received during such periods of construction. A reporting program will be required that documents complaints received, actions taken, and the effectiveness of these actions in resolving disputes.

4.6.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following noise-related effects. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise	Less than significant	N/A	N/A
NZ-2 Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations	Less than significant	N/A	N/A
NZ-3: Exposure of Sensitive Receptors to Temporary Construction-Related Vibration	Significant	Less than significant	NZ-MM-1: Employ Measures to Prevent Exposure of Buildings and Structures to Excessive Groundborne Vibration
NZ-4: Exposure of Sensitive Receptors to Temporary Vibration Caused by Pile Driving	Significant	Significant and unavoidable	NZ-MM-2: Limit Pile-Driving Vibration and Implement a Pile-Driving Vibration Control Plan

Effect NZ-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise

The Rivers Alternative B would construct a sheet pile cutoff wall into the top of the levee along the entire levee reach. The Rivers Alternative B would also implement slope flattening. The staging area would be on the north side of the existing levee, so homes on the south side of the levee would be shielded from staging area noise. Construction equipment on top of the levee would be visible and audible from homes throughout the study area.

Table 4.6-11 lists the construction noise levels at each representative noise sensitive receiver during each of the major stages of The Rivers Alternative B construction, for the condition when the construction activity is closest to the receiver. That table compares the construction noise levels to the daytime and nighttime noise ordinance limits that are used to define significance. Spatial trends in noise levels caused by each category of construction activity were used to derive the values in Table 4.6-11.

Table 4.6-11. Modeled Construction Noise Levels for The Rivers Alternative B

Noise Sensitive Receiver	Closest Distance to Noise Source (feet)	Modeled Noise Level (dBA)		Daytime Noise Ordinance Limit (dBA)[1]		Nighttime Noise Ordinance Limit (dBA)[1]	
		L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}
Sheet Pile Driving and Staging/Mixing Area							
City of Sacramento Homes	1,100	66	59	75	59	70	54
Todhunter Ave. neighborhood	200	85	78	70	50	65	45
Riverbank Elementary School Classrooms (Indoor levels)	450	55	48	No Std.	**45 (Indoors)**	No Std.	**45 (Indoors)**
Fountain Drive Homes	150	85	78	**70**	**50**	**65**	**45**
Rivercrest Drive Homes	50	101	94	**70**	**50**	**65**	**45**
Landside Levee Flattening							
City of Sacramento Homes	1,200	41	36	75	59	70	54
Todhunter Ave. neighborhood	150	76	71	**70**	**50**	**65**	**45**
Riverbank Elementary School Classrooms (Indoor levels)	400	43	38	No Std.	45 (Indoors)	No Std.	45 (Indoors)
Fountain Drive Homes	100	79	74	**70**	**50**	**65**	**45**
Rivercrest Drive Homes	100	79	74	**70**	**50**	**65**	**45**

[1] Bolded/underlined values indicate the noise ordinance limit is exceeded at the listed receiver

[2] Indoor noise levels were estimated assuming the classroom windows are closed, which provides an assumed 20 dBA reduction compared to exterior noise levels (Federal Highway Administration 1995)

The conclusions based on the noise results shown in Table 4.6-11 are as follows:

- Sheet pile driving would not cause noise levels at homes across the river in the City of Sacramento to exceed the nighttime noise ordinance limits. Therefore, noise impacts at that location would be less than significant.
- Sheet pile driving would cause indoor noise levels inside classrooms at Riverbank Elementary School to exceed the City's noise ordinance limit, assuming the classroom windows are closed and the windows provide a nominal 20 dBA reduction compared to exterior levels.
- Sheet pile driving would cause exceptionally high noise levels at homes along Riverbank Road, Rivercrest Drive, and Fountain Drive.
- Noise levels during levee slope flattening would be much lower than the noise that would occur during sheet pile driving. However, this activity would cause noise to exceed daytime and nighttime noise ordinance limits when the construction was done within roughly 1,500 feet of a dwelling.

The construction noise levels at homes and school classrooms would be addressed by the environmental commitments described in Section 2.7 of Chapter 2, Alternatives. Those commitments include temporarily relocating residents, if construction noise levels exceed noise ordinance limits. In addition, the City would commit to installing acoustical insulation in noise-affected classrooms at Bryte Elementary School and Riverbank Elementary School. Therefore, even though construction noise levels would exceed the City noise ordinance limits, the high noise levels would not be considered significant. No mitigation is required.

Similar to the The Rivers APA, haul trucks and worker commute vehicles traveling along public streets would not cause project-related traffic noise to exceed the City's noise ordinance limits, even if haul trucks were used 24 hours per day. Forecast traffic noise levels for The Rivers APA are less than the City noise ordinance limit, and Alternative B would generate lower traffic volumes than the APA. Therefore, traffic noise generated by Alternative B would also be less than the City noise ordinance limit, and would not be considered significant. No mitigation is required.

Effect NZ-2: Exposure of Sensitive Receptors to Intermittent Noise as a Result of Ongoing Maintenance Activities and Permanent Facility Operations

There would be no additional ongoing flood control-related levee maintenance activities beyond what is currently undertaken to control vegetation. Recreation trail maintenance would include sweeping, pavement repair, removal of obstacles, and periodic asphalt overlays. These maintenance activities would not have a significant effect on noise or vibration. Levee patrol roads (where permanent bike/paths and trails would be installed) are currently used for biking and walking and noise levels as a result of the use of improved paths would likely be similar to existing conditions. Therefore, this effect would be considered less than significant. No mitigation is required.

Effect NZ-3: Exposure of Sensitive Receptors to Temporary Construction-Related Vibration

The Rivers Alternative B would include installation of a sheet pile cutoff wall along the top of the levee. Some existing homes are within 50 feet of the possible alignment from the sheet pile wall. The specific type of pile driver to be used has not been determined. Therefore, for this assessment it was assumed an impact pile driver would be used, because that type of equipment would generate the highest vibration levels.

Sheet piles would be driven into the top of the levee, which is constructed of compacted, fine-grained embankment material. Based on that soil type, the source vibration level for an impact pile driver is estimated to be 0.644 inch/sec ppv, the typical value cited by the Federal Transit Administration (2006). Table 4.6-12 shows the estimated ground vibration levels that would occur at various distances from the pile driver. A ppv vibration level of 0.20 inch/sec, which is the level that might cause cracking of interior walls made of plaster, would occur 60 feet from the pile driver. The ppv level of 0.10 inch/sec, which is the level described as "strongly discernible," would occur 90 feet from the pile driver. Therefore, this assessment concludes that a ground vibration impact might occur at homes within 100 feet of the pile driver.

Because sensitive receptors in The Rivers residential community would potentially be located within this 100-foot distance, this effect is considered significant. Implementation of Mitigation Measure NZ-MM-1 would reduce this effect to a less-than-significant level.

Table 4.6-12. Estimated Ground Vibration Levels Caused by Impact Pile Driver

Distance from Construction Equipment (feet)	Ground Vibration PPV (inches/second)
25	0.64
50	0.23
60	0.20 Potential damage to interior plaster walls
90	0.10 "Strongly discernible" impact criterion
100	0.080
150	0.044

Based on Federal Transit Administration 2006 and California Department of Transportation 2004. Assumes a single impact pile driver installing sheet piles, with a source vibration level (PPV) of 0.644 inches/second at a reference distance of 25 feet.

Mitigation

Mitigation Measure NZ-MM-1: Employ Measures to Prevent Exposure of Buildings and Structures to Excessive Groundborne Vibration

Effect NZ-4: Exposure of Sensitive Receptors to Temporary Construction-Related Vibration

The operation of heavy equipment other than pile-drivers may generate groundborne vibration that could be perceptible at residences or other sensitive land uses close to construction activity. Based on vibration reference levels from Federal Transit Administration (2006), vibration from construction activity would attenuate to less than 0.1 in/sec ppv within about 50 feet under typical conditions. Because sensitive receptors in The Rivers residential community would potentially be located within this distance, this effect is considered significant. Implementation of Mitigation Measure NZ-MM-2(as described above under The Rivers APA) would reduce this effect, but not to a less-than-significant level.

Mitigation Measure NZ-MM-2: Limit Pile-Driving Vibration and Implement a Pile-Driving Vibration Control Plan

WSAFCA will employ vibration-reducing construction practices such that pile driving vibration does not exceed 0.2 inch per second at any adjacent structure. WSAFCA will prepare a vibration control plan that will identify feasible measures that will be employed to reduce construction vibration where necessary. These measures may include but are not limited to:

- maximizing the distance between pile driving and structures;
- employing resilient pile caps to reduce vibration amplitude; and
- employing alternative driving methods such as vibratory driving to reduce vibration.

If the above reduction measures are not feasible at any given location, then WSAFCA will inspect the structure before pile driving begins, conduct vibration monitoring during pile driving, and inspect the structure again after completion of pile driving. WSAFCA will promptly take corrective measures to repair identified damages caused by the pile driving.

Section 4.7
Vegetation and Wetlands—The Rivers Early Implementation Project

4.7.1 Introduction

This section describes the regulatory and environmental setting for vegetation and wetlands, effects on vegetation and wetlands that would result from the proposed project, and mitigation measures that would reduce significant effects.

Please note: During development of this EIS/EIR, the length of The Rivers project site was reduced (from approximately 4,500 feet in length to 3,035 feet), as described in Approach to the Final EIS/EIR and Chapter 2, Alternatives. The effects analyses portion of these sections have been revised to reflect the shorter presently proposed length. All other resources sections are unchanged from the Draft EIS/EIR.

The key sources of data and information used in the preparation of this section are listed below.

- California Natural Diversity Database (CNDDB) records search of the U.S. Geological Survey (USGS) 7.5-minute Grays Bend, Taylor Monument, Rio Linda, Davis, Sacramento West, Sacramento East, Saxon, Clarksburg, and Florin quadrangles (California Natural Diversity Database 2009b)
- U.S. Fish and Wildlife Service (USFWS) list of endangered, threatened, and proposed species for the USGS 7.5-minute Sacramento West quadrangle and Yolo County obtained from the USFWS web site (U.S. Fish and Wildlife Service 2009b)
- California Native Plant Society (CNPS) 2009 online *Inventory of Rare and Endangered Plants of California* (California Native Plant Society 2009b)
- The California Department of Food and Agriculture *Pest Ratings of Noxious Weed Species and Noxious Weed Seed* (California Department of Food and Agriculture 2009)
- The California Invasive Plant Council's California Invasive Plant Inventory (California Invasive Plant Council 2006, 2007)
- City of West Sacramento General Plan Policy Document (City of West Sacramento 2004)

4.7.2 Affected Environment

This section describes the affected environment for vegetation and wetlands in The Rivers EIP project area, including regulatory and environmental settings.

4.7.2.1 Regulatory Setting

4.7.2.1.1 Federal

The following Federal policies related to vegetation and wetlands apply to implementation of The Rivers EIP.

Endangered Species Act

USFWS and NMFS are responsible for implementation of the Federal Endangered Species Act (ESA) (16 USC 1531 *et seq*.). The ESA protects fish and wildlife species that are listed as threatened or endangered, as well as their habitats. Endangered species, subspecies, or distinct population segments are in danger of extinction through all or a significant portion of their range. Threatened species, subspecies, or distinct population segments are likely to become endangered in the near future.

ESA Section 7 mandates that all Federal agencies consult with USFWS and the National Marine Fisheries Service (NMFS) if the agencies determine that a proposed project may affect a listed species or its habitat. The purpose of consultation with USFWS and NMFS is to ensure that the Federal agencies' actions do not jeopardize the continued existence of a listed species or destroy or significantly modify any critical habitat for listed species.

For plants listed as endangered under the ESA, Section 9(a) (2) of the act prohibits their import or export from the United States. Section 9(a) (2) also prohibits acts to remove, cut, dig up, damage, or destroy endangered plant species in non-Federal areas in knowing violation of any state law or in the course of criminal trespass. Candidate species and species that are proposed or under petition for listing receive no protection under Section 9.

Clean Water Act

The Federal Clean Water Act (CWA) is administered by the EPA and the U.S. Army Corps of Engineers (USACE). USACE is responsible for regulating the discharge of fill material into waters of the United States (including lakes, rivers, streams, and their tributaries) and wetlands. Wetlands are defined for regulatory purposes as areas that are "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions"(Environmental Laboratory 1987: 13).

The discharge of dredged or fill material into waters of the United States is subject to permitting under CWA Section 404. Certification from the applicable regional water quality control board (RWQCB is also required when a proposed activity may result in discharge into navigable waters, pursuant to CWA Section 401 and EPA's Section 404(b)(1) guidelines.

On June 5, 2007, USACE and EPA issued a memorandum titled Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos* v. *United States & Carabell* v*. United States* that states that the agencies will assert jurisdiction over the following categories of water bodies: traditional navigable waters (TNWs), wetlands adjacent to TNWs, non-navigable tributaries of TNWs that are relatively permanent, and wetlands that abut such tributaries.

Additionally, on November 8, 2008 the Sacramento District of USACE issued a public notice (SPK-2008-01557) regarding local processing procedures for jurisdictional determinations. Applicants seeking USACE permits can elect either the traditional "approved" approach to obtain a jurisdictional determination from USACE or seek a preliminary jurisdictional determination that concedes jurisdiction to USACE. The preliminary jurisdictional determination is intended to streamline the process for applicants who want to obtain USACE permit authorizations or jurisdictional determinations.

Rivers and Harbors Act

Rivers and Harbors Act Section 10 requires authorization from USACE for the construction of any structure in or over any navigable waters of the United States. Tidal waterways within the Delta are considered navigable waters. The law applies to any dredging, excavation, filling, or other modification of a navigable water of the United States, as well as to all structures, including bank protection (e.g., riprap) and mooring structures, such as those in a marina. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work would affect the course, location, or condition of the water body.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) of 1958 requires that all federal agencies consult with USFWS, NMFS, and the affected state wildlife agency for activities that affect, control, or modify surface waters, including wetlands and other waters. Under the FWCA, USFWS and NMFS have an extended responsibility for project review that encompasses concerns about plant and wildlife species that may not be addressed under NEPA and the federal ESA. This extended responsibility may include a project's secondary effects on jurisdictional waters, including wetlands. USFWS and NOAA Fisheries review CWA Section 404 permit applications, as well as other federal actions perceived to modify waters, and prepare a coordination act report to document the coordination between the federal agency and the appropriate state regulatory agencies. (Cylinder et al. 2004: 54).

Executive Order 11990: Protection of Wetlands

Executive Order 11990, signed May 24, 1977, directs all Federal agencies to refrain from assisting in or giving financial support to projects that encroach on publicly or privately owned wetlands. It further requires that Federal agencies support a policy to minimize the destruction, loss, or degradation of wetlands. A project that encroaches on wetlands may not be undertaken unless the agency has determined that 1) there are no practicable alternatives to such construction, 2) the project includes all practicable measures to minimize harm to wetlands that would be affected by the project, and 3) the effect would be minor.

Executive Order 13112: Invasive Species

Executive Order 13112, signed February 3, 1999, directs all Federal agencies to prevent and control the introduction of invasive species in a cost-effective and environmentally sound manner. The order established the NICS, which is composed of Federal agencies and departments, and the supporting Invasive Species Advisory Committee, which is composed of state, local, and private entities. The council's national invasive species management plan recommends objectives and measures to implement Executive Order 13112 and to prevent the introduction and spread of invasive species (National Invasive Species Council 2008). Executive Order 13112 requires consideration of invasive species in NEPA analyses, including their identification and distribution, their potential effects, and measures to prevent or eradicate them.

4.7.2.1.2 State

The following state policies related to vegetation and wetlands apply to implementation of The Rivers EIP.

California Endangered Species Act

The California Endangered Species Act (CESA) was enacted in 1984. The act prohibits the take of endangered, threatened, and candidate species and defines it as an activity that would directly or indirectly kill an individual of a species; habitat destruction is not included in the state's definition of take. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. The California Department of Fish and Game (DFG administers the act and authorizes take through Section 2081 agreements (except for species designated as fully protected). DFG can adopt a Federal biological opinion as a state biological opinion under California Fish and Game Code, Section 2095. In addition, DFG can write a consistency determination for species that are both federally and state-listed if DFG determines that the avoidance, minimization, and compensation measures will ensure no take of species. In the case of rare plant species, CESA defers to the California Native Plant Protection Act of 1977 (CNPPA; discussed below).

California Native Plant Protection Act

The CNPPA prohibits importation of rare and endangered plants into California, and take or sale of rare and endangered plants. CESA defers to CNPPA, which ensures that state-listed plant species are protected when state agencies are involved in projects subject to CEQA. In this case, plants listed as rare under CNPPA are not protected under CESA, but rather under CEQA.

California Fish and Game Code

DFG provides protection from take for a variety of species under the California Fish and Game Code. DFG also protects streams, water bodies, and riparian corridors through the streambed alteration agreement process under Fish and Game Code 1601–1606. The code stipulates that it is "unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake" without notifying DFG, incorporating necessary mitigation, and obtaining a streambed alteration agreement. DFG's jurisdiction extends to the top of banks and often includes the outer edge of riparian vegetation canopy cover. Riparian trees that have a diameter of 6 inches or greater also fall within DFG's jurisdiction.

Porter-Cologne Water Quality Control Act

Section 13260 of the California Water Code requires "any person discharging waste, or proposing to discharge waste, in any region that could affect the *waters of the state* to file a report of discharge (an application for waste discharge requirements)." Under the Porter-Cologne Water Quality Control Act definition, the term *waters of the state* is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." Although all waters of the United States that are within the borders of California are also waters of the state, the converse is not true—in California, waters of the United States represent a subset of waters of the state. Therefore, the State of California retains authority to regulate discharges of waste into any waters of the state, regardless of whether USACE has concurrent jurisdiction under CWA Section 404.

If USACE determines a wetland is not subject to regulation under CWA Section 404, water quality certification under CWA Section 401 is not required. However, the RWQCB may impose waste discharge requirements (WDRs) if fill material would be placed into waters of the state.

4.7.2.1.3 Local

The following local policies related to vegetation and wetlands may apply to implementation of The Rivers EIP.

Yolo County

Yolo County General Plan

Table 4.7-1 summarizes the *Yolo County General Plan* policies (Yolo County 2002) related to vegetation and wetlands in the project area.

Yolo County Oak Woodland Conservation and Enhancement Plan

The *Yolo County Oak Woodland Conservation and Enhancement Plan* (Yolo County 2007) promotes voluntary efforts to conserve and enhance the county's existing oak woodlands to help minimize the effects of land conversion and other factors that disturb the health and longevity of existing oak woodlands.

Table 4.7-1. Summary of Yolo County General Plan Policies Related to Vegetation and Wetlands in the Project Area

Policy Number	Policy Description
OP-4	The County shall encourage and support coordinated efforts by State and federal agencies, cities, special districts, and non-profit and conservation organizations to protect lands containing open space resources.
OP-5	The County shall utilize the CEQA process to identify significant impacts on open space and shall require new development to implement county-approved mitigation measures that minimize such impacts.
OP-6	The County shall utilize the following objective criteria when considering conversion of open space lands to other uses: • The use is directly related and essential to an otherwise approved open space, agricultural or recreational activity; • Lack of suitable locations in Yolo County prevent the use from locating within an area not designated for open space uses; • The site is not located in a conservation easement, contracted agricultural preserve, Farmland Security Zone, flood control bypass or channel, or earthquake fault zone; • The use will not diminish or prevent open space, recreational or agricultural use on adjoining lands; • The use can be developed without impairing the open space experience, managed resource production and other open space uses and activities in the vicinity; and • The use does not conflict with any adopted local, State or federal plans for protection of open space resources.
OP-7	Development shall be directed away from naturally occurring riparian areas and wetlands.

Policy Number	Policy Description
OP-8	Open space buffer areas shall be utilized to separate incompatible uses from areas of unique biological or agricultural importance.
OP-18	The County, in conjunction with the cities in Yolo County, shall endeavor to adopt a Natural Communities Conservation Plan that protects wildlife resources, open space and agricultural production.
Source: Yolo County 2002	

City of West Sacramento

City of West Sacramento General Plan

Table 4.7-2 summarizes the *City of West Sacramento General Plan* policies (Part II, Section 6) (City of West Sacramento 2004) that are applicable to vegetation and wetlands in the project area.

Table 4.7-2. Summary of City of West Sacramento General Plan Policies Related to Vegetation and Wetland Resources in the Project Area

Section-Goal-Policy Number	Policy Description
VI-C-1	The City shall encourage and support development projects and programs that enhance public appreciation and awareness of the natural environment.
VI-C-2	The City shall support state and federal policies for preservation and enhancement of riparian and wetland habitats by incorporating, as deemed appropriate, the findings and recommendations of the *Sacramento Greenway Plan*, California Department of Fish and Game and the U.S. Fish and Wildlife Service into site-specific development proposals.
VI-C-3	The City shall require site-specific surveys to identify significant wildlife habitat and vegetation resources for development projects located in or near riparian or wetland areas.
VI-C-4	The City shall support mitigation measures which provide for no net loss of riparian or wetland habitat acreage and value by regulating development in and near these habitats and promoting projects that avoid sensitive areas. Where habitat loss is unavoidable, the City shall seek replacement on at least a 1:1 basis. Replacement entails creating habitat that is similar in extent and ecological value to that displaced by the project. The replacement habitat should consist of locally occurring, native species and shall be located as close as possible to the project site or be part of a larger replacement habitat project.
VI-C-5	To minimize disturbance to wildlife, the City shall require the provision and maintenance of an adequate setback between significant wetland habitat and adjacent development. The buffer shall be landscaped with native or compatible introduced ornamental vegetation and may be used for passive recreation purposes.
VI-C-6	The City shall encourage the maintenance of marsh and riparian vegetation along irrigation/drainage canals and along the Deep Water Ship Channel by encouraging that routine maintenance and clearing disturb only one bank per year and maintain the fringes of marsh vegetation.
VI-C-7	The City shall seek to minimize the loss or degradation of wetland and riparian habitats at the following sites: Lake Washington and associated wetlands; Bee Lakes and associated riparian woodlands; riparian woodlands along the Sacramento River north of the I Street Bridge and south of the barge canal; and riparian woodlands along the Deep Water Ship Channel and the Yolo Bypass.
VI-C-9	The City shall seek to preserve populations of rare, threatened, and endangered species by ensuring that development does not adversely affect such species or by fully mitigating adverse effects.

Section-Goal-Policy Number	Policy Description
VI-C-10	The City shall not approve projects that would affect endangered wildlife or plant species.
VI-C-11	The City shall implement measures to ensure that development in the city does not adversely affect fishery resources in the Sacramento River, Deep Water Ship Channel, and Lake Washington.
VI-C-12	Public access and recreation facilities shall not eliminate or degrade riparian habitat values. Trails, picnic areas, and other developments shall be sited to minimize impacts on sensitive wildlife habitat or riparian vegetation.
VI-C-13	The City shall promote the use of native plants, especially valley oaks, for landscaping roadsides, parks, and private properties. In particular, native plants should be used along the Sacramento River and in areas adjacent to riparian and wetland habitats.

Source: City of West Sacramento 2004

Tree Preservation Ordinance

The City's Tree Preservation Ordinance is found in the West Sacramento Municipal Code, Title 8 (Health and Safety), Chapter 24 (Tree Preservation). The City has definitions for heritage and landmark trees.

A *heritage tree* is defined as any living tree with a trunk circumference of 75 inches (diameter of 24 inches) or more, or any living native oak (any species of the genus *Quercus*) with a trunk circumference of 50 inches (diameter of 16 inches) or more, both measured 4.5 feet above ground level. The circumference of multi-trunk trees is based on the sum of the circumference of each trunk. A *landmark tree* is defined as a tree or stand of trees that is especially prominent, stately, or of historical significance as designated by the City Council. Trees that are too small in diameter to meet the size threshold of either a heritage or landmark tree but are located within the public right-of-way (typically 12.5 feet from the curb) are also protected by the ordinance.

It is unlawful in West Sacramento to perform any of the following acts with respect to a heritage or landmark tree without a tree permit issued by the City's tree administrator:

- Move, remove, cut down, poison, set fire to or permit fire to burn in proximity to, or perform or fail to perform any act that results in the unnatural death or destruction of a landmark or heritage tree.
- Perform any activity that will interfere with or retard the natural growth of any landmark or heritage tree.
- Perform any work or permit any work to be performed within the dripline area of a landmark or heritage tree.
- Trim or prune any branch of a landmark or heritage tree that is 5 inches or more in diameter.
- Change the appropriate amount of irrigation or drainage water provided to any landmark, heritage, or street tree. Trench, grade, pave, or otherwise damage or disturb any exposed roots within 1 foot outside the dripline area of any landmark, heritage, or street tree.
- Park or operate any motor vehicle within 1 foot outside the dripline area of any landmark, heritage, or street tree.

- Place or store any equipment or construction materials within 1 foot outside the dripline area of any landmark, heritage, or street tree.
- Place, apply, or attach any signs, ropes, cables, or other items to any landmark, heritage, or street tree.
- Place or allow to flow any oil, fuel, concrete mix, or other deleterious substance into or over within 1 foot outside the dripline area of any landmark, heritage, or street tree.

Tree permits require the applicant to replace a tree that must be removed with a living tree on the property or within West Sacramento in a location approved by the tree administrator. The applicant must also replace the replacement tree if it dies any time within 3 years of the initial planting. Replacement is not required if a tree is removed because it poses a risk or hosts a plant parasite.

Replacement trees are required at a ratio of 1:1 (i.e., 1-inch diameter of replacement plant for every 1-inch diameter of tree removed). Replacement trees may be a combination of 15-gallon trees, which are the equivalent of a 1-inch-diameter tree, or 24-inch box trees, which are the equivalent of a 3-inch-diameter tree. If a property owner is unable to replace the tree on his or her property or within an area approved by the tree administrator, the tree administrator shall require the property owner to pay an in-lieu fee to the city. An in-lieu fee payment is not required if the tree needs to removed solely because it poses a risk to persons or property or if the tree acts as a host for a plant that is parasitic. In-lieu fees will be set by city council resolution and be used to purchase and plant trees elsewhere in West Sacramento.

4.7.2.2 Environmental Setting

This section discusses the environmental setting related to vegetation and wetlands in The Rivers EIP project area.

4.7.2.2.1 Study Area

For the purposes of this section, The Rivers EIP study area consists of the project disturbance footprint plus an additional 100-foot-wide buffer zone to support an assessment of potential indirect effects. The width of the buffer zone was selected to account for indirect effects on elderberry shrubs (*Sambucus mexicana*) that are the host plant for the federally threatened valley elderberry longhorn beetle (VELB), which is discussed in Section 4.9, Wildlife. Areas designated for site access and construction staging are included in the project disturbance footprint. The study area occurs within the Great Central Valley subdivision of the California Floristic Province in Yolo County (Hickman 1993: 44, 45) and encompasses a portion of the Sacramento River North Levee. The majority of the study area consists of the levee itself, which has a broad, flat crown and is sloped on the landside only. The study area is bounded on the north by non-native annual grassland and riparian habitat and on the other three sides by developed and landscaped areas that include commercial development, residential development, Bryte Park, and Riverbank Elementary School. The topography of the portion of the study area adjacent to the levee is relatively level and elevations in the study area range from approximately 20 to 26 feet above mean sea level.

4.7.2.2.2 Field Surveys

The methods used to identify vegetation and wetland resources in the study area consisted of a pre-field investigation, reconnaissance-level site visits, a delineation of wetlands and other waters, an arborist survey, and a botanical survey. Each of these components is described below.

Pre-Field Investigation

Prior to conducting the reconnaissance-level site visits an ICF International botanist/wetland ecologist reviewed information pertaining to vegetation and wetland resources in the project region from the sources listed below.

- a CNDDB records search of the USGS 7.5-minute Sacramento West, Sacramento East, Grays Bend, Taylor Monument, Rio Linda, Davis, Clarksburg, Saxon, and Florin quadrangles (California Natural Diversity Database 2007);
- the USFWS list of endangered, threatened, and proposed species for the USGS 7.5-minute Sacramento West quadrangle and Yolo County obtained from the USFWS web site (U.S. Fish and Wildlife Service 2007); and
- the CNPS's 2009 online *Inventory of Rare and Endangered Plants of California* (California Native Plant Society 2007).

No Federal, state, or local regulatory agencies were contacted prior to conducting the pre-field investigation; however, it was not appropriate at that time because the potential for the study area to contain sensitive vegetation and wetland resources could not be completely evaluated without field observations.

Reconnaissance-Level Site Visits

The botanist/wetland ecologist conducted three reconnaissance-level site visits to evaluate existing vegetation and wetland resources in the study area. The field visits were conducted on September 19 and October 5, 2007, and January 9 and February 13, 2009. The purpose of these site visits was to complete the following actions:

- Identify land cover types and compare field observations with existing vegetation data.
- Evaluate whether potential habitat may be present for special-status plant species that have been identified in the project region.
- Identify potential wetlands and other waters of the United States and/or state that should be delineated during future surveys.
- Identify trees that may potentially be protected under the City's Tree Preservation Ordinance.
- Identify invasive plant species present in the study area.

Delineation of Wetlands and Other Waters

An ICF International soil scientist and a botanist delineated wetlands and other waters of the United States in the study area on December 29, 2008. The delineation was conducted to identify the types and locations of wetlands and other waters that may be subject to regulation by Federal (USACE) and/or state (Central Valley RWQCB) agencies. The delineation was conducted in accordance with guidance provided in the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987: 53–69), the Regional Supplement to the Corps of Engineers 1987 Manual: Arid West Region (U.S. Army Corps of Engineers 2008), and USACE Regulatory Guidance Letter RGL 05-05 (U.S. Army Corps of Engineers 2005). The delineation was conducted to support the submission of a preliminary jurisdictional determination to the USACE Sacramento District and to obtain wastewater discharge requirements from the Central Valley RWQCB for waters of the state.

Arborist Survey

An ICF International arborist conducted tree surveys within the project disturbance footprint on April 10, 2009 and on August 23, 2010. The study area for the April 10, 2009 tree survey did not include all portion of the study area, so the August 23, 2010 tree survey was conducted to ensure that all trees that could be affected by the current project disturbance footprint were surveyed. The arborist survey methods follow standard professional practices and all tree location data were collected with a global positioning system unit with sub-meter accuracy. The arborist recorded the species, number of trunks, and diameter at breast height (diameter at 4.5 feet above the ground surface, unless otherwise noted, measured with a calibrated diameter-at-breast-height tape), tree height, dripline diameter, and the health and vigor of each tree. Results of the arborist survey are described below in the section entitled Tree Resources.

Botanical Survey

Two ICF International botanists conducted a botanical survey of the study area on April 30, 2009. The botanists walked meandering transects throughout the study area. All plant species observed were identified to the level necessary to determine if they were special-status plants or were plant species with unusual or significant range extensions. Plant species specific to The Rivers EIP study area are identified in Appendix G

4.7.2.2.3 Land Cover Types

The study area contains the following land cover types: Great Valley valley oak riparian forest, non-native annual grassland, the Sacramento River, and unvegetated/vacant/developed areas. The Great Valley valley oak riparian forest and non-native annual grassland (i.e., non-native grassland) are natural communities identified in DFG's List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database (California Department of Fish and Game 2003). Each of the land cover types is discussed below and shown in Figure 4.7-1.

Great Valley Valley Oak Riparian Forest

The Great Valley valley oak riparian forest occurs in a narrow corridor along the Sacramento River and has an overstory of mature, well-established trees (Figure 4.7-1). Approximately 8.99 acres of Great Valley valley oak riparian forest occur within the study area; however, only 2.07 acres occurs

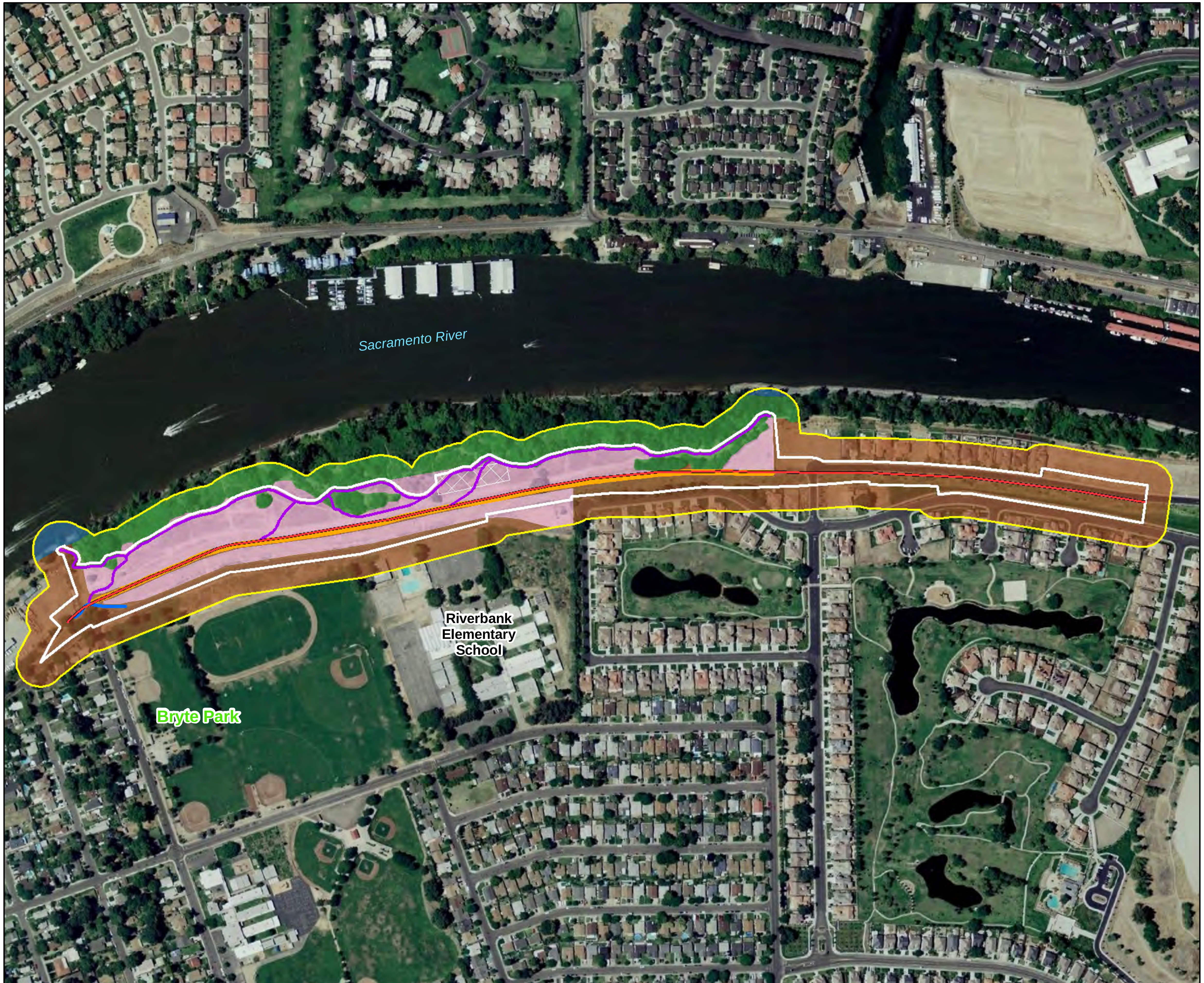

Figure 4.7-1

Land Cover Types in the Study Area at
The Rivers Early Implementation Project Site

Habitat	Project Area: Construction Limit (Acres)	Project Area: Staging Area (Acres)	Total in Study Area (Acres)
Non-native Annual Grassland	9.57	0.55	11.19
Unvegetated/ Vacant/Developed	8.90	---	25.16
Great Valley Oak Riparian Forest	2.07	---	8.99
Sacramento River	---	---	0.59
Total Acreage	**20.54**	**0.55**	**45.93**

Study Area

Construction Limit

Staging Area

Paved Pedestrian Trail

Paved Trail Landing

Levee Embankment Ramp

Alignment

Paved Bicycle Trail

N

Feet

400 200 0 400

Aerial Photo Source: Aerials Express, 2007

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within the project disturbance footprint. Valley oak (*Quercus lobata*) is the dominant species, but Fremont cottonwood (*Populus fremontii* ssp*. fremontii*), box elder (*Acer negundo* var. *californicum*), and interior live oak (*Quercus wislizeni*) are also present. The shrub layer was predominantly Himalayan blackberry (*Rubus discolor*) and poison oak (*Toxicodendron diversilobum*). Scattered elderberry shrubs occur within and along the southern edge of the riparian forest. Riparian forest is identified as a sensitive natural community by the California Natural Diversity Database (California Natural Diversity Database 2009b).

Non-Native Annual Grassland

The non-native annual grassland in The Rivers EIP study area occurs between the Great Valley valley oak riparian forest and the unvegetated/vacant/developed areas. Indications of past and ongoing disturbance are evident (e.g., dirt trails, transient camps) (Figure 4.7-1). Approximately 11.19 acres of non-native annual grassland occur within the study area and the majority of it (approximately 10.12 acres) occurs within the project disturbance footprint. Species commonly observed in the non-native annual grassland were wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft chess, rattail fescue (*Vulpia myuros* var. *myuros*), foxtail barley (*Hordeum murinum* spp. *leporinum*), and Italian ryegrass (*Lolium multiflorum*). Forb species observed in non-native annual grasslands in the study area were Mediterranean mustard (*Hirschfeldia incana*), big heronbill (*Erodium botrys*), prickly lettuce (*Lactuca serriola*), horseweed (*Conyza canadensis*), and wild radish (*Raphanus* spp.).The annual grassland was very dense on the landside slope of the levee but sparser on the levee crown, where open, sandy areas were observed. The annual grasslands in the study area contain a relatively large proportion of ruderal species, likely as a result of the substantial degree of disturbance from human activities (e.g., numerous dirt trails traverse the grasslands in the northern portion of the study area).

Sacramento River

The study area contains 0.59 acre of the Sacramento River that is comprised of a small area of open water and the portion of the riverbank located below the ordinary high water mark (OHWM). The Sacramento River is located outside the construction zone in the buffer zone component of the study area.

Unvegetated/Vacant/Developed

The unvegetated/vacant/developed portions of the study area consist of paved and unpaved roads, commercial development, residential development, Bryte Park, and Riverbank Elementary School and encompass approximately 25.16 acres (Figure 4.7-1). The commercial development is located in the western portion of the study area that is adjacent to the Sacramento River. The majority of the residential development is located in the southern half of the eastern portion of the study area. Riverbank Elementary School and Bryte Park are in the southern half of the western portion of the study area. Plant species observed in developed/landscaped areas were non-native ornamentals.

4.7.2.2.4 Waters of the United States, Including Wetlands

No wetlands occur within the study area. However, the study area contains 0.59 acre of the Sacramento River, which includes both areas of open water and portions of the riverbank that are located below the OHWM. The detailed wetland delineation report was submitted to the USACE as part of the CWA Section 404 permitting process, and on February 3, 2010 the Sacramento District of the USACE issued a preliminary jurisdictional determination form for the proposed project. The Sacramento River also qualifies as waters of the state.

4.7.2.2.5 Special-Status Plant Species

Special-status plants are species that are legally protected under California Endangered Species Act, the federal Endangered Species Act, or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. For the purposes of this EIS/EIR, sensitive plants include:

- species listed or proposed for listing as threatened or endangered under ESA (50 CFR 17.12 [listed plants] and various notices in the *Federal Register* [proposed species]);
- species that are candidates for possible future listing as threatened or endangered under ESA (74 FR 57804, November 9, 2009);
- species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5);
- species that meet the definitions of rare or endangered under the State CEQA Guidelines Section 15380;
- plants listed as rare under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.);
- plants considered by CNPS to be "rare, threatened, or endangered in California" (Lists 1B and 2, California Native Plant Society 2009b); and
- plants listed by CNPS as plants about which more information is needed to determine their status, and plants of limited distribution (Lists 3 and 4, California Native Plant Society 2009b), which may be included as special-status species on the basis of local significance or recent biological information.

No special-status plant species occur in the study area based on one or more of the following findings: absence of habitat, absence of suitable microhabitat, and lack of occurrence during field surveys. Eighteen special-status plant species were identified as occurring in the project region (California Natural Diversity Database 2009b; California Native Plant Society 2009b; U.S. Fish and Wildlife Service 2009b). Four of the eighteen species are federally and/or state-listed as endangered or threatened: palmate-bracted bird's-beak (*Cordylanthus palmatus*), Boggs Lake hedge hyssop (*Gratiola heterosepala*), Colusa grass (*Neostapfia colusana*), and Crampton's tuctoria (*Tuctoria mucronata*). The status, distribution, habitat requirements, and identification period of the eighteen species are shown in Table 4.7-3. Although the Great Valley mixed riparian forest is potential habitat for northern California black walnut, no protected native stands were observed during any of the site visits.

Five of the remaining seventeen species occur in habitats (i.e., vernal pools, marshes) that are not present in the study area: Bogg's Lake hedge hyssop (*Gratiola heterosepala*), rose-mallow (*Hibiscus lasiocarpos*), legenere (*Legenere limosa*), Colusa grass (*Neostapfia colusana*), and Sanford's arrowhead (*Sagittaria sanfordii*). Although habitat is present in the grassland for eight of the remaining ten species, suitable microhabitat (mesic areas, adobe clay soils, alkaline soils) is not present. No mesic areas were observed during site visits and no alkaline, serpentine, or adobe clay soils have been documented in the two soil mapping units present in the study area: Lang sandy loam and Sycamore silt loam (Andrews 1972: 15, 16, 33, 34). Two special-status plant species, stinkbells (*Fritillaria agrestis*) and heartscale (*Atriplex cordulata*) were determined to have low potential to occur in the study area. No special-status plants were observed in the study area during the April 30, 2009 botanical survey that coincided with the reported blooming periods of stinkbells and heartscale (California Native Plant Society 2009b).

The timing of the survey also coincided with the reported blooming period of eight other special-status plant species identified during the pre-field investigation as occurring in the project region (California Native Plant Society 2009b) but for which the study area lacked suitable habitat or microhabitat. Therefore, the proposed alternatives for The Rivers EIP would not have a significant effect on special-status plants and effects on special-status plants are not discussed further. The closest special-status plant occurrence to the study area is rose-mallow that has been documented approximately 1 mile northeast of the study area (California Natural Diversity Database 2009b); however, no suitable habitat (i.e., freshwater marsh) is present in The Rivers study area.

1 **Table 4.7-3. Special-Status Plants Identified as Occurring in the Project Region for the CHP Academy EIP**

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution/Floristic Province[1]	Habitat Requirements	Identification Period	Potential for Occurrence in CHP Academy Study Area
Ferris's milk vetch *Astragalus tener* var. *ferrisiae*	–/–/1B.1	Historic range included the Central Valley from Butte to Alameda Counties; currently only occurs in Butte and Glenn Counties	Seasonally wet areas in meadows and seeps, sub-alkaline flats in valley and foothill grassland; 16–246 feet	Apr–May	Habitat present in grasslands but no suitable microhabitat (i.e., alkaline flats) is present. No occurrences within 10 miles. Not observed during April 2009 botanical survey.
Alkali milk vetch *Astragalus tener* var. *tener*	–/–/1B.2	Southern Sacramento Valley, northern San Joaquin Valley, eastern San Francisco Bay	Playas, on adobe clay in valley and foothill grassland, vernal pools on alkali soils; below 197 feet	Mar–Jun	Habitat present in grasslands but suitable microhabitat (i.e., adobe clay) is not present. Nearest occurrence is ~9 miles away. Not observed during April 2009 botanical survey.
Heartscale *Atriplex cordulata*	–/–/1B.2	Western Central Valley and valleys of adjacent foothills	Saline or alkaline soils in chenopod scrub, meadows and seeps, sandy areas in valley and foothill grassland; below 1,230 feet	Apr–Oct	Habitat present in grasslands and sandy soils occur in the study area, but grasslands are highly disturbed by human activities. No saline or alkaline soils have been documented in the study area. Nearest reported occurrence (extirpated) was ~7.5 miles away. Not observed during April 2009 botanical survey.
Brittlescale *Atriplex depressa*	–/–/1B.2	Western and eastern Central Valley and adjacent foothills on west side of Central Valley	Alkaline or clay soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools; below 1,050 feet	Apr–Oct	Habitat present in grasslands but no suitable microhabitat (i.e., alkaline soils) is present. Nearest occurrence is ~10 miles away. Not observed during April 2009 botanical survey.

[1] Floristic provinces as defined in Hickman 1993.

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution/Floristic Province[1]	Habitat Requirements	Identification Period	Potential for Occurrence in CHP Academy Study Area
San Joaquin saltscale *Atriplex joaquiniana*	–/–/1B.2	Western edge of the Central Valley from Glenn to Tulare Counties	Alkaline soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland; below 2,739 feet	Apr–Oct	Habitat present in grasslands but no suitable microhabitat (i.e. alkaline soils) is present. Nearest occurrence is ~8 miles away. Not observed during April 2009 botanical survey.
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E/E/1B.1	Livermore Valley and scattered locations in the Central Valley from Colusa to Fresno Counties	Alkaline grassland, alkali meadow, chenopod scrub; 16–508 meters	May–Oct	Grasslands in study area lack typical associates (i.e., iodine bush [*Allenrolfea occidentalis*]) and no suitable microhabitat (i.e., alkaline soils) is present. Nearest occurrence is ~8 miles away. Not observed during April 2009 botanical survey.
Dwarf downingia *Downingia pusilla*	–/–/2.2	Inner North Coast Ranges, southern Sacramento Valley, northern and central San Joaquin Valley	Mesic areas in valley and foothill grassland, vernal pools; below 1,460 feet	Mar–May	Habitat present in grasslands but no suitable microhabitat (i.e., mesic areas) is present. Nearest occurrence is ~7.5 miles away. Not observed during April 2009 botanical survey.
Stinkbells *Fritillaria agrestis*	–/–/4.2	Outer North Coast Ranges, Sierra Nevada foothills, Central Valley, Central Western California	Clay, sometimes serpentine soils in chaparral, cismontane woodland, pinyon-juniper woodland, valley and foothill grassland; 33–5,102 feet	March–June	Habitat present in grassland and clay subsoils may be present at surface from disturbance to study area. Overlap between highest study area elevation (36 feet) and elevation range of species (i.e., 36–5,102 feet above mean sea level) is very minimal. Grasslands are highly disturbed from human activities. No serpentine soils occur in the study area. Nearest occurrence is ~8.5 miles away. Not observed during April 2009 botanical survey.

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution/Floristic Province[1]	Habitat Requirements	Identification Period	Potential for Occurrence in CHP Academy Study Area
Boggs Lake hedge hyssop *Gratiola heterosepala*	–/E/1B.2	Inner North Coast Ranges, central Sierra Nevada foothills, Sacramento Valley, Modoc Plateau	Marshes and swamps along lake margins, vernal pools on clay soils; 32–7,792 feet	Apr–Aug	No marsh or vernal pool habitat present. Nearest occurrence is ~10 miles away.
Rose-mallow *Hibiscus lasiocarpos*	–/–/2.2	Central and southern Sacramento Valley, deltaic Central Valley, and elsewhere in the U.S.	Freshwater marsh along rivers and sloughs; below 394 feet	Jun–Sep	No marsh habitat present. Nearest occurrence is ~1 mile away.
Northern California black walnut *Juglans hindsii*	–/–/1B.1	Last two native stands in Napa and Contra Costa Counties; historically widespread through southern Inner North Coast Ranges, southern Sacramento Valley, northern San Joaquin Valley, San Francisco Bay	Riparian scrub and riparian woodland; below 1,443 feet	Apr–May	Riparian habitat present but no native stands observed during 2007 and 2009 field surveys. Nearest occurrences is ~9 miles away.
Legenere *Legenere limosa*	–/–/1B.1	Sacramento Valley, North Coast Ranges, northern San Joaquin Valley and Santa Cruz mountains	Vernal pools; below 2,887 feet	Apr–Jun	No vernal pool habitat present. Nearest occurrence is ~7.5–8.5 miles away.
Heckard's pepper-grass *Lepidium latipes* var. *heckardii*	–/–/1B.2	Southern Sacramento Valley	Alkaline flats in valley and foothill grassland; 32–656 feet	Mar–May	Habitat present in grasslands but no suitable microhabitat (i.e., alkaline soils) is present. Nearest occurrence is ~7 miles away. Not observed during April 2009 botanical survey.
Little mousetail *Myosurus minimus* ssp. *Apus*	–/–/3.1	Central Valley, San Francisco Bay area, southern Outer Coast Ranges, South Coast	Alkaline soils in valley and foothill grassland and vernal pools; 66–2,100 feet	Mar–Jun	Study area is substantially lower than species elevation range. No alkaline soils or vernal pool habitat present. No occurrences within 10 miles. Not observed during April 2009 botanical survey.
Baker's navarretia *Navarretia leucocephala* ssp. *Bakeri*	–/–/1B.1	Inner North Coast Ranges, western Sacramento Valley	Mesic areas in cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, vernal pools;16–5,709 feet	Apr–Jul	Habitat present in grasslands but no suitable microhabitat (i.e., mesic areas) is present. No occurrences within 10 miles. Not observed during April 2009 botanical survey.

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution/Floristic Province[1]	Habitat Requirements	Identification Period	Potential for Occurrence in CHP Academy Study Area
Colusa grass *Neostapfia colusana*	T/E/1B.1	Central Valley with scattered occurrences from Colusa to Merced Counties	Adobe soils of vernal pools; 16–656 feet	May–Aug	No vernal pool habitat present. Nearest occurrence is ~9 miles away.
Sanford's arrowhead *Sagittaria sanfordii*	–/–/1B.2	Scattered locations in Central Valley and Coast Ranges from Del North to Fresno Counties	Freshwater marshes, sloughs, canals, and other slow-moving water habitats; below 2,132 feet	May–Oct	Not observed in canal during August 2009 field survey. Nearest occurrence is ~4.5 miles away.
Crampton's tuctoria *Tuctoria mucronata*	E/E/1B.1	Southwestern Sacramento Valley, Solano and Yolo Counties	Mesic areas in valley and foothill grassland, vernal pools; 16–33 feet	Apr–Aug	Habitat present in grasslands but no suitable microhabitat (i.e., mesic areas) is present. No vernal pool habitat present. Nearest occurrence is ~9 miles away. Not observed during April 2009 botanical survey.

[a] Status explanations:

Federal

E = listed as endangered under the Federal Endangered Species Act.

T = listed as threatened under the Federal Endangered Species Act.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

R = listed as rare under the California Native Plant Protection Act (this category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.

– = no listing.

California Native Plant Society (CNPS)

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.

3 = List 3 species: more information is needed about this plant

4 = List 4 species: limited distribution and on a watch list.

0.1 = seriously endangered in California.

0.2 = fairly endangered in California.

* = presumed extirpated from that County.

1

4.7.2.2.6 Tree Resources

According to the results of the arborist surveys, there are 37 trees within the project footprint with a cumulative diameter at breast height (DBH) of 897 inches and average vigor of 'fair.' These trees consist of almond (*Prunus* sp.), Fremont cottonwood, interior live oak, mulberry (*Morus* sp.), Oregon ash (*Fraxinus latifolia*), and valley oaks. The results of the arborist surveys are presented in Table 4.7-4 below.

Table 4.7-4. Arborist Survey Results for The Rivers EIP

Tree Species	Number of Individuals Observed
Almond	1
Interior live oak	1
Mulberry	6
Fremont cottonwood	13
Oregon ash	1
Valley oak	15

4.7.2.2.7 Invasive Plant Species

Plant species that are considered invasive by the California Department of Agriculture and the California Invasive Plant Council are well-represented and fairly widespread throughout the study area (California Invasive Plant Council 2006, 2007; California Department of Agriculture 2009). Invasive plant species observed in the study area included Himalayan blackberry, yellow star-thistle (*Centaurea solstitialis*), Bermuda grass (*Cynodon dactylon*), Mediterranean mustard, and ripgut brome. The California Department of Food and Agriculture and California Invasive Plant Council ratings for the invasive species observed in The Rivers EIP study area are provided with the plant list (Appendix G).

4.7.2.2.8 Protected Tree Resources

The study area contains 14 trees that may be considered heritage or landmark trees as defined by the City's Tree Preservation Ordinance. As noted above, a *heritage tree* is defined as any living tree with a trunk circumference of 75 inches (diameter of 24 inches) or more, or any living native oak (any species of the genus *Quercus*) with a trunk circumference of 50 inches (diameter of 16 inches) or more, both measured 4.5 feet above ground level. The circumference of multi-trunk trees is based on the sum of the circumference of each trunk. A *landmark tree* is defined as a tree or stand of trees that is especially prominent, stately, or of historical significance as designated by the City Council.

According to August 2010 arborist survey results, eleven of the protected trees are valley oaks, one is an interior live oak and two are Fremont cottonwoods (Table 4.7-5).

Table 4.7-5. Protected Tree Resources for The Rivers EIP

Species	Tree I.D.	DBH (in.)
Valley oak	8	43.0
Fremont cottonwood	57	40.0
Valley oak	45	34.0
Cottonwood	56	27.0
Valley oak	43	22.0
Valley oak	7	20.0, 14.0
Valley oak	39	20.0
Valley oak	47	20.0
Valley oak	68	20.0, 5.0
Valley oak	41	17.0
Valley oak	46	17.0
Interior live oak	40	16.0
Valley oak	38	16.0, 13.0, 10.0
Valley oak	49	16.0, 10.0

4.7.3 Environmental Consequences

This section describes environmental consequences relating to vegetation and wetland resources for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.7.3.1 Assessment Methods

Evaluation of the vegetation and wetland effects in this section is based on the information provided by technical maps, reports, and other documents that describe the resource conditions of the study area. This information was then compared to the type and location of proposed flood and recreation alternatives to determine whether effects would occur.

4.7.3.2 Determination of Effects

For this analysis, based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.), an effect pertaining to vegetation and wetlands was considered significant if it would:

- have a substantial adverse effect, either directly or 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 DFG or USFWS;
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by DFG or USFWS;
- have a substantial adverse effect on federally protected wetlands as defined by CWA Section 404 (including, but not limited to, marshes and vernal pools) through direct removal, filling, hydrological interruption, or other means;

- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- conflict with the provisions of an adopted habitat conservation plan, natural communities conservation plan, or other approved local, regional, or state habitat conservation plan.

4.7.3.2.1 Effect Assumptions

The following assumptions regarding effects on vegetation and wetlands in The Rivers study area have been made for this analysis:

- No special-status plants occur in the study area and therefore effects on these species are not discussed in this section.
- No direct effects on elderberry shrubs would result from implementation of the project alternatives.
- All project activities, including equipment staging and access, would take place within the project disturbance footprint and noted staging areas.
- Fill or borrow material would be obtained from a quarry or other authorized location.
- Operations and maintenance activities post-project would be the same as those currently implemented.
- If discharge of fill into waters of the United States is associated with the proposed project, WSAFCA would require a CWA Section 404 permit from the USACE Sacramento District, and CWA Section 401 certification from the Central Valley RWQCB. Before construction begins, WSAFCA would obtain all necessary permits pertaining to affected waters of the United States. The permitting process would also require compensation for construction-, operation-, and maintenance-related effects.
- Grading would require a CWA Section 402 permit and preparation of a SWPPP.
- Grading or other construction activities would require a streambed alteration agreement from DFG.

4.7.3.2.2 Effect Mechanisms

Vegetation and wetland resources could be directly and indirectly affected by The Rivers EIP. The following types of activities could cause varying degrees of effects on these resources:

- grading, and fill placement during construction of levee alternatives;
- channel dewatering or installation of temporary water-diversion structures;
- temporary stockpiling and sidecasting of soil, construction materials, or other construction wastes;
- soil compaction, dust, and water runoff from the construction site into adjacent areas;
- introduction or spread of invasive plant species into adjacent open space areas; and
- runoff of herbicides, fertilizers, diesel fuel, gasoline, oil, raw concrete, or other toxic materials used for levee alternatives, operations, and maintenance into sensitive biological resource areas (e.g., riparian habitat, wetlands).

4.7.4 Effects and Mitigation Measures

4.7.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects on vegetation or wetlands would occur.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento River North Levee could fail due to under-seepage, slope stability, or geometry issues would continue. These effects could include significant loss of vegetation and habitat quality due to both the hydraulic forces of the flood itself as well as the clean-up efforts. However, given the uncertainty of the occurrence or magnitude of such an event, potential effects on vegetation and waters of the United States cannot be fully quantified based on available information.

As presented in Chapter 2, the No Action Alternative relative to USACE levee vegetation policy is characterized by four possible scenarios (see Appendix C for further details):

- full application of the ETL, meaning prohibition and removal of woody vegetation within the levee prism or within 15 feet of the landside or waterside levee toes;
- no application of the ETL, assuming the continued existence into the future of the vegetation conditions at the time of the analysis;
- application of the interim guidance for USACE levee vegetation policy from the Framework process, meaning trees within the levee prism on the landside slope, upper 20 feet of the waterside slope, or within 10 feet of the landside toe must be trimmed up five feet above the ground (or 12 feet above the crown road) and thinned; and
- application of a possible variance, such as the variance issued for Natomas Levee Improvement Program (NLIP) under USACE's draft variance policy, meaning removal of trees within the levee prism on the landside slope or within the landside operations and maintenance corridor, and allowance of trees within the levee prism on the waterside slope based on demonstration of not affecting the critical levee prism.

The table below summarizes the potential loss of trees based on these No Action Alternative scenarios.

	No Action—Full ETL	No Action—No ETL	No Action—Framework	No Action—Variance
Potential Approximate Trees Removed	37	0	0	37

As discussed in the Draft EIS/EIR, compliance with USACE's levee vegetation guidance could result in the removal of a substantial amount of vegetation, including vegetation that comprises mature oak woodland and supports wildlife populations (including special-status species). (Figure 4.7-2.) This effect could be considered significant.

4.7.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on vegetation and wetlands. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
VEG-1: Disturbance of Removal of Riparian Vegetation as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor VEG-MM-4: Compensate for Loss of Protected Trees
VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction	Less than significant	N/A	N/A
VEG-5: Conflict with Provisions of an Adopted HCP/NCCP or other Approved Local, Regional, or State Habitat Conservation Plan	No effect	N/A	N/A

Effect VEG-1: Disturbance or Removal of Riparian Habitat as a Result of Project Construction

The construction activities associated with The Rivers APA would result in the loss of 0.9 acre (37 trees with a cumulative DBH of 897 inches) of Great Valley valley oak riparian forest, a sensitive natural community. These effects result from the riparian habitat being located within the project disturbance footprint (i.e., the construction zone). As noted in Section 2.6, Chapter 2, The Rivers APA, Post-Construction Riparian Mitigation (p. 2-36), WSAFCA will develop a revegetation plan prior to the removal of existing riparian vegetation that will compensate for the loss riparian habitat. WSAFCA has identified potential on-site mitigation areas (approximately 2.17 acres of open grassland and 3.81 acres of interspersed understory) where on-site mitigation may occur (Figure 2-8). The revegetation plan will be prepared by a qualified restoration ecologist and reviewed by the appropriate agencies (including CDFG and CVFPB).

K:\Projects_1\HDR\00875_07\mapdoc\Permitting\4_Julia\Fig_4_7_2_Vegetation_Removal_20101014.mxd (20101014)

Figure 4.7-2
The Rivers
Vegetation Removal

N

0 270 540 1,080 Feet

WSAFCA will monitor plantings and submit annual survival reports to regulatory agencies issuing permits related to habitat effects. In addition to a revegetation plan, as outlined under Section 2.6, Chapter 2, Alternatives, WSAFCA will install barrier fencing to avoid disturbance to sensitive habitats and species. Effects on riparian habitat are considered significant. Implementation of the measures outlined in Chapter 2 and Mitigation Measures VEG-MM-1, VEG-MM-2, VEG-MM-3, described below, will reduce this effect to a less-than-significant level.

The table below summarizes the potential loss of trees from the APA relative to the No Action Alternative scenarios. It should be noted that because all trees potentially affected by the project are directly within the construction footprint, there is no difference in number between those removed for the project, for ETL compliance, or application for variance.

	No Action—Full ETL	No Action—No ETL	No Action—Framework	No Action—Variance	APA
Potential Approximate Trees Removed	37	0	0	37	37

Mitigation

Mitigation Measure VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat

For direct effects on woody riparian habitat that cannot be avoided, WSAFCA will compensate for the loss of riparian habitat to ensure no net loss of habitat functions and values, as described in Chapter 2, Section 2.6, The Rivers APA Post-Construction Riparian Mitigation (p. 2-36). Compensation ratios will be finalized based on detailed site-specific information and determined through additional coordination with the appropriate local, state and Federal agencies during the permitting and consultation process. To provide context, a 1:1 mitigation ratio would result in the replacement of 0.9 acres, or 897 plantings; a 2:1 ratio would result in the replacement of 1.8 acres, or 1794 plantings.

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Before any work occurs in the project area, including grading, a qualified biologist will conduct mandatory contractor/worker awareness training for construction personnel. The awareness training will be provided to all construction personnel to brief them on the need to avoid effects on sensitive biological resources (e.g., riparian habitat, special-status species, special-status wildlife habitat) and the penalties for not complying with permit requirements. The biologist will inform all construction personnel about the life history of special-status species with potential for occurrence on site, the importance of maintaining habitat, and the terms and conditions of the biological opinion or other authorizing document. Proof of this instruction will be submitted to USFWS, DFG, or other overseeing agency, as appropriate.

The training will also cover the restrictions and guidelines that must be followed by all construction personnel to reduce or avoid effects on special-status species during project construction. The crew leader will be responsible for ensuring that crew members adhere to the guidelines and restrictions. Educational training will be conducted for new personnel as they are brought on the job during the construction period. General restrictions and guidelines for vegetation and wildlife that must be followed by construction personnel are listed below.

- Project-related vehicles will observe the posted speed limit on hard-surfaced roads and a 10-mile-per-hour speed limit on unpaved roads during travel in the project site.
- Project-related vehicles and construction equipment will restrict off-road travel to the designated construction area.
- All food-related trash will be disposed of in closed containers and removed from the study area at least once a week during the construction period. Construction personnel will not feed or otherwise attract fish or wildlife to the project site.
- No pets or firearms will be allowed in the project site.
- To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel will not service vehicles or construction equipment outside designated staging areas.

For special-status wildlife, any worker who inadvertently injures or kills a special-status wildlife species or finds one dead, injured, or entrapped will immediately report the incident to the biological monitor. The monitor will immediately notify WSAFCA, who will provide verbal notification to the USFWS Endangered Species Office or the local DFG warden or biologist within 3 working days. WSAFCA will follow up with written notification to USFWS or DFG within 5 working days.

Mitigation Measure VEG-MM-3: Retain a Biological Monitor

WSAFCA will retain qualified biologists to monitor construction activities adjacent to sensitive biological resources (e.g., special-status species, riparian habitat, wetlands, elderberry shrubs). The biologists will assist the construction crew, as needed, to comply with all project implementation restrictions and guidelines. In addition, the biologists will be responsible for ensuring that the project proponent or its contractors maintain the construction barrier fencing adjacent to sensitive biological resources.

Effect VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction

Although the portion of the Sacramento River (0.59 acre) in the study area is located outside the construction zone, ground disturbance associated with project construction could potentially result in the placement of fill materials into the Sacramento River. This effect is potentially significant because if fill materials enter the Sacramento River, the proposed project would have adverse significant effect on a water of the United States that is subject to USACE regulation under CWA. Implementation of the environmental commitments outlined in Section 2.7, Chapter 2, Alternatives, (preparation of SWPPP, SPCCP, and BSSPP) and Mitigation Measures VEG-MM-2, and VEG-MM-3, described above, would ensure that The Rivers APA would not have an adverse significant effect on the Sacramento River.

Effect VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction

As described in Effect VEG-1, there is approximately 0.9 acre of riparian habitat (37 trees with a cumulative DBH of 897 inches) that falls within the construction disturbance footprint and will be removed to allow for construction. As presented in the Protected Tree Resources in the environmental setting, the results of an arborist survey determined that 14 of the trees (cumulative dbh of 280) meet the definition of heritage or landmark trees as defined by the City's Tree Preservation Ordinance.

The table below summarizes the potential loss of heritage or landmark trees from the APA relative to the No Action Alternative scenarios. It should be noted that because all trees potentially affected by the project are directly within the construction footprint, there is no difference in number between those removed for the project, for ETL compliance, or application for variance.

	No Action—Full ETL	No Action—No ETL	No Action—Framework	No Action—Variance	APA
Potential Approximate Trees Removed	14	0	0	14	14

As described in Effect VEG-1, WSAFCA proposes to develop an on-site riparian mitigation plan to mitigate for the loss of riparian and protected trees. Implementation of this mitigation plan and VEG-MM-1, VEG-MM-2, and VEG-MM-3 described above, as well as VEG-MM-4 described below, would ensure that the Rivers APA would not have a significant effect on trees that are protected under the local ordinance.

Mitigation

Mitigation Measure VEG-MM-4: Compensate for Loss of Protected Trees

WSAFCA will apply for a tree permit for the removal of the 14 protected trees. To maximize the habitat value of replacement trees, avoid redundant mitigation, and duplicative expensive, mitigation for the 14 protected trees will be integrated into the revegetation plan described in VEG-MM-1, above and in Section 2.6, The Rivers APA.

Replacement trees are required at a ratio of 1:1 (i.e., 1-inch diameter of replacement plant for every 1-inch diameter of tree removed). Mitigation will be subject to approval by the City's tree administrator and will take into account species affected, replacement species, location, health and vigor, habitat value, and other factors to determine fair compensation for tree loss.

WSAFCA will also replace the replacement tree if it dies within 3 years of the initial planting. WSAFCA will also replace any replacement trees that die within 3 years of the initial planting. Replacement is not required if a tree is removed because it poses a risk to persons or property or hosts a plant parasite.

Effect VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction

Invasive plants are already present in the project area. However, construction activities associated with construction could introduce new invasive plants or contribute to the spread of existing invasive plants to un-infested areas outside the project area. Invasive plants or their seeds may be dispersed by construction equipment if appropriate prevention measures are not implemented. The introduction or spread of invasive plants as a result of the proposed project could have a significant effect on sensitive natural communities within and outside the project area by displacing native flora. The implementation of one or more of the BMPs described in the environmental commitment to avoid or minimize the spread or introduction of invasive plant species (Section 2.7, Chapter 2, Alternatives,) will ensure that the proposed project would not have a significant effect on sensitive natural communities from the introduction or spread of invasive plants.

Effect VEG-5: Conflict with an Adopted HCP/NCCP or other Approved Local, Regional or State Habitat Conservation Plan

There is no adopted habitat conservation plan or natural communities conservation plan applicable to the Rivers EIP project site area. There are three plans under development but not yet formally adopted and one adopted plan that apply in the region or project area. The plans under development are the Yolo County Natural Community/Habitat Conservation Plan (NCCP/HCP), the South Sacramento HCP, and the Bay Delta NCCP. To the north of the project site, the Natomas Basin HCP/NCCP has been formally adopted and applies to a 53,537 acre area in the northern portion of Sacramento County and the southern portion of Sutter County. The Natomas Basin HCP covers 22 listed, candidate and other species, including 7 plant species and sets forth biological goals and objectives for wetland species/habitat and upland species/habitat within the NBHCP plan area. The Rivers EIP project site would not be in conflict with these goals with respect to special-status plants because no special-status plant species occur within the study area (see Section 4.7.2.2.5, Special-Status Plant Species). The NBHCP's goals for upland species/habitat within the NBHCP plan area are:

1. Acquire, enhance and create a mosaic of upland habitat types for breeding, foraging, and cover for species dependent on upland habitat types.
2. Ensure reserve land connectivity with travel corridors for upland dependent species. The habitat areas should encompass grasslands, agricultural croplands, riparian habitats, and shelter and nesting habitat areas (fence rows, clusters of shrubs and small trees), as well as wetland areas to provide year-round source of water for upland species. The upland areas should be configured to enhance natural species migration, minimize species isolation, and prevent future habitat fragmentation.

As discussed in Effect VEG-1, the construction activities associated with The Rivers APA would result in the loss of 0.9 acre (37 trees with a cumulative DBH of 897 inches) of Great Valley valley oak riparian forest, a sensitive natural community. Mitigation for this loss is proposed to occur on-site and will be managed in perpetuity as riparian habitat, which would ensure connectivity and avoid future fragmentation of the habitat. Although the project site falls outside the plan areas of the NBHCP, its actions would not conflict with the habitat goals and objectives of the NBHCP. Therefore, there is no effect. A discussion regarding wildlife is included in Section 4.9.

4.7.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on vegetation and wetlands. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
VEG-1: Disturbance of Removal of Riparian Vegetation as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor
VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction	Significant	Less than significant	VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel VEG-MM-3: Retain a Biological Monitor VEG-MM-4: Compensate for Loss of Protected Trees
VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction	Less than significant	N/A	N/A
VEG-5: Conflict with Provisions of an Adopted HCP/NCCP or other Approved Local, Regional, or State Plan	No effect	N/A	N/A

Effect VEG-1: Disturbance or Removal of Riparian Habitat as a Result of Project Construction

This effect would be the same as described above under The Rivers APA. This effect is considered less than significant with the implementation of protection measures as described in The Rivers EIP project description (Section 2.6, Chapter 2, Alternatives) and Mitigation Measures VEG-MM-1, VEG-MM-2 and VEG-MM-3.

Effect VEG-2: Loss of Wetlands and Waters of the United States as a Result of Project Construction

This effect would be the same as described above under The Rivers APA. This effect is considered less than significant with the implementation of protection measures as described in The Rivers EIP project description (Section 2.6, Chapter 2, Alternatives) and Mitigation Measures VEG-MM-2 and VEG-MM-3.

Effect VEG-3: Disturbance or Removal of Protected Trees as a Result of Project Construction

This effect would be the same as described above under The Rivers APA. This effect is considered less than significant with the implementation of riparian mitigation as described in The Rivers EIP project description (Section 2.6, Chapter 2, Alternatives) and Mitigation Measures VEG-MM-1, VEG-MM-2, VEG-MM-3, and VEG-MM-4.

Effect VEG-4: Introduction or Spread of Invasive Plants as a Result of Project Construction

This effect is the same as that described above under The Rivers APA. The introduction or spread of invasive plants as a result of the proposed project could have a significant effect on sensitive natural communities within and outside the project area by displacing native flora. The implementation of one or more of the BMPs described in the environmental commitments to avoid or minimize the spread or introduction of invasive plant species (Section 2.7, Chapter 2, Alternatives) will ensure that the proposed project would not have a significant effect on sensitive natural communities from the introduction or spread of invasive plants. No mitigation is required.

Effect VEG-5: Conflict with an Adopted HCP/NCCP or other Approved Local, Regional or State Plan

This effect is the same as that described above under The Rivers APA. There is no effect.

Section 4.8

Fisheries and Aquatic Resources— The Rivers Early Implementation Project

4.8.1 Introduction

This section describes the regulatory and environmental setting for fisheries resources and aquatic habitats, the effects on special-status fish species that would result from the proposed project, and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- U.S. Fish and Wildlife Service (USFWS) list (dated February 4, 2009) of endangered, threatened, and proposed species for the study area (Appendix H)
- Published and unpublished reports
- Field survey on October 26, 2007
- ICF International file information

4.8.2 Affected Environment

This section describes the affected environment for fisheries and aquatic resources in the CHP Academy EIP project area, including the regulatory and environmental settings.

4.8.2.1 Regulatory Setting

4.8.2.1.1 Federal

The following Federal policies related to fisheries and aquatic resources may apply to implementation of The Rivers EIP.

Endangered Species Act

The Federal Endangered Species Act (ESA) protects fish and wildlife species and their habitats that have been identified by the National Marine Fisheries Service (NMFS) or USFWS as threatened or endangered. *Endangered* refers to species, subspecies, or distinct population segments (DPSs) that are in danger of extinction through all or a significant portion of their range. *Threatened* refers to species, subspecies, or DPSs that are likely to become endangered in the near future.

ESA is administered by USFWS and NMFS. In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fish, and USFWS is responsible for other listed species. Provisions of Sections 9 and 7 of ESA are relevant to this project and are summarized below.

Section 9: ESA Prohibitions

Section 9 of the ESA prohibits the take of any fish or wildlife species listed under ESA as endangered. Take of threatened species also is prohibited under Section 9, unless otherwise authorized by Federal regulations.[1] *Take*, as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." In addition, Section 9 prohibits removing, digging up, cutting, and maliciously damaging or destroying federally listed plants on sites under Federal jurisdiction.

Section 7: ESA Authorization Process for Federal Actions

Section 7 of the ESA provides a means for authorizing take of threatened and endangered species by Federal agencies. Under Section 7, the Federal agency conducting, funding, or permitting an action (the lead Federal agency, such as USACE) must consult with NMFS or USFWS, as appropriate, to ensure that the proposed project will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed project "may affect" a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment (BA) to evaluate the nature and severity of the expected effect. In response, NMFS or USFWS issues a biological opinion (BO), with a determination that the proposed project either:

- may jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding), or
- will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

The BO issued by NMFS or USFWS may stipulate discretionary "reasonable and prudent" conservation measures. If the project would not jeopardize a listed species, USFWS or NMFS issues an incidental take statement to authorize the proposed activity.

Critical Habitat

Critical habitat, as defined in ESA Section 3, is:

I. the specific area within the geographic area occupied by a species, at the time it is listed in accordance with ESA, on which are found those biological features
   i. essential to the conservation of the species, and
   ii. may require special management considerations or protection; and
II. specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Aquatic habitats in the study area have been designated as critical habitat for the following species:

- Central Valley spring-run Chinook salmon,
- Central Valley winter-run Chinook salmon,

[1] In some cases, exceptions may be made for threatened species under ESA Section 4(d); in such cases, USFWS or NMFS issues a "4(d) rule" describing protections for the threatened species and specifying the circumstances under which take is allowed.

- Central Valley steelhead,
- Southern DPS green sturgeon, and
- Delta smelt.

Clean Water Act

The Clean Water Act (CWA) was enacted as an amendment to the Federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary Federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands.

The CWA empowers the U.S. Environmental Protection Agency (EPA) to set national water quality standards and effluent limitations and includes programs addressing both point-source and nonpoint-source pollution. Point-source pollution is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. Nonpoint-source pollution originates over a broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. The following sections provide additional details on pertinent sections of the CWA.

Section 404: Permits for Fill Placement in Waters and Wetlands

The U.S. Army Corps of Engineers (USACE) and EPA regulate the discharge of dredged and fill material into waters of the United States under Section 404 of the CWA. USACE jurisdiction over non-tidal waters of the United States extends to the OHWM, provided the jurisdiction is not extended by the presence of wetlands (33 CFR Part 328, Section 328.4). The ordinary high water mark (OHWM) is defined in the Federal regulations to mean:

> [T]hat line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 CFR Part 328, Section 328.3[e]).

USACE typically will exert jurisdiction over that portion of the project site that contains waters of the United States and adjacent or isolated wetlands. This jurisdiction equals approximately the bank-to-bank portion of a creek along its entire length up to the OHWM and adjacent wetland areas that will either be directly or indirectly adversely affected by a proposed project.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires all Federal agencies to consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect essential fish habitat (EFH). EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation states that migratory routes to and from anadromous fish spawning grounds should also be considered EFH. The phrase *adversely affect* refers to the creation of any effects that reduce the quality or quantity of EFH. Federal activities that occur outside an EFH but that may, nonetheless, have an effect on EFH waters and substrate must also be considered in the consultation process. Under the Magnuson-Stevens Act, effects on habitat managed under the Pacific Salmon Fishery Management Plan must also be considered.

4.8.2.1.2 State

The following state regulations or agencies may govern the implementation of The Rivers EIP.

California Endangered Species Act

The California Endangered Species Act (CESA), which is administered by the California Department of Fish and Game (DFG), protects wildlife and plants listed by the California Fish and Game Commission as threatened and endangered under the act. CESA prohibits all persons from taking species that are state-listed as threatened or endangered except under certain circumstances; the CESA definition of take is any action or attempt to “hunt, pursue, catch, capture, or kill.”

CESA Section 2081 provides a means by which agencies or individuals may obtain authorization for incidental take of state-listed species, except for certain species designated as “fully protected” under the California Fish and Game Code. Take must be incidental to, and not the purpose of, an otherwise lawful activity. Requirements for a Section 2081 permit are similar to those used in the ESA Section 7 process. They include identification of effects on listed species, development of mitigation measures that minimize and fully mitigate effects, development of a monitoring plan, and assurance of funding to implement mitigation and monitoring.

California Fish and Game Code Section 1600: Streambed Alteration Agreements

DFG has jurisdictional authority over wetland resources associated with rivers, streams, and lakes under Sections 1600–1607. DFG has the authority to regulate all work under the jurisdiction of the State of California that would substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed.

In practice, DFG marks its jurisdictional limit at the top of the stream or lake bank, or the outer edge of the riparian vegetation, where present, and sometimes extends its jurisdiction to the edge of the 100-year floodplain. Because riparian habitats do not always support wetland hydrology or hydric soils, wetland boundaries, as defined by CWA Section 404, sometimes include only portions of the riparian habitat adjacent to a river, stream, or lake. Therefore, jurisdictional boundaries under Section 1600 may encompass a greater area than those regulated under CWA Section 404.

DFG enters into a streambed alteration agreement with an applicant and can impose conditions on the agreement to ensure that no net loss of wetland values or acreage will be incurred. The streambed or lakebed alteration agreement is not a permit, but a mutual agreement between DFG and the applicant.

4.8.2.1.3 Local

The following local regulations or agencies would govern the implementation of The Rivers EIP.

City of West Sacramento General Plan

Section VI, Natural Resources Goals and Policies, of the *City of West Sacramento General Plan* identifies policies designed to protect habitat and biological resources that are applicable to the resources located in the study area. The policies listed below are pertinent to fish resources in the project area (City of West Sacramento 2004, II-68-69).

Goal C: To protect sensitive native vegetation and wildlife communities and habitat in West Sacramento

Policies:

2. The City shall support state and Federal policies for preservation and enhancement of riparian and wetland habitats by incorporating, as deemed appropriate, the findings and recommendations of the *Sacramento Greenway Plan*, California Department of Fish and Game and the U.S. Fish and Wildlife Service into site-specific development proposals.

3. The City shall require site-specific surveys to identify significant wildlife habitat and vegetation resources for development projects located in or near riparian or wetland areas.

4. The City shall support mitigation measures which provide for no net loss of riparian or wetland habitat acreage and value by regulating development in and near these habitats and promoting projects that avoid sensitive areas. Where habitat loss is unavoidable, the City shall seek replacement on at least a 1:1 basis. Replacement entails creating habitat that is similar in extent and ecological value to that displaced by the project. The replacement habitat should consist of locally occurring, native species and shall be located as close as possible to the project site or be part of a larger replacement habitat project.

7. The City shall seek to minimize the loss or degradation of wetland and riparian habitats at the following sites: Lake Washington and associated wetlands; Bee Lakes and associated riparian woodlands; riparian woodlands along the Sacramento River north of the I Street Bridge and south of the barge canal; and riparian woodlands along the Deep Water Ship Channel and the Yolo Bypass.

9. The City shall seek to preserve populations of rare, threatened, and endangered species by ensuring that development does not adversely affect such species or by fully mitigating adverse effects.

10. The City shall not approve projects that would cause unmitigable impacts on rare, threatened, or endangered wildlife or plant species.

11. The City shall implement measures to ensure that development in the city does not adversely affect fishery resources in the Sacramento River, Deep Water Ship Channel, and Lake Washington.

12. Public access and recreation facilities shall not eliminate or degrade riparian habitat values. Trails, picnic areas, and other developments shall be sited to minimize impacts on sensitive wildlife habitat or riparian vegetation.

13. The City shall promote the use of native plants, especially valley oaks, for landscaping roadsides, parks, and private properties. In particular, native plants should be used along the Sacramento River and in areas adjacent to riparian and wetland habitats.

Yolo County General Plan

The *Yolo County General Plan* was adopted in 1983. The objective of the general plan is to provide guidance for the development of Yolo County. The general plan promotes the preservation of farm land and open spaces to minimize the area of urbanization. The Open Space and Recreation Element of the general plan was updated in 2002. The following goals, objectives, and policies are relevant to fish resources in the study area:

Goals and Supporting Objectives

- **OG-4:** Protect and manage local water resources.
  - **OO-5:** Provision for open space corridors within existing and future development.
- **OG-5:** Preserve and enhance existing biological resources.
  - **OO-6:** No net loss of wetland and/or riparian habitat.
  - **OO-7:** Maintenance of unique or sensitive plant or animal habitat.

4.8.2.2 Environmental Setting

4.8.2.2.1 Study Area

The Rivers EIP project area is located on the Sacramento River North Levee. The Sacramento River North Levee reach extends along the right bank of the Sacramento River from its confluence with the Sacramento Bypass downstream approximately 6.0 miles to the entrance to the barge canal. The site has Great Valley oak riparian forest habitat lining the bank. The Sacramento River channel adjacent to the site provides migratory and temporary rearing habitat for anadromous fish such as steelhead, Chinook salmon, river lamprey, and green sturgeon. Native fish, such as delta smelt and Sacramento splittail, also may spawn in the Sacramento River within the study area along shallow river margins and on adjacent floodplain habitat, when available. The study area contains riparian vegetation (8.99 acres), nearshore habitat (0.59 acre), and shaded riverine aquatic habitat (SRA) (0.59 acres). (Figure 4.7-1 in Section 4.7, Vegetation and Wetlands).

4.8.2.2.2 Aquatic Habitat

Aquatic habitat in The Rivers EIP project area consists of nearshore and SRA habitat, which is present in the Sacramento River North Levee. Nearshore and SRA habitat within the study area encompasses approximately 0.59 acre (Figure 4.7-1 in Section 4.7, Vegetation and Wetlands). This habitat is described in greater detail below.

Nearshore and SRA Habitat

Nearshore areas support large and diverse fish and wildlife populations. These areas are important to fish for rearing and migration because they create attachment sites for aquatic insects (a food source for fish) and provide fish with shelter from predators. For example, juvenile Chinook salmon and steelhead rely on nearshore habitats as fry, smolt, or yearlings and to some extent as adults. In addition, vegetated nearshore habitat can also provide spawning areas for some fish species, such as splittail, delta smelt, black bass, and sunfish. Riparian vegetation is a component of nearshore and SRA cover and directly influences the quality of fish habitat. Its presence has an effect on cover, food, instream habitat complexity, streambank stability, and temperature regulation. Large woody debris usually originates from riparian trees and provides habitat complexity in aquatic environments, an essential component of fish habitat. The roots of riparian vegetation at the land-water interface and on adjacent berms provide streambank stability and cover for rearing fish. (Meehan and Bjorn 1991)

Cover describes the physical components of a stream environment that provide shelter and hiding, resting, rearing, holding, and feeding areas for fish and other aquatic organisms. Gravel, cobbles, boulders, ledges, undercut banks, aquatic plants, saplings, brush, trees, and instream woody material (e.g., tree limbs, logs, rootwads) all provide cover. The quantity and quality of cover for fish and aquatic invertebrates is a primary determinant of habitat availability and suitability. The occurrence of many aquatic species, including juvenile salmonids, depends on the size, density, and continuity of suitable cover.

Riparian vegetation also provides shade and an insulating canopy that moderates water temperatures in both summer and winter. While the influence of shade on regulating river temperatures decreases as rivers become larger, the moderating effects of shade on nearshore water temperatures may be important to some fish species, including juvenile salmonids, during the growing season.

Riparian vegetation also influences the food chain of a stream, providing organic detritus and terrestrial insects. Terrestrial organisms falling from overhanging branches contribute to the food base of the aquatic community. Salmonids in particular are primarily insectivores and feed mainly on drifting food organisms.

Habitat complexity of nearshore and SRA within the study area is low. At the eastern end of the study area, only one tree is overhanging the river. At the western end where more SRA occurs, the bank is lined with riprap which decreases the value of nearshore habitat.

4.8.2.2.3 Special-Status Fish Species

The special-status fish species listed below have the potential to occur in the study area.

- Sacramento River winter-run Chinook salmon Evolutionarily Significant Unit (ESU) (*Oncorhynchus tshawytscha*)—FE/SE
- Central Valley spring-run Chinook salmon ESU (*O. tshawytscha*)—FT/ST
- Central Valley fall-/late fall–run Chinook salmon ESU (*O. tshawytscha*)—FSC/SSC
- Central Valley steelhead DPS (*O. mykiss*)—FT
- Southern DPS of North American green sturgeon (*Acipenser medirostris*)—FT/SSC
- Delta smelt (*Hypomesus transpacificus*)—FT/ST
- Sacramento splittail (*Pogonichthys macrolepidotus*)—SSC
- River lamprey (*Lampetra ayresi*)—SSC

Special-status fish species that occur or have the potential to occur in or near the study area, as well as their likely status in the study area, are presented in Table 4.8-1. Critical habitat for winter and spring-run Chinook salmon and Central Valley steelhead falls within the study area in the Sacramento River.

1 **Table 4.8-1. Special-Status Fish Species with Potential to Occur in the Study Area**

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Occurrence in the Study Area
Delta smelt *Hypomesus transpacificus*	T/T	Primarily in the Sacramento–San Joaquin Estuary, but has been found as far upstream as the mouth of the American River on the Sacramento River and Mossdale on the San Joaquin River; range extends downstream to San Pablo Bay	Occurs in estuary habitat in the Delta where fresh and brackish water mix in the salinity range of 2–7 parts per thousand (Moyle 2002).	High
Sacramento splittail *Pogonichthys macrolepidotus*	–/SSC	Occurs throughout the year in low-salinity waters and freshwater areas of the Sacramento–San Joaquin Delta, Yolo Bypass, Suisun Marsh, Napa River, and Petaluma River (Moyle 2002).	Spawning takes place among submerged and flooded vegetation in sloughs and the lower reaches of rivers.	High
Central Valley steelhead *Oncorhynchus mykiss*	T/–	Sacramento River and tributary Central Valley rivers	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 7.8 to 18°C (Moyle 2002). Habitat types are riffles, runs, and pools.	High—spawning during migration
Sacramento River winter-run Chinook salmon *Oncorhynchus tshawytscha*	E/E	Mainstem Sacramento River below Keswick Dam (Moyle 2002)	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools. (Moyle 2002.)	High—spawning during migration
Central Valley spring-run Chinook salmon *Oncorhynchus tshawytscha*	T/T	Upper Sacramento River and Feather River	Has the same general habitat requirements as winter-run Chinook salmon. Coldwater pools are needed for holding adults (Moyle 2002).	High—spawning during migration
Central Valley fall-/late fall–run Chinook salmon *Oncorhynchus tshawytscha*	SC/SSC	Sacramento and San Joaquin Rivers and tributary Central Valley rivers	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	High—spawning during migration

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Occurrence in the Study Area
Green sturgeon (southern DPS) *Acipenser medirostris*	T/SSC	Sacramento, Klamath and Trinity Rivers (Moyle 2002)	Spawn in large river systems with well-oxygenated water, with temperatures from 8.0 to 14°C	High—spawning during migration
River lamprey *Lampetra ayresi*	–/SSC	Sacramento, San Joaquin, and Napa Rivers; tributaries of San Francisco Bay (Moyle 2002; Moyle et al. 1995)	Adults live in the ocean and migrate into fresh water to spawn	High—spawning during migration

[a] Species Definitions

Federal

E = endangered under the Federal Endangered Species Act
T = threatened under the Federal Endangered Species Act
SC = species of concern
– = no listing

State

E = endangered under the California Endangered Species Act
T = threatened under the California Endangered Species Act.
SSC = species of special concern
– = no listing

Chinook Salmon

Chinook salmon are anadromous fish, meaning that adults live in marine environments and return to their natal freshwater streams to spawn. Juveniles rear in freshwater for a period of up to 1 year until smoltification (i.e., a physiological preparation for survival in marine environs) and subsequent ocean residence.

Four distinct runs of Chinook salmon occur in the Sacramento River system: winter-run, spring-run, fall-run, and late fall–run. The runs are named after the season of adult migration, with each run having a distinct combination of adult migration, spawning, juvenile residency, and smolt migration periods. In general, fall- and late fall-run Chinook salmon spawn soon after entering their natal streams, while spring- and winter-run Chinook salmon typically hold in their natal streams for up to several months before spawning.

Winter Run

Both the ESA and CESA list the winter-run Chinook salmon ESU as an endangered species. Critical habitat for winter-run Chinook salmon includes the Sacramento River from Keswick Dam (river mile [RM] 302) to Chipps Island (RM 0) in the Delta (National Marine Fisheries Service 1997).

Historically, winter-run Chinook salmon spawned in cold tributary streams upstream of present-day Shasta Reservoir, including the Little Sacramento, Pit, McCloud, and Fall Rivers and Battle Creek. Presently, winter-run Chinook salmon persist in the Sacramento River below Keswick Dam and are sustained by coldwater releases from Shasta Reservoir.

Adult winter-run Chinook salmon immigration (upstream migration) through the Delta and into the Sacramento River occurs from December through July, with peak immigration from January through April. Winter-run Chinook salmon spawn primarily in the mainstem Sacramento River between Keswick Dam (RM 302) and the Red Bluff Diversion Dam (RM 242). Winter-run Chinook salmon spawn between late April and mid-August, with peak spawning generally occurring in June (Snider et al. 2000) (Table 4.8-2).

Juvenile emigration (downstream migration) past the Red Bluff Diversion Dam (RM 242) begins in late July, peaks during September, and may extend through mid-March (National Marine Fisheries Service 1997). The peak period of juvenile emigration through the lower Sacramento River into the Delta generally occurs between January and April (National Marine Fisheries Service 1997) (Table 4.8-2). Differences in peak emigration periods between these two locations suggest that juvenile winter-run Chinook salmon may exhibit a sustained residence in the upper or middle reaches of the Sacramento River before entering the lower Sacramento River and the Delta. Although the location and extent of rearing in these lower or middle reaches is unknown, it is believed that the duration of fry presence in an area is directly related to the magnitude of river flows during the rearing period (Stevens 1989). Additional information on life history and habitat requirements is available in the biological opinion (BO), which was developed specifically to evaluate effects on winter-run Chinook salmon associated with Central Valley Project (CVP) and State Water Project (SWP) operations (National Marine Fisheries Service 1993).

Spring Run

The Central Valley spring-run Chinook salmon ESU, which includes populations spawning in the Sacramento River and its tributaries, is listed as threatened under ESA and CESA. Critical habitat is designated for spring-run Chinook salmon in the Sacramento River, but the Sacramento DWSC is excluded from the critical habitat designation (70 FR 52596).

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 spring-run Chinook salmon populations are the Sacramento River and its tributaries, including the Yuba River, Mill Creek, Deer Creek, and Butte Creek.

Spring-run Chinook salmon enter the Sacramento River from late March through September (Reynolds et al. 1993), but peak abundance of immigrating adults in the Delta and lower Sacramento River occurs from April through June (Table 4.8-2). Adult spring-run Chinook salmon remain in deep-water habitats downstream of spawning areas during summer until their eggs fully develop and become ready for spawning. This is the primary characteristic that distinguishes spring-run Chinook salmon from the other runs. Spring-run Chinook salmon spawn primarily upstream of the Red Bluff Diversion Dam and in the aforementioned tributaries. Spawning occurs from mid-August through early October (Reynolds et al. 1993) (Table 4.8-2). A small portion of an annual year-class may emigrate as post-emergent fry (less than 1.8 inches long) and reside in the Delta undergoing smoltification. However, most are believed to rear in the upper river and tributaries during winter and spring, emigrating as juveniles (more than 1.8 inches long). The timing of juvenile emigration from the spawning and rearing reaches can vary depending on tributary of origin and can occur from November through June (Table 4.8-2).

Fall and Late Fall Run

Central Valley fall-run and late fall–run Chinook salmon are commercially and recreationally important. These ESUs are Federal species of concern. Because the fall-run Chinook salmon is currently the largest run of Chinook salmon in the Sacramento River system, it continues to support commercial and recreational fisheries of significant economic importance.

All Central Valley streams that had adequate flows in the fall, even if they were intermittent during the summer, probably supported fall-run Chinook salmon. Unlike spring- and winter-run Chinook salmon that migrated to higher elevation streams, fall-run Chinook salmon likely were limited to streams of the valley floor and lower foothill reaches because of their egg-laden and generally deteriorated physical condition.

In general, adult fall-run Chinook salmon migrate into the Sacramento River and its tributaries from July through December, with immigration peaking from mid-October through November (Table 4.8-2). Fall-run Chinook salmon spawn in numerous tributaries of the Sacramento River, including the lower American River, lower Yuba River, Feather River, and tributaries of the upper Sacramento River. Most mainstem Sacramento River spawning occurs between Keswick Dam and the Red Bluff Diversion Dam. A greater extent of fall-run spawning, relative to the other three runs, occurs below the Red Bluff Diversion Dam, with limited spawning potentially occurring as far downstream as Tehama (RM 220) (Yoshiyama et al. 1996). Spawning generally occurs from October through December, with fry emergence typically beginning in late December and January (Table 4.8-2). Fall-run Chinook salmon emigrate as post-emergent fry, juveniles, and smolts after rearing in their natal streams for up to 6 months. Consequently, fall-run emigrants may be present in the lower Sacramento River from January through June (Reynolds et al. 1993) (Table 4.8-2) and remain in the Delta for variable lengths of time before ocean entry.

Adult immigration of late fall-run Chinook salmon into the Sacramento River generally begins in October, peaks in December, and ends in April (Moyle et al. 1995) (Table 4.8-2). Primary spawning areas for late fall-run Chinook salmon are located in tributaries of the upper Sacramento River (e.g., Battle Creek, Cottonwood Creek, Clear Creek, Mill Creek), although late fall-run Chinook salmon are believed to return to the Feather and Yuba Rivers as well (Moyle et al. 1995). Spawning in the mainstem Sacramento River occurs primarily from Keswick Dam (RM 302) to the Red Bluff Diversion Dam (RM 258), generally from January through April (Moyle et al. 1995). Juveniles emigrate through the lower Sacramento River primarily from October through April (Table 4.8-2).

Central Valley Steelhead

Central Valley steelhead is listed as threatened under the ESA. Critical habitat is designated for steelhead in the Sacramento River, but the Sacramento DWSC is excluded from the critical habitat designation (70 FR 52596). Steelhead, an anadromous variant of rainbow trout, is closely related to Pacific salmon. The species was once abundant in California coastal and Central Valley drainages. However, population numbers have declined significantly in recent years, especially in the tributaries of the Sacramento River. Steelhead typically migrate to marine waters after spending 1 year or more in fresh water. In the marine environment, they typically mature for 1 to 3 years before returning to their natal streams to spawn as 3- or 4-year-olds. Unlike Pacific salmon, steelhead are capable of spawning more than once before they die. Immigration of adult steelhead in the Sacramento River occurs in nearly all months but peaks in late September and October (Moyle 2002). The steelhead spawning season typically stretches from December through April (Table 4.8-2). After several months, fry emerge from the gravel and begin to feed. Juveniles rear in fresh water from 1 to 4 years (usually 2 years), then migrate to the ocean as smolts in the spring (March through June).

Sacramento Splittail

Sacramento splittail is a California species of special concern. Sacramento splittail is an endemic California minnow that was once widely distributed in lakes and rivers throughout the Central Valley, including the Sacramento River upstream to Redding and the American River as far east as Folsom (Moyle 2002). Present distribution includes Suisun Bay, the Napa and Petaluma Rivers (Sommer et al. 1997), the Sacramento River as far north as the Red Bluff Diversion Dam, portions of the Delta, and the San Joaquin River upstream of its confluence with the Tuolumne River (Moyle 2002).

Adult splittail usually reach sexual maturity in their second year. They then migrate upstream in late fall to early winter before spawning. Spawning occurs from mid-winter through July in water temperatures between 48°F and 68°F (Wang 1986) at times of high winter or spring runoff (Moyle et al. 1995). Eggs acquire adhesive properties following exposure to water and adhere to vegetation or other benthic substrates (Wang 1986). Fertilized eggs generally hatch in 3 to 5 days, and larvae begin feeding on plankton soon thereafter. Juvenile splittail inhabit shallow areas with abundant vegetation that are devoid of strong currents (Wang 1986) as they travel downstream from the spawning grounds to the Delta.

Mature splittail are generally found in the shallows of sloughs in edgewater habitat by emergent vegetation. They feed primarily on benthic invertebrates and aquatic insect larvae (Moyle 2002). Although they are tolerant of brackish water (Moyle 2002), splittail tend to move from areas of relatively high salinity to those characterized by fresh water (Moyle et al. 1995).

Delta Smelt

Delta smelt are listed as threatened under the ESA and CESA. Critical habitat is designated from the Delta into the Sacramento River. Estuarine rearing habitat for juvenile and adult delta smelt is typically found in the waters of the lower Delta and Suisun Bay where salinity is between 2 and 7 parts per thousand (ppt). Delta smelt tolerate 0 to 19 ppt salinity. They typically occupy open shallow waters but also occur in the main channel in the region where fresh and brackish water mix. The zone may be hydraulically conducive to their ability to maintain position and metabolic efficiency (Moyle 2002).

Adult delta smelt begin spawning migration into the upper Delta in December or January (Table 4.8-2). Migration may continue over several months. Spawning occurs between January and July, with peak spawning during April through mid-May (Moyle 2002) (Table 4.8-2). Spawning occurs along the channel edges in the upper Delta, including the Sacramento River above Rio Vista, Cache Slough, Lindsey Slough, and Barker Slough. Spawning has been observed in the Sacramento River up to Garcia Bend during drought conditions, possibly attributable to adult movement farther inland in response to saltwater intrusion (Wang and Brown 1993). Eggs are broadcast over the river bottom where they attach to firm substrate, woody material, and vegetation. Hatching takes approximately 9 to 13 days, and larvae begin feeding 4 to 5 days later. Newly hatched larvae contain a large oil globule and are semi-buoyant. Larval smelt feed on rotifers and other zooplankton. As their fins and swim bladder develop, they move higher into the water column. Larvae and juveniles gradually move downstream toward rearing habitat in the estuarine mixing zone (Wang 1986).

Green Sturgeon

NMFS has divided sturgeon into two DPSs: the southern and northern DPS. The northern DPS comprises sturgeon from the Eel River northward; the southern DPS comprises populations below the Eel, specifically the Sacramento River population (71 FR 17757). The southern DPS, which occurs in the study area, is federally listed as threatened (71 FR 17757, April 7, 2006). In October 2009, NMFS designated critical habitat for green sturgeon in the Sacramento River which includes the project area (74 FR 52300). Green sturgeon are known to occur in the lower reaches of large rivers, including the Klamath, Eel, and Smith Rivers from the Delta northward (Moyle 2002). Green sturgeon also have been found in saltwater from Ensenada, Mexico, to the Bering Sea and Japan (Miller and Lea 1972). Adults of this species tend to be associated with marine environments more than the more common white sturgeon, although spawning populations have been identified in the Sacramento and Klamath rivers (Beak Consultants 1993). Virtually all green sturgeon spawning occurs upstream of Hamilton City and as far upstream as Keswick Dam (Adams et al. 2002). Green sturgeon are thought to spawn upstream of the Red Bluff Diversion Dam following modifications to the operation of that facility (Adams et al. 2002). The preferred spawning substrate is thought to be large cobble, although the substrate type may range from clean sand to bedrock. Eggs are broadcast and fertilized in relatively fast-flowing water where depths typically exceed 10 feet (Moyle 2002). In the Sacramento River, green sturgeon presumably spawn at temperatures ranging from 46°F to 57°F (Beak Consultants 1993).

River Lamprey

River lamprey is a state species of special concern. River lamprey are relatively small (averaging 6.7 inches long) and highly predaceous (Moyle 2002). They are anadromous and will attack fish in both fresh and saltwater (Moyle 2002). A great deal of what is known about the species is based on populations in British Columbia. There, adults migrate from the Pacific Ocean into rivers and streams in September and spawn in winter. Adults excavate a saucer-shaped depression in sand or gravel riffles where eggs are deposited. After spawning, the adults perish. Juvenile river lamprey, called ammocoetes, remain in backwaters for several years where they feed on algae and microorganisms (Moyle et al. 1986). The metamorphosis from juvenile to adult begins in July and is complete by the following April. From May through July, following completion of metamorphosis, river lamprey aggregate in the Delta before entering the ocean.

River lamprey is distributed in streams and rivers along the eastern Pacific Ocean from Juneau, Alaska, to San Francisco Bay. They may be most abundant in the Sacramento and San Joaquin River systems, although they are only rarely observed (Moyle et al. 1986).

Table 4.8-2. Life Stage Timing and Distribution of Selected Species Potentially Affected by The Rivers EIP

Species/Life Stage	Distribution	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Winter-Run Chinook Salmon													
Adult migration and holding	S.F. Bay to Upper Sacramento River												
Juvenile rearing (natal stream)	Upper Sacramento River to S.F. Bay												
Juvenile movement and rearing	Upper Sacramento River to S.F. Bay												
Spring-Run Chinook Salmon													
Adult migration	S.F. Bay to Upper Sacramento River and Tributaries												
Juvenile movement	Upper Sacramento River and Tributaries to S.F. Bay												
Late Fall–Run Chinook Salmon													
Adult migration	S.F. Bay to Upper Sacramento River and Tributaries												
Juvenile movement and rearing	Upper Sacramento River and Tributaries												
Fall-Run Chinook Salmon													
Adult migration and holding	S.F. Bay to Upper Sacramento River and Tributaries												
Juvenile movement	Upper Sacramento River and Tributaries to S.F. Bay												
Steelhead													
Adult migration	S.F. Bay to Upper Sacramento River and Tributaries												
Juvenile and smolt movement	Upper Sacramento River and Tributaries to S.F. Bay												

Species/Life Stage	Distribution	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Green Sturgeon													
Adult migration and holding	S.F. Bay to Upper Sacramento River												
Juvenile rearing (natal stream to estuary)	Upper Sacramento River to S.F. Bay												
Juvenile movement and rearing	Upper Sacramento River to S.F. Bay												
Delta Smelt													
Adult migration	South Delta to North Delta and Lower Sacramento River												
Spawning	Upper Delta to Lower Sacramento River												
River Lamprey													
Adult migration and spawning	Pacific Ocean to Sacramento River												
Metamorphosis and movement	Sacramento River to Delta												

Sources: Wang and Brown 1993, U.S. Fish and Wildlife Service 1996, McEwan 2001, Moyle 2002, Hallock 1989,Beamesderfer et al. 2006

Note: Primary occurrence included in the assessment of project effects

4.8.2.2.4 Factors that Affect Abundance of Fish Species

Information relating abundance with environmental conditions is most available for listed species, especially Chinook salmon. The following section focuses on factors that have potentially affected the abundance of listed species in the Central Valley. Although not all species are discussed, factors affecting the listed species are assumed also to affect the abundance of other native and non-native species in similar fashion.

Spawning Habitat Area

Spawning habitat area may limit the production of juveniles and subsequent adult abundance of some species. Spawning habitat area for fall- and late fall–run Chinook salmon, which compose more than 90% of the Chinook salmon returning to the Central Valley streams, has been identified as limiting their population abundance. Existing spawning habitat area has not been identified as a limiting factor for the less-abundant winter-run and spring-run Chinook salmon (National Marine Fisheries Service 1996, U.S. Fish and Wildlife Service 1996), although habitat may be limiting in some streams (e.g., Butte Creek) during years of high adult abundance.

Delta smelt spawn in fresh water at low tide on aquatic, submerged, and inshore plants and over sandy and hard bottom substrates of sloughs and shallow edges of channels in the upper Delta and Sacramento River above Rio Vista (Wang 1986, Moyle 2002). Spawning habitat area has not been identified as a factor affecting delta smelt abundance (U.S. Fish and Wildlife Service 1996), but little is known about specific spawning areas and requirements in the Delta.

A lack of sufficient seasonally flooded vegetation may limit splittail spawning success (Young and Cech 1996, Sommer et al. 1997). Splittail spawn over flooded vegetation and debris on floodplains inundated by high flows from February to early July in the Sacramento River and San Joaquin River systems. The onset of spawning appears to be associated with rising water levels, increasing water temperature, and day length (Moyle 2002). The Sutter and Yolo Bypasses along the Sacramento River are important spawning habitat areas during high flow.

Rearing Habitat Area

Rearing habitat area may limit the production of juveniles and subsequent adult abundance of some species. USFWS (1996) has indicated rearing habitat area in Central Valley streams and rivers limits the abundance of juvenile fall-run and late fall–run Chinook salmon and juvenile steelhead. Rearing habitat for salmonids is defined by environmental conditions such as water temperature, dissolved oxygen (DO), turbidity, substrate, water velocity, water depth, and cover (Jackson 1992, Bjornn and Reiser 1991, Healey 1991). Chinook salmon also rear along the shallow vegetated edges of Delta channels (Grimaldo et al. 2000).

Environmental conditions and interactions among individuals, predators, competitors, and food sources determine habitat quantity and quality and the productivity of the stream (Bjornn and Reiser 1991). Everest and Chapman (1972) found juvenile Chinook salmon and steelhead of the same size using similar in-channel rearing area.

Rearing area varies with flow. High flow increases the area available to juvenile Chinook salmon because they extensively use submerged terrestrial vegetation on the channel edge and the floodplain. Deeper inundation provides more overhead cover and protection from avian and terrestrial predators than shallow water (Everest and Chapman in Jackson 1992). In broad, low-gradient rivers, change in flow can greatly increase or decrease the lateral area available to juvenile Chinook salmon, particularly in riffles and shallow glides (Jackson 1992).

Rearing habitat for larval and early juvenile delta smelt encompasses the lower reaches of the Sacramento River below Isleton and the San Joaquin River below Mossdale. Estuarine rearing by juveniles and adults occurs in the lower Delta and Suisun Bay. USFWS (1996) has indicated that loss of rearing habitat area would adversely affect the abundance of larval and juvenile delta smelt. The area and quality of estuarine rearing habitat are assumed to be dependent on the downstream location of approximately 2 ppt salinity (Moyle et al. 1992). The condition where 2 ppt salinity is located in the Delta is assumed to provide less habitat area and lower quality than the habitat provided by 2 ppt salinity located farther downstream in Suisun Bay. During years of average and high outflow, delta smelt may concentrate anywhere from the Sacramento River around Decker Island to Suisun Bay (Moyle 2002). This geographic distribution may not always be a function of outflow and 2 ppt isohaline position. Outflow and the position of the 2 ppt isohaline may account for only about 25% of the annual variation in abundance indices for delta smelt (California Department of Water Resources and Bureau of Reclamation 1994).

Rearing habitat has not been identified as a limiting factor in splittail population abundance, but as with spawning, a lack of sufficient seasonally flooded vegetation may be limiting population abundance and distribution (Young and Cech 1996). Rearing habitat for splittail encompasses the Delta, Suisun Bay, Suisun Marsh, the lower Napa River, the lower Petaluma River, and other parts of San Francisco Bay (Moyle 2002). In Suisun Marsh, splittail concentrate in the dead-end sloughs that have small streams feeding into them (Daniels and Moyle 1983; Moyle 2002). As splittail grow, salinity tolerance increases (Young and Cech 1996). Splittail are able to tolerate salinity concentrations as high as 29 ppt and as low as 0 ppt (Moyle 2002).

Migration Habitat Conditions

The Sacramento River and the Delta provide a migration pathway between freshwater and ocean habitats for adult and juvenile steelhead and all runs of Chinook salmon.

Migration habitat conditions include streamflows that provide suitable water velocities and depths that provide successful passage. Flow in the Sacramento River and in the Delta provides the necessary depth, velocity, and water temperature; however, flow and environmental conditions in the Central Valley are not always at optimal levels (e.g., see discussion below for water temperature). In the Delta, the channel pathways affect migration of juvenile Chinook salmon. Juvenile Chinook salmon survival is lower for fish migrating through the central Delta (i.e., diverted into the Delta Cross Channel and Georgiana Slough) than for fish continuing down the Sacramento River (Newman and Rice 1997). Similarly, juvenile Chinook salmon entering the Delta from the San Joaquin River appear to have higher survival rates if they remain in the San Joaquin River channel instead of moving into Old River and the south Delta (Brandes and McLain 2001).

Larval and early juvenile delta smelt are transported by currents that flow downstream into the upper end of the mixing zone of the estuary where incoming saltwater mixes with outflowing fresh water (Moyle et al. 1992). Reduced flow may adversely affect transport of larvae and juveniles to rearing habitat.

Adult splittail gradually move upstream during the winter and spring months to spawn. Year-class success of splittail is positively correlated with wet years, high Delta outflow, and floodplain inundation (Sommer et al. 1997; Moyle 2002). Low flow impedes access to floodplain areas that support rearing and spawning.

Water Temperature

Fish species have different responses to water temperature conditions depending on their physiological adaptations. Salmonids in general have evolved under conditions in which water temperatures need to be relatively cool. Delta smelt and splittail can tolerate warmer temperatures. In addition to species-specific thresholds, different life stages have different water temperature requirements. Eggs and larval fish are the most sensitive to warm water temperature.

Unsuitable water temperatures for adult salmonids such as Chinook salmon and steelhead during upstream migration lead to delayed migration and the potential for lower reproduction rates. Elevated summer water temperatures in holding areas cause mortality of spring-run Chinook salmon (U.S. Fish and Wildlife Service 1996). Warm water temperature and low DO also increase egg and fry mortality. USFWS (1996) cited elevated water temperatures as limiting factors for fall- and late fall-run Chinook salmon.

Juvenile salmonid survival, growth, and vulnerability to disease are affected by water temperature. In addition, water temperature affects prey species abundance and predator occurrence and activity. Juvenile salmonids alter their behavior depending on water temperature, including movement to take advantage of local water temperature refugia (e.g., movement into stratified pools, shaded habitat, subsurface flow) and improve feeding efficiency (e.g., movement into riffles).

Water temperature in Central Valley rivers frequently exceeds the tolerance of Chinook salmon and steelhead life stages. For example, adult fall-run Chinook salmon have been observed to stop their upstream migration when water temperatures exceed 66°F (Hallock et al. 1970). For Chinook salmon eggs and larvae, survival during incubation is assumed to decline with increasing temperature between 54°F and 61°F (Myrick and Cech 2001, Seymour 1956 in Alderice and Velsen 1978). For juvenile Chinook salmon, survival is assumed to decline as temperature warms from 64°F to 75°F (Myrick and Cech 2001; Rich 1987). Relative to rearing, Chinook salmon require cooler temperatures to complete the parr-smolt transformation and maximize their saltwater survival. Successful smolt transformation is assumed to deteriorate at temperatures ranging from 63°F to 73°F (Marine 1997 in Myrick and Cech 2001, Baker et al. 1995).

For steelhead, successful adult migration and holding are assumed to deteriorate as water temperature warms between 52°F and 70°F. Adult steelhead appear to be much more sensitive to thermal extremes than are juveniles (National Marine Fisheries Service 1996, McCullough 1999). Conditions supporting steelhead spawning and incubation are assumed to deteriorate as temperature warms between 52°F and 59°F (Myrick and Cech 2001). Juvenile rearing success is assumed to deteriorate at water temperatures ranging from 63°F to 77°F (Raleigh et al. 1984, Myrick and Cech 2001). Relative to rearing, smolt transformation requires cooler temperatures, and successful transformation occurs at temperatures ranging from 43°F to 50°F. Juvenile steelhead, however, have been captured at Chipps Island in June and July at water temperatures exceeding 68°F (Nobriga and Cadrett 2001). Juvenile Chinook salmon have also been observed to migrate at water temperatures warmer than expected based on laboratory experimental results (Baker 1995).

Delta smelt and splittail populations are adapted to water temperature conditions in the Delta. Delta smelt may spawn at temperatures as high as 72°F (U.S. Fish and Wildlife Service 1996) and can rear and migrate at temperatures as warm as 82°F (Swanson and Cech 1995). Splittail may withstand temperatures as warm as 91°F but prefer temperatures between 66°F and 75°F (Young and Cech 1996).

Entrainment

All fish species are entrained to varying degrees by the SWP and CVP Delta export facilities and many other smaller diversions in the Delta and Central Valley rivers. Fish entrainment and subsequent mortality are highly variable among species and may be a function of the size of the diversion, the location of the diversion, the behavior of the fish (Swanson et al. 2004, 2005), and other factors, such as fish screens, the presence of predatory species, and water temperature. Diversions that divert relatively little water from the total channel and with low approach velocities are assumed to minimize stress and protect fish from entrainment.

Juvenile striped bass populations have steadily declined since the mid-1960s partially because of entrainment losses of eggs and young fish at water diversions (Foss and Miller 2001). The CVP and SWP fish facilities indicate entrainment of adult delta smelt during spawning migration from December through April (California Department of Water Resources and Bureau of Reclamation 1994). Juveniles are entrained primarily from April through June. Young-of-year splittail are entrained between April and August when fish are moving downstream into the estuary (Cech et al. 1979 as cited in Moyle 2002). Juvenile Chinook salmon are entrained in all months but primarily from November through June when juveniles are migrating downstream.

Although several studies documenting entrainment at small, unscreened Delta diversions are available, few address population-level effects or accurately estimate the total loss of fish at the diversions studied (Moyle and Israel 2005). Some diversions may in fact entrain large numbers of individuals. However, many studies report capturing mostly larval or post-larval fish, with the majority of the catch being dominated by non-native species such as gobies, threadfin shad, and striped bass (Cook and Buffaloe 1998, Nobriga et al. 2004).

Contaminants

In the Sacramento and San Joaquin River basins, industrial and municipal discharge and agricultural runoff transport contaminants into rivers and streams that ultimately flow into the Delta. Principal pollutants in the Delta are agricultural chemicals and their derivatives (Herbold et al. 1992). Organophosphate insecticides, such as carbofuran, chlorpyrifos, and diazinon, are present throughout the Central Valley and dispersed in agricultural and urban runoff. The "first-flush" storm event or the "dormant spray" storm event is of most concern because of the higher concentration of contaminants in the runoff. In particular, diazinon and chlorpyrifos are applied to control wood-boring insects in dormant stone fruit orchards from December to February (Zamora et al. 2003). These contaminants enter rivers in winter runoff and enter the estuary in concentrations that can be toxic to invertebrates (CALFED Bay-Delta Program 2000). Unlike severe bioaccumulators such as organochlorine pesticides, organophosphate pesticides are typically metabolized by most invertebrates. However, some organophosphate pesticides do not bioaccumulate, and some do bioaccumulate. In particular, diazinon has a solubility of 68.9 milligrams per liter (mg/L) (at 68°F), but should not bioaccumulate in aquatic organisms (Zamora et al. 2003). Chlorpyrifos, on the other hand, is more persistent in the environment and tends to be hydrophobic to the water column. Chlorpyrifos has a lower solubility than diazinon (1.12 mg/L at 75°F) and has a significant potential to bioaccumulate in aquatic organisms (Zamora et al. 2003). Because some organophosphate may accumulate in living organisms, they may become toxic to fish species, especially those life stages that remain in the system year-round and spend considerable time there during the early stages of development, such as Chinook salmon, steelhead, splittail, green sturgeon, and delta smelt.

Mercury contamination from historical mining activities is extensive on both sides of the Central Valley and occurs primarily from widely scattered hydraulic mining debris along eastside tributaries and active abandoned mines and associated debris piles on the west side. These sources continue to deposit significant amounts of mercury into the Bay-Delta system. The Cosumnes River, Yolo Bypass, and Sacramento River are the primary ongoing sources of mercury contamination in the Bay-Delta. Mercury occurs in several forms, including pure elemental mercury and toxic methylmercury. Mercury is mobile in aquatic systems as aqueous mercury or when attached to suspended particulate matter. Methylmercury is a significant water quality concern because small amounts can bioaccumulate in fish to levels that are toxic to humans and wildlife. In the Delta, mercury concentrations in bluegill, Sacramento sucker, and largemouth bass have been found to exceed the human health standard of 0.5 part per million (ppm) by two to six times (Slotten 1991).

Other contaminants of particular concern in the Bay-Delta system include high concentrations of trace elements such as selenium, copper, cadmium, and chromium; however, their effects on higher trophic levels are poorly understood, in part as a result of the complex distribution of high concentrations in both time and space (Herbold et al. 1992). In general, it appears that the highest concentrations occur in areas where human activity adjacent to the bay is also the highest. Although these trace elements also occur naturally, concentrations of these trace elements have been found to be high enough to adversely affect the growth and reproduction of aquatic animals in laboratory experiments (Herbold et al. 1992).

Further discussion on water quality constituents of concern can be found in Section 4.2, Water Quality and Groundwater Resources.

Predation

Nonnative species cause substantial predation mortality on native species. Studies at Clifton Court Forebay estimated predator-related mortality of hatchery-reared fall-run Chinook salmon to be from about 60% to more than 95%. Although the predation contribution to mortality is uncertain, the estimated mortality suggests that striped bass and other predatory fish, primarily non-native, pose a threat to juvenile Chinook salmon moving downstream, especially where the stream channel has been altered from natural conditions. Turbulence from water passing over dams and other structures may disorient juvenile Chinook salmon and steelhead, increasing their vulnerability to predators. Predators such as striped bass, largemouth bass, and catfish also prey on delta smelt and splittail (U.S. Fish and Wildlife Service 1996).

Food

Food availability and type affect survival of fish species. Species such as threadfin shad and wakasagi may affect delta smelt survival through competition for food. Introduction of non-native food organisms also may have an effect on delta smelt and other species' survival. Non-native zooplankton species are more difficult for small smelt and striped bass to capture, increasing the likelihood of larval starvation (Moyle 2002). Splittail feed on opossum shrimp, which in turn feed on native copepods that have shown reduced abundance, potentially attributable to the introduction of non-native zooplankton and the Asiatic clam (*Potamorcorbula amurensis)*. In addition, flow affects the abundance of food in rivers, the Delta, and Suisun Bay. In general, higher flows result in higher productivity, including a higher input of nutrients from channel margins and floodplain inundation, and higher production when low salinity occurs in the shallows of Suisun Bay. Higher productivity increases the availability of prey organisms for delta smelt and other fish species.

4.8.3 Environmental Consequences

This section describes the environmental consequences relating to fisheries and aquatic resources for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.8.3.1 Assessment Methods

4.8.3.1.1 Prefield Investigation

To prepare for the field surveys and analysis of the potential effects of the proposed project on fish species, fisheries biologists reviewed existing resource information related to the study area to evaluate whether sensitive habitats and special-status fish species are known from or could occur in the study area. The information reviewed included the following sources:

- a USFWS list of endangered, threatened, and proposed species for the Sacramento West, Clarksburg, Liberty Island, and Rio Vista USGS 7.5-minute quadrangle and Sacramento and Yolo Counties (U.S. Fish and Wildlife Service 2009); and
- published and unpublished documents and reports pertaining to the study area.

4.8.3.1.2 Field Surveys

A reconnaissance-level survey of the study area was conducted by an ICF International fisheries biologist on October 26, 2007. During the survey, fish habitat was identified and evaluated for its ability to support special-status fish species.

4.8.3.2 Determinations of Effects

For this analysis, an effect pertaining to special-status fish species and their habitats was considered adverse under NEPA or significant under CEQA if it would result in any of the following environmental effects, which are based on professional practice and CEQA Guidelines Appendix G (14 CCR 15000 *et seq.).*

Assessment species are selected based on listing under the ESA and/or CESA. An effect was considered adverse under NEPA and significant under CEQA if project actions would substantially reduce the abundance and distribution of the identified important fish species. Additionally, significant effects may occur if the project alternatives would result in:

- substantial interference with the movement of any resident or migratory fish species;
- substantial long- or short-term loss of habitat quality or quantity;
- substantial adverse effects on rare or endangered species, candidate species, other special-status species, or habitat of the species; or
- substantial adverse effects on fish communities or species protected by applicable environmental plans and goals.

4.8.3.2.1 Effect Assumptions

The determination of significance requires that:

- environmental conditions are measurably changed by the project,
- the change in environmental conditions significantly affects a species or its habitat,
- the change in environmental conditions is permanent or ongoing or affects a substantial proportion of the species population, or
- species population abundance is likely reduced, including a short-term reduction.

Qualitative relationships between environmental conditions and life stage survival are the basis of the effect assessment. Cause-and-effect relationships are identified for assessment species, including the relationship between environmental conditions and habitat and the effects of changes in habitat on survival. Determination of significance requires a qualitative or quantitative assessment of population sensitivity to changes in survival of specific life stages.

4.8.3.2.2 Effect Mechanisms

The assessment of effects considers the occurrence and potential occurrence of species and life stages relative to the magnitude, timing, frequency, and duration of project activities. Species habitat attributes potentially affected by construction activities include rearing habitat area and migration habitat conditions. Short-term effects on fish species attributable to bank protection activities include water quality effects and noise and disturbance. Long-term effects on fish habitat include loss of aquatic vegetation and SRA cover. This evaluation of effects on special-status fish species was based on the analysis of the proposed levee treatments.

Short-term construction effects are evaluated qualitatively based on general knowledge of the physiological tolerances and behavioral responses of listed fish species to potential increases in turbidity and suspended sediment, noise, and contaminants.

4.8.4 Effects and Mitigation Measures

4.8.4.1 No Action Alternative

The No Action Alternative would consist of the continuation of the existing deficiencies along the portion of the Sacramento River North Levee reach encompassed by The Rivers EIP project area (i.e., no levee improvements would be implemented to meet the minimum level of acceptable flood protection). Current levee operations and maintenance activities would continue. No construction-related release of contaminants would occur, and no noise and disturbance to special-status fish species or construction-related loss of habitat for special-status fish species would occur. The current levee maintenance activities, including mowing and application of herbicides, would continue.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento River North Levee could fail due to under-seepage, slope stability, or geometry issues would continue. Failure of the Sacramento River North Levee, depending on the magnitude of the event, could cause catastrophic flooding.

A catastrophic levee failure could result in the displacement of fish into flooded areas and the potential for stranding and mortality. In addition, adverse water quality effects could result from the release of hazardous materials during a flooding event, which could lead to stress and direct mortality or adversely affect migration, spawning and rearing habitat of fish species in the Sacramento River, Yolo Bypass, and the Delta. Emergency clean-up and earth-moving activities could also result in an increase in sediment and turbidity and the release of hazardous materials into the Sacramento River, the Delta and adjacent waterways that adversely affect migration, spawning or rearing habitat, or result in direct mortality of special status fish species. Depending on the magnitude of the flood, emergency clean-up activities could last for days, weeks, or even months. If a flood occurred in late winter, clean-up activities could last into the spring, a critical time for migration, movement, and rearing of winter-run and spring-run Chinook salmon, steelhead, and green sturgeon. Given the unpredictable nature of emergency clean-up activities, is it likely that implementation of best management practices (BMPs) and measures to reduce effects on fish would not be possible. All of these effects would be considered significant. Furthermore, if levees along the Sacramento River were to collapse, important SRA habitat would be lost. Restoration of this critical habitat could require decades. All of these effects would be considered significant; however, given the uncertainty of the occurrence or magnitude of such an event, potential effects on fisheries cannot be quantified based on available information.

As discussed under the No Action Alternative in Section 4.7, Vegetation and Wetlands, compliance with the vegetation-free zone as described in the USACE's Vegetation Guidance could be required with or without project implementation. This would result in loss of approximately 0.9 acres of riparian vegetation. However, this vegetation is approximately 100 to 150 feet or more from the Sacramento River channel and does not support SRA habitat.

4.8.4.2 The Rivers Applicant Preferred Alternative

Under The Rivers Applicant Preferred Alternative (APA), construction activities would occur approximately 150 feet or more from the Sacramento River channel. Riparian trees (approximately 0.9 acre) would be removed and some nonnative understory vegetation would be trimmed and removed to construct flood and recreation project elements. This vegetation is approximately 100 to 150 feet from the Sacramento River and does not support SRA habitat.

Implementation of The Rivers APA would result in the following effects on fisheries and aquatic resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect FISH-1: Increase in Sedimentation and Turbidity in Adjacent Water Bodies as a Result of Construction	Less than significant	N/A	N/A
Effect FISH-2: Release of Contaminants into Adjacent Water Bodies as a Result of Construction	Less than significant	Less than significant	Mitigation Measure WQ-MM-1, Implement Measures to Maintain Surface Water Quality and Groundwater Quality
Effect FISH-3: Noise and Disturbance of Special-Status Fish Species as a Result of Construction	Less than significant	N/A	N/A

Effect FISH-1: Increase in Sedimentation and Turbidity in Adjacent Water Bodies as a Result of Construction

The proposed project would involve earth-moving activities that could cause erosion and soil disturbance, subsequently resulting in sediment transport and delivery to aquatic habitats. Increases in sedimentation and turbidity have been shown to affect fish physiology, behavior, and habitat. However, the potential for adverse effects on fish from an increase in turbidity and sedimentation is low because the construction activities would be conducted during the typical construction season, which is outside the principal spawning and migration season, and fish abundance is typically low. Should migratory adult or juvenile salmonids be present, such species would be expected to bypass channel reaches with elevated turbidity and sediment levels because a sufficient portion of the channel's width (i.e., zone of passage) would remain unaffected. In addition, the implementation of the environmental commitment of an erosion and sediment control plan would minimize any increase in sedimentation. Therefore, this effect would be considered less than significant.

Effect FISH-2: Release of Contaminants into Adjacent Water Bodies as a Result of Construction

Construction activities for the proposed project may involve storage, use, or discharge of toxic and other harmful substances near the Sacramento River. Construction activities would involve the use of heavy equipment, cranes, compactors, and other construction equipment that uses petroleum products (e.g., fuels, lubricants, hydraulic fluids, coolants). All of these materials may be toxic to fish and other aquatic organisms. Construction activities will occur during the typical construction season, which is outside the principal spawning and migration season, and fish abundance is typically low. However, accidental spills of construction materials such as concrete, fuels, oils, and coolants could occur in adjacent wetlands or small drainage ditches that may drain to adjacent water bodies or the river. WSAFCA and its contractor will adhere to environmental commitments to implement an SWPPP and an SPCCP, and a BSSCP, as described in Section 2.7 of Chapter 2, Alternatives, which would make any construction-related effects on water quality (and fish or fish habitat) less than significant. If a spill were to occur, the SPCCP and BSSCP would be followed and Mitigation Measure WQ-MM-1, Implement Measures to Maintain Surface Water Quality and Groundwater Quality (as described in Section 4.2, Water Quality and Groundwater Resources), would be implemented to ensure water quality is returned to baseline conditions.

Effect FISH-3: Noise and Disturbance of Special-Status Fish Species as a Result of Construction

Construction-related short-term effects on fish would include effects related to noise, vibrations, artificial light, and other physical disturbances caused by heavy equipment operation. These types of physical disturbances can disrupt or delay normal activities, or cause injury or mortality. The potential magnitude of effects depends on a number of factors, including the type and intensity of the disturbance, proximity of the action to the water body, timing of actions relative to the occurrence of sensitive life stages, and frequency and duration of activities.

Construction activities for the proposed project are at a distance from the Sacramento River that these types of effects would be unlikely. In addition, construction-related noise levels are not expected to cause delay or adversely affect upstream or downstream migration of salmon, steelhead, and other migratory species for the reasons listed below.

- Construction would be limited to the typical construction season and during periods of low abundance, and outside the principal spawning and migration season. Typical construction season generally corresponds to the dry season, but The Rivers EIP construction may occur outside the limits of the dry season, only as allowed by applicable permit conditions.
- Migratory and resident fish would likely move upstream, downstream, or laterally to an unaffected portion of the river in response noise or disturbance and would therefore be unaffected.
- If present, migratory species, such as adult and juvenile salmonids, would be expected to bypass channel reaches with noises or disturbances because a sufficient portion of the channel's width (i.e., zone of passage) would remain unaffected.

4.8.4.3 The Rivers Alternative B

Under The Rivers Alternative B, riparian trees would be removed (up to 1 acre) and some nonnative understory vegetation would be trimmed and removed to construct flood and recreation project elements and to comply with USACE vegetation policy. This vegetation is approximately 100 to 150 feet from the Sacramento River and does not support SRA habitat.

Implementation of The Rivers Alternative B would result in the following effects on fisheries and aquatic resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect FISH-1: Increase in Sedimentation and Turbidity in Adjacent Water Bodies as a Result of Construction	Less than significant	N/A	N/A
Effect FISH-2: Release of Contaminants into Adjacent Water Bodies as a Result of Construction	Less than significant	Less than significant	Mitigation Measure WQ-MM-1, Implement Measures to Maintain Surface Water Quality and Groundwater Quality
Effect FISH-3: Noise and Disturbance of Special-Status Fish Species as a Result of Construction	Less than significant	N/A	

Effect FISH-1: Increase in Sedimentation and Turbidity in Adjacent Water Bodies as a Result of Construction

This effect would be the same as described above under The Rivers APA. The potential for adverse effects on fish from an increase in turbidity and sedimentation is low because the construction activities will be conducted during the typical construction season when fish abundance is low and outside the principal spawning and migration season. In addition, the implementation of the environmental commitment of an erosion and sediment control plan would minimize any increase in sedimentation. Therefore, this effect would be considered less than significant.

Effect FISH-2: Release of Contaminants into Adjacent Water Bodies as a Result of Construction

This effect would be the same as described above under The Rivers APA. WSAFCA and its contractor will adhere to environmental commitments to implement an SWPPP and an SPCCP, and a BSSCP, as described in Section 2.7 of Chapter 2, Alternatives, which would make any construction-related effects on water quality (and fish or fish habitat) less than significant. If a spill were to occur, the SPCCP and BSSCP would be followed and Mitigation Measure WQ-MM-1, Implement Measures to Maintain Surface Water Quality and Groundwater Quality (as described in Section 4.2, Water Quality and Groundwater Resources), would be implemented to ensure water quality is returned to baseline conditions.

Effect FISH-3: Noise and Disturbance of Special-Status Fish Species as a Result of Construction

This effect would be the same as described above under The Rivers APA. It is unlikely that construction activities for the proposed project would cause short-term effects on fish because of the project location's distance from the Sacramento River and the typical low abundance of fish in the river during the construction season. This effect is considered less than significant.

Section 4.9
Wildlife—
The Rivers Early Implementation Project

4.9.1 Introduction

This section describes the regulatory and environmental setting for wildlife resources, effects on wildlife resources that would result from the proposed project, and the mitigation measures that would reduce these effects.

Please note: During development of this EIS/EIR, the length of The Rivers project site was reduced (from approximately 4,500 feet in length to 3,035 feet), as described in Approach to the Final EIS/EIR and Chapter 2, Alternatives. The effects analyses portion of these sections have been revised to reflect the shorter presently proposed length. All other resources sections are unchanged from the Draft EIS/EIR.

The key sources of data and information used in the preparation of this section are listed below.

- California Natural Diversity Database (CNDDB) records search of the Sacramento West U.S. Geological Survey (USGS) 7.5-minute quadrangles and the nine quads surrounding each (California Natural Diversity Database 2009)
- U.S. Fish and Wildlife Service (USFWS) list of endangered, threatened, and proposed species for the Sacramento West, Clarksburg, Saxon, Liberty Island, and Rio Vista USGS 7.5-minute quadrangle and Sacramento, Yolo, and Solano Counties (U.S. Fish and Wildlife Service 2009)
- Vegetation data from the Yolo Natural Heritage Program (Yolo Natural Heritage Program 2009)
- Aerial photographs of the project study area
- *City of West Sacramento General Plan 2004* (City of West Sacramento 2004)
- *Yolo County General Plan* (Yolo County 2002)
- Published and unpublished reports
- ICF International file information

An ICF International biologist conducted pre-field investigations and reconnaissance-level field surveys in the study area, as described in the Environmental Consequences section below. This information was used to develop lists of special-status wildlife species that could be present in the study area. Special-status species with potential to occur in the study area are discussed in the Environmental Setting section.

4.9.2 Affected Environment

This section describes the affected environment for wildlife resources in The Rivers EIP project area, including regulatory and environmental setting.

4.9.2.1 Regulatory Setting

4.9.2.1.1 Federal

The following Federal laws, regulations, and policies apply to wildlife resources at The Rivers EIP.

Federal Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973 and subsequent amendments provide for the conservation of listed endangered or threatened species or candidates for listing and the ecosystems on which they depend. USFWS has jurisdiction over federally listed plants, wildlife, and resident fish and National Marine Fisheries Service (NMFS) has jurisdiction over anadromous fish and marine fish and mammals.

Section 7: ESA Authorization Process for Federal Actions

Section 7 of the ESA provides a means for authorizing take of threatened and endangered species by Federal agencies. It applies to actions that are conducted, permitted, or funded by a Federal agency. Under ESA Section 7, the lead Federal agency conducting, funding, or permitting an action must consult with USFWS or NMFS, as appropriate, to ensure that the proposed action will not jeopardize the continued existence of an endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed action may affect a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment (BA) evaluating the nature and severity of the expected effect. In response, USFWS or NMFS issues a biological opinion (BO), with a determination that the proposed action either:

- may jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding), or
- will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

A BO issued by USFWS or NMFS may stipulate discretionary "reasonable and prudent" conservation measures. If it is determined the proposed project would not jeopardize the continued existence of a listed species, USFWS or NMFS would issue an incidental take statement to authorize the proposed activity.

On December 2, 2010, USACE submitted a letter to USFWS requesting concurrence with its determination that The Rivers EIP was not likely to adversely affect VELB (*Desmocerus californicus dimorphus*) or Delta smelt (H*ypomesus transpacificus*). See Appendix H, Correspondence Regarding Special-Status Species.

Section 9: ESA Prohibitions

Section 9 of ESA prohibits the take of any fish or wildlife species listed under ESA as endangered. *Take*, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Harm is defined as "any act that kills or injures the species, including significant habitat modification." Take of threatened species also is prohibited under Section 9 unless otherwise authorized by Federal regulations.[1] Additionally, Section 9 prohibits removing, cutting, and maliciously damaging or destroying federally listed plants on sites under Federal jurisdiction.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes hunting seasons and capture limits for game species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10).

Executive Order 13186 (January 10, 2001) directs each Federal agency taking actions that have or may have a negative effect on migratory bird populations to work with USFWS to develop a memorandum of understanding (MOU) that will promote the conservation of migratory bird populations. Protocols developed under the MOU must include the following agency responsibilities:

- avoid and minimize, to the extent practicable, adverse effects on migratory bird resources when conducting agency actions;
- restore and enhance migratory bird habitats, as practicable; and
- prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable.

The executive order is designed to assist Federal agencies in their efforts to comply with the MBTA, and does not constitute any legal authorization to take migratory birds.

The project will incorporate measures to avoid and minimize adverse effects to migratory birds in order to comply with MBTA.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act, as amended in1946, requires consultation with USFWS and the state fish and wildlife agencies where the waters of any stream or other body of water are proposed, authorized, permitted, or licensed to be impounded, diverted, or otherwise controlled or modified under a Federal permit or license. Consultation is undertaken for the purpose of preventing loss of and damage to wildlife resources.

Consultation with federal and state fish and wildlife agencies (USFWS, NOAA Fisheries, and DFG) will be required prior to project implementation.

Golden and Bald Eagle Protection Act

This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. The USFWS has proposed regulations to create a permit program to authorize limited take of bald eagles and golden eagles where take is associated with otherwise lawful activities. The permits

[1] In some cases, exceptions may be made for threatened species under ESA Section 4[d]; in such cases, USFWS or NMFS issues a “4[d] rule” describing protections for the threatened species and specifying the circumstances under which take is allowed.

will authorize limited, non-purposeful take of eagles; authorizing individuals, companies, government agencies (including tribal governments), and other organizations to disturb or otherwise take eagles in the course of conducting lawful activities such as operating utilities and airports. Most permits issued under the new regulations would authorize disturbance. In limited cases, a permit may authorize the physical take of eagles, but only if every precaution is taken to avoid physical take. Removal of eagle nests would usually be allowed only when it is necessary to protect human safety or the eagles (U.S. Fish and Wildlife Service 2010) (see also the Migratory Bird Treaty Act).

4.9.2.1.2 State

The following state laws, regulations, and policies apply to wildlife resources at the CHP Academy EIP.

California Endangered Species Act

California implemented the California Endangered Species Act (CESA) in 1984. The act prohibits the take of listed endangered and threatened species. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. The California Department of Fish and Game (DFG) administers the act and authorizes take through Section 2081 agreements (except for species designated as fully protected). Swainson's hawk is the only state listed species with known and/ or potential occurrence within the study area. Protection measures for this species have been incorporated into the project to ensure that take does not occur.

California Fish and Game Code

Section 1602 of the California Fish and Game Code (CFGC) requires project proponents to notify DFG before any project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review generally occur during the environmental process. When an existing fish or wildlife resource may be substantially adversely affected, DFG is required to propose reasonable changes to the project to protect the resources. These modifications are formalized in a streambed alteration agreement that becomes part of the plans, specifications, and bid documents for the project.

The CFGC provides protection from take for a variety of species, referred to as fully protected species. CFGC 5050 lists protected amphibians and reptiles. CFGC 5515 prohibits take of fully protected fish species. CFGC 3511 prohibits take of fully protected bird species. Fully protected mammals are protected under CFGC 4700. The CFGC defines take as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research, all take of fully protected species is prohibited.

CFGC 3503 prohibits the killing of birds or the destruction of bird nests. CFGC 3503.5 prohibits the killing of raptor species and destruction of raptor nests. Many bird species could potentially nest in the study area or vicinity. These nests would be protected under these sections of the CFGC.

4.9.2.1.3 Local

City of West Sacramento General Plan

In 1990, the City adopted the *City of West Sacramento General Plan*. The general plan was last revised and adopted in December 8, 2004. The general plan outlines goals and policies related to natural resources within the study area. The following objectives, policies, and implementation procedures are relevant to the study area:

Objective: To protect native vegetation and wildlife communities and habitat in West Sacramento

Policies

1. The City shall encourage and support development projects and programs that enhance public appreciation and awareness of the natural environment.
2. The City shall support state and federal policies for preservation and enhancement of riparian and wetland habitats by incorporating, as deemed appropriate, the findings and recommendations of *Sacramento Greenway Plan*, DFG, and USFWS into site-specific development proposals.
3. The City shall require site-specific surveys to identify significant wildlife habitat and vegetation resources for development projects locate in or near riparian or wetland areas.
4. The City shall support mitigation measures which provide for no net loss of riparian or wetland habitat acreage and value by regulating development in and near these habitats and promoting projects that avoid sensitive areas. Where habitat loss is unavoidable, the City shall seek replacement on at least a 1:1 basis. Replacement entails creating habitat that is similar in extent and ecological value to that displaced by the project. The replacement habitat should consist of locally occurring, native species and shall be located as close as possible to the project site or be part of a larger replacement habitat project.
5. To minimize disturbance to wildlife, the City shall require the provisions and maintenance of an adequate setback between significant wetland habitat and adjacent development. The buffer shall be landscaped with native or compatible introduced ornamental vegetation and may be used for passive recreation purposes.
6. The City shall encourage the maintenance of marsh and riparian vegetation along irrigation/drainage canals and along the Deep Water Ship Channel by encouraging that routine maintenance and clearing disturb only one bank per year and maintain the fringes of marsh vegetation.
7. The City shall seek to minimize the loss and degradation of wetland and riparian habitats at the following sites: Lake Washington and associated wetlands; Bee Lakes and associated riparian woodlands; riparian woodlands along the Sacramento River north of the I Street Bridge and south of the barge canal; and riparian woodlands along the Deep Water Ship Channel and the Yolo Bypass.
8. The City shall seek a cooperative effort with other jurisdictions; the State, and the federal government to conserve habitat. The goal of this effort shall be to preserve and enhance habitat values in appropriate large areas while allowing the orderly development within the incorporated areas of Yolo County. In the event a multi-jurisdictional effort is unsuccessful, the City shall adopt a conservation ordinance or plan that identifies specific habitats and sites where

development could diminish or eliminate significant biological habitat and protects them from the adverse effects of excavating, grading, filling, dredging, removing vegetation, landscaping with exotic species, and other incompatible uses and activities. In event protection is not possible, full mitigation shall be required.

9. The City shall seek to preserve populations of rare, threatened, and endangered wildlife or plant species.
10. The City shall not approve project that would cause unmitigatible impacts on rare, threatened, or endangered wildlife or plant species.
11. The City shall implement measures to ensure that development in the city does not adversely affect fishery resources in the Sacramento River, Deep Water Ship Channel, and Lake Washington.
12. Public access and recreation facilities shall not eliminate or degrade riparian habitat values. Trails, picnic areas, and other developments shall be sited to minimize impacts on sensitive wildlife habitat or riparian vegetation.
13. The City shall promote the use of native plants, especially valley oaks, for landscaping roadsides, parks, and private properties. In particular, native plants shall be used along the Sacramento River and in areas adjacent to riparian and wetland habitats.

Yolo County General Plan

The *Yolo County General Plan* was adopted in 1983. The objective of the general plan is to provide guidance for the development of Yolo County. The general plan promotes the preservation of farm land and open spaces to minimize the area of urbanization. The Open Space and Recreation Element of the general plan was updated in 2002. The following goals, objectives, and policies are relevant to wildlife resources in the study area:

Goals and Supporting Objectives

- OG-1: Preserve open space lands utilizing a variety of land use controls and regulations.
  - OO-1: Creation and maintenance of regulatory framework that places a high priority on preservation of public and private open space lands.
- OG-2: Preserve agricultural land as the principal component of the local open space program.
  - OO-2: Maintenance of Urban Boundaries to direct urban growth into existing towns and cities to protect open space and agricultural lands.
- OG-3: Ensure a harmonious relationship between open space users and agriculture.
  - OO-3: Avoidance of conflicts with agricultural activities.
  - OO-4: Clearly demarcated boundaries between public open space and private agricultural lands.
- OG-4: Protect and manage local water resources.
  - OO-5: Provision for open space corridors within existing and future development.
- OG-5: Preserve and enhance existing biological resources.
  - OO-6: No net loss of wetland and/or riparian habitat.

- OO-7: Maintenance of unique or sensitive plant or animal habitat.

- OG-8: Create a continuous open space corridor along Lower Cache Creek and provide expanded public access to the Yolo Bypass, Lower Putah Creek, Willow Slough, the Sacramento River, and the Blue Ridge Mountains.
    - OO-10: Development of partnerships with local stakeholder watershed organizations to expand existing public open space along Cache Creek, Lower Putah Creek, the Sacramento River and within the Yolo Bypass.

Policies

- **OP-4:** The County shall encourage and support coordinated efforts by State and federal agencies, cities, special districts, and non-profit and conservation organizations to protect lands containing open space resources.
- **OP-5:** The County shall utilize the CEQA process to identify significant impacts to open space and shall require new development to implement county-implemented mitigation measures that minimize such impacts.
- **OP-7:** Development shall be directed away from naturally occurring riparian areas and wetlands.
- **OP-8:** Open space buffers shall be utilized to separate incompatible uses from areas of unique biological or agricultural importance.
- **OP-18:** The County, in conjunction with cities in Yolo County, shall endeavor to adopt a Natural Communities Conservation Plan that protects wildlife resources, open space, and agricultural production.

4.9.2.2 Environmental Setting

This section discusses the environmental setting related to wildlife resources in the study area for The Rivers EIP (defined below), including the methods used to evaluate wildlife habitats including upland, riverine, and wetland habitats, a description of existing land cover types and associated habitat uses, and discussions of the special-status wildlife species that are known to occur in the project region.

4.9.2.2.1 Study Area

The Rivers EIP study area is approximately 4,400 feet in length and is located on the Sacramento River North Levee, just north of the confluence of the Sacramento and American Rivers, including part of The Rivers residential development. For the purposes of the wildlife analysis, the study area consists of the project area plus an approximate 100-foot-wide buffer zone that accounts for potential indirect effects on the valley elderberry longhorn beetle (VELB). The study area encompasses portions of the Sacramento River North Levee with a majority of the study area consisting of the levee itself. The topography of the portion of the study area adjacent to the levee is relatively level. Elevations in the study area range from approximately 20 to 26 feet above mean sea level. The majority of the study area on the landside of the levee consists of residential development and a school. A single row of houses is located on top of the levee in the southern portion of the study area. The waterside of the levee is undeveloped and supports a well-developed riparian corridor.

4.9.2.2.2 Field Surveys

Pre-Field Investigation

Prior to field surveys CNDDB (2009b) and USFWS (2009) species lists and aerial photographs for the study area were reviewed.

Reconnaissance-Level Site Visits

An initial general survey of the project area was conducted by ICF Jones & Stokes wildlife biologists on November 29, 2007. The survey was conducted by walking around the study area to visually assess potential wildlife resources. A focused elderberry shrub (the host plant for VELB) survey was also conducted, as described below. During all surveys wildlife habitat uses associated with land cover types were identified, habitats were evaluated for their ability to support special-status wildlife species, and all wildlife species observed were recorded (Table 4.9-1).

Table 4.9-1. Wildlife Species Observed in The Rivers EIP Study Area

Common Name	Scientific Name
Birds	
Acorn woodpecker	*Melanerpes formicivorus*
American crow	*Corvus brachyrhynchos*
American Goldfinch	*Carduelis tristis*
American kestrel	*Falco sparverius*
Black phoebe	*Sayornis nigricans*
Brewer's blackbird	*Euphagus cyanocephalus*
Bushtit	*Psaltriparus minimus*
California towhee	*Pipilo crissalis*
Canada goose	*Branta Canadensis*
Dark-eyed junco	*Junco hyemalis*
European starling	*Sturnus vulgaris*
Golden-crowned sparrow	*Zonotrichia atricapilla*
Gull sp.	*Larus* sp.
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferous*
Mallard	*Anas platyrhynchos*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auratus*
Red-tailed hawk	*Buteo jamaicensis*
Rock dove	*Columba livia*
Snowy egret	*Egretta thula*
Spotted towhee	*Pipilo erythrophthalmus*
Turkey vulture	*Cathartes aura*
Western meadow lark	*Sturnella neglecta*
Western scrub jay	*Aphelocoma californica*
White-crowned sparrow	*Zonotrichia leucophrys*
Yellow-rumped warbler	*Dendroica coronate*

Common Name	Scientific Name
Mammals	
Black-tailed jack rabbit	*Lepus californicus*

Elderberry Surveys

An elderberry shrub surveys was conducted by ICF biologists on January 9, 2009, along the perimeter of the construction boundaries for the majority of the study area where flood improvements and the recreation trails are proposed to occur. It should be noted that comprehensive protocol-level surveys were not conducted for some of the area 100 feet north of the construction boundaries (between the northern construction boundary perimeter and the Sacramento River), due to the fact that many of the shrubs in this area occur in clusters within a thick understory which makes access for protocol level surveys difficult, invasive, and potentially damaging to habitat. Moreover, these shrubs are not proposed for disturbance. During coordination meetings with USFWS staff in December 2009, it was agreed that this approach was acceptable given the difficulty to access and the fact that shrubs were not proposed to be removed or disturbed.

Elderberry shrub surveys consisted of walking through the project area and mapping, with a GPS, all elderberry shrubs (and shrub clusters) within 100 feet of portions of the proposed construction area (as noted above) in accordance with the USFWS Conservation Guidelines for the VELB (U.S. Fish and Wildlife Service 1999a). Other information recorded for each shrub included number of stems between 1 and 3 inches, 3 and 5 inches, and greater than 5 inches in diameter; whether each stem 1 inch or more in diameter is located in a riparian or non-riparian area; approximate height and width of the elderberry shrub; presence of VELB exit holes; and dominant vegetation that is associated with the elderberry shrub. The results of the survey are presented below under in the section entitled Effects and Mitigation Measures, Effect Wild-1, and illustrated on Figure 4.9-1.

4.9.2.2.3 Wildlife Habitat—Land Cover Type Associations

The study area contains the following land cover types: Great Valley valley oak riparian forest, non-native annual grassland, and unvegetated/vacant/developed areas. Additionally, the Sacramento River (open water) occurs within 50 feet of portions of the study area; therefore, a discussion of this habitat is also included. These land cover types are discussed below with respect to the habitat they provide for wildlife. A detailed description of each of these types, including the dominant plants contained within each type, is in Section 3.7, Vegetation and Wetlands. These land cover types are shown in Figure 4.7-1 along with acreages of these types occurring within the construction limit, staging area, and larger study area.

Great Valley Valley Oak Riparian Forest

In the study area, riparian forest occurs along the Sacramento River North Levee adjacent to the Sacramento River. The overstory of the riparian habitat consists of mature, well-established trees: Fremont cottonwood (*Populus fremontii* ssp*. fremontii*), valley oak (*Quercus lobata*), black willow (*Salix gooddingii*), and box elder (*Acer negundo* var. *californicum*) with a shrub layer of smaller trees and shrubs. Elderberry shrubs (*Sambucus mexicana*), which are the host plant of VELB, were observed within this community.

Overstory trees may be used for nesting and roosting by numerous raptors, including Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), great horned owl (*Bubo virginianus*), Cooper's hawk (*Accipiter cooperii*), and American kestrel (*Falco sparverius*) as well as the herons and egrets mentioned below as foraging in open water areas. Overstory trees also provide suitable habitat for song birds such as Bullock's oriole (*Icterus bullockii*), yellow-rumped warbler (*Dendroica coronata*), tree swallow (*Tachycineta bicolor*), and western scrub jay (*Aphelocoma californica*). Riparian forest also provides important foraging habitat for resident, migratory, and wintering songbirds. The understory of riparian woodlands provide habitat for mammals, including various species of rodents, raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*). Areas containing large, dense shrubby vegetation dominated by willow or blackberry may support tricolored blackbird (*Agelaius tricolor*). Riparian forests also provide cover and foraging habitat for reptiles and amphibians, such as terrestrial garter snake (*Thamnophis elegans*), gopher snake (*Pituophis catenifer*), Pacific tree frog (*Hyla regilla*), and western toad (*Bufo boreas*). Suitable areas in the understory may also be used as nesting habitat for western pond turtles (*Actinemys marmorata*).

Non-Native Annual Grassland

Non-native annual grasses and forbs do occur adjacent to and within the study area. Annual grasslands provide nesting and foraging habitat for several species of songbirds, including savanna sparrow (*Passerculus sandwichensis*), white-crowned sparrow (*Zonotrichia leucophrys*), and western meadowlark (*Sturnella neglecta*); and foraging habitat for several species of raptors, including red-tailed hawk, white-tailed kite, northern harrier, great-horned owl, and Swainson's hawk. California ground squirrels commonly occur in annual grassland habitat. Their burrows provide important nesting habitat for western burrowing owls (*Athene cunicularia hypugea*). Reptiles found in these habitats include California kingsnake, gopher snake, and western rattlesnake (*Crotalus viridis*).

Unvegetated/Vacant/Developed

The unvegetated/vacant/developed portions of the study area consist of unvegetated portions of the Sacramento River North Levee, paved and unpaved roads and trails, and residential housing. These areas likely support common wildlife species including house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), European starling (*Sturnus vulgaris*), Brewer's blackbird (*Euphagus cyanocephalus*), American crow (*Corvus brachyrhynchos*), mourning dove, rock dove (*Columba livia*), Virginia opossum (*Didelphis virginiana*), California ground squirrel, and California meadow vole, to name a few. Scattered landscape trees and shrubs associated with this area may provide nesting habitat for the above-listed common birds.

Open Water

Open water habitat adjacent to the study area consists of the Sacramento River. Open water provides breeding, foraging, and migration habitat for numerous wildlife species. Mammal species commonly known to use perennial aquatic open water habitats include river otter, which uses these areas for foraging and escape cover, and muskrat, which may use deepwater areas as migration corridors between suitable foraging areas. Open water areas also provide essential foraging habitat for wading birds including great blue heron (*Ardea herodias*), great egret (*Ardea alba*), and snowy egret (*Egretta thula*), numerous waterfowl species including mallard (*Anas platyrhynchos*), ruddy duck (*Oxyura jamaicensis*), bufflehead (*Bucephala albeola*), other water birds including eared grebe

Figure 4.9-1
The Rivers Site: Elderberry Shrub Survey Map

(*Podiceps nigricollis*), double-crested cormorants (*Phalacrocorax auritus*), American white pelicans (*Pelecanus erythrorhynchos*), and land birds including black phoebe (*Sayornis nigricans*) and belted kingfisher (*Megaceryle alcyon*). These areas also provide rearing habitat, escape cover, and foraging habitat for reptiles and amphibians including western pond turtle (*Actinemys marmorata*), common garter snake (*Thamnophis sirtalis*), bullfrog (*Rana catesbeiana*), Pacific tree frog (*Hyla regilla*), and western toad (*Bufo boreas*). The vegetated areas below the ordinary high water mark (OHWM) provide nesting habitat for numerous songbirds, including red-winged blackbird (*Agelaius phoeniceus*), marsh wren (*Cistothorus palustris*), and wading birds such as Virginia rail (*Rallus limicola*).

4.9.2.2.4 Special-Status Wildlife

Special-status wildlife species are wildlife that are legally protected under the ESA, CESA, or other regulations and species that are considered rare by the scientific community. Special-status species include the following:

- species that are listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.12 for listed plants, 50 CFR 17.11 for listed animals, and various notices in the *Federal Register* for proposed species);
- species that are candidates for future listing as threatened or endangered under the ESA (72 FR 69034, December 6, 2007);
- species listed or proposed for listing by the State of California as threatened or endangered under the CESA (14 CCR 670.5);
- species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines Section 15380); and
- animals that are identified as California species of special concern or fully protected species on California Department of Fish and Game's Special Animals List (California Department of Fish and Game 2008).

Based on the USFWS (2009) species list for the Sacramento West quadrangle and Yolo County, a review of CNDDB (2009b) occurrences within a 10-mile radius of the study area, and information collected during field surveys, 35 special-status wildlife species were identified as having potential to occur in the study area (Table 4.9-2). Of these, 21 have low to no potential to occur in the study area because the study area is outside the species' known range or suitable habitat is absent from the study area. The remaining 14 wildlife species identified as having potential to occur in the study area include the VELB, giant garter snake, western pond turtle, Swainson's hawk, white-tailed kite, loggerhead shrike, tricolored blackbird, purple martin, bank swallow, northern harrier, western burrowing owl, hoary bat, western red bat, and pallid bat.

The protection status, distributional range, and habitat requirements for these species are described below in Table 4.9-2.

1 **Table 4.9-2. Special-Status Wildlife Species with Potential to Occur in The Rivers EIP Study Area**

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Invertebrates				
Delta green ground beetle *Elaphrus viridus*	T/–	Restricted to Olcott Lake and other vernal pools at Jepson Prairie Preserve, Solano County	Sparsely vegetated edges of vernal lakes and pools; occur up to 250 feet from pools	None. Study area is outside of the species' range.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/–/–	Stream side habitats below 3,000 feet throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant	High. Known occurrences within a mile of the study area.
Conservancy fairy shrimp *Branchinecta conservatio*	E/–/–	Disjunct occurrences in Solano, Merced, Tehama, Ventura, Butte, and Glenn Counties	Large, deep vernal pools in annual grasslands	None. Study area is outside of the species' range.
Vernal pool fairy shrimp *Branchinecta lynchi*	T/–/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. Isolated populations also in Riverside County.	Common in vernal pools; also found in sandstone rock outcrop pools.	None. No suitable habitat in the study area.
Vernal pool tadpole shrimp *Lepidurus packardi*	E/–/–	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds	None. No suitable habitat in the study area.
Lange's metalmark butterfly *Apodemia mormo langei*	E/–/–	Once found throughout the Antioch Dunes; range now reduced to less than 10 acres of Antioch Dunes in Contra Costa County	Limited to dense to moderately dense patches of food plant, wild buckwheat, in stabilized sand dunes	None. Study area is outside of the species' range.
Amphibians				
California tiger salamander *Ambystoma californiense*	T/C/–	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to northeastern San Luis Obispo County.	Small ponds, lakes, or vernal pools in grass-lands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy	None. No suitable habitat in the study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
California red-legged frog *Rana aurora draytonii*	T/SSC/–	Found along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County	Permanent and semi-permanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation. May estivate in rodent burrows or cracks during dry periods.	None. The study area is outside of this species current known range. This species is believed to be extirpated from the valley floor.
Reptiles				
Silvery legless lizard *Anniella pulchra pulchra*	–/SSC/–	Along the Coast, Transverse, and Peninsular Ranges from Contra Costa County to San Diego County with spotty occurrences in the San Joaquin Valley	Habitats with loose soil for burrowing or thick duff or leaf litter; often forages in leaf litter at plant bases; may be found on beaches, sandy washes, and in woodland, chaparral, and riparian areas	Low. No CNDDB occurrences within 10 miles of the study area. Potential habitat in the study area.
Giant garter snake *Thamnophis couchi gigas*	T/T/–	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno	Sloughs, canals, low gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter	Low to None. CNDDB occurrences within three miles of study area. No suitable habitat within study area.
Western pond turtle *Actinemys marmorata*	–/SSC/–	Occurs from the Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of Sierra Nevada	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests	Moderate. Species observed within ponds 3 miles south of study area along South River Road. Suitable habitat within study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Birds				
Double-crested cormorant *Phalacrocorax auritus* (rookery site)	–/SSC/–	Winters along the entire California coast and inland over the Coast Ranges into the Central Valley from Tehama County to Fresno County; a permanent resident along the coast from Monterey County to San Diego County, along the Colorado River, Imperial, Riverside, Kern and King Co.s, and the islands off San Francisco; breeds in Siskiyou, Modoc, Lassen, Shasta, Plumas, and Mon Co.s; also breeds in the San Francisco Bay Area and in Yolo and Sacramento Counties	Rocky coastlines, beaches, inland ponds, and lakes; needs open water for foraging, and nests in riparian forests or on protected islands, usually in snags	Low. No CNDDB nesting records within 10 miles of the study area. No nesting or foraging habitat within study area.
White-faced ibis *Plegadis chihi* (rookery site)	–/SSC	Both resident and winter populations on the Salton Sea and in isolated areas in Imperial, San Diego, Ventura, and Fresno Counties; breeds at Honey Lake, Lassen County, at Mendota Wildlife Management Area, Fresno County, and near Woodland, Yolo County.	Prefers freshwater marshes with tules, cattails, and rushes, but may nest in trees and forage in flooded agricultural fields, especially flooded rice fields	Low. No CNDDB nesting records within 10 miles of the study area. No suitable nesting or foraging habitat within study area.
California black rail *Laterallus jamaicensis coturniculus*	–/T/–	Permanent resident in the San Francisco Bay and eastward through the Delta into Sacramento and San Joaquin Counties; small populations in Marin, Santa Cruz, San Luis Obispo, Orange, Riverside, and Imperial Counties.	Tidal salt marshes associated with heavy growth of pickleweed; also occurs in brackish marshes or freshwater marshes at low elevations.	None. No CNDDB nesting records within 10 miles of the study area. No suitable habitat within study area.
California clapper rail *Rallus longirostris obsoletus*	E/E/–	Marshes around the San Francisco Bay and east through the Delta to Suisun Marsh	Restricted to salt marshes and tidal sloughs; usually associated with heavy growth of pickle-weed; feeds on mollusks removed from the mud in sloughs	None. Study area is outside of the species' range.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Mountain plover *Charadrius montanus*	PT/SSC	Does not breed in California; in winter, found in the Central Valley south of Yuba County, along the coast in parts of San Luis Obispo, Santa Barbara, Ventura, and San Diego Counties; parts of Imperial, Riverside, Kern, and Los Angeles Counties	Occupies open plains or rolling hills with short grasses or very sparse vegetation; nearby bodies of water are not needed; may use newly plowed or sprouting grain fields	None. Study area is outside of the species' breeding range, unlikely to forage in study area.
Western snowy plover (inland population) *Charadrius alexandrinus nivosus*	–/SSC	Nests at inland lakes throughout northeastern, central, and southern California, including Mono Lake and Salton Sea	Barren to sparsely vegetated ground at alkaline or saline lakes, reservoirs, ponds and riverine sand bars; also along sewage, salt-evaporation, and agricultural waste-water ponds	None. No suitable nesting or foraging habitat in the study area.
Northern harrier *Circus cyaneus*	–/SSC	Occurs throughout lowland California. Has been recorded in fall at high elevations	Grasslands, meadows, marshes, and seasonal and agricultural wetlands	Moderate. No CNDDB nesting records within 10 miles of the study area. Marginally suitable nesting habitat in study area. Suitable foraging habitat in grasslands adjacent to levee.
White-tailed kite *Elanus leucurus*	–/ FP/–	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County at the Mexico border	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging	High. CNDDB nesting records within 3 miles of study area. Suitable nesting and foraging habitat in study area.
Swainson's hawk *Buteo swainsoni*	–/T/–/–	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County.	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields.	High. CNDDB nesting records within 100 feet of study area.
Western burrowing owl *Athene cunicularia hypugea*	–/SSC/–	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along south coast	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows	High. CNDDB nesting records within a mile of the study area. Suitable nesting and foraging habitat in study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	–/E	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers	Wide, dense riparian forests with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley-oak riparian habitats where scrub jays are abundant	None. No suitable nesting habitat in the study area; forests in study area are dominated by valley oak and contain abundant scrub jays.
Loggerhead shrike *Lanius ludovicianus*	–/SSC/–	Resident and winter visitor in lowlands and foothills throughout California; rare on coastal slope north of Mendocino County, occurring only in winter	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches	Moderate. No CNDDB nesting records within 10 miles of the study area. Suitable nesting and foraging habitat in study area.
Tricolored blackbird *Agelaius tricolor*	–/SSC/–	Permanent resident in the Central Valley from Butte County to Kern County; breeds at scattered coastal locations from Marin County south to San Diego County and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony	Low. CNDDB nesting records 2 miles south of the study area. No suitable nesting habitat in study area; marginally suitable foraging habitat in grasslands adjacent to levee.
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	–/SSC/–	Locally numerous in the Klamath Basin, Modoc Plateau, Great Basin desert, and large mountain valleys in northeastern California; and in the San Joaquin Valley. Common breeders in the Colorado River valley, the Salton Sink, and the western Mojave desert; scarce in the Sacramento Valley and along the southern coast in Los Angeles, Riverside, and San Bernardino counties.	Nest in marshes with tall emergent vegetation, such as tules or cattails, generally in open areas and edges over relatively deep water. Breeding marshes often on edges of deep water bodies such as lakes, reservoirs, and or larger ponds.	None. CNDDB nesting records approximately 10 miles south of the study area. No suitable nesting or foraging habitat in the study area.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Purple martin *Progne subis*	–/SSC/–	Coastal mountains south to San Luis Obispo County, west slope of the Sierra Nevada, and northern Sierra and Cascade ranges. Absent from the Central Valley except in Sacramento. Isolated, local populations in southern California	Nests in abandoned woodpecker holes in oaks, cottonwoods, and other deciduous trees in a variety of wooded and riparian habitats. Also nests in vertical drainage holes under elevated freeways and highway bridges	Moderate. CNDDB nesting records under nearby freeway approximately 2 miles southeast of the study area. Suitable nesting habitat in study area.
Bank swallow *Riparia riparia*	–/T/–	Occurs along the Sacramento River from Shasta County to Sacramento County, along the Feather and lower American Rivers, in the Owens Valley; and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou Counties. Small populations near the coast from San Francisco County to Monterey County	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam	Low. CNDDB nesting records approximately 5 miles southeast of the study area. No suitable nesting habitat in the study area.
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	–/SSC/–	Found only in the San Francisco Bay Area in Marin, Napa, Sonoma, Solano, San Francisco, San Mateo, Santa Clara, and Alameda Counties	Freshwater marshes in summer and salt or brackish marshes in fall and winter; requires tall grasses, tules, and willow thickets for nesting and cover	None. Study area is outside of the species' range.
Grasshopper sparrow *Ammodramus savannarum*	–/SSC/–	Summer resident in the foothills of the Sierra Nevada and Coast Range from Mendocino and Trinity counties south to San Diego County.	Dry, dense grasslands with a variety of grasses and tall forbs and scattered shrubs.	Low. No CNDDB nesting records within study area. Potential nesting habitat within study area.
Suisun song sparrow *Melospiza melodia maxillaris*	–/SSC/–	Restricted to the extreme western edge of the Delta, between the cities of Vallejo and Pittsburg near Suisun Bay	Brackish and tidal marshes supporting cattails, tules, various sedges, and pickleweed	None. Study area is outside of the species' range.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area
Mammals				
Hoary bat *Lasurius cinerius*	–/SSC/–	Occurs throughout California from sea level to 13,200 feet.	Primarily found in forested habitats. Also found in riparian areas and in park and garden settings in urban areas. Day roosts within foliage of trees.	Moderate. Not reported to occur within study area; reported in CNDDB to occur approximately 2 miles of the study area. Suitable roosting habitat in study area.
Pallid bat *Antrozous pallidus*	–/SSC/FSS, WBWG: High priority	Occurs throughout California except the high Sierra from Shasta to Kern County and the northwest coast, primarily at lower and mid elevations	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts	Moderate. Not reported to occur within study area; no CNDDB record reported to occur within 10 of the study area. Suitable roosting habitat in study area.
Western red bat *Lasiurus blossevillii*	–/–/FSS, WBWG: High priority	Scattered throughout much of California at lower elevations	Found primarily in riparian and wooded habitats. Occurs at least seasonally in urban areas. Day roosts in trees within the foliage. Found in fruit orchards and sycamore riparian habitats in the central valley	Moderate. Not reported to occur within study area; no CNDDB record reported to occur within 10 of the study area. Suitable roosting habitat in study area.
Salt marsh harvest mouse *Reithrodontomys raviventris*	E/E, FP	San Francisco, San Pablo, and Suisun Bays; the Delta	Salt marshes with a dense plant cover of pickle-weed and fat hen; adjacent to an upland site	None. Study area is outside of the species' range.
American badger *Taxidea taxus*	–/SSC/–	In California, badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties	Badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground	Low. One historic record (1938) reported approximately 8 miles from the study area. Study area contains limited suitable habitat for this species.

Common and Scientific Names	Status Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Study Area

Status explanations:

Federal

E = listed as endangered under the Federal Endangered Species Act.

T = listed as threatened under the Federal Endangered Species Act.

P = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

C = candidate for listing

– = no listing.

Western Bat Working Group (WBWG) Available: http://www.wbwg.org/spp_matrix.html)

High priority = species are imperiled or at high risk of imperilment

Moderate priority= this designation indicates a level of concern that should warrant closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat

Low priority = While there may be localized concerns, the overall status of the species is believed to be secure.

Valley Elderberry Longhorn Beetle

Although no occurrences of VELB in the study area have been reported, there are numerous records of occurrences within 10 miles of the study area (California Natural Diversity Database 2009b). Three occurrences are located within 1 mile of the study area. Although not reported to occur in the study area, elderberry shrubs sized 1 inch or more at ground level are present in the study area and therefore VELB has potential to occur. See elderberry shrub survey map Figure 4.9-1 for locations of these shrubs.

Giant Garter Snake

There are no CNDDB (2009b) records for giant garter snakes in the study area, although there are numerous occurrences within 10 miles. The closest occurrence is located approximately 3miles from the study area in an agricultural drainage. This occurrence is labeled as sensitive and therefore provides minimal information about the occurrence location. There are approximately 25 other recorded occurrences within 10 miles of the study area, most of which are also labeled as sensitive and therefore no specific location information is available (California Natural Diversity Database 2009b).

The Sacramento River is the only aquatic habitat in close proximity to the study area. Giant garter snakes are known to utilize low gradient streams but the Sacramento River contains high flows that would not support giant garter snakes.

Western Pond Turtle

CNDDB (2009b) records do not indicate any western pond turtle occurrences in the study area. Pond turtles have been incidentally observed approximately 3miles southeast of the study area in ponds west of South River Road, by ICF biologists. Additionally, western pond turtle is recorded to occur 7 miles east of the study area in a drainage at the McClellan Air Force Base (California Natural Diversity Database 2009b).

The Sacramento River is the only aquatic habitat in close proximity to the study area. If present in the Sacramento River, pond turtles could use riparian habitat in the study area for winter hibernacula and nesting.

Swainson’s Hawk

Swainson’s hawk is known to nest in trees within and adjacent to the study area. The closest reported nest site is approximately within approximately 300 feet from the construction area. This nest site is presumed to have been used in the 2010 nesting season and is informally reported to have been occupied for the past eight breeding seasons. This nest site was identified in September 2010 by DFG staff, but is most likely the same site as a former CNDDB record. Two additional documented nest sites lie within approximately 600 feet of the project area; one of these is known to have been active in 2007. A Swainson’s hawk nest is located in a cottonwood tree within 30 feet of the Sacramento River on the opposite side of the project site at river mile (RM) 61.5. The nest site was last observed to be active in 1993 (California Natural Diversity Database 2009b). Grasslands in the study area are likely used as foraging habitat by this species.

A review of the nest records reported in *The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk in Yolo County* was also conducted (Estep 2008). No new nest records were found to occur within a 0.5 mile of the study area.

White-Tailed Kite

There are no CNDDB (2009b) occurrences for white-tailed kite in the study area. Several nest sites are reported to occur within a 10-mile radius, the closest being a nest site within 3 miles of the study area along the American River (California Natural Diversity Database 2009b). Large trees within and adjacent to the study area provide suitable nesting habitat, and grasslands provide suitable foraging habitat.

Loggerhead Shrike

CNDDB (2009b) records do not indicate any loggerhead shrike occurrences within 10 miles of the study area. However, the study area is within the expected range for this species. Scattered trees and shrubs in the study area have potential to support nesting of this species and grasslands provide suitable foraging habitat.

Tricolored Blackbird

There are no CNDDB (2009b) occurrences for tricolored blackbird in the study area. Within 10 miles of the study area, CNDDB (2009b) indicated one tricolored blackbird nesting site, located approximately 2 miles south of the study area near the Port of Sacramento, in the vicinity of the Port North Levee. The birds were reported to be nesting in an area containing thistle and mustard in 1969 and 1974. The size of this population was not reported. Himalayan blackberry brambles and grasslands containing dense forbs in the study area provide suitable nesting habitat. Grasslands in the study area also contain suitable foraging habitat for this species.

Purple Martin

There are no CNDDB (2009b) occurrences for purple martin in the study area. The nearest CNDDB (2009b) occurrence for this species is for a colony nesting in weep holes under the I-5 freeway overpass at I Street approximately 2 miles east of the study area. Numerous other occurrences are reported within a 10-mile radius for colonies nesting under freeway or street overpasses. Suitable nesting habitat for this species occurs in the riparian forest areas in the study area.

Bank Swallow

There are no CNDDB (2009b) occurrences for this species in the study area. Numerous CNDDB nesting records for this species occur approximately 5 miles southeast of the study area along the American River. Additionally this species is recorded in CNDDB to nest approximately 14 miles north of the study area along the Sacramento River. Banks along the Sacramento River, located within and adjacent to the study area, are heavily vegetated with Himalayan blackberry, aquatic and upland grasses, and willows and do not provide suitable nesting habitat for bank swallow. The study area does not contain any potential nesting habitat for this species.

Northern Harrier

CNDDB (2009b) records do not indicate any northern harrier occurrences in the study area or within 10 miles of the study area. Annual grasslands in the study area provide suitable foraging habitat but would be unlikely to support nesting because a majority of the grassland habitat is within the levee itself.

Western Burrowing Owl

There are no CNDDB (2009b) occurrences for this species in the study area though numerous burrowing owl occurrences are reported within 10 miles of the study area. The closest recorded nesting record is within 1 mile of the site located 0.2 mile southwest of the intersection of Highway 84 and Harbor Boulevard. Grasslands within and alongside the study area provide suitable nesting habitat where ground squirrel burrows are present and open grassland areas near suitable nesting habitat provide suitable foraging habitat.

Special-Status Bats

There are no CNDDB (2009b) occurrences for these species in the study area. Within 10 miles of the study area, CNDDB (2009b) records indicate a hoary bat observation approximately2 miles south of the study area within the Sacramento River North Levee reach. CNDDB (2009b) records do not indicate any western red bat or pallid bat observations within 10 miles of the study area. Riparian forest in the study area provides suitable roosting habitat for these species, while the adjacent Sacramento River provides suitable foraging habitat.

4.9.3 Environmental Consequences

This section describes the environmental consequences related to wildlife resources for The Rivers EIP. It describes the methods used to determine the potential project effects and lists the thresholds used to conclude whether a potential effect would be significant.

4.9.3.1 Assessment Methods

The effect analysis below is quantitative and is based on site-specific information.

The key effects were identified and evaluated based on the environmental conditions observed in The Rivers EIP study area and the expected magnitude, intensity, and duration of project related effects associated with project construction and operation.

4.9.3.1.1 Effects Mechanisms

This section discusses the construction related project activities that could affect wildlife resources in the study area. It is assumed that following project construction, O&M activities within the project area would consist of the same types of activities that occurred prior to construction. These activities include hand and mechanical (mower) removal of weeds, spraying of weeds, minimal tree or shrub trimming, and reconditioning of levee slope and road with bull dozer up to once a year. Additionally pavement repairs would occur as needed along new paved trails. Though O&M activities were not previously carried out in proposed new trail areas it is assumed that effects to wildlife species would result from project construction and that maintenance activities would not involve significant noise or habitat removal to affect species occurring in the area. Additionally, because it is assumed that trails will occur at least 20 feet from elderberry shrubs, O&M activities would not result in trimming of elderberry shrubs or potential effects to VELB. Though the creation of paved trails will make it easier for people to utilize the area for recreation purposes (mainly walking and fishing) the area already appears to experience heavy human use, specifically evidenced by the presence of a homeless camp within the study area, and the creation of paved trails are not expected to significantly increase the level of use within the area. Therefore, the use of the trails by people, other O&M activities associated with the trails, and O&M activities associated with the levee itself are not anticipated to affect wildlife species in the area above the current (baseline) level. These potential effects are therefore not discussed further.

The types of construction related direct and indirect effects used to assess effects on wildlife resources are listed below.

Direct Effects

Direct effects on wildlife could result from the following actions:

- vegetation clearing (including trees), grading, excavating/trenching, placement of rock slope protection, and paving activities during construction;
- temporary stockpiling and sidecasting of soil, construction materials, or other construction wastes;
- soil compaction, dust, and water runoff from the construction site;
- short-term construction-related noise (from equipment); and
- degradation of water quality in drainages and wetlands, resulting from construction runoff containing petroleum products.

Indirect Effects

Indirect effects on wildlife could result from the following actions:

- permanently altering light and noise levels;
- altering hydrology;
- causing damage through toxicity associated with herbicides, insecticides, and rodenticides;
- introducing pet and human disturbance (including trash dumping);
- increasing habitat for native competitors or predators; and
- introducing invasive non-native species.

4.9.3.2 Determination of Effects

For this analysis, an effect pertaining to wildlife resources was considered significant if it would result in any of the following environmental effects, which are based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq.).*

- have a substantial adverse effect, either directly or 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 DFG 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;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- conflict with the provisions of an adopted habitat conservation plan, natural communities conservation plan, or other approved local, regional, or state habitat conservation plan; or
- contribute to a substantial reduction or elimination of species diversity or abundance.

Qualitative relationships between environmental conditions and life stage survival or wildlife resources are the basis of the effect assessment. Cause and effect relationships are identified for assessment species, including the relationship between environmental conditions and habitat, and the effects of changes in habitat on survival.

The mitigation measures described for potential effects on sensitive wildlife resources have not been developed through formal consultation or coordination with resource agencies (e.g., DFG, USFWS, NMFS, and the USACE). WSAFCA will contact agencies as part of the environmental compliance process to determine specific compensatory mitigation for effects on wetlands, state- and federally listed species, riparian habitats, and other habitats supporting special-status species. Additional mitigation measures may also be identified as conditions of permits (e.g., a BO, Section 7 Incidental Take Statement, or Section 1602 Streambed Alteration Agreement).

4.9.4 Effects and Mitigation Measures

4.9.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects on wildlife, such as displacement or loss of habitat would occur.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento River North Levee could fail due to seepage or slope stability/geometry issues would continue. A catastrophic levee failure at this site would result in flooding and inundation that could significantly affect wildlife and their upland or wetland habitats by physical displacement, mortality, or destruction of habitat. In addition, cleanup and repair activities could result in physical displacement for extended periods of time and significant effects on habitat. If a flood event were to occur along the Sacramento River corridor, the narrow band of valuable riparian habitat located along the levees could be damaged. Given the importance of this riparian corridor for numerous special-status species and for the pacific flyway in general, loss or fragmentation of this habitat would be a significant effect, and it could take decades for a mature riparian forest to re-establish itself in the affected areas, if USACE vegetation policies allow re-establishment at all. Given the uncertainty of the occurrence or magnitude of such an event, potential effects on wildlife and their habitats cannot be quantified based on available information.

As discussed under the No Action Alternative in Section 4.7, Vegetation and Wetlands, compliance with the vegetation-free zone as described in the USACE's Vegetation Guidance could be required in the absence of project implementation.

Compliance with USACE's levee vegetation guidance could result in the removal of a substantial amount of vegetation, including vegetation that comprises mature oak woodland and supports wildlife populations (including special-status species). This effect could be considered significant.

4.9.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative APA would result in the following potential effects on wildlife resources. These potential effects are summarized in the table below and are discussed in detail following the table.

Effect	Finding	With Mitigation	Mitigation Measure
WILD-1: Disturbance or Loss of VELB and Their Habitat (Elderberry Shrubs)	Significant	Less than Significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel
WILD-2: Disturbance or Loss of Western Pond Turtle and Their Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-1: Conduct a Preconstruction Survey for Western Pond Turtle and Exclude Turtles from Work Area, If Present
WILD-3: Disturbance to Nesting Swainson's Hawks and Loss of Nesting and Foraging Habitat	Significant	Less than Significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's Hawk
WILD-4: Disturbance to Nesting Special-Status Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's hawk

Effect	Finding	With Mitigation	Mitigation Measure
WILD-5: Disturbance to Burrowing Owl and Loss of Habitat	Significant	Less than significant	VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-3: Conduct Preconstruction Surveys for Burrowing Owl Prior to Construction and If Present, Protect Nests through Use of Agency-Approved Protection Buffers WILD-MM-4: Coordinate with Resource Agencies and Develop An Appropriate Compensation Plan for Burrowing Owl
WILD-6: Disturbance or Loss of Bats and Bat Roosts	Significant	Less than significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-5: Conduct a Preconstruction Survey for Roosting Bats and Avoid or Mitigate for Potential Effects
WILD-7: Disturbance to Nesting Non-Special-Status Migratory Birds and Loss of Nesting and Foraging Habitat	Significant	Less than significant	VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's hawk
WILD-8: Disturbance or Loss of Common Wildlife Species and Their Habitats	Less than significant	N/A	N/A
WILD-9: Disruption of Wildlife Movement Corridors	Less than significant	N/A	N/A
WILD-10: Conflict with Provisions of an Adopted HCP/NCCP or Other Approved Local, Regional, or State Habitat Conservation Plan	No effect	N/A	N/A

Effect WILD-1: Disturbance or Loss of VELB and Their Habitat (Elderberry Shrubs)

In the study area, elderberry shrubs occur in the Sacramento River riparian corridor adjacent to the project construction limit. As shown in Table 4.9-3, below, and Figure 4.9-1, a total of 22 shrubs or shrub clusters are located within 100 feet of the project construction limit.

Complete avoidance of effects on VELB is assumed when a 100-foot buffer (from construction) is established around elderberry shrubs. Direct effects on VELB may generally occur when construction occurs within 20 feet of elderberry shrubs. Indirect effects on VELB may generally occur if elderberry shrubs are located from 20 to 100 feet of construction. There are no shrubs located within 20 feet of the construction limit. As shown in Table 4.9-3, 22 shrubs are located between 20 and 100 feet of the construction limit.

Table 4.9-3. Elderberry Shrub Survey Results—Riparian

Elderberry Shrub/Cluster Number	Number of Stems > 1 Inch and < 3 Inches	Number of Stems > 3 Inches and < 5 Inches	Number of Stems > 5 Inches	Total Number of Stems	Exit holes N/Y
Shrubs within Indirect Impact Area (shrubs > 20 ft but < 100 ft from construction limit)					
EB 150	2	1	0	3	N
EB 151	3	1	0	4	N
EB 152	1	0	1	2	N
EB 153	0	1	0	1	N
EB 154	7	1	0	8	N
EB 155	5	3	0	8	N
EB 156	14	0	0	14	N
EB 157	5	0	0	5	N
EB 158	5	0	0	5	N
EB 159	10	0	0	10	N
EB 160	20	0	0	20	N
EB 161	10	0	0	10	N
EB 162	4	0	0	4	N
EB 163	9	5	2	16	N
EB 164	1	0	0	1	N
EB 165	20	0	0	20	N
EB 166	5	2	0	7	N
EB 167	4	0	0	4	N
EB 168	10	2	0	12	N
EB 169	4	0	0	4	N
EB 170	9	0	0	9	N
EB 171	25	3	0	28	N
Total	**173**	**19**	**3**	**192**	**N/A**

WSAFCA has coordinated with USFWS and will implement the following protection measures (also described in Section 2.7, Chapter 2, Alternatives) in order to ensure that elderberry shrubs within the study area will be protected during project construction:

- Protective buffer areas will be created for elderberry shrub clusters by the installation of approximately 1500 feet of K-rail fencing along the edge of the construction zone (Figure 2-7). In the eastern portion of the project area, there are shrubs that lie within existing tree canopy. To protect these shrubs and avoid potentially damaging existing trees, an approximate 80-foot semi-circle of orange construction fencing will be installed adjacent to the construction zone in this portion of the study area (Figure 2-7). Within buffer areas, signs will be posted along fencing for the duration of construction. The signs will contain the following information:

  > This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.

- Buffer area fences around elderberry shrubs/clusters will be inspected weekly by a qualified biologist during ground-disturbing activities and monthly after ground-disturbing activities until project construction is complete or until the fences are removed, as approved by the biological monitor and the resident engineer. The biological monitor will be responsible for ensuring that the contractor maintains the buffer area fences around elderberry shrubs throughout construction. Biological inspection reports will be provided to the project lead and USFWS.
- WSAFCA will ensure that the project site will be watered down as necessary to prevent dust from becoming airborne and accumulating on elderberry shrubs in and adjacent to a project site.

The implementation of these measures and Mitigation Measure VEG-MM-2 will ensure avoidance of effects on VELB. Therefore, potential effects on VELB would be considered less than significant.

Mitigation

Mitigation Measure VEG--MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Effect WILD-2: Disturbance or Loss of Western Pond Turtle and Their Habitat

Although western pond turtle is not currently known to occur in the study area, there is potential for this species to utilize the riparian corridor adjacent to the Sacramento River for winter hibernacula and nesting. However, construction at the project area is designed to avoid the Sacramento River riparian corridor, thus avoiding effects on this species. The implementation of Mitigation Measures VEG-MM-2and WILD-MM-1 would further ensure that this species would not be affected. Potential effects to this species would be less than significant.

Mitigation

Mitigation Measure VEG--MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-1: Conduct a Preconstruction Survey for Western Pond Turtle and Exclude Turtles from Work Area, If Present

To avoid and minimize impacts on western pond turtles, the project proponent will retain a qualified wildlife biologist to conduct a preconstruction survey 1 week before and within 48 hours of disturbance in aquatic and riparian habitats. The survey objectives are to determine presence or absence of pond turtles within the construction work area.

If possible, the surveys should be timed to coincide with the time of day and year when turtles are most likely to be active (during the cooler part of the day 8am-12 pm during spring, summer, and late summer). Prior to conducting presence/absence surveys the biologist should locate the microhabitats for turtle basking (logs, rocks, brush thickets) and determine a location to quietly observe turtles.

Each survey should include a 30 minute wait time after arriving onsite to allow startled turtles to return to open basking areas. The survey should consist of a minimum 15 minute observation time per area where turtles could be observed.

If turtles are observed during a survey, they will be relocated outside of the construction area to appropriate aquatic habitat by a biologist with a valid memorandum of understanding from DFG and as determined during coordination with DFG.

If turtles are present they can either be hand-captured or trapped and then moved.

If turtles are captured and moved up or downstream, install exclusion fence perpendicular to the river extending upslope an appropriate distance, determined based on topography and site vegetation. If this is determined to be infeasible, a monitor will need to be present during in-water construction (and construction within riparian habitat areas) to ensure that turtles do not move into the construction area.

Effect WILD-3: Disturbance to Nesting Swainson's Hawks and Loss of Nesting and Foraging Habitat

Mature riparian cottonwood and oak trees along the Sacramento River are prime nesting habitat for Swainson's hawk. A Swainson's hawk nest has been identified by DFG (September 2010) within approximately 300 feet of the project boundary in the north-central portion of the project between the construction zone and the river. It was informally reported to have been active for the past 8 years. This site is most likely the same as a previously documented site reported in CNDDB. A second nest site, located to the northeast of the project site, is also documented to occur within 300 feet of the project boundary and was reported to be active in 2007(Estep 2008). CNDDB also identifies a third nest site within approximately 600 feet of the project boundary. If any of these nests are occupied in 2011, construction activities taking place during the breeding season could create sufficient noise to disturb these nests.

An additional Swainson's hawk nest has been reported in a cottonwood tree on the opposite side of the Sacramento River from the project area. Pursuant to a site visit with USFWS and DFG representatives in December 2009, the Sacramento River presents a visual barrier from this nest and project activities that occur during the nesting season (generally February 1 through August 31) are unlikely to adversely affect nesting activities (should the nest be active).

Construction of the project would require removal of 0.9 acre of riparian habitat. See Section 4.7, Vegetation and Wetlands for a discussion of riparian effects and proposed on-site riparian mitigation.

In the study area, suitable Swainson's hawk foraging habitat occurs in grassland areas within and adjacent to the Sacramento North Levee. There are a total of 10.12 acres of grasslands within the project area. Of this area, 0.55 acres will be used for staging and will therefore only be temporarily disturbed while 1.73 acres will be permanently removed. The removal of 1.73 acres will be required for the construction of 0.83 acres of paved pedestrian trails and the conversion of 0.9 acres of grasslands to riparian forest, which is needed in order to replace riparian habitat to be removed onsite as part of the project. Because the riparian compensation plan has not yet been approved by DFG, it is assumed that only 0.9 acres of replacement habitat will be needed (based on the generally approved 1:1 compensation ratio) but more replacement habitat could be required resulting in a greater loss of grasslands. The remaining 7.84 acres within the project area would be removed in order to construct the levee but would be returned to grassland following construction and is therefore not considered to be a permanent loss of grassland. See Figure 4.7-1 for acres of land cover types in the project area. Although the exact loss of grasslands required for project construction and riparian habitat mitigation is not yet known, the loss is assumed to be no more than 5 acres.

Tree and shrub removal, other vegetation clearing, grading, and other construction activities conducted during the nesting season (generally February 1 through August 31) could remove or otherwise cause abandonment of active nests of Swainson's hawk. Additionally, the removal of Swainson's hawk foraging and nesting habitat could result in adverse effects to this species. These effects would be considered significant.

WSAFCA representatives coordinated with DFG representatives during a field visit in December 2009 to discuss appropriate protection measures for Swainson's hawk. As part of the project, WSAFCA will implement the following agreed upon measures:

- Install construction barrier fencing (described in Chapter 2, The Rivers EIP Alternatives) to delineate the construction area and protect sensitive resources.
- A breeding season (generally February 1-August 31) survey for nesting migratory birds will be conducted for all trees and shrubs located within 500 feet (0.25 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys will be completed during at least two of the following survey periods: January 1 to March 20, March 20 to April 5, April 5 to April 20, and June 10 to July 30 with no fewer than three surveys completed in at least two survey periods, and with at least one of these surveys occurring immediately prior (within 48 hours) to project initiation (Swainson's Hawk Technical Advisory Committee 2000). The results of the surveys will be submitted to DFG. Other migratory bird nest surveys can be conducted concurrent with Swainson's hawk surveys. If the biologist determines that the area surveyed does not contain any active migratory bird nests, construction activities, including vegetation removal or pruning of trees and shrubs, can commence without any further mitigation.
- If active nests are found, WSAFCA will maintain a 0.25-mile buffer or other distance determined appropriate through consultation with DFG, between construction activities and the active nest(s) until young have been determined to have fledged. In addition, a qualified biologist (experienced with raptor behavior) will be present on-site (daily) during construction activities occurring during the breeding season to watch for any signs of stress. If nesting birds are observed to exhibit agitated behavior indicating that they are experiencing stress, construction activities will cease until a qualified biologist, in consultation with DFG, determines that young have fledged the active nest.
- To avoid removing or disturbing any active Swainson's hawk nests, other special-status bird nests, or non-special-status migratory bird nests, tree and shrub removal will be conducted during the non-breeding season (generally September 1 through January 31) or after a qualified biologist determines that fledglings have left an active nest.

Implementation of these measures and VEG-MM-1, VEG-MM-2, and WILD-MM-2 would avoid and minimize potential nesting disturbance effects and compensate for the loss of Swainson's hawk habitat. Therefore, potential effects to this species would be less than significant.

Mitigation

Mitigation Measure VEG-MM-1: Compensate for the Loss of Woody Riparian Habitat

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's hawk

According to DFG's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley,* loss of Swainson's hawk foraging habitat shall be mitigated for at a specified ratio that depends on the distance between the project area and the nearest active nest site (California Department of Fish and Game 1994). Based on the presence of a known nest within 1 mile of the project site, loss of foraging habitat in the project area will be compensated at a ratio of 1:1. The project will also result in the removal of 0.9 acre of riparian habitat which will also be compensated at a ratio of at least 1:1 as described under VEG-MM-1 in Section 4.7. Compensation for loss of foraging habitat will be carried out by providing off-site habitat management lands as described in the DFG's (1994) guidelines or by purchasing credits at a local, DFG- approved mitigation bank. The Yolo Natural Heritage Program is in the process of developing a habitat conservation plan/natural community conservation plan for Yolo County. This plan is not yet available for review in its entirety and therefore the ability of the project to be covered under the plan is not currently known. However, WSAFCA has been in coordination with the Yolo Natural Heritage Program to discuss potential mitigation sites that are in alignment with the draft plan. This coordination will continue throughout the project implementation process.

Effect WILD-4: Disturbance to Nesting Special-Status Birds and Loss of Nesting and Foraging Habitat

Several other special-status birds have potential to nest in or adjacent to the study area based on reported occurrences within a 10-mile radius. These species include white-tailed kite, northern harrier, loggerhead shrike, and purple martin.

These species are not reported to nest in the study area but are known to nest in the vicinity. Riparian forest areas within and adjacent to the construction area contain suitable nesting habitat for white-tailed kite and purple martin. Open grassland areas containing scattered shrubs and trees provide suitable nesting habitat for loggerhead shrike. Grasslands in and adjacent to the study area provide potential nesting habitat for northern harrier.

Tree and shrub removal, other vegetation clearing, grading, or other construction activities conducted during the nesting season (generally February 1 through August 31) could remove or cause abandonment of active nests of special-status birds discussed above. These effects would be considered significant.

Additionally, project construction would require removal of foraging (grasslands) and nesting (grasslands and riparian forest) habitat which could adversely affect these species. Permanent habitat losses would include less than 5 acres of grasslands and 0.9 acres of riparian habitat.

WSAFCA will implement the following measures as part of the project to protect active bird nests:

- Install construction barrier fencing (described in Chapter 2, The Rivers EIP Alternatives) to delineate the construction area and protect sensitive resources.
- To avoid removing or disturbing any active Swainson's hawk nests, other special-status bird nests, or non-special-status migratory birds nests, tree and shrub removal will be conducted during the non-breeding season (generally September 1 through January 31), where possible, or after a qualified biologist determines that fledglings have left an active nest (as described below).

- A breeding season (generally February 1-August 31) survey for nesting migratory birds will be conducted for all trees and shrubs located within 500 feet (0.25 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys will be completed during at least two of the following survey periods: January 1 to March 20, March 20 to April 5, April 5 to April 20, and June 10 to July 30 with no fewer than three surveys completed in at least two survey periods, and with at least one of these surveys occurring immediately prior (within 48 hours) to project initiation (Swainson's Hawk Technical Advisory Committee 2000). The results of the surveys will be submitted to DFG. Other migratory bird nest surveys can be conducted concurrent with Swainson's hawk surveys. If the biologist determines that the area surveyed does not contain any active migratory bird nests, construction activities, including vegetation removal or pruning of trees and shrubs, can commence without any further mitigation.
- If active nests are found, WSAFCA will maintain a 0.25-mile buffer or other distance determined appropriate through consultation with DFG, between construction activities and the active nest(s) until young have been determined to have fledged. In addition, a qualified biologist (experienced with raptor behavior) will be present on-site (daily) during construction activities occurring during the breeding season to watch for any signs of stress. If nesting birds are observed to exhibit agitated behavior indicating that they are experiencing stress, construction activities will cease until a qualified biologist, in consultation with DFG, determines that young have fledged the active nest.

Implementation of these measures and Mitigation Measures VEG-MM-1, VEG-MM-2, and WILD-MM-2 would reduce potential effects to active nests and compensate for habitat losses. These protection and compensation measures would reduce potential effects to less than significant.

Mitigation

Mitigation Measure VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat

Mitigation Measure VEG--MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's hawk

Effect WILD-5: Disturbance to Burrowing Owl and Loss of Habitat

Burrowing owl is reported to nest 0.5 mile south of the study area. Burrowing owls have potential to nest in grasslands and unvegetated areas along levees throughout the study area. Construction activities, including grading and clearing activities within and adjacent to occupied lands could result in nesting failure, death of nestlings, or loss of eggs. Effects on a state species of special concern and species protected under the MBTA and CFGC are considered significant. Implementation of Mitigation Measures VEG-MM-2, WILD-MM-3, and WILD-MM-4 would ensure that project activities would not result in nesting disturbance or habitat loss for this species and reduce potential effects to less than significant.

Mitigation

Mitigation Measure VEG-MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-3: Conduct Preconstruction Surveys for Burrowing Owl Prior to Construction and If Present, Protect Nests through Use of Agency-Approved Protection Buffers

A preconstruction survey for burrowing owl will be completed, in accordance with DFG guidelines described in the *Staff Report on Burrowing Owl Mitigation*, prior to the start of construction. The survey area will include suitable habitat in the study area and where possible other suitable areas within 500 feet of the construction zone. Surveys will be conducted during the wintering (December 1 through January 31 recommended survey period) and nesting (April 15 through July 15 recommended survey period) seasons. Surveys will be conducted from 2 hours before sunset to 1 hour after, or from 1 hour before or 2 hours after sunrise. At least one survey will occur within 48 hours of the start of construction. If no burrowing owls are located during these surveys, no additional action would be warranted. However, if breeding or resident owls are located on or immediately adjacent to the site, the following measures will be implemented.

- No burrowing owls will be evicted from burrows during the nesting season (February 1 through August 31). Eviction outside the nesting season may be permitted pending evaluation of eviction plans and receipt of formal written approval from the DFG authorizing the eviction.
- A 250-foot buffer, within which no new activity would be permissible, would be maintained between project activities and nesting burrowing owls. This protected area would remain in effect until August 31, or at the DFG's discretion and based on monitoring evidence, until the young owls are foraging independently.
- If accidental disturbance, injury, or death of owls occurs, the DFG would be notified immediately.

Mitigation Measure WILD-MM-4: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Burrowing Owl

If a preconstruction survey finds that burrowing owls occupy a project area, and occupied habitat will be converted to unsuitable habitat, habitat compensation on off-site mitigation lands will be implemented. Habitat management lands comprising existing burrowing owl foraging and breeding habitat will be acquired and preserved. An area of 6.5 acres (the amount of land found to be necessary to sustain a pair or an individual owl) will be secured for each pair of owls or for an individual, in the case of an odd number of birds.

Where construction would only temporarily modify occupied habitat but habitat value would return to the preproject condition, compensation would not be required.

Effect WILD-6: Disturbance or Loss of Bats and Bat Roosts

Pallid bat, hoary bat and western red bat have potential to roost in riparian forest habitat adjacent to the project area. Bat roosts of special-status species and non- special-status species are highly sensitive to disturbance and are considered a sensitive resource by DFG. Construction activities such as tree removal and trimming or construction noise could result in impacts on roosting bats, including the destruction of active roosts, the loss of individuals, or roost failure. In addition, nighttime construction activities could disturb bats emerging from nearby roosts resulting in the disruption of foraging activities. These effects could be considered significant if the subsequent population decline was large and affected the viability of the local populations of bats. WSAFCA will implement protective fencing measures as outlined in Section 2.6, Chapter 2, Alternatives, to protect sensitive habitats. Implementation of this measure and Mitigation Measures VEG-MM-1, VEG-MM-2, and WILD-MM-5 would reduce this potential effect to less than significant.

Mitigation

Mitigation Measure VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat

Mitigation Measure VEG--MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-5: Conduct a Preconstruction Survey for Roosting Bats and Avoid or Mitigate for Potential Effects

Prior to any tree trimming and removal or other construction activities, a qualified biologist will conduct a preconstruction survey to determine whether bats are present. The survey will consist of a nighttime emergence survey of suitable trees for evidence (presence of guano or urine stains) of use by bats, and it should be conducted no more than 14 days prior to construction activities. If the biologist determines that the area surveyed does not contain any active roosts, activities may commence without any further mitigation. If active roosts are found, roosting structures should be retained, and the need for a construction buffer should be determined through consultation with DFG. If avoidance is not possible, DFG may require that bats be excluded from the habitat prior to start of the breeding and/or hibernation season. Compensatory mitigation for the loss of roosting habitat also should be determined through consultation with DFG but may include the construction and installation of suitable replacement habitat on site.

Effect WILD-7: Disturbance to Nesting Non-Special-Status Migratory Birds and Loss of Nesting and Foraging Habitat

Numerous non-special-status migratory bird species also have potential to nest in and adjacent to the construction area. Examples of these include red-tailed hawk, red-shouldered hawk, great horned owl, and American kestrel.

Tree and shrub removal, other vegetation clearing, grading, or other construction activities conducted during the nesting season (generally February 1 through August 31) could remove or cause abandonment of active nests of migratory birds protected under the MBTA and CFGC. These effects would be considered significant.

Additionally, project construction would require removal of foraging (grasslands) and nesting (grasslands and riparian forest) habitat which could adversely affect these species. Permanent habitat losses would include less than 5 acres of grasslands and 0.9 acres of riparian habitat.

As part of the project, WSAFCA will implement the following measures:

- Install construction barrier fencing (described in Chapter 2, The Rivers EIP Alternatives) to delineate the construction area and protect sensitive resources.
- To avoid removing or disturbing any active Swainson's hawk nests, other special-status bird nests, or non-special-status migratory birds nests, tree and shrub removal will be conducted during the non-breeding season (generally September 1 through January 31), where possible, or after a qualified biologist determines that fledglings have left an active nest (as described below).
- A breeding season (generally February 1-August 31) survey for nesting migratory birds will be conducted for all trees and shrubs located within 500 feet (0.25 mile for Swainson's hawk) of construction activities, including grading. Swainson's hawk surveys will be completed during at

least two of the following survey periods: January 1 to March 20, March 20 to April 5, April 5 to April 20, and June 10 to July 30 with no fewer than three surveys completed in at least two survey periods, and with at least one of these surveys occurring immediately prior (within 48 hours) to project initiation (Swainson's Hawk Technical Advisory Committee 2000). The results of the surveys will be submitted to DFG. Other migratory bird nest surveys can be conducted concurrent with Swainson's hawk surveys. If the biologist determines that the area surveyed does not contain any active migratory bird nests, construction activities, including vegetation removal or pruning of trees and shrubs, can commence without any further mitigation.

- If active nests are found, WSAFCA will maintain a 0.25-mile buffer or other distance determined appropriate through consultation with DFG, between construction activities and the active nest(s) until young have been determined to have fledged. In addition, a qualified biologist (experienced with raptor behavior) will be present on-site (daily) during construction activities occurring during the breeding season to watch for any signs of stress. If nesting birds are observed to exhibit agitated behavior indicating that they are experiencing stress, construction activities will cease until a qualified biologist, in consultation with DFG, determines that young have fledged the active nest.

Implementation of these measures and Mitigation Measures VEG-MM-1, VEG-MM-2, and WILD-MM-2 would reduce potential effects to active nests and compensate for habitat losses. These protection and compensation measures would reduce potential effects to less than significant.

Mitigation Measure VEG-MM-1: Compensate for the Disturbance or Removal of Riparian Habitat

Mitigation Measure VEG--MM-2: Conduct Mandatory Contractor/Worker Awareness Training for Construction Personnel

Mitigation Measure WILD-MM-2: Coordinate with Resource Agencies and Develop an Appropriate Compensation Plan for Swainson's hawk

Effect WILD-8: Disturbance or Loss of Common Wildlife Species and Their Habitats

The study area contains both natural and human influenced habitats that support numerous common species. Other common animals that could occupy the study area include terrestrial and aquatic mammals, amphibians, reptiles, and invertebrates. These species could also be affected by project construction but effects to these species would be considered less than significant because these species are not afforded protection under applicable laws, regulations, and policies described in the regulatory section. However, measure prescribed for special-status species would generally serve to protect other common species.

Effect WILD-9: Disruption of Wildlife Movement Corridors

In the study area, the riparian forest adjacent to the Sacramento River is considered to be a major movement corridor. Although construction has been designed to avoid impacts to this corridor, the construction site, particularly the Sacramento North Levee, may also be used as a movement corridor for wildlife due to its proximity to the Sacramento River. During construction of levee improvements, movement through the project area would be temporarily impeded by the placement of physical barriers (fencing) used to protect resources outside of the construction footprint but movement would be restored to the pre-project condition following construction.

Therefore, disruption of movement through the project area is less than significant. No mitigation is required.

Effect WILD-10: Conflict with Provisions of an Adopted HCP/NCCP or other Approved Local, Regional or State Habitat Conservation Plan

There is no adopted habitat conservation plan or natural communities conservation plan applicable to The Rivers EIP project site area. There are three plans under development in the region or project area, but not yet formally adopted, and one adopted plan in the region. The plans under development are the Yolo County Natural Community/Habitat Conservation Plan (NCCP/HCP), the South Sacramento HCP, and the Bay Delta NCCP. To the north of the project site, the adopted Natomas Basin HCP/NCCP applies to a 53,537 acre area in the northern portion of Sacramento County and the southern portion of Sutter County. The Natomas Basin HCP covers 22 listed, candidate and other species, and sets forth biological goals and objectives for wetland species/habitat and upland species/habitat within the NBHCP plan area. Its primary biological goal is to create a system of reserves, with both wetland and upland components, that would support a viable population of giant garter snake, Swainson's hawk and other covered species, with a primary focus on preservation efforts for giant garter snake and Swainson's hawk. Species with the potential to occur in The Rivers EIP project area that are covered in the NBHCP are bank swallow, burrowing owl, loggerhead shrike, Swainson's hawk, tricolored blackbird, white-faced ibis, and valley elderberry long horn beetle. The Rivers EIP project site is geographically outside of the plan area for the NBHCP; nonetheless, with the implementation of avoidance and minimization measures, it will not result in any significant effects for species covered by the NBHCP.

As discussed in Effect VEG-1 (Section 4.7), the construction activities associated with The Rivers APA would result in the loss of 0.9 acre (37 trees with a cumulative DBH of 897 inches) of Great Valley valley oak riparian forest, a sensitive natural community. Mitigation for this loss is proposed to occur on-site and will be managed in perpetuity as riparian habitat, which would ensure connectivity and avoid future fragmentation of the habitat. Although the project site falls outside the plan areas of the NBHCP, its actions would not conflict with the habitat goals and objectives of the NBHCP. Therefore, there is no effect.

4.9.4.3 The Rivers Alternative B

With respect to wildlife resources, the construction corridor and construction-related effects associated with The Rivers Alternative B would be the same as those described above for The Rivers APA. Effects discussions and mitigation measures for The Rivers Alternative B would be the same as those described for The Rivers APA. In the interest of brevity, the text and table are not repeated here.

Section 4.10
Land Use and Agriculture—The Rivers Early Implementation Project

4.10.1 Introduction

This section describes the affected environment for land use and agriculture, including the regulatory setting associated with land use and agriculture, effects on land use and agriculture that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- *City of West Sacramento General Plan* (City of West Sacramento 2004)
- *Yolo County General Plan* (Yolo County 1983)
- California Department of Conservation resource files

4.10.2 Affected Environment

This section describes the affected environment for land use and agriculture in The Rivers EIP project area, including the regulatory and environmental setting.

4.10.2.1 Regulatory Setting

4.10.2.1.1 Federal

The following Federal policies related to land use and agriculture may apply to implementation of The Rivers EIP.

Farmland Protection Policy Act

A National Agricultural Land Study conducted in the early 1980s found that millions of acres of farmland were being converted to other uses each year in the United States. As a result, a need for Congress to implement programs and policies to protect farmland was identified. Congress then passed the Agriculture and Food Act of 1981, which contained the Farmland Protection Policy Act (FPPA). The purpose of the FPPA is to minimize the extent to which Federal programs contribute to the irreversible conversion of farmland to non-agricultural uses, and to ensure that Federal programs are administered in a manner that will be compatible with state, local, Federal, and private programs and policies to protect farmland. For the purpose of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be used currently for agriculture. These lands may contain forest land, pasture land, cropland, or other land but may not have water or urban built-up land.

Farmland Designations

The purpose of the Farmland Mapping and Monitoring Program (FMMP) farmland designations is to provide consistent and impartial data to decision makers for use in assessing the status, reviewing trends, and planning for the future of agricultural land resources in California; however, the project is not responsible for regulating farmland. FMMP rates agricultural land according to soil quality and irrigation status and updates maps every 2 years. Farmland designations are discussed below.

Prime Farmland

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion.

Unique Farmland

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops such as, citrus, tree nuts, olives, cranberries, fruits, and vegetables.

Farmland of Statewide Importance

Farmland of statewide importance is land of statewide or local importance identified by state or local agencies for agricultural use, but not of national significance.

4.10.2.1.2 State

The following state policies related to land use and agriculture may apply to implementation of The Rivers EIP.

Williamson Act

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agriculture or related open space use. In return, landowners receive property tax assessments that are much lower than normal because they are based on farming and open space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the state via the Open Space Subvention Act of 1971.

The Williamson Act was amended in August 1998 to establish Farmland Security Zones. Under this Farm Bureau–sponsored Super Williamson Act, landowners can receive an additional 35% reduction in the land's value for property tax purposes. This additional tax reduction can be earned only if farmers and ranchers keep their property in the conservation program for at least 20 years. Farmland Security Zone contracts are comparable to the Williamson Act contracts in that each year another year is added to the agreement unless the landowner or county does not renew the contract. The legislation prohibits the annexation of land enrolled in a 20-year contract to a city, or a special district that provides non-agricultural services, or for use as a public school site.

Of California's 58 counties, 52 have adopted the Williamson Act program. Yolo County is included in those that have adopted the act. The location of these lands in the project vicinity is discussed in the Environmental Setting that follows.

4.10.2.1.3 Local

The following local policies related to land use and agriculture may apply to implementation of The Rivers EIP.

Delta Protection Commission

The Delta Protection Act of 1992 created the Delta Protection Commission. The Commission seeks to adaptively protect, maintain, and wherever possible, enhance and restore the overall quality of the Delta environment consistent with the Delta Protection Act. The Commission's goal is to guide orderly, balanced conservation and development of land resources in the Delta, and to improve flood protection.

The Commission divided the Delta area into a primary zone and a secondary zone. The city of West Sacramento is in the secondary zone. Within the primary zone, standards limit uses and practices that could affect the beneficial uses of the Delta. Local county general plans all designate the primary zone primarily for agriculture; however, recreation, wildlife habitat, and nature preserves are approved on agriculture-zoned lands.

The secondary zone of the Delta surrounds the primary zone. The area of the city that lies south of the main line is within the secondary zone. While no standards affect the secondary zone, development within these areas is coordinated with and monitored by the Commission.

Yolo County General Plan

The *Yolo County General Plan* defines land use and zoning goals and policies for the county. The following policies are included in the general plan.

Goals

- **AG-1:** Conserve and preserve agricultural lands in Yolo County, especially areas currently farmed or having prime agricultural soils and outside existing planned communities and city limits.
- **AG-3:** Ensure the compatibility of land uses adjacent to agricultural operations, so that agricultural productivity is not substantially affected.
- **AG-6:** Provide opportunities for recreation, tourism and associated support services in appropriate locations.

Policies

- **AP-1:** Land uses in areas designated for agricultural use shall be limited to those directly related to agricultural production or support of agriculture.
- **AP-2:** The County shall utilize an Agricultural Conservation Easement Program to help protect and preserve agricultural lands, as defined in this Element. This program shall require payment of an in-lieu fee sufficient to purchase a farmland conservation easement, farmland deed restriction, or other farmland conservation mechanism as a condition of approval for conversion of agricultural land to non-agricultural use. The in–lieu fee or other conservation mechanism shall recognize the importance of land value and shall require equivalent mitigation. This may include the use of a variable standard that requires a commitment to preserve fewer acres if the

land to be preserved is threatened by development and a greater number of acres to be preserved if the land to be preserved is removed from development pressures.

- **AP-5:** Yolo County shall actively maintain the Williamson Act Land Conservation (Agricultural Preserve) program.

City of West Sacramento General Plan

Land use and development in the study area are guided primarily by the *City of West Sacramento General Plan*. The general plan defines land use and zoning categories for the incorporated areas and provides an inventory of existing land uses in the city. The following policies and goals are included in the general plan.

Natural Resources

- **Goal B:** To promote the economic viability of agriculture in West Sacramento and to discourage premature development of agricultural land with non-agricultural uses, while providing for urban needs.
- **Policy 3:** The City shall encourage the County of Yolo to retain agricultural uses on lands adjacent to the city.

The general plan also includes land use standards for zoning purposes. The following program-related land use designations include public/quasi-public as a possible use: rural residential, residential, commercial/water-related, heavy industrial, industrial/water-related, waterfront, public/quasi-public, recreation and parks, and agriculture.

4.10.2.2 Environmental Setting

This section discusses the environmental setting related to land use and agriculture in The Rivers EIP project area.

The proposed levee improvement would take place entirely within Yolo County and the City of West Sacramento, along the Sacramento River North Levee. The land in and adjacent to the project area has been designated by the City of West Sacramento as public/quasi public, single-family residential, waterfront, recreation-parks, and public open space (City of West Sacramento 2009).

Residential areas are at the southwest and southeast corners of the project area. The residential area to the southwest is comprised of single-family homes. The residential area to the southeast is The Rivers gated community, also comprised of single family homes. The area that lies south of the 70+00 to 82+50 section of the project area is comprised of Bryte Park, which is designated as recreation-parks by the City of West Sacramento. The portion of the city that lies directly south of the 82+50 to 92+50 section of the project area is comprised of Riverbank Elementary School, which is designated as public-quasi public areas. Inside The Rivers gated community at the southeast corner of the project area, the land has been designated as waterfront. The area of the levee is designated as public open space (City of West Sacramento 2009).

No land in the project area has been designated as agricultural, nor is any land part of a Williamson Act contract.

4.10.3 Environmental Consequences

This section describes the environmental consequences relating to land use and agriculture for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.10.3.1 Assessment Methods

This evaluation of land use and agriculture is based on a review of the regulatory setting above, review of the project in regard to compliance with Federal, state and local land use plans and regulations, and field observations. Key effects were identified and evaluated based on the environmental characteristics of The Rivers EIP project area and the magnitude, intensity, and duration of activities related to the construction and operation of this project.

4.10.3.2 Determination of Effects

For this analysis, an effect pertaining to land use and agriculture was analyzed under NEPA and CEQA if it would result in any of the following environmental effects, which are based on NEPA standards, State CEQA Guidelines Appendix G (14 CCR 15000 *et seq.*), and standards of professional practice.

4.10.3.2.1 Land Use

For the purposes of this analysis, effects on land use are considered significant if implementation of the proposed project would:

- physically divide an established community;
- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect; or
- conflict with any applicable habitat conservation plan or natural community conservation plan.

4.10.3.2.2 Agriculture

For the purposes of this analysis, effects on agriculture are considered significant if implementation of the proposed project would:

- convert prime farmland, unique farmland, or farmland of statewide importance;
- conflict with existing zoning for agricultural use, or a Williamson Act contract; or
- involve other changes in the existing environment, which because of their location or nature, could result in conversion of farmland to non-agricultural use.

  The project would be considered to have a significant effect on important farmland (i.e., prime farmland, unique farmland, farmland of statewide importance) if it would result in an irretrievable conversion of a substantial acreage of such land. An irretrievable conversion is one that involves the conversion of land to uses that would cause serious degradation of the quality of soils and/or result in expenditures of substantial development costs that likely would preclude the practicality of future conversion back to agriculture. Implementation of the project would not physically divide an established community. There would be no conflict with any applicable habitat conservation plan or natural community conservation plan. The Yolo Natural Heritage Program is currently developing a natural community conservation plan (NCCP) and habitat conservation plan (HCP), but has not formally released or adopted a program within the study area. Additionally, there would be no conflict with a Williamson Act contract because no Williamson Act lands are located within the study area. Therefore, the first, third, and fifth criteria do not apply to the project and are not considered further.

4.10.4 Effects and Mitigation Measures

4.10.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to land use would occur.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento River North Levee could fail due to seepage, slope stability or geometry issues would continue. Given levee conditions, the risk of levee failure would continue under the No Action Alternative. A flood event could have severe ramifications for agriculture and land use in West Sacramento. Flooding may cause inundation, erosion, or sedimentation from high flows, destruction, or damage to agricultural equipment, outbuildings and processing facilities, all of which could lead to reduction in agricultural productivity. This damage may cause depression of the agricultural economy and cause abandonment of or prolonged delay in cultivation of productive lands, which could ultimately result in a change in the use of these lands that may be difficult to reverse.

Similarly, levee failure could significantly change the land uses in urban areas, both temporarily and permanently, and result in the physical division of established communities. A period of months or years would be required for clean-up and repair after a large flood event, during which time the affected parcels would be temporarily unable to support their designated land uses. Damages sustained by residential, commercial, civic, and industrial areas inundated by flooding could be so great as to render the properties permanently unusable. Additionally, the cost of cleanup and repair after flooding could be too great to make restoring the current land use worthwhile, resulting in permanent changes to land use in West Sacramento and potential division of established communities.

4.10.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers APA would result in the following effects on land use and agriculture. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect LU-1: Temporary Changes in Land Uses to Accommodate Construction	Less than significant	N/A	N/A
Effect LU-2: Change in Land Use Designations or Potential to Conflict with Local Land Use Designations as a Result of Construction	Less than significant	N/A	N/A

Effect LU-1: Temporary Changes in Land Uses to Accommodate Construction

During construction of The Rivers APA, a staging area to house construction equipment and materials would be necessary (see Figure 2-6 for the location of the staging area). The staging and construction areas are zoned as Waterfront and Public Open Space by the City of West Sacramento (Figure 4.10-1). These will be returned to their original uses following the completion of construction. Thus, The Rivers APA would not result in significant effects on land use as a result of temporary land use changes. This effect is considered less than significant. No mitigation is required.

A portion of the construction area encompasses 15 residences from which the residents would be temporarily relocated during construction. The effects associated with relocating these residents are discussed in Section 4.11, Socioeconomic and Community Effects.

Effect LU-2: Change in Land Use Designations or Potential to Conflict with Local Land Use Designations as a Result of Construction

Implementation of The Rivers APA may require WSAFCA to acquire a permanent right-of-way in areas adjacent to the levee through fee title or easement interest within the footprint of the project improvements to prevent residential or utility encroachments into the flood control system. At the western end of the project area, the land is zoned as public/quasi-public, a zone that provides for government-owned facilities, public and private schools, and quasi-public uses such as hospitals and churches. The purpose of this zone is to provide for a broad range of public, quasi-public, and non-profit institutional uses. The proposed use in WSAFCA's acquired permanent right-of-way, flood infrastructure maintenance, would not conflict with current zoning and land use as the current use is recreation-park land. Additionally, 23 acre of land located on top of the levee (currently designated public open space) would be added to Bryte Park, resulting in a net gain in recreation-park land.

At the eastern end of the project area in The Rivers gated community, there are 11 residences located on top of the levee and four residences adjacent to the landside toe of the levee that encroach into the levee operation and maintenance area. The Rivers gated community is zoned as waterfront, a zone that provides for marinas, restaurants, retail, amusement, hotel, and motel uses, mid-rise and high-rise offices, multi-family residential units (which are oriented principally to the river), public and quasi/public uses, and similar and compatible uses. WSAFCA's acquisition of a permanent right-of -way within The Rivers gated community would not conflict with current zoning; however, it may conflict with the current residential use. However, flood infrastructure maintenance could be considered a compatible use within the Waterfront zone. If property were to be acquired as a permanent right-of-way, the amount of land would affect a small percentage of the housing and residential use within The Rivers gated community and would not result in a loss substantial enough to divide the community.

In summary, the implementation of The Rivers APA would still be compatible with local land use designations because the public open space, public/quasi-public, and waterfront designations allow flood infrastructure maintenance uses. This effect would be less than significant. No mitigation is required.

4.10.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on land use and agriculture. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
LU-1: Temporary Changes in Land Uses to Accommodate Construction	Less than significant	N/A	N/A
Effect LU-2: Change in Land Use Designations or Potential to Conflict with Local Land Use Designations as a Result of Construction	Less than significant	N/A	N/A

Effect LU-1: Temporary Changes in Land Uses to Accommodate Construction

This effect would be the same as described above under The Rivers APA. This effect is considered less than significant. No mitigation is required.

Effect LU-2: Change in land use Designations or Potential to Conflict with Local Land Use Designations as a Result of Construction

This effect would be the same as described above under The Rivers APA. This effect is considered less than significant. No mitigation is required.

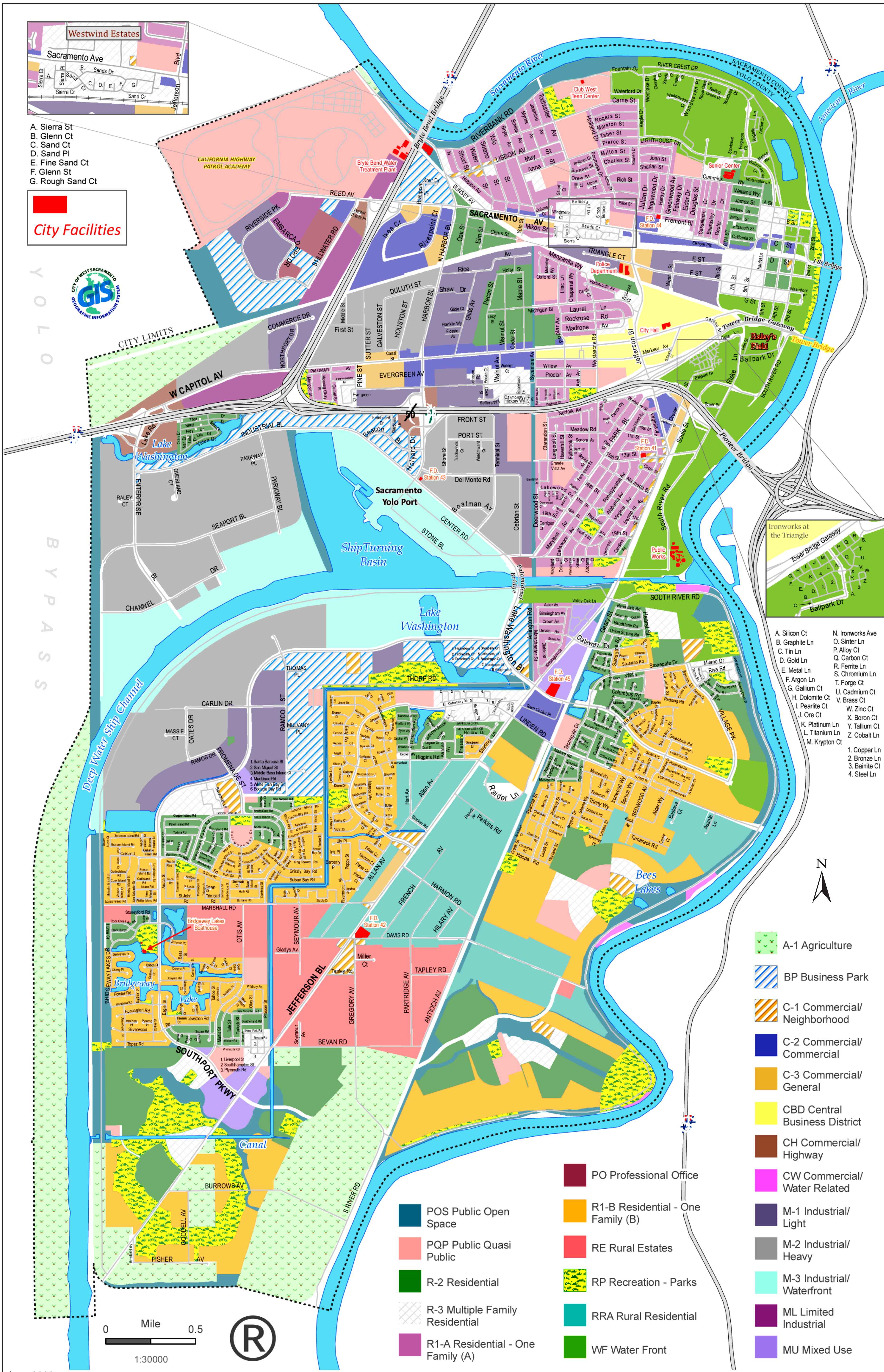

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Figure 4.10-1
City of West Sacramento Zoning Map

Section 4.11

Socioeconomic and Community Effects—The Rivers Early Implementation Project

4.11.1 Introduction

This section describes the affected environment socioeconomic and community conditions, including the regulatory setting associated with employment, agricultural production, population, and housing; the effects on socioeconomic and community conditions that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- California Department of Finance City/County Population and Housing Estimates (California Department of Finance 2009a, 2009b, 2009c)
- California Department of Water Resources Land Use Survey (California Department of Water Resources 1997)
- California Employment Development Department El Dorado, Placer, Sacramento, Sutter, Yolo, Yuba, and Solano County Local Area Profiles (California Employment Development Department 2009a, b, c, d, e, f, and g)
- *City of West Sacramento General Plan Policy Document* (City of West Sacramento 2004)
- *City of West Sacramento General Plan Background Document* (City of West Sacramento 2000)
- U.S. Census Bureau QuickFacts (U.S. Census Bureau 2009a, 2009b, 2009c)
- *Yolo County 2008 Agricultural Crop Report* (Yolo County Department of Agriculture 2008)

4.11.2 Affected Environment

This section describes the affected environment for socioeconomics and the community in The Rivers EIP project area, including regulatory and environmental settings.

4.11.2.1 Regulatory Setting

The following policies related to socioeconomics and the community may apply to the implementation of The Rivers EIP.

4.11.2.1.1 Federal

The following federal policies related to socioeconomics and the community may apply to the implementation of The Rivers EIP.

Uniform Relocation Assistance and Real Property Acquisition Policies Act

Federal, state, and local government agencies, and other agencies receiving Federal financial assistance for public programs and projects that require the acquisition of real property, must comply with the policies and provisions set forth in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended in 1987 (42 United States Code [USC] 4601 *et seq*.) (Uniform Act), and implementing regulation, Title 49 Code of Federal Regulations [CFR] Part 24. Relocation advisory services, moving cost reimbursement, replacement housing, and reimbursement for related expenses and rights of appeal are provided for in the Uniform Act.

Property acquisition and relocation services, compensation for living expenses for temporarily relocated residents, and negotiations regarding any compensation for temporary loss of business would be accomplished in accordance with the Uniform Act and California Government Code Section 7267, *et seq*. (see discussion below).

4.11.2.1.2 State

The following state policies related to socioeconomics and the community may apply to the implementation of The Rivers EIP.

Relocation Assistance and Property Acquisition

The State of California's Government Code Section 7260, *et seq*. brings the California Relocation Act into conformity with the Federal Uniform Act. In the acquisition of real property by a public agency, both the Federal and state acts seek to (1) ensure consistent and fair treatment of owners of real property, (2) encourage and expedite acquisition by agreement to avoid litigation and relieve congestion in the courts, and (3) promote confidence in public land acquisition.

The Relocation Assistance and Real Property Acquisition Guidelines were established by 25 California Code of Regulations (CCR) 1.6. The guidelines were developed to assist public entities with developing regulations and procedures for implementing 42 USC 61—the Uniform Act, for Federal and federally assisted programs. The guidelines are designed to ensure that uniform, fair, and equitable treatment is given to people displaced from their homes, businesses, or farms as a result of the actions of a public entity. Under the Uniform Act, persons required to relocate temporarily are not considered "displaced," but must be reimbursed for all reasonable out-of-pocket expenses. In accordance with these guidelines, people will not suffer disproportionate injury as a result of action taken for the benefit of the public as a whole. Additionally, public entities must ensure consistent and fair treatment of owners of such property, and encourage and expedite acquisitions by agreement with owners of displaced property to avoid litigation.

Property acquisition and relocation services, compensation for living expenses for temporarily relocated residents, and negotiations regarding any compensation for temporary loss of business would be accomplished in accordance with the Uniform Act (see discussion above) and California Government Code Section 7267, *et seq*.

General Plans

State law requires each city and county to adopt a general plan for its future growth. This plan must include a housing element that identifies housing needs for all economic segments and provides opportunities for housing development to meet those needs. At the state level, the Housing and

Community Development Department estimates the relative share of California's projected population growth that will occur in each county presented by the Department of Finance's demographic research unit.

Each city and county must update its general plan housing element on a regular basis (usually every 5 years). Among other things, the housing element must incorporate policies and identify potential sites that would accommodate the city's and county's share of the regional housing need. Prior to adopting a general plan update for housing, the city or county must submit the draft to the Housing and Community Development Department for its review. The Housing and Community Development Department will take action to advise the local jurisdiction whether its housing element complies with provisions of California Housing Element Law. The *City of West Sacramento General Plan Housing Element* was last updated in 1992, but is currently undergoing an update process.

4.11.2.1.3 Local

The following local policies related to socioeconomics and the community may apply to the implementation of The Rivers EIP.

City of West Sacramento General Plan

The *City of West Sacramento General Plan* was adopted by the City in 1990. Although the 1990 general plan contains policies related to housing and economics, these policies are out of date in light of the significant amount of development that has occurred over the past 20 years. The City is in the process of updating the general plan, which is expected to be complete in 2009. The new general plan will guide the city's growth through 2030. The *General Plan Issues and Opportunities Report*, published in June 2008, identified the following areas of focus related to housing and economics:

- designating higher densities at appropriate locations to support transit,
- promoting mixed-use development,
- maintaining rural residential land in the southern area,
- promoting tourism,
- increasing the number of good-paying jobs (especially in Southport), and
- addressing telecommunication infrastructure.

4.11.2.2 Environmental Setting

This section discusses the environmental setting related to socioeconomic and community effects in Yolo County, the City of West Sacramento area and more specifically, The Rivers EIP project area.

4.11.2.2.1 Yolo County

Employment

With its affordable housing and land and its easy access to highway, rail, water, and air transportation, Yolo County has an attractive business climate. The primary business sectors are government; professional and business services; transportation, warehousing, and utilities; and agriculture (LSA Associates, Inc. 2009). The largest employers in the county are the University of California Davis, Cache Creek Casino Resort, the U.S. Postal Service, and the State of California (Yolo County 2009). Total retail taxable sales in the county in 2007 were $3,259,843,000 (California Employment Development Department 2009e).

Yolo County has a population of 200,709 (California Department of Finance 2009a). The labor force is 98,200, with 87,900 people employed and 10,300 unemployed; an unemployment rate of 10.5% (California Employment Development Department 2009e). The median household income is $55,988 and the per capita income is $19,365 (U.S. Census Bureau 2009a).

Agricultural Production

Yolo County has a long agricultural heritage and, as recently as its current general plan update, has historically set policies that preserve agriculture. Almost 99% of the county's unincorporated land (621,224 acres) is designated for agricultural use (Yolo County 2008). The 2008 Yolo County Agricultural Crop Report indicates that Yolo County's total agricultural production in 2008 was $527,330,803. This is an increase of more than 16% over 2007 yields. The top- producing crops were tomatoes, alfalfa, rice, wine grapes, and seed crops (Table 4.11-1). It should be noted that these figures represent crop values only, and do not take into account other agricultural contributions to the economy such as field labor, processing, transport, marketing, and other services. When these factors are also considered, agriculture contributes over $1.5 billion to the Yolo County economy. (Yolo County Department of Agriculture 2008)

Table 4.11-1. Crop Yields and Values for Top-Producing Crops (and Corn and Grain) in Yolo County, 2008

	Total Tonnage Produced	Value per Ton	Total
Alfalfa	387,896	$189.24	$73,405,515
Corn (field)	44,730	$152.19	$6,807,486
Grain	53,969	$179.11	$9,666,518
Rice	105,104	$521.32	$54,792.829*
Rice, wild	3,415	$1,684.17	$5,751,816
Tomatoes	1,528,882	$68.76	$105,124,614
Wine grapes (black)	17,333	$597.72	$10,360.047
Wine grapes (white)	60,069	$526.83	$31,645,542
Seed crops (total)	24,135	Not available	$31,952,413

Source: Yolo County Department of Agriculture 2008
* Includes Federal rice payment

The Sacramento Area Council of Governments envisions that, because of its commitment to agriculture and natural resources, Yolo County will grow at a slower rate compared to the rest of the region. Local retail and office jobs will expand, while industrial jobs will decline (Sacramento Area Council of Governments 2004).

4.11.2.2.2 West Sacramento

Employment

West Sacramento attracts business with an accessible and cooperative government; access to multi-modal transportation (highway, rail, and port); a regional workforce of over one million people; and low business costs (City of West Sacramento Economic Development 2009). The city's economy is moving from a climate that was historically focused the on the transportation and warehouse sectors toward newer industries such as biotech, green energy, and green technology (Mintier & Associates 2008). West Sacramento had an 89% employment growth rate between 1990 and 1999, which is the third highest growth rate of any city in the Sacramento region (City of West Sacramento Economic Development 2009). The top employers are the United Parcel Service, the U.S. Postal Service, Nor-Cal Beverage, and Raleys/Bel Air. The City is targeting the following industries in its *City of West Sacramento General Plan Update* (Mintier & Associates 2008):

- biotechnology/life sciences,
- clean energy and green technology,
- food processing,
- manufacturing,
- retail, and
- small business.

The city's retail business greatly expanded over the last 4 years with the store openings of IKEA, Wal-Mart, Target, Home Depot, Lowe's, and Nugget Market. West Sacramento now has a higher sales-to-income ratio than surrounding communities and the region as a whole (Mintier & Associates 2008). Table 4.11-2 shows West Sacramento's largest private employers.

The Sacramento Area County of Governments envisions that West Sacramento will be the fastest growing city in the region because of its proximity to Sacramento's urban core and many opportunities for reinvestment. Major job growth will be in the retail and office sectors, with less growth in the industrial sector than in the past. (Sacramento Area Council of Governments 2004)

Table 4.11-2. West Sacramento's Largest Private Employers

Company Name	
United Parcel Service (UPS)	All Phase Security, Inc.
U.S. Postal Service	Bytheways Manufacturing Inc.
Nor-Cal Beverage	Clark Pacific
Raley's/Bel Air	Hunter Douglas
Fed-Ex Freight West, Inc.	Siemens Healthcare Diagnostics
Xyratex International	KOVR TV 13
C & S Wholesale Grocers	Idexx Veterinary Services
First Health Group Corporation	Capital Coors Company
Wal Mart	Consolidated Procurement Services
Prologix Distribution Services	Farmer's Rice Cooperative

Company Name	
Tony's Fine Foods	IKEA
Citibank	Lowe's
Roadway Express	

The City of West Sacramento has a population of 47,782 (California Department of Finance 2009a) and employs 30,655 people (Sacramento Area Council of Governments 2008a). The unemployment rate is 9.5% (California Employment Development Department 2009e). The median household income is $31,718 and the per capita income is $15,245 (U.S. Census Bureau 2009b).

Agricultural Production

The *City of West Sacramento General Plan* designates two areas within the city as agricultural: the area of Southport generally south of Bevan Road and a small part of the Yolo Bypass at the western edge of the city, immediately north of West Capitol Avenue and south of the Southern Pacific tracks (LSA Associates 2009). These areas, in addition to areas with other general plan designations, are currently used for farming (California Department of Water Resources 1997). A very conservative estimate of currently-farmed acreage located within the West Sacramento area is 570 acres.

According to the most recently available DWR Land Use maps, the majority of the land in West Sacramento currently in agricultural production is planted in corn, grain, and alfalfa (California Department of Water Resources 1997). Alfalfa is the second highest-grossing crop in Yolo County (Table 4.11-3). Grain and corn crops are much smaller overall producers (Yolo County Department of Agriculture 2008).

Table 4.11-3. Annual Yields and Values for Crops Grown in West Sacramento

	Tonnage per Acre	Value per Ton	Value per Acre
Corn (field)	5.51	$152.19	$838.57
Grains	3.21	$179.11	$574.94
Alfalfa	6.84	$189.24	$1,294.40

Source: Yolo County Department of Agriculture 2008

The Port of West Sacramento is an inland port that has historically served the agricultural industry. In 2005, the City of West Sacramento assumed leadership of the port and has since broadened the port's duties to include green cargo (specialized cargo that enhances the environment) (City of West Sacramento 2009a). There are thousands of jobs associated with the port and related movement of goods via truck, rail, and ship (City of West Sacramento 2009b). Due to increased worldwide demand for rice, the port expects to export about 339,000 metric tons of bagged rice this year—about double its normal capacity (The Cunningham Report 2009). President Obama's proposed 2010 Civil Works budget includes $10 million for widening the DWSC that leads to the port. Deepening the DWSC would almost double the number of fully loaded oceangoing freight ships able to access the Sacramento region (Port of West Sacramento 2009).

Population

The City of West Sacramento is the third largest city in Yolo County and is currently experiencing strong, steady growth (Yolo County 2009). The City incorporated in 1987, combining the former communities of Bryte, Broderick, West Sacramento, and Southport. Southport is home to newer residences and Bryte and Broderick have higher percentages of pre-WWII homes. The U.S. Census reports that the population in West Sacramento was 31,615 in 2000 (U.S. Census Bureau 2009b). According to the California Department of Finance the estimated population of residents in West Sacramento in January 2009 was 47,782, a 1.9% increase over 2008 and 51% increase since 2000 (California Department of Finance 2009c).

As a point of reference for the city, information about population in Yolo County is presented here. Yolo County's population is currently 200,709, an increase of 1.2% over last year (California Department of Finance 2009b), and approximately 17.2% over 2000 (U.S. Census Bureau 2009a). Over 88% of Yolo County's population lives in its four incorporated cities—West Sacramento, Davis, Woodland, and Winters. The remaining 12% live in unincorporated areas of the county (Yolo County 2008).

Housing

As the population of West Sacramento grows, the city's housing stock is growing as well. The California Department of Finance estimates that there are currently approximately18,550 total housing units in the city, which is an increase of approximately 50% over the number of housing units in 2000 (California Department of Finance 2009c; U.S. Census Bureau 2009b). An unofficial vacancy rate estimate for the city in 2009 is 5.5% (Sperling's Best Places 2009).

As a point of reference for the city, information about housing in Yolo County is presented here. The California Department of Finance estimates that there are currently approximately 73,811 housing units in Yolo County, an increase of approximately 20% over 2000 levels (California Department of Finance 2009c; U.S. Census Bureau 2009a).

4.11.2.2.3 The Rivers EIP Project Area

There are 15 residences in the immediate vicinity of The Rivers EIP project area. During some periods of time, construction activities would be directly adjacent to these homes. In addition, the proposed utility modifications would result in the temporary disruption of service (water, telephone, electricity, gas, and sanitary sewer) during construction.

There are 11 residences located on top of the levee and four residences adjacent to the landside toe of the levee that encroach into the levee operation and maintenance area. Before construction, WSAFCA may acquire temporary or permanent right-of-way through fee title or easement interest within the footprint of the project improvements to prevent residential or utility encroachments into the flood control system.

No land in agricultural production is located within or adjacent to The Rivers EIP project area that could be affected by implementation of either alternative.

Some unofficial recreational activities, such as fishing, that may provide commerce for local recreation-related businesses (e.g., bait shops) occur on the vegetated waterside berm located adjacent to the levee at The Rivers EIP project area.

4.11.3 Environmental Consequences

This section describes the analysis of effects relating to socioeconomic and the community for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and identifies the thresholds used to conclude whether an effect would be significant.

4.11.3.1 Assessment Methods

Effects on socioeconomics and the community were evaluated qualitatively based on the criteria listed below in Determination of Effects. Additionally, The Rivers EIP was evaluated for consistency with relevant local plans and policies at the Federal, state and local level.

4.11.3.2 Determination of Effects

For this analysis, an effect pertaining to socioeconomics and the community was analyzed under NEPA and CEQA if it would result in any of the following environmental effects, which are based on NEPA standards, State CEQA Guidelines Appendix G (14 CCR 15000 et seq.), and standards of professional practice:

- a substantial change in employment;
- inducement of substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure); or
- displacement of substantial numbers of existing housing or people, necessitating the construction of replacement housing elsewhere.

4.11.3.2.1 Effect Assumptions

Although some unofficial recreational activities that may provide commerce for local recreation-related businesses occur on the vegetated waterside berm located adjacent to the levee at The Rivers EIP project area, there are abundant close-by alternate locations for the types of activities that may be potentially affected by project construction. The recreation analysis found project-related effects on recreation to be less than significant (Section 4.14, Recreation). Employment at recreation-related businesses is therefore not anticipated to be affected by project implementation, and is therefore not discussed further in this section.

4.11.4 Effects and Mitigation Measures

4.11.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to socioeconomics or the community would occur and there would be no changes in existing population or employment, except for the changes currently planned for in the appropriate local and state planning documents. Therefore, there would be no effect on this resource under the No Action Alternative.

Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento Bypass Levee could fail due to seepage or slope stability/geometry issues would continue. Should a levee failure and associated flooding occur, there could be widespread temporary and permanent displacement of residents. Damages suffered from flooding could lead to the long-term disruption of industrial, agricultural, and retail economic activities within the city of Sacramento. Dependent on the degree of damage caused, disruption of activities could lead to a reduction in employment and short- to long-term depressed economic conditions resulting from damage to industrial, retail, and agricultural facilities and major transportation facilities that support their activities. These effects are explored in more detail below.

Levee failure at The Rivers EIP site and subsequent flooding of the city of West Sacramento would affect the entire city, causing substantial damage to structures, contents, and other property such as landscaping and automobiles. A population of 40,439 lives in 15,448 housing units within the city (Sacramento Area Council of Governments 2008b and 2008c). All of these residents could be displaced by a catastrophic flood event. Additionally, the city is home to 30,655 jobs (Sacramento Area Council of Governments 2008a), 734 commercial and industrial structures, 46 public structures and 27 park facilities, all of which would be affected by a flood event (HDR, Inc. 2009). Agricultural operations could also sustain major damage in a flood event; 22.6% of the land area within the city is either farmland or open space (City of West Sacramento 2009c).

During the recovery period after a flood event, West Sacramento residents would require temporary housing, and displacement of many or all occupants would occur while levees, buildings, and other infrastructure were repaired. Businesses, social services, and other employers occupying affected structures would be forced to relocate. The potential number of displaced residents throughout the city (more than 40,000) and businesses (more than 30,000 jobs) is so large that the demand for temporary quarters would likely exceed the available supply of vacant buildings surrounding the West Sacramento area. Thus, many displaced residents and businesses may be forced to relocate to areas a considerable distance from West Sacramento, resulting in substantial intermediate-term and long-term economic impacts to the West Sacramento area. These impacts include changes in employment numbers and patterns, changes in business and personal incomes, changes in tax revenues, and changes in regional economic activity.

A flood event in West Sacramento would also disrupt state and interstate highway, rail, and shipping traffic, causing long-term effects on the region's and the state's economy. West Sacramento has one of the most comprehensive transportation networks on the west coast. Its central geographic location and extensive north-south and east-west highway access has made it a major distribution center. High volumes of truck traffic pass through the city on I-80 and US 50/Business 80 every day, with truck traffic transporting approximately $63 billion worth of cargo annually through West Sacramento (HDR, Inc. 2009). Major transcontinental rail lines passing through the city provide commercial and passenger rail service to all parts of the nation, and the Port of West Sacramento runs domestic and international shipping services (City of West Sacramento 2009). Approximately 9.3 million tons of rail freight valued at approximately $5 billion travels through West Sacramento annually (HDR, Inc. 2009). Flooding of this transportation and distribution infrastructure would cut off major statewide and interstate commerce corridors and cause severe statewide economic effects.

These flood-related effects on population, housing, and socioeconomic conditions would be significant. Post-flooding conditions could result in short-term increases in employment for post-flooding cleanup and restoration activities, but these increases would likely not offset the potential losses.

4.11.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers APA would result in the following effects on socioeconomics and the community. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect SOC-1: Temporary Increase in Employment in the Region during Construction	Beneficial	N/A	N/A
Effect SOC-2: Effects on Residents	Significant and unavoidable	N/A	N/A

Effect SOC-1: Temporary Increase in Employment in the Region during Construction

Construction activities associated with implementation of The Rivers EIP would temporarily increase employment and personal income in the local area. Preliminary cost estimates anticipate that total construction-related expenditures associated with The Rivers APA would be approximately $15 million to $25 million (Vecchio pers. comm. 2009) in 2011. This is an estimate of direct costs only, and does not include indirect/induced changes in employment and personal income resulting from project construction. Project construction would benefit the local economy by temporarily increasing employment and personal income. Although the increase in employment is not considered substantial when compared to total employment in the region, this effect on employment would be beneficial.

Effect SOC-2: Effects on Residents

Construction of The Rivers APA would be adjacent to 30 to 40 residences, would require temporary displacement of the occupants of approximately 15 residences, and may require easement or right-of-way acquisition. WSAFCA has committed to providing relocation services and compensation to the affected residents at The Rivers APA project area. WSAFCA would develop a Temporary Resident Relocation Plan, as described in Section 2.7.8 of Chapter 2, which would outline the process for providing notice for relocation, coordinating relocating activities, and providing security for homes that are vacated, among other issues related to temporary relocation. All acquisition and relocation services, as well as compensation for living expenses for temporarily relocated residents, would be provided in compliance with Federal and state relocation laws. No residents would be permanently displaced and no new construction would be necessary. However, because of the inconvenience to displaced residents, this effect is considered significant and unavoidable.

4.11.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on socioeconomics and the community. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect SOC-1: Temporary Increase in Employment in the Region during Construction	Beneficial	N/A	N/A
Effect SOC-2: Effects on Residents	Significant and unavoidable	N/A	N/A

Effect SOC-1: Temporary Increase in Employment in the Region during Construction

Construction-related expenditures associated with The Rivers Alternative B have not been calculated, but are anticipated to be similar to the numbers presented for The Rivers APA, although construction would take place over 2 years instead of 1. Project construction would benefit the local economy by temporarily increasing employment and personal income. Although the increase in employment is not considered substantial when compared to total employment within the region, this effect on employment would be beneficial.

Effect SOC-2: Effects on Residents

Construction of The Rivers Alternative B would require temporary displacement of the occupants of 15 residences, and may require easement or right-of-way acquisition. WSAFCA has committed to providing relocation services and compensation to the affected residents at The Rivers APA project area. WSAFCA would develop a Temporary Resident Relocation Plan, as described in Section 2.7.8 of Chapter 2, which would outline the process for providing notice for relocation, coordinating relocating activities, and providing security for homes that are vacated, among other issues related to temporary relocation. All acquisition and relocation services, as well as compensation for living expenses for temporarily relocated residents, would be provided in compliance with Federal and state relocation laws. No residents would be permanently displaced and no new construction would be necessary. However, because of the inconvenience to displaced residents, this effect is considered significant and unavoidable.

Section 4.12
Environmental Justice—
The Rivers Early Implementation Project

4.12.1 Introduction

This section describes the regulatory and environmental setting for environmental justice, effects on low-income and minority populations that would result from the proposed project, and mitigation measures that would reduce significant effects.

The key sources of data used in the preparation of this section are listed below.

- *City of West Sacramento General Plan Policy Document* (City of West Sacramento 1990)
- U.S. Census Bureau QuickFacts (U.S. Census Bureau 2009a, 2009b, 2009c)

4.12.2 Affected Environment

This section describes the affected environment for environmental justice in The Rivers EIP project area, including regulatory and environmental settings.

4.12.2.1 Regulatory Setting

4.12.2.1.1 Federal

The following Federal policy related to environmental justice may apply to the implementation of The Rivers EIP.

Executive Order 12898: Environmental Justice

Federal Executive Order 12898, Environmental Justice, requires that, to the greatest extent practicable and permitted by law, "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Executive Order 12898 charges each cabinet department to "make achieving environmental justice part of its mission," with the U.S. Environmental Protection Agency (EPA) responsible for implementation of Executive Order 12898. The Council of Environmental Quality (CEQ) has oversight of the Federal government's compliance with Executive Order 12898 and NEPA.

4.12.2.1.2 State

Following the lead of Executive Order 12898, the State of California passed a series of environmental justice regulations in 2001. These laws define environmental justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."

4.12.2.2 Environmental Setting

This section discusses the environmental setting related to environmental justice in The Rivers EIP project area.

4.12.2.2.1 Study Area

The study area is in the city of West Sacramento, in Yolo County. For comparison, the same demographic information presented for West Sacramento is also presented for Yolo County and the State of California.

4.12.2.2.2 Demographics

Local Setting

In 2000, Caucasians and Asians made up the largest two populations in the state, accounting for 59.5% and 10.9% of the population, respectively, while 16.8% of respondents claimed "other race." Those of Hispanic origin made up 32.4%, almost one-third of the State's population (U.S. Census 2008).

The Federal government considers race and Hispanic origin to be two separate and distinct concepts. The Federal Office of Management and Budget's (OMB) standards for data on race generally reflect social definition recognized in this country, and do not conform to any biological, anthropological or genetic criteria. According to the revised OMB standards, race is considered a separate concept from Hispanic origin (ethnicity). For Census 2000, the questions on race and Hispanic origin were asked of every individual living in the United States. People who identify their origin as Spanish, Hispanic, or Latino may be of any race.

In 2000, Caucasians and Asians made up the largest two populations in Yolo County, accounting for 67.7and 9.9% respectively, while 13.8% of respondents claimed "other race." Those of Hispanic origin made up 25.9% of Yolo County (U.S. Census 2008).

In 2000, Caucasians and Asians made up the largest two populations in the city of West Sacramento accounting for 65% and 7.2% of the population respectively, while 16% claimed "other race." Those of Hispanic origin made up 30% of the city (U.S. Census 2008). Table 4.12-1 compares data regarding race in the study area in 2000 and 2005. Table 4.12-2 compares the household poverty status by city, county, and state.

Table 4.12-1. Race/Origin Characteristics by City/County/State, 2000 and 2005

	2000			2005		
	City of West Sacramento (percentage)	Yolo County (percentage)	State of California (percentage)	City of West Sacramento (percentage)	Yolo County (percentage)	State of California (percentage)
Race						
White	65.0	67.7	59.5	65.0	67	59.5
Black or African American	2.6	2	6.7	2.6	2	6.7
American Indian and Alaska Native	1.8	1.2	1.0	1.8	1	1.0
Asian	7.2	9.9	10.9	7.2	11	10.9
Native Hawaiian, other Pacific Islander	0.6	0.3	0.3	0.6	0.08	0.3
Some Other Race	16.0	13.8	16.8	16.0	12	16.8
Two or more races	6.9	5.2	4.7	6.9	5	4.7
Origin						
Hispanic	30.0	25.9	32.4	30.0	27.8	32.4

Source: U.S. Census Bureau 2000 and 2005 American Community Survey

Table 4.12-2. Household Poverty Status by City/County/State, 2000

City	City of West Sacramento	Yolo County	State of California
Percent below poverty level	22.3	18.4	14.2

Source: U.S. Census Bureau 2000; California Employment Development Department 2000

4.12.3 Environmental Consequences

This section describes the environmental consequences relating to environmental justice for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.12.3.1 Assessment Methods

The following methodology is based on EPA's Environmental Justice Guidance (U.S. Environmental Protection Agency 1998), which states that "Minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of analysis." As such, demographic data for the City of West Sacramento in the local setting and in Yolo County in the regional setting were compared to demographic data from the next highest unit of analysis, the State of California, to determine whether that specific area had a "meaningfully greater" percentage of minority or low-income population.

Demographic information was gathered for the city, county and state level. Proposed environmental justice effects were analyzed by comparing census data from the local setting and regional setting with data for the State of California. Data were primarily collected from the U.S. Census Bureau 2000 Census and 2005 Census. The population data that are pertinent to the analysis of environmental justice include race, income, and age characteristics such as:

- the percent of minority population (Black or African American, American Indian and Alaskan Native, Asian, Native Hawaiian and Other Pacific Islander, some other race, and two or more races);
- the percent of persons of Hispanic origin;
- the percent of population below the poverty level; and
- the percent of population residing below the U.S. Census Bureau poverty threshold, defined as a single person with an income below \$8,840, or a family of four with an income below \$16,588.

The environmental justice effects of the proposed project were analyzed by comparing census data from the local setting and regional setting with data for the State of California.

4.12.3.2 Determination of Effects

Effects pertaining to environmental justice were considered significant if the proposed project would result in a disproportionate effect on minority or low-income communities.

4.12.4 Effects and Mitigation Measures

4.12.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection.

Given levee conditions, under the No Action Alternative, failure at The Rivers EIP site and subsequent flooding and inundation could temporarily or permanently displace residents over a wide area. Flood depth calculations prepared for the City of West Sacramento show that low-income and minority neighborhoods would not be disproportionately affected by flood inundation (PB 2007). Flooding could also result in temporary or long-term decreases in agricultural, industrial, and other economic enterprise in the city of West Sacramento that could result in a loss of jobs. However, this would likely affect populations of all income and ethnic classifications and would not result in a disproportionately high or significant effect on minority or low-income populations.

4.12.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effect on environmental justice. A description of this effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect EJ-1: Disproportionate Effect on Minority or Low-Income Populations	No effect	N/A	

Effect EJ-1: Disproportionate Effect on Minority or Low-Income Populations

The Rivers APA would reduce the risk of flooding to existing residential, commercial, and industrial development in the WSAFCA service area. While there are low-income and minority populations present throughout the study area, the flood protection benefits of the project would reach all segments of the population in the city of West Sacramento.

Construction-related environmental effects (e.g., exposure to noise, dust, and traffic) may occur in and around the project site, but the effects would be temporary and the neighborhood near The Rivers APA is largely affluent. There would be no disproportionate effects on low-income or minority populations. Some residents would be temporarily displaced during construction (this effect is discussed in Section 4.11, Socioeconomic and Community Effects); however, the residents who would be displaced are not disproportionately low-income or minority.

There is a known vagrant population that camps along the Sacramento River near The Rivers APA project area. The proposed project could displace this population during construction activities. Increased recreational use of these areas as a result of the proposed project's recreation improvements may deter camping activity. However, there is not enough data about this population to make conclusions about the amount of people who might be displaced. In addition, any loitering or camping along the river corridor is unlawful.

The Rivers APA would not result in a significant disproportionate effect on minority or low-income populations.

4.12.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effect on environmental justice. A description of this effect is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect EJ-1: Disproportionate Effect on Minority or Low-Income Populations	No effect	N/A	

Effect EJ-1: Disproportionate Effect on Minority or Low-Income Populations

This effect is the same as described above under The Rivers APA. The Rivers Alternative B would not result in a significant disproportionate effect on minority or low-income populations.

Section 4.13

Visual Resources—The Rivers Early Implementation Project

4.13.1 Introduction

This section describes the regulatory and environmental setting for visual resources, the effects on visual resources that would result from the proposed project, and mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- *City of West Sacramento General Plan* (City of West Sacramento 2004)
- City of West Sacramento Municipal Code
- *Sacramento Riverfront Master Plan*, July 2003
- *West Sacramento Bicycle and Pedestrian Path Master Plan*, October 1991
- *Yolo County General Plan*, July 1983, Open Space and Recreation Element last amended November 2002
- Zoning Regulations of the City of West Sacramento, March 2005

4.13.2 Affected Environment

This section describes the affected environment for visual resources in The Rivers EIP project area, including regulatory and environmental settings.

4.13.2.1 Regulatory Setting

4.13.2.1.1 Local

The following local policies related to visual resources may apply to implementation of The Rivers EIP.

City of West Sacramento General Plan

The *City of West Sacramento General Plan* (City of West Sacramento 1990) identifies the following goals and policies for the implementation plan.

Urban Structure and Design

- **Goal B:** To enhance the relationship between the City and the Sacramento River.
  - **Policy B1:** The City shall seek to preserve the trees and other vegetation along the banks of the Sacramento River for their aesthetic qualities and environmental and ecological values.

- **Policy B4:** The City shall promote the development of important visual and scenic areas along the riverfront, including around the barge canal, for public access, including water-related activities.

- **Goal D:** To maintain and enhance the quality of the City's landscape and streetscape.
  - **Policy D1:** The City shall endeavor to protect the tree canopy created by mature trees in existing developed areas and in newly developing areas.
  - **Policy D2:** The City shall require that all new development incorporate the planting of trees and other vegetation to extend the vegetation pattern of older adjacent neighborhoods into new development.

Yolo County General Plan

The *Yolo County General Plan* (Yolo County 1983) identifies the following goals, objectives, and policies for the implementation plan.

Scenic Highways Policies

Policy SH-5: Protection. Yolo County shall regulate and guide land uses, recreation, circulation, conservation, and open spaces and shall require retention or conservation of natural features and vegetation along both State and locally designated scenic highways.

Policy SH-6: River Roads. Yolo County shall consider designating "river roads" as designated scenic highways.

Policy SH-7: Natural Vegetation and Landscaping. Yolo County shall require retention, of existing trees and vegetation and natural landforms, and shall require landscaping to enhance scenic qualities and/or screen unsightly views, and shall implement regulations to prohibit removal of trees along public rights-of-way without consideration of their scenic or historic value, and shall implement tree conservation or enhancement in new development, with emphasis on oak preservation.

Recreation Policies

Policy REC-1: Recreation Basic. Yolo County acquires, maintains and provides a variety of park, open and natural areas for recreational and leisure pursuits at the regional, community and neighborhood level through means of California statute, established land use controls, regulations, real property transfer, and the advice, guidance and cooperation of other jurisdictions and through coordination with other elements of this general plan, as amended. It shall be the basic recreation policy of the County to: Protect and preserve as many of the County's recreational and scenic resources as possible.

Yolo County Open Space and Recreation Element

The Yolo County Open Space and Recreation Element (Yolo County 2002) of the general plan identifies the following goals, objectives, and policies for the implementation plan.

Goal OG-7: Preserve aesthetic resources and values.

Objective OO-8: Protection of identified areas of unique historical or cultural value within the county and preservation of those sites for educational, scientific and aesthetic purposes.

Objective OO-9: Identification and preservation of scenic corridors and viewsheds.

Policy OP-7: Development shall be directed away from naturally occurring riparian areas and wetlands.

4.13.2.1.2 Concepts and Terminology

Identifying a study area's visual resources and conditions involves three steps:

- Objective identification of the visual features (visual resources) of the landscape.
- Assessment of the character and quality of those resources relative to overall regional visual character.
- Determination of the importance to people, or *sensitivity*, of views of visual resources in the landscape.

Because evaluating visual effects is inherently subjective, Federal and professional standards of visual assessment methodology have been used to determine potential effects on aesthetic values of the study area (see Environmental Consequences, below). The aesthetic value of an area is a measure of its visual character and quality, combined with the viewer response to the area (Federal Highway Administration 1988). Scenic quality can best be described as the overall impression that an individual viewer retains after driving through, walking through, or flying over an area (U.S. Bureau of Land Management 1980). Viewer response is a combination of viewer exposure and viewer sensitivity. Viewer exposure is a function of the number of viewers, number of views seen, distance of the viewers, and viewing duration. Viewer sensitivity relates to the extent of the public's concern for a particular viewshed. These terms and criteria are described in detail below.

Visual Character

Natural and artificial landscape features contribute to the visual character of an area or view. Visual character is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. Urban features include those associated with landscape settlements and development, including roads, utilities, structures, earthworks, and the results of other human activities. The perception of visual character can vary significantly seasonally, even hourly, as weather, light, shadow, and elements that compose the viewshed change. The basic components used to describe visual character for most visual assessments are the elements of form, line, color, and texture of the landscape features (USDA Forest Service 1974, Federal Highway Administration 1988). The appearance of the landscape is described in terms of the dominance of each of these components.

Visual Quality

Visual quality is evaluated using the well-established approach to visual analysis adopted by Federal Highway Administration, employing the concepts of vividness, intactness, and unity (Federal Highway Administration 1988, Jones et al. 1975), which are described below.

- *Vividness* is the visual power or memorableness of landscape components as they combine in striking and distinctive visual patterns.
- *Intactness* is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, and in natural settings.

- *Unity* is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the landscape.

Visual quality is evaluated based on the relative degree of vividness, intactness, and unity, as modified by the visual sensitivity of the viewers. High-quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

Viewer Exposure and Sensitivity

The measure of the quality of a view must be tempered by the overall sensitivity of the viewer. Viewer sensitivity or concern is based on the visibility of resources in the landscape, proximity of viewers to the visual resource, elevation of viewers relative to the visual resource, frequency and duration of views, number of viewers, and type and expectations of individuals and viewer groups.

The importance of a view is related in part to the position of the viewer relative to the resource; therefore, visibility and visual dominance of landscape elements depend on their placement within the viewshed. A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail) (Federal Highway Administration 1983). To identify the importance of views of a resource, a viewshed must be broken into distance zones of foreground, middleground, and background. Generally, the closer a resource is to the viewer, the more dominant it is and the greater its importance to the viewer. Although distance zones in a viewshed may vary between different geographic regions or types of terrain, the standard foreground zone is 0.25 to 0.5 mile from the viewer, the middleground zone is from the foreground zone to 3 to 5 miles from the viewer, and the background zone is from the middleground to infinity (USDA Forest Service 1974).

Visual sensitivity depends on the number and type of viewers and the frequency and duration of views. Visual sensitivity is also modified by viewer activity, awareness, and visual expectations in relation to the number of viewers and viewing duration. For example, visual sensitivity is generally higher for views seen by people who are driving for pleasure, people engaging in recreational activities such as hiking, biking or camping, and homeowners. Sensitivity tends to be lower for views seen by people driving to and from work or as part of their work (USDA Forest Service 1974, Federal Highway Administration 1983, U.S. Soil Conservation Service 1978). Commuters and non-recreational travelers typically have fleeting views and tend to focus on commute traffic, not on surrounding scenery; therefore, they are generally considered to have low visual sensitivity. Residential viewers typically have extended viewing periods and are concerned about changes in the views from their homes; therefore, they are generally considered to have high visual sensitivity. Viewers using recreation trails and areas, scenic highways, and scenic overlooks are usually assessed as having high visual sensitivity.

Judgments of visual quality and viewer response must be made based in a regional frame of reference (U.S. Soil Conservation Service 1978). The same landform or visual resource appearing in different geographic areas could have a different degree of visual quality and sensitivity in each setting. For example, a small hill may be a significant visual element on a flat landscape but have very little significance in mountainous terrain.

4.16.1.1.1 Viewer Groups and Viewer Responses

The primary viewer groups in the study area are persons living or conducting business near levees; travelers using the interstates, highways, and smaller local roads (including those on levee crowns); and recreationists (boaters, beachgoers, and anglers using canals, creeks, and rivers; trail users; equestrians; bicyclists; joggers; and others). All viewer groups have direct views of the study areas described above.

Residents

Suburban and rural residents are located directly adjacent to levees or are separated from them by local streets or a similar corridor. Suburban residences mostly are oriented inward toward the developments, and only residences on the outer edge of the developments have middleground and background views of levees. The separation and orientation of rural residences allow inhabitants to have direct views over agricultural fields toward levees. Both suburban and rural residents are likely to have a high sense of ownership over their adjacent waterways, the open space that surrounds them, the recreational opportunities they provide, and their inherent scenic quality. Because of their potential exposure to such views, short distance from the study areas, and sense of ownership, these residents are considered to have high sensitivity to changes in the viewshed.

Businesses

Viewers from industrial, commercial, government, and educational facilities have semi-permanent views from their respective facilities. Situated in different locations throughout the study areas, these facilities' views range from views limited by the levees to sweeping views that extend out to the background. Employees and users of these facilities are likely to be occupied with their work activities and tasks at hand. However, some of these facilities depend on the waterways in the study area as a destination spot and source of income (e.g., Port of West Sacramento).

People using these facilities often travel to and from work and spend leisure time on the waterways and levees. For these reasons, their limited viewing times, their focus on tasks at hand, and the current use of the levees, this viewer group is considered to have moderate sensitivity to changes in views.

Roadway Users

Roadway users' vantages differ based on the roadway they are traveling and elevation of that roadway. The majority of views are mostly limited to the foreground by suburban, commercial, and industrial development; vegetation; and the levees themselves. Views to the middleground and background are present but are limited to areas where structures that otherwise would conceal background views from the roadway are set back. However, if the vantage is elevated, as on portions of Capital City Freeway, bridges crossing over the Sacramento River, levee roads (e.g., South River Road), and other local roadways, most views of the surrounding mountain ranges (Vaca Mountains, Coast Range, and Sierra Nevada), waterways (American and Sacramento Rivers, DWSC, Yolo Bypass when flooded) and open space areas (agriculture, parkways) are only partially obstructed by the rooflines and mature vegetation in the area.

Travelers use roadways at varying speeds; normal highway and roadway speeds differ based on the traveler's familiarity with the route and roadway conditions (e.g., presence/absence of rain). Single views typically are of short duration, except on straighter stretches where views last slightly longer.

Viewers who frequently travel these routes generally possess moderate visual sensitivity to their surroundings. The passing landscape becomes familiar to these viewers, and their attention typically is not focused on the passing views but on the roadway, roadway signs, and surrounding traffic. Viewers who travel local routes for their scenic quality generally possess a higher visual sensitivity to their surroundings because they are likely to respond to the natural environment with a high regard and as a holistic visual experience. Furthermore, there are scenic stretches of roadway passing through the study areas that offer sweeping views of the surrounding area that are of interest to motorists, especially when traveling on the bridges or levee tops. For these reasons, viewer sensitivity is moderate among most roadway travelers.

Recreationists

Recreational users view the study areas from parks, waterways, roadways, trails, and from the levees themselves. Recreational uses consist of boating and fishing, hunting in the bypasses, birding, walking, running, jogging, and bicycling along trails, levee crowns, and local roads. Users of the waterways are likely to seek out natural areas within the corridor, such as sand and gravel bars and beaches, in addition to using the waterways as a resource. Waterway users have differing views based on their location in the landscape and are accustomed to variations in the level of industrial, commercial, suburban, and recreational activities occurring within the study area. The amount of vegetation present along the levees creates a softened, natural edge that is enjoyed by all recreationists. Local recreationists also have a high sense of ownership over the waterways and corridors they use for recreation, and these areas are highly valued throughout the greater Sacramento area.

Viewer sensitivity is high among recreationists using the study areas because they are more likely to value the natural environment highly, appreciate the visual experience, have a high sense of ownership, and be more sensitive to changes in views.

4.13.2.2 Environmental Setting

This section discusses the environmental setting related to visual resources in The Rivers EIP project area.

4.13.2.2.1 The Rivers EIP Study Area

The Rivers EIP study area is at the northern tip of the City of West Sacramento boundary, directly west of the Sacramento River's confluence with the American River and east of the Sacramento Bypass Levee. The area is urbanized and has commercial and industrial developments, residential communities, educational facilities, open space, and riparian corridors.

The eastern most portion of The Rivers EIP project area is inside a newer gated development built in the last decade called The Rivers Community. Homes in this community are large two-story structures with small lots and have not been designed to meld with the older communities of Bryte and Broderick to the south, with respect to layout, architectural style, and streetscaping, yet it is speckled with mature oaks and other trees that were left to remain growing on certain properties. Some of the homes were constructed on the crown of the levee, while others are only separated by the project area by a small thoroughfare. Homes built atop the levee are adjacent to mature vegetation that lines the Sacramento River throughout the project area (Figure 4.13-1)

Looking northeast atop the levee crown. Note the fence delineating the property line of a home located on the levee crown to the right of the photo and the riparian vegetation lining the levee in the foreground.

Figure 4.13-1
The Rivers EIP

The southern border of the project area is bounded by the older residential homes comprising the Bryte and Broderick areas, west of The Rivers Community. The western-most end of the project area is bounded by Riverbank Elementary School, Bryte Park, and Alice Norman Playfields that are adjacent to the levee. In addition, the Lighthouse Golf Course is located adjacent to the levee, between the middle school and The Rivers Community.

The Sacramento River corridor creates a noticeable contrast to the surrounding, predominantly suburban area. Most views from the project area are limited to the foreground by bends in the river, vegetation, and development. The visual quality of the area is moderately unified because the landscape is fairly congruent and harmonious in terms of scale, color, and form. The inherent scenic qualities presented by a naturalized, accessible river corridor in a highly developed area result in a vividness that is moderately high. The presence of development and infrastructure surrounding this corridor results in a study area that is moderate in intactness and unity.

At the street level, viewers have foreground views of the levee and mature riparian trees, with little to no middleground and background views (Figure 4.13-2). While atop the levee, foreground views to the southeast extend over open space playing fields toward background views of the downtown Sacramento skyline (Figure 4.13-3). While atop the levee looking due east and west, viewers have foreground views of only the levee crown with riparian vegetation to the north lining the levee (Figure 4.13-4).

4.13.2.2.2 Viewer Groups

The primary viewer groups in The Rivers study area are persons living or conducting business near this area, such as those living in The Rivers Community; travelers using local roads (including those on levee crowns); and recreationists (boaters, and fishermen on the Sacramento River; bicyclists; joggers). Primary viewer groups also include educators, students, and parents associated with Riverbank Elementary School. These groups have direct views of the project area described above.

Residents

Suburban residents are located directly adjacent to The Rivers EIP project area, or are separated from the project area by local streets. Some homes located on Rivercrest Drive are atop the levee crown. Suburban residences mostly are oriented inward toward the developments, and only residences on the outer edge of the developments have middleground and background views of levees. The residents in the project vicinity are likely to have a high sense of ownership over their adjacent waterways, the open space that surrounds them and their inherent scenic quality. Because of their potential exposure to such views, short distance from the study areas, and sense of ownership, these residents are considered to have high sensitivity to changes in the project area viewshed.

Businesses

Within the vicinity of The Rivers EIP project area there are residential and educational facilities that people frequent daily. Most persons in these facilities have semi-permanent views from their respective facilities of the project area; however, some, such as those who work from homes located in the project area, have permanent views of the area. Situated in different locations throughout the study area, these facilities' views range from views limited by the levees to sweeping views that extend out to the background. Users of these facilities are likely to be occupied with their work activities and tasks at hand. Because of their limited viewing times traveling to and from work and their focus on tasks at hand, this viewer group is considered to have moderate sensitivity to changes in views.

Roadway Users

Roadway users' vantages differ based on the roadway they are traveling and elevation of that roadway. The majority of views at the project area are mostly limited to the foreground by suburban, commercial, and industrial development; vegetation; and the levees themselves. Views to the middleground and background, including of the Sacramento River, are present but are limited to areas where structures that would otherwise conceal background views from the roadway, such as homes, are set back and where there is limited vegetation along the river corridor.

Travelers use roadways in the project area at varying speeds based on the traveler's familiarity with the route and roadway conditions (i.e., presence or absence of rain). Speed can be expected to be minimal near the project area as most of the roadways are in residential areas or near Riverbank Elementary School, extending the duration of travelers' views. Viewers who frequently travel these routes generally possess moderate visual sensitivity to their surroundings. The passing landscape becomes familiar to these viewers, and their attention typically is not focused on the passing views but on the roadway, roadway signs, and surrounding traffic. Viewers who travel local routes for their scenic quality generally possess a higher visual sensitivity to their surroundings because they are likely to respond to the natural environment with a high regard and as a holistic visual experience. Viewer sensitivity is high among most roadway travelers in this project area because the area is within their neighborhood and community, and many viewers feel a strong ownership of the vicinity.

Recreationists

Recreational users view the project area from parks, waterways, roadways, and from the levees themselves. Recreational uses consist of boating and fishing, nature watching, walking, running, jogging, and bicycling along levee crowns and local roads. Waterway users have differing views, based on their location in the landscape and are accustomed to variations in the level of industrial, commercial, suburban, and recreational activities occurring within the project area. The amount of vegetation present along the levees creates a softened, natural edge that is enjoyed by all recreationists. Local recreationists also have a high sense of ownership over the waterways, corridors, and levees they use for recreation, being that these areas are highly valued throughout the greater Sacramento area.

Viewer sensitivity is high among recreationists in the project area because they are more likely to value the natural environment highly, appreciate the visual experience, have a high sense of ownership, and be more sensitive to changes in views.

4.13.3 Environmental Consequences

This section describes the environmental consequences relating to visual effects for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

Looking east across Riverbank Road. Note the levee embankment across the middle of the photo with mature riparian tress visible on the waterside. This photo depicts a section of the levee with an open space element.

Figure 4.13-2
The Rivers EIP

Looking southwest from atop the levee, across the Bryte Park playing fields and the Bryte and Broderick neighborhoods, toward the downtown Sacramento skyline in the background.

Figure 4.13-3
The Rivers EIP

Looking due east from atop the levee crown, west of The Rivers community. Note the very wide levee crown, and the row of riparian vegetation in the middleground to the north.

Figure 4.13-4
The Rivers EIP

4.13.3.1 Assessment Methods

The key effects were identified and evaluated based on the environmental characteristics of The Rivers EIP project area and the magnitude, intensity, and duration of activities related to the construction and operation of the proposed project.

This evaluation of visual effects is based on:

- direct field observation from vantage points, including neighboring buildings, property, and roadways (conducted November 28, 2007, February 5, 2009, and September. 2009);
- photographic documentation of key views;
- professional standards (as described below);
- review of project construction drawings; and
- review of the project with regard to compliance with state and local ordinances and regulations and professional standards pertaining to visual quality.

4.13.3.2 Determination of Effects

For this analysis, an effect pertaining to visual resources was considered significant if it would result in any of the following environmental effects, which are based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.):

- cause a substantial, demonstrable negative aesthetic effect on a scenic vista or view open to the public;
- substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare that would adversely affect day or nighttime public views.

4.13.3.2.1 Professional Standards

According to professional standards, a project may be considered to have a significant effect if it would:

- conflict with local guidelines or goals related to visual quality;
- alter the existing natural viewsheds, including changes in natural terrain;
- alter the existing visual quality of the region or eliminate visual resources;
- increase light and glare in the project vicinity;
- result in backscatter light into the nighttime sky;
- result in a reduction of sunlight or introduction of shadows in community areas;
- obstruct or permanently reduce visually important features; or
- result in long-term (that is, persisting for 2 years or more) significant visual changes or contrasts to the existing landscape as viewed from areas with high visual sensitivity.

4.13.4 Effects and Mitigation Measures

4.13.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies at The Rivers EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to visual resources would occur. Therefore there would be no effect on this resource attributable to implementation of the No Action Alternative. A catastrophic levee failure in the study area would result in flooding and inundation that could significantly damage existing visual resources (such as vegetation). Flood-fight or cleanup activities could present new visual elements similar to those identified below during project construction. In addition, scenic vistas for existing and future recreation facilities could be damaged irreparably or for an extended period of time which would reduce the enjoyment derived by recreationists. Given the uncertainty of the occurrence or magnitude of such an event, potential effects on recreation cannot be quantified based on available information.

As discussed in Vegetation and Wetlands (Section 4.7), the No Action Alternative assumes several different scenarios relating to vegetation removal on levees. Compliance with these scenarios would result, at most, in the removal of a 0.9 acre of riparian vegetation at The Rivers EIP project area, causing a significant effect on visual resources. Many visual receptors, including pedestrians, bicyclists, equestrians, boaters, and viewers from both sides of the water course are accustomed to the visual character that vegetation contributes to the landscape. Removal of a substantial amount of this riparian vegetation in compliance with the levee vegetation guidance would significantly affect recreation in the project area.

4.13.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on visual resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
VIS-1: New Source of Light or Glare	Significant	Significant and unavoidable	No feasible mitigation
VIS-2: Temporary Visual Effects as a Result of Construction Activities	Less than significant	N/A	N/A
VIS-3: Changes to the Existing Visual Character or Quality of the Site and Its Surroundings as a Result of Construction, Operations, and Maintenance	Significant	Significant and unavoidable	No feasible mitigation
VIS-4: Conflicts with Local Visual Resource Policies	Significant	Significant and unavoidable	No feasible mitigation

Effect VIS-1: New Source of Light or Glare

The Rivers APA would not add any new permanent source of light or glare .It is expected that construction would occur at night, requiring temporary nighttime lighting. The staging area would also be lit at night for security reasons. Such nighttime lighting would be temporary through the duration of construction. There are many residences on the landside of the levee, within close proximity to The Rivers APA project area, and there are 15 residences on top of the levee that may be directly within the construction zone. This effect would be significant because some residents would have direct views of the construction adjacent to their homes and to the nighttime lighting required for project construction. This would significantly affect their viewshed as these residences are not accustomed to nighttime glare of this degree. This effect would be significant and unavoidable.

Because this effect is significant and unavoidable, those directly affected by this effect would be relocated. This effect is discussed in Section 4.11, Socioeconomic and Community Effects. As part of the environmental commitment described in Section 2.7, Chapter 2, Alternatives, WSAFCA would provide assistance for residents who are required to relocate during the construction period. WSAFCA would compensate residents for reasonable rent and living expenses incurred due to relocation. Residents would have the right to decent, safe and sanitary housing in accordance with the Uniform Act.

Effect VIS-2: Temporary Visual Effects as a Result of Construction Activities

Construction activities associated with The Rivers APA would introduce considerable heavy equipment and associated vehicles into the views of adjacent residents, recreationists, motorists, and businesses. The equipment would be visible throughout the construction season. Presence of the equipment would temporarily degrade the visual quality of the project area to low vividness, intactness, and unity.

Residential viewer groups in the study area and vicinity are not accustomed to seeing construction activities and equipment, and sensitivity to such effects would be high. Other viewer groups are more accustomed to seeing construction activities and equipment from construction that has occurred in the business parks near the I Street Bridge, daily activities in the industrial areas, and local roadway construction projects and would have low sensitivity to construction effects.

However, because this effect is temporary, would last no longer than the construction duration, and is limited to the relatively small project area, it would not substantially degrade the visual quality of the study area. In addition, the implementation of an environmental commitment to provide temporary construction barriers, as needed, between construction zones and residences, as described in Section 2.7 of Chapter 2, Alternatives, would make this effect less than significant.

In addition, effects on roadway users would be less than significant because of the short intervals of time that they are in visual contact with the study area and familiarity with construction along other roadways in the vicinity.

Effect VIS-3: Changes to the Existing Visual Character or Quality of the Site and Its Surroundings as a Result of Construction, Operations, and Maintenance

Construction of The Rivers APA has the potential to substantially degrade the existing visual character or quality of the project area and surroundings for viewer groups because construction would require the removal of all vegetation within the construction footprint and within established operations and maintenance vegetation-free zones according to USACE policies. This would mainly affect the levee crown, the landside and waterside levee slopes, and 15 feet from the toe on both sides.

Construction of The Rivers APA would require compliance with recent USACE policies regarding woody vegetation on levees. This policy requires that all woody vegetation within the levee prism must be removed and the levee slope maintained free of woody vegetation. The levee slopes and adjacent land for 15 feet on either side of the levee would be required to be maintained free of woody vegetation in perpetuity, resulting in the loss of a highly valued, regional aesthetic landscape component. Trees and vegetation located outside of the levee prism, construction footprint, and maintenance zone would remain to the extent possible and retain high visual quality (i.e., on the waterside berm between the levee maintenance zone and the Sacramento River where the mature oak forest and riparian forest would be allowed to remain. The mature vegetation along the berm on the waterside of the levee is characteristic of the region and is a striking, distinctive element in the landscape. The existing vegetation that is removed will be replaced with herbaceous vegetation. An environmental commitment has been made by WSAFCA to minimize vegetation removal to the extent possible (Section 2.7, Chapter 2, Alternatives); however, maintaining the levee and levee maintenance zone void of the characteristic riparian vegetation and mature landscaping would highly degrade the visual character and quality of the area for all viewer groups. No feasible mitigation is available to reduce the effect. This effect would be significant and unavoidable.

Effect VIS-4: Conflicts with Local Visual Resource Policies

As mentioned above under the local regulatory policies, the majority of the local jurisdictions have tree preservation ordinances and riverfront master plans that indicate that riparian vegetation and mature landscaping are highly desirable components that are greatly valued for the aesthetic qualities they provide. Construction of The Rivers APA would require the removal of all vegetation within the construction footprint and all woody vegetation within the levee prism, as well as within 15 feet from the levee toe on both sides. This removal of vegetation would conflict with local visual policies. Because vegetation in many areas would not be allowed to be replanted, as discussed in Effect VIS-3, no feasible mitigation is available to reduce the effect. This effect would be significant and unavoidable.

4.13.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on visual resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
VIS-1: New Source of Light or Glare	Significant	Significant and unavoidable	No feasible mitigation
VIS-2: Temporary Visual Effects as a Result of Construction Activities	Less than significant	N/A	N/A
VIS-3: Changes to the Existing Visual Character or Quality of the Site and Its Surroundings as a Result of Construction, Operations, and Maintenance	Significant	Significant and unavoidable	No feasible mitigation
VIS-4: Conflicts with Local Visual Resource Policies	Significant	Significant and unavoidable	No feasible mitigation

Effect VIS-1: New Source of Light or Glare

This effect is the same as described above under The Rivers APA. The Rivers Alternative B would create a new source of light and glare that would result in a significant and unavoidable effect on local residents. Because this effect is significant and unavoidable, those directly affected by this effect would be relocated. This effect is discussed in Section 4.11, Socioeconomic and Community Effects. As part of the environmental commitment described in Section 2.7 Chapter 2, Alternatives, WSAFCA would provide assistance for residents who are required to relocate during the construction period.

Effect VIS-2: Temporary Visual Effects as a Result of Construction Activities

This effect is the same as described above under The Rivers APA. The Rivers Alternative B would temporarily degrade the visual quality of the project area to low vividness, intactness, and unity. However, because this effect is temporary, would last no longer than the construction duration, and is limited a small area, it would not substantially degrade the overall visual quality in the study area. In addition, the implementation of an environmental commitment to provide temporary construction barriers, as needed, between construction zones and residences, as described in Section 2.7 of Chapter 2, Alternatives, would make this effect less than significant.

Effect VIS-3: Changes to Existing Visual Character or Quality of the Site and Its Surroundings as a Result of Construction, Operations, and Maintenance

This effect is the same as described above under The Rivers APA. The Rivers Alternative B would require compliance with recent USACE policies regarding woody vegetation on levees, and removal of all mature woody vegetation on the levee and within 15 feet of the toe on both sides of the levee would highly degrade the visual character and quality of the area for all viewer groups. Although an environmental commitment has been made by WSAFCA to minimize vegetation removal to the extent possible (Section 2.7 of Chapter 2, Alternatives), this effect remains significant and unavoidable, and no feasible mitigation is available to reduce this effect.

Effect VIS-4: Conflicts with Local Visual Resource Policies

This effect is the same as described above under The Rivers APA. The Rivers Alternative B would require the removal of all vegetation within the construction footprint and all woody vegetation within the levee prism, as well as within 15 feet from the levee toe on both sides. This removal of vegetation would conflict with local visual policies. Because vegetation in many areas would not be allowed to be replanted, as discussed in Effect VIS-3, no feasible mitigation is available to reduce the effect. This effect would be significant and unavoidable.

Section 4.14
Recreation— The Rivers Early Implementation Project

4.14.1 Introduction

This section describes the regulatory and environmental setting for recreation, effects on recreation facilities and recreation opportunities that would result from the proposed project, and the mitigation measures that would reduce significant effects.

The key sources of data and information used in the preparation of this section are listed below

- *West Sacramento General Plan*, (City of Sacramento 1990, last amended 2004)
- *City of West Sacramento Parks Master Plan (Smith Group 2003)*
- *Sacramento Riverfront Master Plan*, July 2003
- Dave Shpak, Park Development Manager, City of West Sacramento
- *West Sacramento Bicycle and Pedestrian Path Master Plan*, October 1991and 1995 Addendum
- *Yolo Bypass Wildlife Area Land Management Plan*, June 2008
- *Yolo County General Plan*, July 1983, Open Space and Recreation Element last amended November 2002

4.14.2 Affected Environment

This section describes the affected environment for recreation in The Rivers EIP project area, including the regulatory and environmental settings.

4.14.2.1 Regulatory Setting

4.14.2.1.1 Federal and State

No Federal or state plans, policies, regulations, or laws related to recreation resources apply to The Rivers EIP.

4.14.2.1.2 Local

The following local plans related to recreation may apply to implementation of The Rivers EIP.

City of West Sacramento General Plan

The *West Sacramento General Plan* (City of West Sacramento 1990) identifies the following goals, objectives, and policies for the implementation plan.

Recreation and Cultural Resources

- **Goal A:** To establish and maintain a public park system and recreation facilities suited to the needs of West Sacramento residents and visitors.
    - **Policy A12:** The City shall identify appropriate open spaces, including areas within the Central Business District and along the Sacramento River, for development of safe community activity areas.
- **Goal B:** To promote the provision of private recreation facilities and opportunities.
    - **Policy B6:** The City supports the use of the barge canal for aquatic recreational activities, such as sailing, rowing, kayaking, and canoeing, and supports the establishment of a multi-use aquatic facility along the barge canal. Aquatic parks, boat houses, docks, and other support facilities for boating shall be deemed compatible uses along the Deep Water Ship Channel and the barge canal within all land use designations.
- **Goal D:** To provide and encourage, to the fullest extent possible, public access to the Sacramento River and Deep Water Ship Channel for recreation purposes.
    - **Policy D1:** The City shall ensure continuous public access to the Sacramento River for its full length within West Sacramento.
    - **Policy D2:** The City shall seek to ensure continuous public access to the Deep Water Ship Channel, within the limits imposed by safety considerations.
    - **Policy D3:** Linear access to the Sacramento River and Deep Water Ship Channel shall be linked to the city's overall system of parks, recreational pathways, and open space.
    - **Policy D4:** The city shall encourage the development of public and private marinas in appropriate locations on the Sacramento River and along the Deep Water Ship Channel. Siting and development of marinas shall avoid, as much as possible, areas of significant existing riparian vegetation.
    - **Policy D5:** The City shall support and encourage the development of public and private water-oriented park and recreation facilities along the Sacramento River and the Deep Water Ship Channel.
- **Goal E:** To provide a network of pedestrian and bicycle pathways connecting parks and open space areas with other destination points within and beyond the city of West Sacramento.
    - **Policy E2:** The City shall implement a *Riverfront Park Master Plan* that provides for a system of continuous pedestrian and bicycle pathways along the Sacramento River.
    - **Policy E4:** The City shall coordinate the development of the riverfront as envisioned in the 1997 *Sacramento Greenway Plan*.

Natural Resources

- **Goal C:** To protect sensitive native vegetation and wildlife communities and habitat in West Sacramento.
    - **Policy C5:** To minimize disturbance to wildlife, the City shall require the provision and maintenance of an adequate setback between significant wetland habitat and adjacent development. The buffer shall be landscaped with native or compatible introduced ornamental vegetation and may be used for passive recreation purposes.

- **Policy C12:** Public access and recreation facilities shall not eliminate or degrade riparian habitat values. Trails, picnic areas, and other developments shall be sited to minimize effects on sensitive wildlife habitat or riparian vegetation.

Transportation and Circulation

- **Goal G:** To promote pedestrian and bicycle travel as alternatives to automobile use.
  - **Policy G7:** To the extent practicable, bicycle and pedestrian pathways shall be included within open space areas and adjacent to waterways.

Urban Structure and Design

- **Goal B:** To enhance the relationship between the City and the Sacramento River.
  - **Policy B2:** The City shall protect and enhance public access to the Sacramento River along the entire riverfront within West Sacramento by providing for development of a continuous pedestrian and bicycle path along the river.
  - **Policy B4:** The City shall promote the development of important visual and scenic areas along the riverfront, including around the barge canal, for public access, including water-related activities.
  - **Policy B5:** The City shall promote and enhance open space and pedestrian links between the river and public schools, parks, and other major open space areas.

City of West Sacramento Parks Master Plan

The *West Sacramento Parks Master Plan* (Parks Master Plan) (Smith Group 2003) outlines the City's goals and policies with regard to the provision of parks and related recreation facilities for West Sacramento residents, and provides an inventory of current and proposed facilities.

As of April 2009, the City oversaw approximately 145 acres of developed parkland (City of West Sacramento 2009a). Based on the 2007 population of 44,928 (California Department of Finance 2007), this represents an 80-acre shortfall from the standard of 5 acres per 1,000 residents established in the General Plan. Based on this ratio, it is estimated that by 2025 population growth in West Sacramento would require the City to have a total of 375 acres of parkland available in order to meet this standard.

The Parks Master Plan lists underutilized assets, including the Sacramento River, DWSC, turning basin, barge canal, natural corridors, and riparian forests that are key opportunities for recreation development and protection. Several areas are targeted as particularly well-suited for park development. The following recreation facilities are proposed for construction in the study area:

- **Sacramento River North Levee.** Governors Residence State Park (now the site of the future California Indian Heritage Center), Sacramento River/Barge Canal recreation corridor (entire length of levee reach), Triangle Park Blocks neighborhood park, Stone Lock District, and seven fishing piers.

Sacramento Riverfront Master Plan

The *Sacramento Riverfront Master Plan* (SRMP) is a collaborative planning document developed by the Cities of Sacramento and West Sacramento along with Yolo and Sacramento Counties and used to guide riverfront development along the Sacramento River. The SRMP places emphasis on improved public open space along the riverfront and enhancement and preservation of riverine, riparian, and upland forest environments to provide a richer experience for the user. Proposed future projects are grouped by implementation time frame from 0 to 16+ years and include extending riverfront trails, completing and constructing riverfront promenades, E Street fishing pier and boat dock, the Stone Lock District, and four non-vehicular bridges across the Sacramento River (Wallace Roberts and Todd 2003).

West Sacramento Bicycle and Pedestrian Path Master Plan

The *West Sacramento Bicycle and Pedestrian Path Master Plan* (Callander Associates 1991) and *Addendum* (City of West Sacramento Parks and Community Services Department 1995) propose future recreation trails, bike paths, lanes, and routes along the majority of the study area. The plan identifies the following relevant objectives and policies:

Objective 2 Use of City Infrastructure: Utilize city infrastructure including streets, street and railroad rights-of-way, and utility and drainage easements for development of bicycle and pedestrian path system.

Policy 2.7: Utilize non-vehicular areas, wherever possible, for locating bicycle and pedestrian facilities away from motor vehicles, to enhance safety and enjoyment and minimize distances between destination points. Utilize Reclamation District rights-of-way and maintenance roads for paths wherever feasible, and negotiate easements for paths as needed.

Objective 3 Recreational Opportunities: Facilitate city-wide and regional recreation opportunities for bicycling, hiking and jogging.

Policy 3.1: Link city parks, schools, riverfront, open space areas, and scenic areas to the system of bicycle and pedestrian paths.

Policy 3.2: Provide a system of continuous bicycle and pedestrian pathways along the Sacramento River and other waterways, where feasible.

Yolo County General Plan

The *Yolo County General Plan* (Yolo County Community Development Agency 1983) identifies the following goals, objectives, and policies for the implementation plan.

Circulation

Policy CIR-13: Bicycle Routes and Facilities. Yolo County shall promote and ensure opportunities for bicycle use. The following means shall be used to achieve this policy: Encouragement and establishment of bike routes along trails, on levees, along railroad levees, along drainage canals, and along transmission right-of-ways where feasible.

Recreation

Policy REC-7: Urban Waterfront Land Use. Yolo County shall require that a portion of urban waterfront, other than the Port of West Sacramento and existing industrial uses, should be used for water-dependent activities including, but not limited to, recreation, tourism, scenic public walkways, waterview restaurants, marinas, fishing access, small waterfront parks, and interpretation projects with retained and enhanced riparian vegetation and may include related residential development in a proportion established by conditional use permit but not to exceed one-half of the total land area of the project.

Urban waterfront overlay zoning shall be established to locate and define the extent of such areas and shall insure access to the river for all residents.

Open Space and Recreation Element

The revised Yolo County Open Space and Recreation Element (Yolo County Parks and Natural Resources 2002) identifies the following goals, objectives, and policies for the implementation plan:

Objective RO-2: Establishment of a variety of outdoor recreational and educational opportunities along Lower Cache Creek, the Sacramento River, Lower Putah Creek, and within the Yolo Bypass for use by the public.

Policy RP-8: The County shall encourage and support the development of private recreation facilities that preserve scenic and environmentally sensitive resources and that do not result in the creation of land use conflicts.

Policy RP-10: The County shall work with willing landowners to create a continuous corridor of natural open space along Lower Cache Creek, Lower Putah Creek, the Sacramento River and within the Yolo Bypass with provision for limited access at specific locations to recreational and educational uses from a County road or highway. The County shall also consider establishing bicycle access to select areas.

Policy RP-12: Recreational uses shall be clustered at locations along Cache Creek, Lower Putah Creek, and the Sacramento River, in order to minimize habitat disturbance and provide efficient and cost-effective management by the County. All access, whether by road or by trail, shall be through an entry point which can be controlled.

Policy RP-17: The County shall support improved access for bank fishing where safe and adequate parking can be provided and with acquisition of proper rights-of-access from the landowner. Adequate policing, garbage cleanup, sanitation facilities, and fire suppression for such access shall be provided.

4.14.2.2 Environmental Setting

The Rivers EIP study area has a fairly wide vegetated berm with some informal social trails between the levee and the river, and this berm attracts some visitors for fishing, walking, running, and visiting the waterfront. Although access to this area is technically considered trespassing, the City's Police Department and Reclamation District 811 generally do not prosecute for informal recreational use (Shpak pers. comm. 2009). Other, formal, recreation facilities in the nearby vicinity of The Rivers EIP study area are listed below.

- **Bryte Park**. Bryte Park is a City of West Sacramento community park owned by Washington Unified School District and operated and maintained by the City of West Sacramento. It is located west of Todhunter Avenue and south of Riverbank Road. Numerous amenities are available at Bryte Park, including four softball diamonds (two of which are lighted) one hardball diamond, eight soccer fields, full court basketball, football facilities, walking paths, a track, a picnic area with barbecues, a tot lot, a fitness course, restrooms, and the Club West Teen Center, home to an afterschool teen program.

- **Broderick Boat Ramp**. This double-ramp boat launch and picnic facility is operated by the City of West Sacramento and is located on the waterside of the levee just downstream from the Sacramento River's confluence with the American River. It is a popular regional destination because it is the only free, vehicle-accessible public boat ramp in the Sacramento metropolitan area. The City completed improvements to the launch capacity of the ramp and expanded the picnic and restroom facilities during summer 2009 (Shpak pers. comm. 2009).
- **River Walk Park**. River Walk Park, a City of West Sacramento community park, is the City's main event venue on the river. The City frequently holds special events at this park during the summer months (Shpak pers. comm. 2009). River Walk Park features a paved pedestrian promenade along the length of the park (from I Street Bridge south to the Tower Bridge) studded with educational signs discussing the settlement of Sacramento and the river's natural habitat, as well as barbecues, picnic areas, and large expanses of turf with a view of Old Town Sacramento across the river. The City has secured funding to extend the promenade 250 feet to the south of the Tower Bridge if the project is built by summer 2011.

4.14.3 Environmental Consequences

This section describes the environmental consequences relating to recreation resources for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.14.3.1 Assessment Methods

Effects on recreation related to implementation of The Rivers EIP were evaluated qualitatively. Generally, construction activities could result in a short-term loss of recreation opportunities by disrupting use of recreation areas or recreational boating corridors. A long-term effect could occur if a recreation opportunity is eliminated or the quality of that opportunity is severely reduced as a result of permanent project-related structures or operations. Long-term beneficial effects could occur if new or enhanced recreation opportunities are created through implementation of the project.

4.14.3.2 Determination of Effects

For this analysis, an effect pertaining to recreation was considered significant if it would result in any of the following environmental effects, which are based on professional practice and State CEQA Guidelines Appendix G (14 CCR 15000 *et seq*.):

- increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated;
- include recreation facilities or require the construction or expansion of recreation facilities that might have a significant physical effect on the environment;
- substantially restrict or reduce the availability or quality of existing recreation opportunities in the project vicinity; or
- implement operational or construction-related activities related to the placement of project facilities that would cause a substantial long-term disruption of any institutionally recognized

recreation activities. Institutionally recognized recreation activities are those associated with an established publicly or privately operated recreation facility, or those actively administered or promoted by a public or private entity.

4.14.4 Effects and Mitigation Measures

4.14.4.1 No Action Alternative

The No Action Alternative would continue the existing deficiencies along the portion of the Sacramento River North Levee reach encompassed by The Rivers EIP project area (i.e., no levee improvements would be implemented). This means continued or even potentially increased risk that the levee at this site could fail due to under-seepage, slope stability, or geometry issues. Levee failure at this site, depending on the magnitude of the event, could cause catastrophic flooding of the entire city.

Existing recreation opportunities in the study area are expected to remain unchanged under the No Action Alternative. Recreational use of the levees, riverbank, parks, and other facilities would continue as established. The City does not plan to move forward with development of any recreational elements on or near the city's levees without prior implementation of necessary levee upgrades (Shpak Pers. Comm. 2009). Development of new recreational opportunities on or adjacent to levees identified in the City's planning documents would therefore not occur under the No Action Alternative. However, no substantial increase in use of existing recreation facilities should occur under the No Action Alternative, since further development (and further population growth) in West Sacramento could be halted under the No Action Alternative if the city's flood hazard designation is changed, as described in Chapter 2, Alternatives.

Without levee improvements, the risk of levee failure would continue and could even increase, as described in Chapter 2, Alternatives. A catastrophic levee failure would result in flooding and inundation that could significantly damage existing facilities and infrastructure, and erode soil, uproot plants, and otherwise damage substrate by hydraulic force. This would render formal and informal recreation facilities and trails unusable until cleanup and restoration activities could be undertaken. It is possible that after a catastrophic flood event, recreation facilities may never be fully restored to their former condition, permanently reducing the quality and/or quantity of recreation opportunities in the area. In addition, scenic vistas for existing and future recreation facilities could be damaged irreparably or for an extended period of time which would reduce the enjoyment derived by recreationists. Given the uncertainty of the occurrence or magnitude of such an event, potential effects on recreation cannot be quantified based on available information.

As discussed in Vegetation and Wetlands (Section 4.7) compliance with the vegetation removal scenarios described in Section 4.7 would result, at most, in 0.9 acre of vegetation, including vegetation that comprises riparian habitat and supports fish and wildlife populations. Many recreation activities rely on or are significantly enhanced by the presence of mature woody vegetation. Anglers, runners, wildlife viewers, and other recreationists all rely on trees to provide shade and scenery during their activities, all of which are supported by mature woody vegetation offered in and around the study area. Many other users, including pedestrians, bicyclists, and boaters also rely on this woody vegetation for shade, and for the visual character it contributes to the landscape. Removal of a this riparian vegetation in compliance with the levee vegetation guidance would significantly affect recreation in the project study area.

4.14.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on recreation. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
REC-1: Temporary Disruption of Recreation Opportunities during Construction	Less than significant	N/A	N/A
REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor	Significant	Significant and unavoidable	No feasible mitigation
REC-3: Permanent Loss of Recreation Facilities or Opportunities	Less than significant	N/A	N/A
REC-4: Long-Term Increase in Recreation Opportunities	Beneficial	N/A	N/A
REC-5: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities	Beneficial	N/A	N/A

Effect REC-1: Temporary Disruption of Recreation Opportunities during Construction

Bryte Park, a community park operated and maintained by the City of West Sacramento, is located at the landside toe of the Sacramento River North Levee, adjacent to the western end of The Rivers APA project site. In addition to this formal recreation facility, informal recreation activities occur along the levee in The Rivers APA project area, and on the adjacent waterside berm. These activities include fishing, walking, biking, running, and visiting the waterfront.

It is not anticipated that any portion of Bryte Park would need to be closed to accommodate construction activities. However, temporary disruption of the informal recreation activities would occur during construction when the levee crown and adjacent construction and staging areas are closed to public access. Additionally, proximity to construction equipment and activities may degrade recreational experiences on the waterside berm. However, this effect is temporary and there are alternative locations for these types of recreation activities in the city. With implementation of the environmental commitment requiring notification of construction area closure to ensure public safety and provide closure notice in advance of construction activities(described in Section 2.7.13, Chapter 2, Alternatives), this temporary effect would be less than significant. No mitigation is required.

Effect REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor

Implementation of The Rivers APA would follow USACE's policies regarding vegetation on levees. This would require removal of a substantial amount of mature trees and vegetation from the bank of the Sacramento River in The Rivers APA project area, as the new policy forbids woody vegetation on the slopes and crown of the levee or within 15 feet of the waterside and landside levee toes. These zones would be maintained free of woody vegetation in perpetuity.

Many recreation activities rely on or are significantly enhanced by the presence of mature woody vegetation. Anglers rely on trees to provide shade during fishing activities, and wildlife viewers are attracted to areas with mature woody vegetation because of the wealth of wildlife such vegetation supports. Many other users, including pedestrians, bicyclists, equestrians, and boaters also rely on this woody vegetation for shade, and for the visual character it contributes to the landscape (see Section 4.13, Visual Resources).

The majority of informal recreational uses on the levee and berm in and around The Rivers APA project area are tied to the mature riparian forest that characterizes the levee. These uses include fishing, wildlife viewing, walking, bicycling, and boating. Permanent loss of the woody vegetation on and within 15 feet of the Sacramento River North Levee would substantially reduce the quality of existing recreation activities in the area, and is therefore considered significant. No feasible mitigation is available to reduce this effect to a lesser level. This effect would be significant and unavoidable.

Effect REC-3: Permanent Loss of Recreation Facilities or Opportunities

As described in the Environmental Setting section above, Bryte Park, a West Sacramento community park, sits right at the landside toe of the existing levee toward the western end of The Rivers APA project area. A running track and a soccer field are the closest park facilities to the levee. Neither construction activities nor expansion of the levee footprint are planned to intrude into the park, but if project activities were to damage or require removal of facilities at Bryte Park, it would be considered a significant effect, given the dearth of formal recreational facilities in the Bryte and Broderick neighborhoods. However, WSAFCA has committed to rebuilding all formal park facilities removed during construction activities (see the environmental commitment to rebuild affected formal park facilities described in Section 2.7, Chapter 2, Alternatives). With implementation of this environmental commitment, any affected park facilities would be rebuilt after construction of the project, and there would be no permanent loss of recreation opportunities. This effect would be less than significant. No mitigation is required.

Effect REC-4: Long-Term Increase in Recreation Opportunities

As described in Chapter 2, Alternatives, The Rivers APA includes construction of new recreation facilities, including a paved bicycle/pedestrian levee crown trail, a meandering pedestrian trail parallel to the levee crown trail leading to a landing near the river, and interpretive signage. These new facilities would constitute an upgrade in quantity, quality, and safety to the existing facilities at The Rivers APA project area, as well as an increase in recreation opportunities for the city. These recreation enhancements would also advance the policies of the planning documents listed below.

- *City of West Sacramento General Plan,*
- *City of West Sacramento Parks Master Plan,*
- *Sacramento Riverfront Master Plan,*
- *West Sacramento Bicycle and Pedestrian Path Master Plan, and*
- *Yolo County General Plan*.

This effect is considered beneficial.

Effect REC-5: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities

As a result of the incorporation of new recreation facilities in The Rivers APA, the opportunity for physical activity by project area residents would be increased. The Rivers APA is therefore in line with The U.S. National Physical Activity Plan (2010). The plan is a comprehensive set of policies, programs, and initiatives that aim to increase physical activity in all segments of the American population. The plan is the product of a private-public sector collaborative. The goal of the plan is that "all Americans will be physically active and they will live, work, and play in environments that facilitate regular physical activity " (National Physical Activity Plan 2010).

The availability of open space, recreation areas, and parks has been linked with increased physical activity. In a scientific review of studies published prior to 2006, it was found that 14 of 20 articles addressing parks or open space reported at least some, if not an entirely, positive association between park availability, access, use, or proximity and respondents' physical activity levels (Kaczynski and Henderson 2007). This effect would be beneficial.

4.14.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on recreation. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
REC-1: Temporary Disruption of Recreation Opportunities during Construction	Less than significant	N/A	N/A
REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor	Significant	Significant and unavoidable	No feasible mitigation
REC-3: Permanent Loss of Recreation Facilities or Opportunities	Less than significant	N/A	N/A
REC-4: Long-Term Increase in Recreation Opportunities	Beneficial	N/A	N/A
REC-5: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities	Beneficial	N/A	N/A

Effect REC-1: Temporary Disruption of Recreation Opportunities during Construction

This effect would be the same as described above under The Rivers APA. With implementation of the environmental commitment requiring notification of construction area closure to ensure public safety and provide closure notice in advance of construction activities (described in Section 2.7, Chapter 2, Alternatives), temporary disruption of recreation opportunities at The Rivers Alternative B site would be less than significant. No mitigation is required.

Effect REC-2: Long-Term Reduction in Quality of Existing Recreation Opportunities in the Levee Corridor

This effect would be the same as described above under The Rivers APA. This effect is considered significant and unavoidable. No feasible mitigation is available to reduce this effect to a lesser level.

Effect REC-3: Permanent Loss of Recreation Facilities or Opportunities

As described in the Environmental Setting section above, Bryte Park, a West Sacramento community park, sits right at the landside toe of the existing levee toward the western end of The Rivers EIP project area. A running track and a soccer field are the closest park facilities to the levee. Neither construction activities nor expansion of the levee footprint are planned to intrude into the park, but if project activities were to damage or require removal of facilities at Bryte Park, it would be considered a significant effect, given the dearth of formal recreational facilities in the Bryte/Broderick neighborhoods. However, WSAFCA has committed to rebuilding all formal park facilities removed during construction activities (see the environmental commitment to rebuild affected formal park facilities described in Section 2.7, Chapter 2, Alternatives). With implementation of this environmental commitment, any affected park facilities would be rebuilt after construction of the proposed project, and there would be no permanent loss of recreation opportunities. This effect would therefore be less than significant. No mitigation is required.

Effect REC-4: Long-Term Increase in Recreation Opportunities

As described in Chapter 2, Alternatives, The Rivers Alternative B includes construction of new recreation facilities, including a paved bicycle/pedestrian levee crown trail, a meandering pedestrian trail parallel to the levee crown trail leading to a landing near the river, and interpretive signage. These new facilities would constitute an upgrade in quantity, quality, and safety to the existing facilities at The Rivers Alternative B project area, as well as an increase in recreation opportunities for the city. These recreation enhancements would also advance the policies of the planning documents listed below.

- *City of West Sacramento General Plan,*
- *City of West Sacramento Parks Master Plan,*
- *Sacramento Riverfront Master Plan,*
- *West Sacramento Bicycle and Pedestrian Path Master Plan, and*
- *Yolo County General Plan*.

This effect is considered beneficial.

Effect REC-5: Increased Human Health Benefit as a Result of Increased Physical Activity Opportunities

This effect is the same as described above under The Rivers APA. This effect is considered beneficial.

Section 4.15
Utilities and Public Services—
The Rivers Early Implementation Project

4.15.1 Introduction

This section describes the regulatory and environmental setting for utilities and public services, the effects on utilities and public services that would result from the proposed project, and the mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed and briefly described below.

- Communication with West Sacramento Fire/Police Departments (Arsenault pers. comm.)
- Communications with Yolo County Planning Department
- Utility Assessment for Basin-Wide Problem Identification Report, HDR, Inc. (HDR 2007)

4.15.2 Affected Environment

This section describes the affected environment for utilities and public services in The Rivers EIP project area, including regulatory and environmental settings.

4.15.2.1 Regulatory Setting

4.15.2.1.1 State

The following state policies or agencies related to utilities and public services may apply to implementation of The Rivers EIP.

California Public Utilities Commission

The California Public Utilities Commission (CPUC) regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies. CPUC is responsible for ensuring that California utility customers have safe, reliable utility service at reasonable rates, protecting utility customers from fraud, and promoting the health of California's economy. CPUC establishes service standards and safety rules and authorizes utility rate changes. CPUC enforces CEQA compliance for utility construction. CPUC also regulates the relocation of power lines by public utilities under its jurisdiction, such as The Pacific Gas and Electric Company (PG&E). CPUC works with other state and Federal agencies in promoting water quality, environmental protection, and safety.

California Integrated Waste Management Act

In 1989, Assembly Bill 939 (AB 939), known as the Integrated Waste Management Act, was passed into law. Enactment of AB 939 established the California Integrated Waste Management Board and set forth aggressive solid waste diversion requirements. Under AB 939, every city and county in California is required to reduce the volume of waste sent to landfills by 50% through recycling, reuse, composting, and other means. AB 939 requires counties to prepare a Countywide Integrated Waste Management Plan (CIWMP). An adequate CIWMP contains a summary plan that includes goals and objectives, a summary of waste management issues and problems identified in the incorporated and unincorporated areas of the county, a summary of waste management programs and infrastructure, existing and proposed solid waste facilities, and an overview of specific steps that would be taken to achieve the goals outlined in the components of the CIWMP.

4.15.2.1.2 Local

The following local policies related to utilities and public services may apply to implementation of The Rivers EIP.

City of West Sacramento

City of West Sacramento General Plan

The *City of West Sacramento General Plan Policy Document* defines the policies and objectives governing City responsibilities for public utilities and services.

Stormwater Drainage

City of West Sacramento General Plan Section IV, Goal C (City of West Sacramento 2004a) states that the City will maintain an adequate level of service in the storm drainage system to accommodate runoff from existing and future development and to prevent property damage from flooding. The policies to accomplish this goal are listed below.

1. Where practical and economical, the City shall upgrade existing drainage facilities as necessary to correct localized flooding problems.
2. The City shall continue to expand and develop storm drainage facilities to accommodate the needs of existing and planned development.
3. The City shall, through a combination of drainage improvement fees and other funding mechanisms, ensure that new development pays its fair share of the costs of drainage system improvements.
4. The City shall cooperate with other responsible agencies in ensuring that levees surrounding the city are maintained and improved to provide a minimum 200-year flood protection.

Water

The City provides water to its constituents in accordance with the *City of West Sacramento General Plan*, Section IV, Goal A. (City of West Sacramento 2004a) This goal states the City will maintain an adequate level of service in the water system to meet the needs of existing and future development. The policies associated with this statute follow.

1. The City shall continue to use treated surface water from the Sacramento River as the principal source of domestic water for the city, relying on treated groundwater only to supply the port pressure zone and as an emergency backup to the surface water source. The City shall pursue as expeditiously as possible, acquisition of additional surface water rights necessary to accommodate water demand.
2. The City shall continue to expand and develop water treatment, distribution, and storage facilities to accommodate the needs of existing and planned development.
3. To minimize the need for the development of new water sources and facilities and to minimize sewer flows, the City shall promote water conservation both in City operations and in private development.
4. The City shall replace or repair old, leaking water lines as financially feasible.
5. The City shall ensure the provision of adequate fire-flow rates in all new development.
6. The City shall maintain fire hydrants.
7. The City shall, through a combination of water development fees and other funding mechanisms, ensure that new development pays its fair share of the costs of water system improvements.

The Bryte Bend Treatment Plant is responsible for treatment of City's water and for reporting standards and findings regarding the City's drinking water to the California State Department of Health Services, Drinking Water Program. The Bryte Bend Water Treatment Plant Laboratory:

- monitors drinking water quality to ensure it is of a consistently high quality,
- provides laboratory services necessary to support the operating and monitoring requirements for the water treatment plant,
- responds to consumer water quality concerns,
- monitors water quality of the distribution system and watershed, and
- provides services to environmental programs.

Wastewater

The City of West Sacramento manages the wastewater according to the *City of West Sacramento General Plan*, Section IV, Goal B. The City states it will maintain an adequate level of service in the City's sewage collection and disposal system to meet the needs of existing and future development.

Solid Waste

Solid waste disposal is provided by Yolo County and governed by the *City of West Sacramento General Plan*, Section IV, Goal D in close consultation with Yolo County Department of Public Works. This plan defines the programs for recycling and reuse, resource recovery, and disposal. The City commits to provide for the collection and disposal of solid waste while minimizing the generation of waste (City of West Sacramento 2004a).

Public Services

The placement of public services in the City is authorized by the City of West Sacramento Planning Department in accordance the goals and policies established in the *City of West Sacramento General*

Plan, Section IV. The City of West Sacramento Public Works Department is responsible for operating and maintaining city roads, which serve as emergency vehicle routes.

4.15.2.2 Environmental Setting

This section discusses the environmental setting related to utilities and public services in The Rivers EIP project area.

4.15.2.2.1 Utilities and Service Systems

HDR, Inc. performed a preliminary assessment and review of known aboveground and underground utilities in the study area (Appendix E). The assessment was completed by obtaining encroachment permits from the State of California Central Valley Flood Protection Board (CVFPB) that describe underground and aboveground utilities which occur within, on top of, or above the current levee footprint. Overhead utilities (power lines and telephone lines) and underground utilities (telephone and fiber optic conduits, communication cables, and pipelines) occur in the study area. The listed utilities may not be in compliance with the CVFPB and U.S. Army Corps of Engineers (USACE) utility placement standards within levees.

Table 4.15-1 lists aboveground and underground utilities in The Rivers EIP project area.

Table 4.15-1. Utilities Located in The Rivers EIP Project Area

Approximate Stations	Utility	Size	Owner
70+80	Access Manhole	N/A	Unknown
71+90	Access Manhole	N/A	Unknown
70+00–71+00	6-inch Water Main	6 inches	COWS
71+00	4-inch Water Main	4 inches	COWS
71+00–83+70	Telephone	N/A	AT&T
71+00–77+75	Electric	N/A	PG&E
71+00–88+00	Electric	N/A	PG&E
92+50–118+00	2-inch Gas Line	2 inches	PG&E
92+50–118+00	Electric Line	N/A	PG&E
92+50–118+00	Telephone Line	N/A	AT&T
102+00–118+00	2-inch Gas Line	2 inches	PG&E
102+00–118+00	6-inch Sanity Sewer	6 inches	COWS
102+00–118+00	Electric Line	N/A	PG&E
102+00–118+00	Telephone Line	N/A	AT&T
102+50–105+00	8-inch Water Main	8 inches	COWS
106+00–115+00	Telephone Line	N/A	AT&T
107+00	15-inch Storm Drain	15 inches	WSRD
113+25	6-inch Sanitary Sewer	6 inches	COWS
115+50	15-inch Storm Drain w/Outfall	15 inches	WSRD

Source: HDR 2007 (Appendix E)

Electric Power Transmission

Electricity for the study area is provided by PG&E. Power transmission facilities have developed along with population growth within the project area.

Natural Gas

Natural gas pipelines exist throughout the project area. These pipelines are owned and operated by PG&E. These pipelines are 2-inch gas lines that provide natural gas to the residences in the study area. Propane is typically delivered by tanker trucks to users as necessary and is stored in individual propane tanks.

Communications

Telephone lines in the project area are provided by AT&T. The lines are typically aligned parallel to roadways and then traverse the roadways to supply individual service units.

Water

The city's main water source is the Sacramento River. The intake structure is located at Bryte Bend, upstream of the confluence of the Sacramento and American Rivers. Water withdrawn from the Sacramento River is treated at the Bryte Bend Water Treatment Plant, which is operated 24 hours a day by state- certified water treatment plant operators.

Stormwater and Drainage

Stormwater drainage networks consist of both natural and human-made conveyance systems to collect, convey, and store runoff resulting from a storm event. The City manages the stormwater drainage system in the urban areas and in some rural areas.

Impervious surfaces in the project area are limited to roads, other small sections of pavement, urban residential and business structures, and rural residential and agricultural structures. Fifteen-inch stormwater pipelines facilitate drainage within the project area.

Solid Waste

Solid waste disposal is governed by the *City of West Sacramento General Plan* in close consultation with Yolo County Department of Public Works. This plan defines the programs for recycling and reuse, resource recovery, and disposal. Solid waste currently is disposed of at the Yolo County Central Landfill located in the city of Davis. For 2009, the remaining capacity is 37.1 million cubic yards.

Wastewater

Wastewater treatment in the study area is handled by the City of West Sacramento Wastewater Treatment Plant, built in 1948 and expanded in 1977 and 1988. A major improvement program took place during the early 1990s. The plant uses a secondary treatment activated sludge process with an anoxic selector. Within the project area, transmission of wastewater is facilitated by 6-inch sanitary sewer lines. The average daily flow at the wastewater treatment plant is 5.5 million gallons per day.

4.15.2.2.2 Public Services

Fire Protection

The City's Fire Department has the mission of protecting life, environment, and property within the city of West Sacramento. The fire station servicing The Rivers EIP project area is Station 44. It is open 24 hours a day, 7 days a week.

Police Protection

The Police Department provides a full range of police services to the residents of West Sacramento 24 hours a day, 7 days a week.

The Police Department is staffed with 75 sworn officers and 39 civilian full-time employees. Other positions include part-time police officers, parking enforcement officers, reserve police officers, and volunteers.

The department is divided into three geographic "beats". Beat 1 patrols the northern portion of the city, including the Bryte and Broderick areas, and is responsible for The Rivers EIP project area. Beat 2 encompasses the central city along West Capitol Avenue, and Beat 3 is responsible for the area south of the DWSC (Arsenault pers. comm.)

Emergency Medical Services

No hospitals are located in the city of West Sacramento. The nearest hospital is Sutter General Hospital, which is 3.7 miles from West Sacramento at 29th Street in Sacramento.

4.15.3 Environmental Consequences

This section describes the environmental consequences relating to utilities and public services for The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.15.3.1 Assessment Methods

This evaluation of utilities and public services is based on information obtained from the following sources:

- a review of relevant documents and Web sites to obtain information regarding known public services and utilities in the study area,
- the analysis of geographic map research to determine locations of existing utilities and public services for project components, and
- telephone calls and e-mail correspondence to area utility service providers.

4.15.3.2 Determination of Effects

For this analysis, an effect pertaining to utilities and public services was analyzed under NEPA and CEQA if it would result in any of the following environmental effects, which are based on NEPA standards, State CEQA Guidelines Appendix G (14 CCR 15000 *et seq.*), and standards of professional practice:

- require the construction or expansion of electrical or natural gas transmission or distribution facilities;
- require the construction or expansion of a water conveyance or wastewater treatment facility or require new or expanded water supply entitlements;
- require the construction of new or expanded stormwater drainage facilities;
- require the construction or expansion of wastewater treatment facilities;
- cause the capacity of a solid waste landfill to be reached sooner than it would without the project;
- require the construction or expansion of communications facilities (telephone, cell, cable, satellite dish);
- significantly affect public utility facilities that are located underground or aboveground along the local roadways from project construction activities;
- create an increased need for new fire protection, police protection, or ambulance services or significantly affect existing emergency response times or facilities; or
- intersect with major infrastructure components, such as bridges or overpasses, requiring relocation of the components.

4.15.3.2.1 Effects Assumptions

The following assumptions are made as part of the analysis of effects on utilities and public services:

- Implementation of the proposed project is not expected to create additional demand for electricity or natural gas and would not require the construction or expansion of electrical or natural gas transmission lines or public utilities.
- Implementation of the proposed project would not require the construction or expansion of wastewater treatment facilities, nor would it require the relocation of major infrastructure.

4.15.4 Effects and Mitigation Measures

4.15.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to utilities or service systems would occur and none of these services would therefore be interrupted or damaged. Therefore, there would be no effect on this resource under the No Action Alternative.

However, because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento River North Levee could fail due to seepage or slope stability and geometry issues would continue. Failure of the Sacramento River North Levee, depending on the magnitude of the event, could cause catastrophic flooding of the entire city. This could cause inundation from high flows and destruction or damage to utility lines, natural gas supply lines, and water or wastewater piping or facilities, all of which could lead to widespread contamination, temporary power outages, and interruptions of other utilities in the study area and surrounding areas. Effects on the water supply system could be particularly severe, as a single break in a water delivery pipe or main could contaminate the entire city's water supply. All breaks and leaks would need to be repaired and the pipes in every building would need to be flushed to remove contamination before residents and businesses could rely on safe water. Depending on the severity and location of the flooding and contamination, this effort could take a significant amount of time.

Varying levels of damage could be done to public service structures as well, causing delays in fire protection, police protection or emergency medical assistance. A major flood event could also stress the region's emergency response and hospital services, as the likelihood of injury resulting from a flood event is high, and evacuees may not have access to their regular medications. However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related risks cannot be predicted. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made.

4.15.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers APA would result in the following effects on utilities and public service systems. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect PUB-1: Damage of Public Utility Infrastructure and Disruption of Service	Significant	Significant and unavoidable	PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training
Effect PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction	Less than significant	N/A	N/A
Effect PUB-3: Increase in Emergency Response Times	Less than significant	N/A	N/A

Effect PUB-1: Damage of Public Utility Infrastructure and Disruption of Service

Construction of The Rivers APA would result in the relocation of several underground utilities. Utilities within the levee prism include water, electricity, telephone, gas, and sanitary sewer lines; a storm drain; and two utility holes. According to Federal and CVFPB requirements, utilities are not allowed within the official level prism (defined by a 20-foot width along the crown and 3:1 slope ratio landside and waterside). The top portion of a levee that falls outside the official levee prism is called freeboard. Utilities are allowed to be placed within the freeboard portion of a levee. All of the existing utilities within The Rivers APA project area may be relocated within the freeboard and would be temporarily out of service during relocation activities. Throughout the duration of construction, up to 147 days, utilities may be temporarily disrupted at 11 residential units.

During excavation activities, utilities would be intersected on each side of the levee, reconnected and temporarily rerouted to pass over the levee through the duration of construction. After cutoff wall construction, utility lines would be relocated within the freeboard of the levee. As noted in the environmental commitments, Section 2.7 of Chapter 2, Alternatives, WSAFCA would provide assistance for residents to relocate during construction activities and provide compensation to residents for reasonable rent and living expenses incurred due to relocation. In accordance with the Uniform Act, residents would be provided with decent, safe, and sanitary housing. Although disruption of utility services would be temporary and short in duration and the implementation of PUB-MM-1 would reduce the disruption of service, this effect would be significant and unavoidable.

Mitigation

Mitigation Measure PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training

WSAFCA will ensure the following measures are implemented to avoid and minimize potential damage to utility and service disruptions during construction. Implementing these measures will help ensure existing utilities are not damaged and that service interruptions are minimized.

- Obtain utility excavation or encroachment permits as necessary before initiating any work with the potential to affect utility lines, and include all necessary permit terms in construction contract specifications.
- Before starting construction, coordinate with utility providers in the area to locate existing lines. Avoid the relocation of utilities when possible. Provide notification of potential interruptions in services to the appropriate agencies.
- Before starting construction, verify utility locations through field surveys and underground service alerts. Clearly mark any buried utility lines in the area of construction before any earthmoving activity.
- Before starting construction, prepare a response plan to address potential accidental damage to a utility line. The plan will identify chain-of-command rules for notifying authorities and appropriate actions and responsibilities to ensure the safety of the public and the workers. Contractors will conduct worker training to respond to these situations.
- Stage utility relocations to minimize service interruptions.

Effect PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction

Implementation of The Rivers APA may generate up to 69,000 cubic yards of levee material that would require disposal. A portion of the material could be disposed of on-site and used for new levee construction, as long as it is suitable material. Disposal of the soil material would occur if soil characteristics make it infeasible for reuse as levee material, or the soil is determined to have contaminants that would require appropriate disposal. Embankment fill material excavated to construct levee improvements would be evaluated for reuse after excavation and prior to disposal. Soil requiring disposal as part of The Rivers APA would likely be transported to the Yolo County Central Landfill; however, the location of the landfill used for disposal of spoil material and other construction-related waste may be determined by the construction contractor at the time of construction activity based on capacity, type of waste, and other factors. Only those landfills determined to have the ability to accommodate the construction disposal needs of The Rivers APA would be used.

As of fall 2009, the remaining capacity for the Yolo County Central Landfill is 37.1 million cubic yards. Some of the disposed soils may be deemed suitable by the Yolo County Central Landfill for other beneficial uses. These soils would only be temporarily stored at the landfill and would not have an effect on its overcall capacity. The current landfill closure projection is in 2070, which takes into account disposal growth rate, including both beneficial and non-beneficial soil materials. Assuming all of the estimated 69,000 cubic yards of soil would require permanent disposal, The Rivers APA implementation would represent less than 1% of the remaining capacity of the Yolo County Central Landfill. However, the option of beneficial re-use is likely to reduce the cubic yards of soil that require permanent disposal. These facts would make this effect less than significant. No mitigation is required. (Borrego pers. comm.)

Effect PUB-3: Increase in Emergency Response Times

Emergency access to the project vicinity could be affected by construction of the proposed project, and construction-related traffic could delay or obstruct the movement of emergency vehicles. However, execution of the environmental commitment to develop and implement a traffic control and road maintenance plan, described in Section 2.7.9 of Chapter 2, Alternatives, would minimize construction-related effects on emergency response times. This effect would be less than significant. No mitigation is required.

4.15.4.3 The Rivers Alternative B

Implementation of The Rivers APA would result in the following effects on utilities and public service systems. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect PUB-1: Damage of Public Utility Infrastructure and Disruption of Service	Significant	Significant and unavoidable	PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training
Effect PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction	Less than significant	N/A	N/A
Effect PUB-3: Increase in Emergency Response Times	Less than significant	N/A	N/A

Effect PUB-1: Damage of Public Utility Infrastructure and Disruption of Service

Construction of The Rivers Alternative B would result in the relocation of several underground utilities. Utilities within the levee prism include water, electricity, telephone, gas, and sanitary sewer lines; a storm drain; and two utility holes. According to Federal and CVFPB requirements, utilities are not allowed within the official level prism (defined by a 20-foot width along the crown and 3:1 slope ratio landside and waterside). The top portion of a levee that falls outside the official levee prism is called freeboard. Utilities are allowed to be placed within the freeboard portion of a levee. All of the existing utilities within The Rivers Alternative B project area may be relocated within the freeboard and would be temporarily out of service during relocation activities. Throughout the duration of construction, up to 57 days, utilities may be temporarily disrupted at 11 to 15 residential units.

During excavation activities, utilities would be intersected on each side of the levee, reconnected and temporarily rerouted to pass over the levee through the duration of construction. After cutoff wall construction, utility lines would be relocated within the freeboard of the levee. As noted in the environmental commitments, Section 2.7 of Chapter 2, Alternatives, WSAFCA would provide assistance for residents to relocate during construction activities and provide compensation to residents for reasonable rent and living expenses incurred due to relocation. In accordance with the Uniform Act, residents would be provided with decent, safe, and sanitary housing. Although disruption of utility services would be temporary and short in duration and the implementation of PUB-MM-1 would reduce the disruption of service, this effect would be significant and unavoidable.

Effect PUB-2: Exceeded Capacity or Reduced Lifespan of Local Solid Waste Landfills as a Result of Construction

Implementation of The Rivers Alternative B may generate up to 11,000 cubic yards of levee material that would require disposal. A portion of the material could be disposed of on-site and used for new levee construction, as long as it is suitable material. Disposal of the soil material would occur if soil characteristics make it infeasible for reuse as levee material, or the soil is determined to have contaminants that would require appropriate disposal. Embankment fill material excavated to construct levee improvements would be evaluated for reuse after excavation and prior to disposal. Soil requiring disposal as part of The Rivers Alternative B would likely be transported to the Yolo County Central Landfill; however, the location of the landfill used for disposal of spoil material and other construction-related waste may be determined by the construction contractor at the time of construction activity based on capacity, type of waste, and other factors. Only those landfills determined to have the ability to accommodate the construction disposal needs of The Rivers Alternative B would be used.

As of fall 2009, the remaining capacity for the Yolo County Central Landfill is 37.1 million cubic yards. Some of the disposed soils may be deemed suitable by the Yolo County Central Landfill for other beneficial uses. These soils would only be temporarily stored at the landfill and would not have an effect on its overcall capacity. The current landfill closure projection is in 2070, which takes into account disposal growth rate, including both beneficial and non-beneficial soil materials. Assuming all of the estimated 11,000 cubic yards of soil would require permanent disposal, The Rivers Alternative B implementation would represent less than 1% of the remaining capacity of the Yolo County Central Landfill. However, the option of beneficial re-use is likely to reduce the cubic yards of soil that require permanent disposal. These facts would make this effect less than significant. No mitigation is required. (Borrego pers. comm.)

Effect PUB-3: Increase in Emergency Response Times

Emergency access to the project vicinity could be affected by construction of the proposed project, and construction-related traffic could delay or obstruct the movement of emergency vehicles. However, execution of the environmental commitment to develop and implement a traffic control and road maintenance plan, described in Section 2.7.9 of Chapter 2, Alternatives, would minimize construction-related effects on emergency response times. This effect would be less than significant. No mitigation is required.

Section 4.16

Public Health and Environmental Hazards—The Rivers Early Implementation Project

4.16.1 Introduction

This section describes the regulatory and environmental setting for public health and environmental hazards, including hazardous materials, emergency response and evacuation plans, the potential for wildland fires, and health hazards to the public in the city of West Sacramento. The effects on public health and environmental hazards that would result from the proposed project are described, as well as mitigation measures that would reduce these effects.

The key sources of data and information used in the preparation of this section are listed below.

- *2030 Countywide General Plan* for Yolo County (Yolo County 2009)
- *West Sacramento General Plan Policy Document* (City of West Sacramento 1990)
- *West Sacramento EIP, Yolo County* (Environmental Data Resources 2007)

4.16.2 Affected Environment

This section describes the affected environment for public health and environmental hazards in The Rivers EIP project area, including the regulatory and environmental settings.

4.16.2.1 Regulatory Setting

4.16.2.1.1 Federal

The principal Federal regulatory agency responsible for the safe use and handling of hazardous materials is the EPA. Two key Federal regulations pertaining to hazardous wastes are described below. Other applicable Federal regulations are contained primarily in CFR Titles 29, 40, and 49.

The following Federal policies related to public health and environmental hazards may apply to the implementation of The Rivers EIP.

Resource Conservation and Recovery Act

The Federal Resource Conservation and Recovery Act enables the U.S. Environmental Protection Agency (EPA) to administer a regulatory program that extends from the manufacture of hazardous materials to their disposal, thus regulating the generation, transportation, treatment, storage, and disposal of hazardous waste at all facilities and sites in the nation.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund) was passed to facilitate the cleanup of the nation's toxic waste sites. In 1986, the act was amended by the Superfund Amendment and Reauthorization Act Title III (community right-to-know laws). Title III states that past and present owners of land contaminated with hazardous substances can be held liable for the entire cost of the cleanup, even if the material was dumped illegally when the property was under different ownership.

4.16.2.1.2 State

California regulations are equal to or more stringent than Federal regulations. EPA has granted the State of California primary oversight responsibility to administer and enforce hazardous waste management programs. State regulations require planning and management to ensure that hazardous wastes are handled, stored, and disposed of properly to reduce risks to human and environmental health. Several key laws pertaining to hazardous wastes, emergency services, and mosquito abatement are discussed below.

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act, also known as the Business Plan Act, requires businesses using hazardous materials to prepare a plan that describes their facilities, inventories, emergency response plans, and training programs. Hazardous materials are defined as unsafe raw or unused material that is part of a process or manufacturing step. They are not considered hazardous waste. Health concerns pertaining to the release of hazardous materials, however, are similar to those relating to hazardous waste.

Hazardous Waste Control Act

The Hazardous Waste Control Act created the state hazardous waste management program, which is similar to but more stringent than the Federal Resource Conservation and Recovery Act program. The act is implemented by regulations contained in Title 26 CCR, which describes the following elements required for the proper management of hazardous waste:

- identification and classification;
- generation and transportation;
- design and permitting of recycling, treatment, storage, and disposal facilities;
- treatment standards;
- operation of facilities and staff training; and
- closure of facilities and liability requirements.

These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the Hazardous Waste Control Act and Title 26, the generator of hazardous waste must complete a manifest that accompanies the waste from generator to transporter to the ultimate disposal location. Copies of the manifest must be filed with the California Department of Toxic Substances and Control.

Emergency Services Act

Under the Emergency Services Act, the state developed an emergency response plan to coordinate emergency services provided by Federal, state, and local agencies. Rapid response to incidents involving hazardous materials or hazardous waste is an important part of the plan, which is administered by the California Office of Emergency Services. The office coordinates the responses of other agencies, including EPA, the California Highway Patrol, regional water quality control boards, (RWQCBs), air quality management districts, and county disaster response offices.

4.16.2.1.3 Local

The following local policies related to public health and environmental hazards may apply to the implementation of The Rivers EIP.

Yolo County

The Health and Safety Element of the *2030 Countywide General Plan* for Yolo County (Yolo County 2009) contains goals, policies, and actions aimed at reducing the risk associated with natural and human-made hazards within the county. Any violation of these goals, policies, and actions would constitute a significant effect.

Goals

GOAL HS-2: Flood Hazards. Protect the public and reduce damage to property from flood hazards.

Policies

Policy HS-2.2: Ensure and enhance the maintenance and integrity of flood control levees.

Policy HS-2.3: Actively update and maintain policies and programs to ensure consistency with state and Federal requirements.

Actions

Action HS-A5: Require a minimum of 100-year flood protection for new construction, and strive to achieve 200-year flood protection for unincorporated communities where such levels of protection are not provided, require new development to adhere to the requirements of state law and the County Flood Damage Prevention Ordinance.

Action HS-A14: Require a minimum 50-foot setback for all permanent improvements from the toe of any flood control levee.

Action HS-A16: Support the efforts of levee maintenance districts with efforts to secure state and federal funding for geotechnical studies of levees and implementation of associated improvements.

Action HS-A17: Encourage flood hazard reduction projects along the Sacramento River to be consistent with the guidelines of the Sacramento River Corridor Floodway Management Plan.

Action HS-A18: Coordinate with local, state and federal agencies to define existing and potential flood problem areas, including the possible effects associated with global climate change, and to maintain and improve levees and other flood control features.

Action HS-A19: Develop a detailed maintenance and funding plan for levees under County control, to ensure that levee safety is maintained.

Action HS-A20: Support and encourage responsible agencies to site new levees or major rehabilitation of levees at a distance from the river and from existing levees, where feasible. This would provide a degree of redundancy in the system, increase the land available for habitat and flood storage, reduce operation and maintenance costs, and help to ensure the integrity of the structures.

Action HS-A22: Ensure that the upgrade, expansion, or construction of any flood control levee demonstrates that it will not adversely divert flood water or increase flooding.

Action HS-A24: Improve the county's classification within the Federal Emergency Management Agency Community Rating System.

Action HS-A29: Pursuant to Section 8201 of the State Water Code, develop local plans for flood protection, including analysis of financing options to construct and maintain any needed improvements, to address how 100-year floodplain protection for each community may be provided. Those communities that are economically disadvantaged shall have priority in developing flood protection plans. The cities shall be consulted in development of the plans, which shall be consistent with the Central Valley Flood Protection Plan.

City of West Sacramento General Plan

The Central Valley Flood Protection Plan requires 200-year flood protection by the year 2025. The time and effort required to fully evaluate approximately 50 miles of levees, develop recommended strategies for improvement, and implement those improvements prompted action without further delay. In addition, within its General Plan, the City adopted a goal of achieving 200-year flood protection. The Health and Safety Section of the *City of West Sacramento General Plan Policy Document* (City of West Sacramento 1990) contains goals and policies aimed at reducing the risks associated with natural and human-made hazards within the county. Any violation of these goals and policies would constitute a significant effect.

Goal A: To prevent loss of life, injury, and property damage due to geologic and seismic hazards.

Policy 1: The City shall require preparation of geotechnical reports and impose appropriate mitigation measures to ensure, within the limits of technical and economic feasibility, that new structures are able to withstand the effects of seismic activity, including liquefaction.

Policy 3: The City shall request that responsible agencies regularly inspect and repair area levees, as needed, to ensure structural integrity in the event of seismic activity.

Goal B: To prevent loss of life, injury, and property damage due to flooding.

Policy 8: The City shall cooperate with area reclamation districts and other responsible agencies in the maintenance and improvement of levees and drainage channels.

Policy 9: The City shall support state and federal legislation which provides funding for the construction of flood control improvements in urbanized areas.

Policy 10: the City shall discourage uses that promote the erosion or structural deterioration of levees.

Goal C: To prevent loss of life, injury, and property damage due to wildland, cropland, and structural fires, explosions and release of hazardous materials.

Goal D: To ensure that City emergency response procedures are adequate in the event of natural or man-made disasters.

West Sacramento Area Flood Control Agency

WSAFCA is a Joint Powers Authority created in 1994 through a Joint Exercise of Powers Agreement by the City, RD 900, and RD 537. WSAFCA was established to coordinate the planning and construction of flood protection facilities and to finance the local share of flood control projects. WSAFCA is responsible for the operations and maintenance of the detention basins, pump stations, and levees that protect the city.

4.16.2.2 Environmental Setting

This section discusses the environmental setting related to public health and environmental hazards in The Rivers EIP project area.

4.16.2.2.1 Hazardous Materials

Hazardous materials are chemicals and other substances defined as hazardous by Federal and state laws and regulations. In general, these materials are substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may have harmful effects on public health or the environment during their use or when released to the environment. Hazardous materials also include waste chemicals and spilled materials. Hazardous materials occur in common contexts, including:

- pesticides, herbicides, and fertilizers;
- petroleum hydrocarbons;
- underground storage tanks;
- contaminated debris;
- lead;
- wastewater;
- pits or ponds;
- stormwater runoff structures; and
- transformers that may contain polychlorinated biphenyls (PCBs).

The West Sacramento EIP Environmental Data Resources report (Appendix I) identified a hazardous materials site in the California Department of Water Resources (DWR) Maintenance Yard located just west of the project area on Riverbank Road. Multiple leaking underground storage tanks, removed in 1994, are the source of contamination at this site. DWR has monitored the site for groundwater contamination since 2004 and has established the boundary of a groundwater petroleum plume originating from the tank location and spanning the eastern portion of the DWR maintenance facility, northwestern corner of Bryte Park, and a small western portion of The Rivers EIP project area. The groundwater petroleum plume would be affected by construction activities for The Rivers EIP. The effects from this construction are evaluated below under The Rivers EIP Environmental Consequences section and in Section 4.2, Water Quality and Groundwater Resources.

4.16.2.2.2 Wildland Fires

The area surrounding The Rivers EIP project area is not considered a fire-prone area.

4.16.2.2.3 Emergency Response and Evacuation

Emergency response and evacuation services for the project area are provided by the various departments in the city of West Sacramento and through Yolo County Sheriff, Fire, and Emergency Services Departments. The City of West Sacramento has entered into a joint flood operation agreement with the local reclamation districts. The agreement has established procedures to protect the health, safety, welfare, and property of the residents and landowners in the project area. Procedures described in the document consist of flood preparedness, information management, monitoring, flood fighting, and flood evacuation.

4.16.2.2.4 Schools

Two schools are located within 0.25 mile of The Rivers EIP project area. These schools are Bryte Elementary School, located at 637 Todhunter Avenue and Riverbank Elementary School, located at 1100 Carrie Street.

4.16.3 Environmental Consequences

This section describes the environmental consequences relating to public health and environmental hazards for the proposed The Rivers EIP. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.16.3.1 Assessment Methods

The evaluation of potential effects on public health and environmental hazards addresses the potential for health and safety hazards during construction of The Rivers EIP. The analysis includes evaluation of (1) the potential effects related to construction activities on workers, and (2) general safety of and hazards to both workers and the public posed by the construction and implementation of the levee alternatives.

4.16.3.2 Determination of Effects

Criteria used for determining the significance of an effect on public health and environmental hazards are based on the environmental checklist included in Appendix G (14 CCR 15000 *et seq*.) of the State CEQA Guidelines as well as professional standards and practices. The proposed project was considered to cause a significant effect if it would:

- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials to the environment;
- emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school;
- be located on a site that is on a list of hazardous materials sites compiled pursuant to California Government Code 65962.5, and as a result would create a significant hazard to the public or the environment;

- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- significantly affect drinking water quality.

4.16.4 Effects and Mitigation Measures

4.16.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. No construction-related effects relating to public health and environmental hazards would occur.

Without improvements to The Rivers EIP site, the risk of levee failure would remain high. A levee failure in the city's levee system could result in flooding that could upset stored hazardous materials and spread agricultural pesticides, oil, gasoline, and other hazardous materials in flood waters, creating hazardous conditions for the public and the environment. Flood damage to homes and other structures can render them dangerous as a result of structural damage and contamination. Electrical systems could be damaged by flooding, posing the potential of fires, and natural gas leaks could result poisoning through inhalation of fumes, or could cause a sudden explosion if sparked. The likelihood of a significant amount of mold production is high after a flood event. Mold not only threatens the physical integrity of structures, but also poses its own health risks. Mold can cause lung infections, skin irritations, and other health dangers, especially for those with asthma, allergies, or suppressed immune systems. Additionally, the floodwaters themselves and ponds left behind could provide a wide breeding ground for mosquitoes, and the incidence of West Nile Virus and other diseases would likely increase.

Effects on the water supply system could be particularly severe in a flood event, as a single break in a water delivery pipe or main could contaminate the entire city's water supply. All breaks and leaks would need to be repaired and the pipes of every house would need to be flushed to remove contamination before residents and businesses could rely on safe water. Depending on the severity and location of the flooding and contamination, this effort could take a significant amount of time.

Varying levels of damage could be done to public service structures as well, causing delays in fire protection, police protection, or emergency medical assistance. A major flood event could also stress the region's emergency response and hospital services, as the likelihood of injury resulting from the flood event is high, and evacuees may not have access to their regular medications.

However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related risks cannot be predicted. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made.

4.16.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on public health and environmental hazards. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
PH-1: Incidental Release of Hazardous Materials during Construction	Less than significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
PH-2: Exposure to Hazardous Materials Encountered at Project Site	Significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering PH-MM-1: Complete Phase I and Phase II (if necessary) Environmental Site Assessment Investigations and Implement Required Measures
PH-3: Safety Hazards from the Construction Site and Vehicles	Less than significant	N/A	N/A
PH-4: Protection of People or Structures from Flood Hazards	Beneficial	N/A	N/A
PH-5: Emission or Handling of Hazardous Materials Substances, or Waste within 0.25 Mile of an Existing or Proposed School	Significant	Less than significant	PH-MM-1: Complete Phase I and Phase II (if necessary) Environmental Site Assessment Investigations and Implement Required Measures PH-MM-2: Notify Washington Unified School District and Applicable Schools Located within 0.25 Mile of Project Construction Activities

Effect PH-1: Incidental Release of Hazardous Materials during Construction

The Rivers APA implementation would require the use of hazardous materials such as fuels and lubricants to operate construction equipment and vehicles such as excavators, compactors, haul trucks, and loaders. Bentonite (a non-hazardous material) would be transported to sites where slurry cutoff wall construction would occur. Construction contractors would be required to use, store, and transport hazardous materials in compliance with Federal, state, and local regulations during project construction. However, fuels, and lubricants could be accidentally released into the environment at the construction site and along haul routes, causing environmental or human exposure to these hazards. Risks to water quality (surface, ground, and drinking water) associated with incidental release of these materials are addressed in Section 4.2, Water Quality and Groundwater Resources.

As discussed in Section 2.7, Chapter 2, Alternatives, the implementation of environmental commitments, including a stormwater pollution protection plan (SWPPP), a bentonite slurry spill contingency plan (BSSCP), a spill prevention control and countermeasures plan (SPCCP), and the implementation of Mitigation Measures WQ-MM-1 and WQ-MM-2, would ensure that the risk of accidental spills and releases into the environment would be minimal and that the effect on water quality would be less than significant.

In addition, WSAFCA would be required to comply with applicable Federal, state, and local laws, which would reduce the potential for accidental release of hazardous materials during their transport and use. Consequently, the risk of incidental release of hazardous materials during their transport and use in The Rivers APA construction activities is low and the effect is considered less than significant.

Mitigation

Mitigation Measure WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality

If an appreciable spill has occurred and results determine that project activities have significantly affected surface or groundwater quality, a detailed analysis will be performed by a registered environmental assessor or professional engineer to identify the likely cause of contamination. This analysis will conform to American Society for Testing and Materials (ASTM) standards and will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, WSAFCA and its contractors will select and implement measures to control contamination, with a performance standard that surface water quality and groundwater quality must be returned to baseline conditions.

Mitigation Measure WQ-MM-2: Implement Provisions for Dewatering

Before discharging any dewatered effluent to surface water, WSAFCA or its contractors will obtain a Low Threat Discharge and Dewatering NPDES permit from the Central Valley RWQCB. Depending on the volume and characteristics of the discharge, coverage under the Central Valley RWQCB's NPDES General Construction Permit or General Dewatering Permit is possible. As part of the permit, the permittee will design and implement measures as necessary so that the discharge limits identified in the relevant permit are met. For example, if dewatering is needed during the construction of the slurry wall, then the Low Threat Discharge and Dewatering NPDES permit would require proper disposal of the water. As a performance standard, these measures will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable. Implemented measures may include the retention of dewatering effluent until particulate matter has settled before it is discharged, use of infiltration areas, and other BMPs. Final selection of water quality control measures will be subject to approval by WSAFCA.

WSAFCA will verify that coverage under the appropriate NPDES permit has been obtained before allowing dewatering activities to begin. WSAFCA or its agent will perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained. WSAFCA will notify its contractors immediately if there is a non-compliance issue and will require compliance.

Effect PH-2: Exposure to Hazardous Materials Encountered at Project Site

There is the potential that known or previously undocumented hazardous materials could be encountered at The Rivers APA project site. Excavation and construction activities at or near areas of currently unrecorded soil or groundwater contamination could result in the exposure of construction workers, the general public, and the environment to hazardous materials such as petroleum hydrocarbons, pesticides, herbicides, fertilizers, contaminated debris, or elevated levels of other chemicals that could be hazardous. There is one known site located adjacent to and partially within The Rivers APA project site that contains hazardous materials: a petroleum groundwater plume at the DWR Maintenance Yard. Construction activities in the vicinity of known or potentially unknown recognized environmental concerns could result in public health hazards.

Implementation of Mitigation Measures PH-MM-1, described below, WQ-MM-1, and WQ-MM-2, and the environmental commitments of a SWPPP, a BSSCP, and SPCCP, as described in Section 2.7 of Chapter 2, Alternatives, would ensure that the effect on public health and the environment would be less than significant.

Mitigation

Mitigation Measure WQ-MM-1: Implement Measures to Maintain Surface Water Quality and Groundwater Quality

Mitigation Measure WQ-MM-2: Implement Provisions for Dewatering

Mitigation Measure PH-MM-1: Complete Phase I and Phase II (If Necessary) Environmental Site Assessment Investigations and Implement Required Measures

WSAFCA will conduct Phase I environmental site assessments (ESAs) and, if necessary, Phase II ESAs or other appropriate testing. If necessary, the assessment will include an analysis of soil or groundwater samples for the potential contamination sites that have not yet been covered by previous investigations before construction activities begin.

Recommendations in Phase I and Phase II ESAs to address any contamination that is found will be implemented before initiating ground-disturbing activities. In addition, WSAFCA will implement the following measures before ground-disturbing or demolition activities begin, in order to reduce health hazards associated with potential exposure to hazardous substances:

- Prepare a site plan that identifies any necessary remediation activities appropriate for proposed land uses, including excavation and removal of contaminated soils, and redistribution of clean fill material on the project site. The plan will include measures that ensure the safe transport, use, and disposal of contaminated soil and building debris removed from the site, as well as any other hazardous materials. In the event that contaminated groundwater is encountered during site excavation activities, the contractor will report the contamination to the appropriate regulatory agencies, dewater the excavated area, and treat the contaminated groundwater to remove contaminants before discharge into the sanitary sewer system. The contractor will be required to comply with the plan and applicable Federal, state, and local laws.
- Retain licensed contractors to remove all underground storage tanks.
- Notify the appropriate Federal, state, and local agencies if evidence of previously undiscovered soil or groundwater contamination is encountered during construction activities. Any contaminated areas will be cleaned up in accordance with the recommendations of Yolo County Environmental Health Division, Central Valley RWQCB, California Department of Toxic Substances Control, or other appropriate Federal, state or local regulatory agencies.,
- Prepare a worker health and safety plan before the start of construction activities that identifies, at a minimum, all contaminants that could be encountered during construction activity; all appropriate worker, public health, and environmental protection equipment and procedures to be used during project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan will describe actions to be taken should hazardous materials be encountered on site, including protocols for handling hazardous

materials and preventing their spread, and emergency procedures to be taken in the event of a spill.

Effect PH-3: Safety Hazards from the Construction Site and Vehicles

Under The Rivers APA, construction workers would operate vehicles and other mechanical equipment that, if used improperly, could result in safety hazards at the construction site. WSAFCA would ensure that all workers are properly trained to operate equipment. Safety precautions would be followed at all times during construction to avoid accidents. WSAFCA also would require that all workers have a valid driver's license and insurance. These measures would ensure that this effect would be less than significant.

In addition, people may walk, ride bicycles, or otherwise use the levee during the construction period. The staging of the equipment when construction is not underway (i.e., weekends, holidays, or overnight, if construction is not performed 24 hours per day) may pose a threat to public safety if the equipment is not properly secured. Proper signage and detours would be provided as stated in the environmental commitment to provide notification of construction area closure (described in Section 2.7, Chapter 2, Alternatives). These measures would reduce the risk to the public when construction is underway and when it is not. Therefore, this effect would be less than significant. No mitigation is required.

Effect PH-4: Protection of People or Structures from Flood Hazards

All levees have the potential to fail, regardless of design. The U.S. Army Corps of Engineers (USACE) has set forth guidelines for levee design. Under The Rivers APA, the Sacramento River North Levee would be improved using methods that meet engineering requirements set forth by both USACE and the Reclamation Board. In addition, this levee would be improved to meet FEMA 200-year flood protection certification. This would be an improvement compared to the existing level of flood protection. Therefore, this effect would be beneficial.

Effect PH-5: Emission or Handling of Hazardous Materials, Substances, or Waste within 0.25 Mile of an Existing or Proposed School

There are two schools located within 0.25 mile of The Rivers APA project site. These schools are Bryte Elementary School located at 637 Todhunter Avenue and Riverbank Elementary School, located at 1100 Carrie Street. Construction of The Rivers APA would involve the use of potentially hazardous materials, such as fuels (gasoline and diesel) and oils, and may expose the contaminated groundwater plume located to the west of the project site. Undocumented contaminated soil or water may also be found during construction. The effect of exposure to incidental release of these hazardous materials by school-aged children would be significant.

WSAFCA would be required to comply with applicable Federal, state, and local laws related to transport and use of hazardous materials. Consequently, the risk of incidental release of hazardous materials near existing or proposed schools during their transport and use during project construction activities would be low. These measures, along with the implementation of Mitigation Measures PH-MM-1 and PH-MM-2 would ensure that this effect is less than significant.

Mitigation

Mitigation Measure PH-MM-1: Complete Phase I and Phase II (If Necessary) Environmental Site Assessment Investigations and Implement Required Measures

Mitigation Measure PH-MM-2: Notify Washington Unified School District and Applicable Schools Located within 0.25 Mile of Project Construction Activities

WSAFCA will provide written notification of projects to each of the affected schools and the Washington Unified School District within 30 days prior to certification of the EIS/EIR and will consult with Washington Unified School District regarding potential effects on school children from hazards associated with project construction.

4.16.4.3 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on public health and environmental hazards. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect PH-1: Incidental Release of Hazardous Materials during Construction	Less than significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering
Effect PH-2: Exposure to Hazardous Materials Encountered at Project Site	Significant	Less than significant	WQ-MM-1: Implement Measures to Maintain Surface Water quality and Groundwater Quality WQ-MM-2: Implement Provisions for Dewatering PH-MM-1: Complete Phase I and Phase II (if necessary) Environmental Site Assessment Investigations and Implement Required Measures
Effect PH-3: Safety Hazards from the Construction Site and Vehicles	Less than significant	N/A	N/A
Effect PH-4: Protection of People or Structures from Flood Hazards	Beneficial	N/A	N/A
Effect PH-5: Emission or Handling of Hazardous Materials Substances, or Waste within 0.25 Mile of an Existing or Proposed School	Significant	Less than significant	PH-MM-1: Complete Phase I and Phase II (if necessary) Environmental Site Assessment Investigations and Implement Required Measures PH-MM-2: Notify Washington Unified School District and Applicable Schools Located within 0.25 Mile of Project Construction Activities

Effect PH-1: Incidental Release of Hazardous Materials during Construction

The Rivers Alternative B implementation would require the use of hazardous materials such as fuels and lubricants to operate construction equipment and vehicles such as excavators, compactors, haul trucks, and loaders. Construction contractors would be required to use, store, and transport hazardous materials in compliance with Federal, state, and local regulations during project construction. However, fuels, and lubricants could be accidentally released into the environment at the construction site and along haul routes, causing environmental or human exposure to these hazards. Risks to water quality (surface, ground, and drinking water) associated with incidental release of these materials are addressed in Section 4.2, Water Quality and Groundwater Resources.

The implementation of environmental commitments, including a SWPPP, an SPCCP, and the implementation of Mitigation Measures WQ-MM-1 and WQ-MM-2, would ensure that the risk of accidental spills and releases into the environment would be minimal and that the effect on water quality would be less than significant.

In addition, WSAFCA would be required to comply with applicable Federal, state, and local laws, which would reduce the potential for accidental release of hazardous materials during their transport and use. Consequently, the risk of incidental release of hazardous materials during their transport and use in The Rivers Alternative B construction activities is low and the effect is considered less than significant.

Effect PH-2: Exposure to Hazardous Materials Encountered at Project Site

This effect is the same as described above under The Rivers APA. There is the potential that known or previously undocumented hazardous materials could be encountered at The Rivers Alternative B project site that could result in the exposure of construction workers, the general public, and the environment to hazardous materials. Implementation of Mitigation Measures PH-MM-1, WQ-MM-1, and WQ-MM-2 and the implementation of environmental commitments of a SWPPP and SPCCP, as described in Section 2.7 of Chapter 2, Alternatives, would ensure that the effect on public health and the environment would be less than significant.

Effect PH-3: Safety Hazards from the Construction Site and Vehicles

This effect is the same as described above under The Rivers APA. Under implementation of The Rivers Alternative B, construction workers would operate vehicles and other mechanical equipment that, if used improperly, could result in safety hazards at the construction site. WSAFCA would ensure that safety precautions would be followed at all times during construction to avoid accidents. This effect would be less than significant. No mitigation is required.

Effect PH-4: Protection of People or Structures from Flood Hazards

This effect is the same as described above under The Rivers APA. Under The Rivers Alternative B, the Sacramento River North Levee would be improved using methods that meet engineering requirements set forth by both USACE and the Reclamation Board. In addition, this levee would be improved to meet FEMA 200-year flood protection certification. This would be an improvement compared to the existing level of flood protection. Therefore, this effect would be beneficial.

Effect PH-5: Hazardous Materials, Substances, or Waste Handled or Emitted within 0.25 Mile of an Existing or Proposed School

This effect is the same as described above under The Rivers APA. There are two schools located within 0.25 mile of The Rivers Alternative B project site, and potential exposure to incidental release of these hazardous materials by school-aged children would be significant. WSAFCA would be required to comply with applicable Federal, state, and local laws related to transport and use of hazardous materials. Consequently, the risk of incidental release of hazardous materials near existing or proposed schools during their transport and use during project construction activities would be low. These measures, along with the implementation of Mitigation Measures PH-MM-1 and PH-MM-2 would ensure that this effect is less than significant.

Section 4.17
Cultural Resources—
The Rivers Early Implementation Project

4.17.1 Introduction

This section describes the regulatory and environmental setting for cultural resources, the effects on cultural resources that would result from the proposed project, and mitigation measures that would reduce these effects. This section also discusses the prehistoric, ethnographic, and historic background to better define the context of the cultural resources associated with the study area.

The term *cultural resources* encompasses several types of resources, including archaeological, architectural, and traditional cultural properties (TCPs). Archaeological sites include both prehistoric and historic deposits, as well as submerged resources. Architectural properties are buildings, bridges, and infrastructure. TCPs are those locations of importance to a particular group. TCPs are frequently important to Native American groups because of the function the location serves in traditional ceremonies or other activities such as plant gathering. Cultural resources also include cultural landscapes, defined by McClelland et al. (1995:3) as “a geographic area that historically has been used by people, or shaped and modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features.”

4.17.2 Affected Environment

4.17.2.1 Regulatory Setting

4.17.2.1.1 Federal

The following Federal policies related to cultural resources may apply to the implementation of The Rivers EIP.

Section 106 of the National Historic Preservation Act

The proposed project would require a permit from the U.S. Army Corps of Engineers (USACE. The permitting Federal agency is required to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations (36 CFR 800). Section 106 of the NHPA requires that, before beginning any undertaking, a Federal agency must take into account the effects of the undertaking on *historic properties* (cultural resources listed or eligible for listing on the National Register of Historic Places [NRHP]) and afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on these actions. The Section 106 process has five basic steps.

1. Initiate the Section 106 process, including the identification of consulting parties, such as Indian tribes.

2. Identify and evaluate cultural resources to determine whether they are historic properties.
3. Assess the effects of the undertaking on historic properties within the area of potential effects (APE).
4. If historic properties may be subject to an adverse effect, the Federal agency, the State Historic Preservation Officer (SHPO), and any other consulting parties (including Native American tribes and the ACHP) continue consultation to seek ways to avoid, minimize, or mitigate the adverse effect. A memorandum of agreement (MOA) is usually developed to document the measures agreed upon to resolve adverse effects. Alternatively, the Federal agency may prepare and execute a programmatic agreement (PA) with the aforementioned parties to comply with 36 CFR 800, particularly in the context of complex undertakings that entail years of implementation actions or where the undertaking's effects on historic properties cannot be well characterized during the planning phase.
5. Proceed in accordance with the terms of the MOA or PA.

Specific regulations regarding compliance with Section 106 state that, although the tasks necessary to comply with Section 106 may be delegated to others, the Federal agency (in this case, USACE) is ultimately responsible for ensuring that the Section 106 process is completed according to statute.

Federal Historic Significance Criteria

For Federal projects, cultural resource significance is evaluated in terms of eligibility for listing in the NRHP. NRHP criteria for eligibility are defined below. To be considered eligible for listing in the NRHP, a property need only meet one, not all, of the significance criteria outlined below.

The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association, and that:

A. are associated with events that have made a contribution to the broad pattern of our history;

B. are associated with the lives of people significant in our past;

C. embody the distinct characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. have yielded, or are likely to yield, information important in prehistory or history (36 CFR 60.4).

4.17.2.1.2 State

The following state policy related to cultural resources applies to the implementation of The Rivers EIP. CEQA requires that public agencies that finance or approve public or private projects must assess the effects of the project on cultural resources. CEQA requires that, if a project results in significant effects on important cultural resources, alternative plans or mitigation measures must be considered; only impacts on significant cultural resources, however, need to be mitigated.

Therefore, before the level of significance of effects can be determined and appropriate mitigation measures developed, the significance of cultural resources must be determined. The following steps are normally taken in a cultural resources investigation to comply with CEQA:

1. Identify cultural resources.

2. Evaluate the significance of the cultural resources based on established thresholds of significance.
3. Evaluate the effects of a project on all cultural resources.
4. Develop and implement measures to mitigate the effects of the project on significant cultural resources.

Because the proposed project would be located on non-Federal land in California, it must comply with state laws pertaining to the inadvertent discovery of human remains of Native American origin. The procedures that must be followed if burials of Native American origin are discovered on non-Federal land in California are described in the Effects and Mitigation Measures section, below.

State Historic Significance Criteria

The State CEQA Guidelines define three ways that a cultural resource may qualify as a historical resource for the purposes of CEQA:

1. The resource is listed in or determined eligible for listing in the California Register of Historical Resources (CRHR).
2. The resource is included in a local register of historical resources, as defined in Public Resources Code (PRC) 5020.1(k), or is identified as significant in a historical resource survey meeting the requirements of PRC 5024.1(g), unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
3. The lead agency determines the resource to be significant as supported by substantial evidence in light of the whole record. (14 CCR 15064.5[a].)

For a historical resource to be eligible for listing in the California Register of Historic Resources (CRHR), it must be significant at the local, state, or national level under one or more of the following criteria from 14 CCR 15064.5(a)(3)(A–D).

1. It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. It is associated with the lives of persons important in our past.
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual or possesses high artistic values.
4. It has yielded, or may be likely to yield, information important in prehistory or history.

Historical resources automatically listed in the CRHR include those historic properties listed in, or formally determined to be eligible for listing in, the NRHP (PRC 5024.1).

In addition, CEQA distinguishes between two classes of archaeological resources: archaeological sites that meet the definition of a historical resource as defined above and "unique archaeological resources." An archaeological resource is considered unique if it:

- is associated with an event or person of recognized significance in California or American history or of recognized scientific importance in prehistory;
- can provide information that is of demonstrable public interest and is useful in addressing scientifically consequential and reasonable research questions; or

- has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind (PRC 21083.2).

Resources that qualify as unique archaeological resources also meet at least one of the CRHR criteria. It is current professional practice, therefore, to address the importance or significance of cultural resources by determining solely whether it qualifies as a historical resource, without the expressed distinction or determination as to its status as a unique archaeological resource. For the purposes of this project, significant cultural resources as defined by CEQA are defined as those resources that meet at least one of the CRHR eligibility criteria.

4.17.2.1.3 Local

The following local policies related to cultural resources may apply to the implementation of The Rivers EIP.

Yolo County General Plan

Yolo County strives to encourage the enhancement of cultural quality and education in Yolo County through the development of goals, objectives, and policies that the county has established in the Historic Preservation Element of the *Yolo County General Plan*, Part 1 (adopted July 1983) to preserve County history and historical sites.

HP 1—Goal: Yolo County shall support the preservation and enhancement of historic and prehistoric resources within the County when fiscally able.

HP 2—Objectives:

2.1: To preserve Yolo County‘s natural resources with historical significance by designating certain natural resources such as trees and vegetation as "historic" and by supporting a program to preserve them.

2.2: To preserve Yolo County's prehistoric resources by identifying and preserving Native American sites and other significant archaeological sites and by encouraging development of demonstration sites.

Yolo County adopted the following actions as means for helping achieve its goal and objectives:

- Identification of historic resources within the County;
- Recording the historic resources identified in the 1986 Yolo County Historic Resources Survey on the general plan map and maintenance and updating of the map for planning purposes;
- Adoption of a Historic Preservation Ordinance and the establishment of a Yolo County Historic Preservation Commission;
- Support for the conversion of older residential structures in commercial zones to commercial or office use and of older historically significant structures in agricultural areas to tourist uses through the use permit process while maintaining or enhancing their historical authenticity;
- Encouragement of County efforts to seek financing for the preservation of the County's historic resources;

- To encourage the property owners to revitalize their properties through incentives such as utilizing the Historic Building Code, easements, state and Federal tax exemptions as well as seeking Community Development Block Grant funds.

2.4: To promote museums to preserve the prehistorical, historical and agricultural heritage of Yolo County by the following actions:

- Continued support for the Yolo County Historic Museum;
- Promotion of museums within historic structures;
- Support for establishment of additional museums in the County.

2.5: To preserve the historical records of Yolo County and make them accessible to the public by maintaining the Yolo County Archives.

City of West Sacramento General Plan

The City of West Sacramento has adopted policies for identifying, evaluating and protecting historical resources in their general plan (revised and adopted December 2004) Section V Recreational and Cultural Resources Goals and Policies.

Goal F: To preserve and enhance West Sacramento's historical heritage.

Policies:

1. The City shall set as a high priority the protection and enhancement of West Sacramento's historically and architecturally significant buildings.
2. The City shall establish a historic district in the Old Broderick area and develop standards for preservation and rehabilitation of historic structures and compatible infill development.
3. The City shall cooperate in the expansion and updating of the Yolo County Historical Resources Survey.
4. The City shall work with property owners in seeking registration of historical structures and sites as State Historic Landmarks or listing on the National Register of Historic Places.
5. The City and Redevelopment Agency shall support the efforts of property owners to preserve and renovate historic and architecturally significant structures. Where such buildings cannot be preserved intact, the City shall seek to preserve the building façades.
6. Structures of historical, cultural, or architectural merit which are proposed for demolition shall be considered for relocation as a means of preservation. Relocation within the same neighborhood or to another compatible neighborhood shall be encouraged.
7. New development near designated historic landmark structures and sites shall be designed to be compatible with the character of the designated historic resource.
8. The City shall explore the possibility of establishing a city cultural center which might include a historical museum and an art gallery.
9. The City shall consider developing and maintaining the Stone Lock as a point of historical interest.

Goal G: To protect West Sacramento's Native American heritage.

Policies:

1. The City shall refer development proposals that may adversely affect archaeological sites to the California Archaeological Inventory, Northwest Information Center, at Sonoma State University.[1]
2. The City shall not knowingly approve any public or private project that may adversely affect an archaeological site without first consulting the California Archaeological Inventory [*sic*], Northwest Information Center, conducting a site evaluation as may be indicated, and attempting to mitigate any adverse effects according to the recommendations of a qualified archaeologist. City implementation of this policy shall be guided by Appendix K of the State CEQA Guidelines.[2]
3. Archaeological sites shall be protected by means of requirements in development permits requiring on-site monitoring by qualified personnel of excavation work in areas identified as archaeologically sensitive. Development work shall be required to cease in any place where artifacts or skeletal remains have been discovered until these have been examined and evaluated by a qualified archaeologist and arrangements have been made to avoid or otherwise protect valuable resources.

4.17.2.2 Environmental Setting

This section discusses the environmental setting related to cultural resources in the project study area for The Rivers EIP including the records searches and field survey methods used to evaluate cultural resource conditions, and a summary of known cultural resources.

4.17.2.2.1 Prehistoric Context

Although the Sacramento Valley may have been inhabited by humans as early as 10,000 years ago, the evidence for early human occupation is likely buried by deep alluvial sediments that accumulated rapidly during the late Holocene Epoch. Although rare, archaeological remains of this early period allegedly have been identified in and around the Central Valley. Johnson (1967:283–284) presents evidence for some use of the Mokelumne River area, under what is now Camanche Reservoir, during the late Pleistocene Epoch. These archaeological materials and similar materials in the region have been termed the Farmington Complex. Recent work in the vicinity of Camanche Reservoir, however, calls into question whether Farmington Complex exceeds an age of 10,000 Before Present (B.P.) (Rosenthal et al. 2007:151).

Preliminary results from Tremaine & Associates' recent excavations at Sacramento City Hall (Sacramento City Hall overlies the Nisenan village of Sacum' ne, CA-SAC-38) reveal the earliest confirmed habitation of the immediate Sacramento vicinity. Obsidian hydration readings on artifacts may represent use of the site from 3000–8000 B.P. Tremaine & Associates also ran three radiocarbon assays, which yielded conventional dates of 5870, 6690, and 6700 B.P. The radiocarbon assays were taken between 9.8 feet and 11.5 feet below ground surface (Tremaine 2008:99–101).

[1] Note: the name of the California Archaeological Inventory has been changed to California Historical Resources Inventory System.
[2] Appendix K no longer applies to cultural resources and the text within the original Appendix K has been stricken from CEQA statutes.

Later periods of prehistory are better understood because of their more abundant representation in the archaeological record. Fredrickson (1973) identified three general patterns of cultural manifestations for the period between 4,500 and 100 B.P.: the Windmiller, Berkeley, and Augustine Patterns.

The Windmiller Pattern (4500–2800 B.P.) shows evidence of a mixed economy consisting of the generalized hunting of game, fishing, and use of wild plant foods. Settlement strategies during the Windmiller period reflect seasonal occupation of valleys during the winter and of the foothills during the summer (Moratto 1984:201, 206).

Cultural changes are manifested in the Berkeley Pattern (3500–2500 B.P.). Technological changes in groundstone from handstones and milling slabs to the mortar and pestle indicate a greater dependence on acorns, and the presence of a wide variety of projectile points and atlatls indicates hunting was still an important activity (Fredrickson 1973).

The Berkeley Pattern was superseded by the Augustine Pattern around 1450 B.P., and reflects a change in subsistence and land use patterns similar to those of the ethnographically known people of the proto-historic era. This pattern exhibits a great elaboration of ceremonial and social organization, including the development of social stratification. Elaborate exchange systems, further reliance on acorns, and a wide variety of artifacts (flanged tubular smoking pipes, harpoons, clamshell disc beads, and an especially elaborate baked clay industry, which included figurines and pottery vessels called Cosumnes Brownware) are associated with the Augustine Pattern. Increased village sedentism, population growth, and an incipient monetary economy are also hallmarks of this pattern. (Moratto 1984:211, 213)

4.17.2.2.2 Ethnographic Context

The study area is located at the interface of three Native American groups: the Patwin (or Wintun), the Nisenan, and the Plains Miwok. The banks of the Sacramento River and associated riparian and tule marshland habitats were inhabited by the River or Valley Patwin. The Plains Miwok and Nisenan (also called Southern Maidu), while primarily occupying territories east of the Sacramento River, used land west of the river as well (Johnson 1978:Figure 1; Levy 1978:Figure 1; Wilson and Towne 1978:Figure 1).

The material culture and settlement-subsistence behavior of these groups exhibit similarities, likely because of historical relationships and a shared natural environment. Historic maps and accounts of early travelers to the Sacramento Valley testify that tule marshes, open grasslands, and occasional oak groves (Jackson 1851; Ord 1843; Wyld 1849) characterized the study area. The area was generally wet in the winter and often subject to flooding; the weather was exceedingly dry in summer. Much of the floodplain was presumably sparsely inhabited, and Native Americans typically situated their larger, permanent settlements on high ground along the Sacramento and American Rivers (Bennyhoff 1977; Kroeber 1925:351, 1932; Levy 1978; Wilson and Towne 1978:388).

The Native American economy in the study area was based principally on the use of natural resources from the riparian corridors, wetlands, and grasslands adjacent to the Sacramento River. Fish, shellfish, and waterfowl were important sources of protein in the diet of these groups (Johnson 1978:355; Kroeber 1932). Salmon, sturgeon, perch, chub, sucker, pike, trout, and steelhead were caught with nets, weirs, lines and fishhooks, and harpoons. Mussels were harvested from the gravels along the Sacramento River channel. Geese, ducks, and mudhens were hunted using decoys and various types of nets. The majority of important plant resources in the Patwin diet came from the grasslands of the Sacramento River floodplain (Stevens 2004a: Table 1). Plants important to California Indians were also obtained from and managed in valley wetlands (Stevens 2004b:7). In addition to the staple acorn, a number of plants were important secondary food sources, including sunflower, wild oat, alfalfa, clover, and bunchgrass (Johnson 1978:355).

4.17.2.2.3 Historic Context

Early History

The study area is located in Yolo and Solano Counties. The two counties are part of the original 27 counties created when California became a state in 1850. Woodland serves as the county seat of Yolo County. The city of Benicia was the original county seat of Solano, but in 1858 the seat moved to Fairfield. (Hoover et al. 2002:566.)

Spanish explorers visited Yolo and Solano Counties as early as the 1700s in their search for suitable inland mission sites. In 1772, Pedro Fages passed through San Francisco Bay and the Delta and reached the San Joaquin and Sacramento rivers. Between 1793 and 1817, several other mission site reconnaissance expeditions were conducted. The first European American to travel through the area was Jedediah Strong Smith who, in the late 1820s, reported to the Hudson's Bay Company on the quantity and quality of furs in California. Joseph Walker and Ewing Young, during separate excursions, followed his general path in the 1830s. Mexican, American, and European settlers began to arrive and set down roots within the boundaries of the two counties in the 1840s and 1850s (Hoover et al. 2002:566–567).

Sacramento River

The Sacramento River played an important role in the development of Yolo and Solano Counties prior to and including Euroamerican occupation of the region. The river was a convenient landmark for the early explorations that also facilitated reconnaissance of the Sacramento Valley. The Spanish, in 1817, were the first Europeans to traverse the portion of Sacramento River that passes through the project vicinity, having made an exploratory boat trip up the river as far as its confluence with the Feather River (Goldfried 1988:8). This expedition was followed by a series of Spanish, Russian, British, and American land and water forays up the Sacramento River from the 1820s through 1840s (Goldfried 1988:8–9).

River traffic through the project vicinity became more frequent between 1839 and 1848 with the establishment of John Sutter's fort at his New Helvetia Rancho, as well other settlements upriver hosted by Peter Lassen, John Sinclair, John Bidwell's, and others (Goldfried 1988:9; Lydecker and James 2009:9; Sutter et al. 1996 [1845–1848]:1–3). The 1848 gold discovery at Coloma, however, was responsible for the vast increase in Sacramento River traffic in the project vicinity through the 1850s, as Sutter's embarcadero, at what is now Old Sacramento, served as the principal point of departure for persons and goods headed for the Sierra Nevada diggings. Crews frequently abandoned their ships at the embarcadero during the Gold Rush, leaving them to sink or be converted by others into warehouses, stores, and hotels on the river. (Goldfried 1988:11.)

The city of Sacramento and the communities of Washington and Riverbank/Bryte provided a lasting draw to river traffic through the 1920s because water transportation was a convenient and efficient way to move large amounts of goods and people to and from San Francisco and points beyond. River transportation from the mid-19th century through the early 20th century resulted in numerous marks along the river corridor, including ferries, wharves, shipwrecks, and numerous communities (Lydecker and James 2009:28).

Yolo County

The decline of the California Gold Rush resulted in disenchanted miners who realized they could make a greater fortune through farming and ranching rather than gold prospecting, transforming Yolo County from an isolated farming community into a booming agricultural region. Through both the mid-19th and 20th centuries, Yolo County commerce was generally agrarian in focus, the main crops being wheat, barley, and other grains. Commercial enterprises related to agriculture and livestock also sprang up during this period, furthering the development and growth of the region (Larkey and Walters 1987).

Settlement

Yolo County's first town was Fremont, founded in 1849 near the confluence of the Sacramento and Feather Rivers (south of present-day Knights Landing). It became the first county seat in 1850. After the damaging flood of 1851, the county seat was moved to the town of Washington (now part of present-day West Sacramento). Between 1857 and 1861, the county seat moved from Washington to Cacheville (present day Yolo) and back to Washington. However, in 1862, more flooding episodes had motivated the community voters to select the centrally located town of Woodland as the permanent county seat. (Hoover et al. 2002:566, 568–569.)

Present-day West Sacramento experienced little growth until the early 1900s when levee construction along the Sacramento River encouraged settlement and development of the area. Early settlers included Jan Lows de Swart (holder of the Rancho Nueva Flandria land grant), and James McDowell. In 1911, the West Sacramento Company laid out the community of Riverbank (later called Bryte) just west of the Sacramento River. Shortly thereafter, plans were underway for the establishment of the town of West Sacramento (Corbett 1993; Hoover et al. 2002:568).

Irrigation

Between 1911 and 1918, hundreds of miles of levees were constructed in order to control flooding in the Sacramento Valley. As early as 1892, farmers of Yolo County came together to construct levees along the Sacramento River from the town of Washington to roughly 9 miles downstream. In March 1911, the Sacramento Land Company (formerly the West Sacramento Land Company) assisted with the establishment of Reclamation District (RD) 900 in what is now West Sacramento. The formation of this district created a framework for using public funds through bonds, levies, and taxes to drain the land (Corbett 1993; Walters 1987).

Under the direction of civil engineers Haviland & Tibbetts, formation of RD 900 began. The district spanned 11,500 acres from the east-west line of the Southern Pacific Railroad (SPRR) tracks, south to the vicinity of Riverview. Construction involved installing drainage canals, levees, and pumphouses. The canals carried drainage to the pumphouses, which, in turn, moved the water over the levees into the Yolo Bypass. As the land was drained of water, the fields of tules were removed, establishing acres of agricultural land (Corbett 1993). Reclamation districts such as RD 900 frequently result in historically and functionally cohesive, patterned modifications of rural areas through their networks of irrigation works, roads, boundary markers, and buildings. Such rural historic landscapes have been documented in the Sacramento Valley, some of which—such as RD 1000 in Sacramento and Sutter Counties—have been determined eligible for listing in the NRHP

(Bradley and Corbett 1995; Jones & Stokes 2004:22; JRP Historical Consulting Services 1994; Peak 1997).

Following World War I, West Sacramento remained an unincorporated area populated primarily by small farms and a handful of industries. By the 1920s, the main east-west transcontinental highway (U.S. Highway 40, now West Capitol Avenue) extended through West Sacramento; within a few years several hotels and motels were constructed along its route through town. During World War II, factories and other industries began to prosper along the west bank of the Sacramento River. Following the war, the region—like much of the state—experienced a housing boom that would last for several decades (Corbett 1993).

In 1987, after numerous previous attempts, the City of West Sacramento was officially incorporated. The new city included the former communities of Broderick, Bryte, and surrounding urban and rural areas on the west side of the Sacramento River into Southport (Walters 1987).

4.17.2.2.4 Records Search

ICF staff requested a records search in October 2007 at the Northwest Information Center and the North Central Information Center of the California Historical Resources Information System located at Sonoma State University and California State University, Sacramento, respectively. The research consisted of a database search of all previously recorded sites and studies within the study area, established as a 0.25-mile-wide corridor from the center of the river to along both shorelines for the entire length of the study area. The search also consulted the current listings for the NRHP, the CRHR, and pertinent historic inventories and historic maps (Anonymous 1877; Department of Parks and Recreation 1976, 1996; North Central Information Center n.d.; Office of Historic Preservation 2007a:12–14, 2007b:2, 11–14, 31, 2007c:21–70, 2007d:155–157; U.S. Geological Survey 1907, 1908).

The project area has been previously surveyed (Holman 1984; Johnson and Johnson 1974; Peak & Associates 1985, 2005; Woodward and Evans 1992). The majority of survey coverage in the project area was completed more than 10 years ago, necessitating a new survey in support of the proposed project (see Field Survey below).

The records search indicates that the Sacramento River Levee is located in the project area. One previously recorded cultural resource, archaeological site CA-YOL-25, is located within 0.25 mile of the project area. CA-YOL-25 is a Native American occupation mound recorded by Heizer (1934). The site has not been relocated and is presumed destroyed as a result of the original levee construction (Heizer 1934).

4.17.2.2.5 Shipwrecks Database

ICF consulted the California State Lands Commission's Shipwrecks Database (2009) to determine whether historic shipwrecks may be present in the project area. The database was searched by selecting Yolo County in the search field, which generated a list of 12 shipwrecks in Yolo County. The database search yielded latitude and longitude coordinates for 11 of the shipwrecks, which were plotted using an online mapping program (http://www.itouchmap.com/latlong.html) to determine whether any of the shipwrecks were in the project area.

4.17.2.2.6 Field Survey

In October 2007, an ICF archaeologist conducted a reconnaissance-level survey of the project area. Although the records search indicated that the project area had been previously surveyed, an additional reconnaissance review of the project area was deemed necessary to confirm the previous findings and to confirm coverage of the entire project area. The project area is located within heavily a developed area of West Sacramento and very little, if any, natural ground surface remains. The project area has been graded, landscaped, and developed. No previously unidentified archaeological resources were noted within the project area.

On February 5 and March 10, 2009, an ICF architectural historian conducted a field survey of the project area. As part of the field process, buildings, structures, and linear features 45 years old[3] or older were inspected, photographed, and documented (see Summary of Known Cultural Resources below).

4.17.2.2.7 Native American Consultation

In January 2008, ICF cultural resources staff contacted the Native American Heritage Commission (NAHC) to request a search of their Sacred Lands File. The NAHC staff responded in January 2008 with a list of Native American contacts for both Yolo and Solano Counties and the results of the sacred lands data base research that was negative for findings in the project area.

The NAHC contact list included the following federally recognized Indian tribes:

- Rumsey Indian Rancheria of Wintun Indians
- Cortina Band of Wintun Indians (including the Wintun Environmental Protection Agency)
- Ione Band of Miwok Indians
- Wilton Miwok Rancheria[4]

The NAHC also provided contact information for the following federally non-recognized Native American individual:

- Kesner Flores

ICF staff sent letters to the Native American contacts on the lists provided by NAHC. The correspondence included a map depicting the project area, a brief description of the proposed project, and a request for the contacts to share any knowledge or concerns they may have regarding cultural resources in or adjacent to the project area. ICF received a letter response dated April 2008 from Mr. Marshall McKay, Tribal Chairman for the Rumsey Band of Wintun Indians. Mr. McKay's letter stated his gratitude for the letter notification about the proposed levee alternatives and that he was not aware of any sites of religious or cultural importance in the project area. Mr. McKay also stated that the Rumsey Indian Rancheria of Wintun would like to be notified of any cultural finds unearthed during construction actions. ICF staff placed follow-up telephone calls to the letter recipients on June 5, 2009. Voice messages were left with the contacts. To date, no return phone calls have been received.

[3] Although the NRHP typically only considers properties that are 50 years or older for listing, the Office of Historic Preservation (1995: 2) employs a 45-year threshold for the recordation of cultural resources because "there is commonly a five year lag between resource identification and the date that planning decisions are made."

[4] The Wilton Miwok Rancheria regained federal recognition on June 8, 2009 (see FR 33468).

4.17.2.2.8 Additional Research and Consultation

In an effort to identify important historic people, events, and trends that may have been associated with the project area, an ICF historian conducted archival research at the California State Library and the California State Archives, Sacramento. ICF also sent project notification letters to the Yolo County Historical Museum, the Yolo County Historical Society, the Sacramento Archives and Museum Collection Center, and the Portuguese Historical and Cultural Society requesting information regarding cultural resources that may be located within the project area. No responses have been received to date.

4.17.2.2.9 Summary of Known Cultural Resources

Based on the record search and a review of historic maps, one cultural resource 45 years old or older was identified in the project area: the Sacramento Levee. The resource was evaluated for the NRHP and CRHR as part of this project. The results of the survey and evaluation of the Sacramento Levee are documented in the technical report prepared for this project (ICF International 2010) and are summarized below.

Sacramento River Levee

A segment of the Sacramento River Levee is located in the project area. This segment is an earthen levee extending in a roughly east to west direction along the southern bank of the Sacramento River in the southern portion of the project area. The Sacramento River Levee is part of a conglomeration of water control structures constructed in the Sacramento Valley between the mid-19th and mid-20th century as a response to heavy flooding in the area, which occurred repeatedly between the 1850s and early 1910s. Construction and improvements on the levee began as early as the 1860s and continued until the early to mid-20th century as increasing development in the area led to a greater need for more substantial and extensive levees. The Sacramento River Levee appears to meet NRHP Criterion A and CRHR Criterion 1 for its association with flood control and land reclamation efforts in California.

4.17.3 Environmental Consequences

This section describes the environmental consequences relating to cultural resources in The Rivers EIP project area. It describes the methods used to determine the effects of the proposed project and lists the thresholds used to conclude whether an effect would be significant.

4.17.3.1 Assessment Methods

Evaluation of effects on cultural resources is based on information provided by literature review, records searches, historic map research, and consultation with Native Americans. This information was then compared to the type and location of proposed flood control and recreation improvements to determine whether effects would occur.

4.17.3.2 Determination of Effects

4.17.3.2.1 Federal Criteria

According to 36 CFR 800.5, an undertaking would have an adverse effect on historic properties if the effect alters the characteristics[5] that make a property eligible for inclusion in the NRHP. Such effects also would be considered adverse under NEPA. Adverse effects can occur when prehistoric or historic archaeological sites, structures, or objects listed in or eligible for listing in the NRHP are subjected to the following phenomena:

- physical destruction of or damage to all or part of the property;
- alteration of the property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68) and applicable guidelines;
- removal of the property from its historic location;
- change in the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
- neglect of the property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; or
- transfer, lease, or sale of the property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

4.17.3.2.2 State Criteria

CEQA defines a significant impact on cultural resources in 14 CCR 15064.5(b) (1) and (2) as one with the potential to cause a substantial adverse change in the significance of a historical resource or unique archaeological resource. Substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired. The significance of a historical resource is materially impaired when a project results in demolition or material alteration in an adverse manner of those physical characteristics of a resource that:

- convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the CRHR;

[5] Cultural resource managers often refer to these characteristics as character-defining elements or features. Character-defining features are those characteristics of a historic property, historical resource, or unique archaeological resource that convey its significance; the loss of character-defining elements impedes a property's ability to convey its historical significance. The importance of character-defining elements in cultural resource assessments is made clear in *National Register* Bulletin 15, which mentions "character" in this context 42 times (Andrus and Shrimpton 1997).

- account for its inclusion in a local register of historical resources pursuant to PRC 5020.1(k) or its identification in a historical resources survey meeting the requirements of PRC 5024.1(g), unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
- convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

4.17.4 Effects and Mitigation Measures

4.17.4.1 No Action Alternative

The No Action Alternative represents the continuation of existing deficiencies along the portion of the Sacramento River North Levee reach in The Rivers EIP project area. No levee improvements would be made to increase the level of protection. Under the No Action Alternative, it is presumed that no ground-disturbing activities associated with levee repair and alternatives would occur. Because no levee improvements would be made under the No Action Alternative, the risk that the Sacramento River North Levee could fail due to seepage or slope stability/geometry issues would continue. Failure of the Sacramento River North Levee, depending on the magnitude of the event, could cause catastrophic flooding of the entire city. If the Sacramento River North Levee were to fail, a cultural resource could be in the path of an inundation of debris and mud from that failure that could cause significant damage to or the complete destruction of the resource. Furthermore, emergency efforts to stop and repair a failed levee potentially would cause the same or more significant effects than those described for the proposed EIP. While the levee would be damaged, the potential extent of damage to the resource is unknown. It is also unknown whether these events would transpire and affect other cultural resources; therefore, further analysis of effects on cultural would be speculative. Federal agencies responsible for levee repairs would be responsible for compliance with Section 106, as would local governments responsible for carrying out Federal programs.

4.17.4.2 The Rivers Applicant Preferred Alternative

Implementation of The Rivers Applicant Preferred Alternative (APA) would result in the following effects on cultural resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes	Less than Significant	N/A	N/A
Effect CR-2: Change in the Significance of an Archaeological Resource	Significant	Significant and unavoidable	CR- MM-1: Implement Inadvertent Discovery Procedures
Effect CR-3: Disturbance of Native American and Historic-Period Human Remains	Significant	Significant and unavoidable	CR-MM-2: Implement Human Remains Discovery Procedures

Effect CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes

A portion of the Sacramento River Levee is located in the project area and appears to meet NRHP and CRHR criteria. WSAFCA would not demolish or substantially alter the physical characteristics of the levee or cause a major change to its engineering design or overall setting. The Sacramento River Levee would continue to convey its historical significance. Consequently, there would be no adverse effect on this resource as a result of the proposed construction. No mitigation is necessary.

Effect CR-2: Change in the Significance of an Archaeological Resource

Although the project area has been surveyed and no archaeological resources were identified in the project area, there is the possibility that construction would unearth archaeological materials from beneath the ground surface. Damage to such resources, if they meet the significance criteria of the NRHP and/or the CRHR, would constitute a significant effect under CEQA (14 CCR 15064.5) and an adverse effect under Section 106 of the NHPA and NEPA. Therefore, the effect on archaeological resources would be significant. While implementation of Mitigation Measure CR-MM-1 (Implement Inadvertent Discovery Procedures) would reduce the intensity of the effect, the effect would still be significant and unavoidable.

Mitigation

Mitigation Measure CR-MM-1. Implement Inadvertent Discovery Procedures

In the event of an inadvertent discovery of cultural resources during implementation of the proposed project, the USACE and WSAFCA's contractors will immediately cease construction work within 100 feet of the discovery. USACE is responsible to comply with the discovery provisions at 36 CFR 800.13(b)(3). A USACE cultural resources manager will examine the discovery and prepare a memorandum documenting it and the circumstances leading to its identification, as well as NRHP-eligibility recommendations (if possible to make based on field observations). These actions will be completed within 24 hours of the discovery. To determine whether the discovery is NRHP-eligible, test excavations may be necessary, as determined in consultation between the USACE, SHPO, ACHP, and other parties that may ascribe significance to the inadvertent discovery.

In construction contexts, visual inspection and excavation (in the sense of the excavation responsible for the initial identification of the resource) of properties usually reveal enough data to allow for a recommendation of potential NRHP eligibility. If a property appears to meet the appropriate eligibility criteria, the property may be assumed to be eligible and efforts can subsequently focus on the resolution of adverse effects pursuant to 36 CFR 800.13(c).

If USACE PQS recommends that the discovery is not eligible for listing in the NRHP, they will prepare a memorandum recording the circumstances leading to the discovery, the methods used to characterize the site and its significance, and a description of the site. These actions will be completed within 24 hours of the field recommendation of non-significance.

The USACE has 48 hours from the time of the discovery in which to prepare and provide the memorandum to SHPO, ACHP, and other parties that may ascribe significance to the property. The consulted parties have 48 hours from the receipt of the memorandum to present comments to the USACE; the USACE may regard lack of comment within 48 hours as concurrence with its recommendation of non-significance. (36 CFR 800.13[b][3].) Once these consultations have occurred, and if the USACE makes a determination of non-significance, construction may resume in the discovery area upon the receipt of the USACE's express authorization to proceed and under the direction of USACE PQS.

If USACE PQS recommends that a property is significant, the Contractor will be required to mobilize construction a minimum of 100 feet away from the discovery area at the direction of an USACE cultural resources manager. The same notification procedures described in the preceding two paragraphs will be undertaken. In addition, the USACE cultural resources manager, in preparing the discovery memorandum, will recommend treatment methods for the site. Preparation of the memorandum will take into account the principles, standards, and guidance set forth in Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 Federal Register 44716–44742). Once consultation between the USACE and the consulted parties is completed, treatment measures will be implemented.

Effect CR-3: Disturbance of Native American and Historic-Period Human Remains

The project area is located in an area that is considered of moderate to high sensitivity for archaeological cultural remains, including burials. The potential for buried human remains to be unearthed and disturbed during ground-disturbing activities that would be associated with levee repair and alternative construction within the study area is considered high. The disturbance of any human remains is considered a significant effect. Implementation of the human remains discovery provisions in Mitigation Measure CR-MM-2 would likely reduce the severity of this effect, but it would still be considered a significant and unavoidable effect.

Mitigation

Mitigation Measure CR-MM-2. Implement Human Remains Discovery Procedures

Response to human remains discoveries for the proposed project is governed California state law, as the proposed project is located on non-Federal land. In the event of a human remains discovery, an USACE cultural resources manager will immediately notify the Yolo County Coroner. The coroner, as required by the California Health and Safety Code (Section 7050.5), will make the final determination about whether the remains constitute a crime scene and are Native American in origin. The coroner may take 2 working days from the time of notification to make this determination.

If the coroner determines that the remains are of Native American origin, the coroner will contact the NAHC within 24 hours of the determination. The NAHC will immediately designate and contact the most likely descendant (MLD), who must make recommendations for treatment of the remains within about 48 hours from completion of their examination of the finds, as required by PRC 5097.98(a). The USACE will then contact the landowner.

It is likely that if a Native American burial is found, it will be found in the context of a prehistoric archaeological property. For a prehistoric property associated with burials, decisions must be made about how the remainder of the property will be treated for its archaeological (and possibly other) values. Not only must the MLD make decisions about the burials, but a plan must be devised also for evaluation and—if determined to be eligible for the NRHP—treatment of the property in consultation with the MLD, SHPO, and other consulting parties (see Mitigation Measure CR-MM-1 above).

If the remains are found not to be Native American in origin and do not appear to be in an archaeological context, construction shall proceed at the direction of the coroner and USACE cultural resources manager. It is likely that the coroner will exhume the remains. Once the remains have been appropriately and legally treated, construction may resume in the discovery area upon receipt of the USACE's express authorization to proceed and under the direction of an USACE cultural resources manager.

4.17.4.2.2 The Rivers Alternative B

Implementation of The Rivers Alternative B would result in the following effects on cultural resources. A description of these effects is provided below the summary table.

Effect	Finding	With Mitigation	Mitigation Measure
Effect CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes	Less than Significant	N/A	N/A
Effect CR-2: Change in the Significance of an Archaeological Resource	Significant	Significant and unavoidable	CR- MM-1: Implement Inadvertent Discovery Procedures
Effect CR-3: Disturbance of Native American and Historic-Period Human Remains	Significant	Significant and unavoidable	CR-MM-2: Implement Human Remains Discovery Procedures

Effect CR-1: Effects on Architectural (Built Environment) Resources and Cultural Landscapes

This effect is the same as described above under The Rivers Applicant Preferred Alternative. The Rivers Alternative B would not cause an adverse effect on significant architectural resources as a result of the proposed construction. No mitigation is necessary.

Effect CR-2: Change in the Significance of an Archaeological Resource

This effect is the same as described above under The Rivers Applicant Preferred Alternative. There is the possibility that construction would unearth archaeological materials from beneath the ground surface. Implementation of Mitigation Measure CR-MM-1 would reduce the intensity of this effect, but the effect would still be significant and unavoidable.

Mitigation

Mitigation Measure CR-MM-1. Implement Inadvertent Discovery Procedures

Effect CR-3: Disturbance of Native American and Historic-Period Human Remains

This effect is the same as described above under The Rivers Applicant Preferred Alternative. The disturbance of any human remains would be considered a significant effect. Implementation of Mitigation Measure CR-MM-2 would likely reduce the severity of this effect, but it would still be considered a significant and unavoidable effect.

Mitigation

Mitigation Measure CR-MM-2. Implement Human Remains Discovery Procedures

Chapter 5
Growth-Inducing and Cumulative Effects

5.1 Growth-Inducing Effects

5.1.1 Introduction

NEPA and CEQA require that an EIS and EIR discuss how a project, if implemented, could induce growth. This chapter presents an analysis of the potential growth-inducing effects of the CHP Academy and The Rivers EIPs. This chapter includes:

- background information related to growth inducement,
- the methods used to analyze growth-inducing effects, and
- the effect conclusions.

5.1.2 Affected Environment

5.1.2.1 Regulatory Setting

5.1.2.1.1 NEPA and CEQA Requirements

Under authority of NEPA, CEQ regulations require EISs to consider the potential indirect effects of a proposed action. The indirect effects of an action include those that occur later in time or farther away in distance, but are still reasonably foreseeable, and "may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate" (40 CFR Section 1508.8[b]).

In addition, Section 21100(b)(5) of CEQA requires an EIR to discuss how a proposed project, if implemented, may induce growth and the impacts of that induced growth (see also State CEQA Guidelines Section 15126). CEQA requires an EIR to discuss specifically "the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment" (State CEQA Guidelines Section 15126.2[d]).

5.1.2.1.2 Regulations Regarding Floodplain Development

Executive Order 11988 (May 24, 1977) requires a Federal agency, when taking an action, to avoid short- and long-term adverse effects associated with the occupancy and the modification of a floodplain, and it must avoid direct and indirect support of floodplain development whenever there is a reasonable and feasible alternative. If the only reasonable and feasible alternative involves siting in a floodplain, the agency must minimize potential harm to or in the floodplain and explain why the action is proposed in the floodplain.

In February 1978, the Water Resources Council issued Floodplain Management Guidelines for Implementing Executive Order 11988. These guidelines provide analysis of the Executive Order, definitions of key terms, and an eight-step decision-making process for carrying out the Executive

Order's directives. The process contained in the Water Resources Council guidelines incorporates the basic requirements of the Executive Order. Briefly, the eight-step process is outlined below, followed by discussion of the two proposed EIP's application of the process to demonstrate compliance.

- **Step 1: Determine if a proposed action is in the base floodplain (100-year floodplain or 1% chance flood or 500-year or 0.2% if the action falls under the definition of critical, discussed separately below).** The proposed EIPs are activities located primarily on the high ground and levees around West Sacramento and as such are not directly within the base 100-year floodplain but would improve the current level of protection ultimately to the goal of 200-year protection. The proposed improvements are described in Chapter 2 as well as in Chapters 3 and 4 at the project level (for CHP Academy and The Rivers, respectively), including location, construction methods, and operations and maintenance activities.

  The Water Resources Council Floodplain Management Guidelines presented the concept of a critical action. While there is no precise definition of critical action, the guidelines (under Part II, Decision-Making Process, Step 1C) outline the parameters of critical actions. To summarize, as noted in the guidelines, a critical action is "any activity for which even a slight chance of flooding is too great." This definition is intended to apply to Federal actions where that action would involve facilities or infrastructure that are sensitive to flooding, where the consequences of flooding would be severe in terms of ability to provide essential community services or to protect life and welfare (as described in the criteria above). Under the proposed EIPs, it is the levee improvement projects themselves that will reduce the chance of flooding, rather than being sensitive to or compromised by flooding; i.e., their purposes are to manage flood risk. Therefore, the EIPs are not considered a critical action because they are intended to withstand flood conditions, reduce flood risk, and increase flood protection.

- **Step 2: Provide public review.** The NEPA/CEQA process provides for public disclosure; this EIS/EIR is one instrument for public review of the proposed EIPs. As discussed in Chapter 1, USACE and WSAFCA have established a proactive multi-media outreach program to communicate the projects and allow for public review and disclosure. The approach to the outreach program has been to go beyond the guidelines and requirements of NEPA and CEQA for public noticing to ensure the affected community and other interested stakeholders are informed, engaged, and involved through an accessible, open, and transparent process. Thus far, the outreach program has included the following actions:
  - four scoping meetings for the environmental document (two for the joint NEPA/CEQA document and two prior for CEQA only);
  - publication of notices in local newspapers of major circulation;
  - publication in the *Federal Register*;
  - notification to the State Clearinghouse;
  - posting NEPA notices on the USACE website;
  - posting CEQA notices and project information on the City/WSAFCA website;
  - publication of feature articles in the City Lights newsletter, distributed quarterly to all city residents for updates and information about City business;

- presentation and discussion of the status of the projects at various public meetings for elected boards and commissions;
- direct mailing to residents within proximity of proposed construction activities;
- phone calls to public agencies;
- small-group meetings with interested stakeholders; and
- posting of notices in public places.

As the proposed improvements and EIS/EIR are further developed, the outreach program will continue in a broad sense via the methods listed above and will expand through more targeted specific outreach to residents and businesses who might be more directly affected by construction or operation of the proposed improvements.

To date, the results of the outreach program have been very favorable, constructive, and supportive for the EIPs. The tone and substance of the input has been consistent with the very favorable response for the voter-approved assessment to fund the local share of the EIPs. Comments received from the public have been considered to refine the project description and the environmental analysis.

A more detailed accounting of the scoping process is provided in Appendix A.

- **Step 3: Identify and evaluate reasonable and feasible alternatives to locating in the base floodplain.** Firstly, it should be noted that previously West Sacramento has not been mapped in the base floodplain, and land use planning decisions have been based on studies demonstrating protection from the base flood. Only recent studies (as described in Chapter 1) based on evolving levee standards now necessitate improvements to continue maintaining protection above the base floodplain. The proposed action (the EIPs) is specifically targeted to provide such improvements and exceed the level of protection beyond the base flood to that of the 0.5% chance (200-year) flood event or better.

  General engineering and environmental analyses have been performed for the project-level alternatives for the EIPs, following an identification and screening process discussed in Chapter 2, Alternatives. Detailed analyses were performed for the project-level alternatives and have found the proposed action to be the only practicable alternative that achieves the objectives of the project. Construction of the EIPs will remove thousands of transportation, commercial, institutional, and residential structures and nearly 50,000 residents out of the base floodplain.

- **Step 4: Identify the impacts of the proposed action.** This EIS/EIR analyzes the environmental effects potentially resulting from the proposed EIPs per NEPA/CEQA requirements. Review under the Endangered Species Act, Clean Water Act, Clean Air Act, and other Federal and state environmental regulations is also occurring in coordination with the EIS/EIR. Project-level impacts for the EIPs are in Chapters 3 and 4 (for CHP Academy and The Rivers, respectively). In brief, the CHP Academy EIP may have temporary construction-related effects on roadways, air quality from heavy equipment use, and biological resources (due to temporary disruption of or construction near habitat). The Rivers EIP may have temporary construction-related effects on roadways; temporary effects on biological resources (due to temporary disruption of or construction near habitat); and temporary construction-related effects on residents due to noise generation, changes in visual quality, and interruption in utility service and property access.

- **Step 5: Minimize threats to life and property and to natural and beneficial floodplain values. Restore and preserve natural and beneficial floodplain values.** The proposed EIPs would reduce flood risk for West Sacramento and increase protection for life and property within the city. The existing levee system was originally designed and constructed to provide a minimum level of protection from the base flood and ensure that human life and structures are out of the floodplain. The EIPs target is to maintain and increase the level of protection beyond that of the base flood to a minimum 200-year protection (0.5% chance).

- **Step 6: Reevaluate alternatives. This EIS/EIR is part of a step-wise evaluation process to refine the alternatives through public review as well as through r**esource and regulatory agency input in consultation for compliance with the Clean Water Act, Endangered Species Act, and other project authorizations. The alternatives have been evaluated at the planning level for initial screening (in Chapter 2) and for re-evaluation through project-level analysis (Chapters 3 and 4). The alternatives are also continuously evaluated on a technical basis through independent **review of the design documents (**i.e., plans and specifications) at several levels of design development, including expert peer review by a Board of Senior Consultants. The recommendations and design refinements resulting from these reviews have been incorporated in the project descriptions and environmental commitments (Chapter 2), resource analyses and findings (Chapters 3 and4), and project-level analyses and mitigation measures (Chapters 3 and 4). This level of screening analysis has demonstrated that the proposed actions at the CHP Academy and The Rivers sites are the most practicable alternatives.

- **Step 7: Issue findings and a public explanation.** To conclude the NEPA process, a record of decision for the EIPs will be publically issued following the Final EIS. To conclude the CEQA process, findings will be publically issued following the Final EIR. A public workshop will be conducted during the draft document stage and a public hearing will be held to decide on project adoption by WSAFCA as an action under CEQA.

- **Step 8: Implement the action.** WSAFCA intends to construct the EIPs as soon as possible based on conclusion of the project approval processes, targeted to be initiated in the 2011 construction season.

In conclusion, the proposed EIPs would reduce the risk of flood loss and minimize the impact of floods on human health, safety, and welfare by improving existing flood management infrastructure, and would increase protection for existing urban development and remove a potential obstacle to future growth. Because there is no reasonable and feasible alternative to the urban development indirectly associated with the proposed EIPs and because the actions will improve flood protection, it is not in conflict with Executive Order 11988. This EIS/EIR further complies with this Executive Order by identifying the most reasonable and feasible flood improvement alternative and disclosing the potential effects of actions under the EIPs that may lead to growth or other direct and indirect effects. Additionally, Chapter 1, Introduction, and Chapter 2, Alternatives, explain why levee improvements are necessary for West Sacramento, regardless of how they may affect future development and growth.

5.1.2.2 Environmental Setting

The information in this section provides context for the analysis and helps the reader understand the structure of the analysis. This background information includes the legal requirements for analyzing growth-inducing effects in CEQA and NEPA documents.

5.1.2.2.1 Growth Projections

California's population is estimated at 36 million people in 2005 and is expected to rise to nearly 44 million by 2025 (U.S. Bureau of the Census 2008).

Locally, the population of West Sacramento has grown from 31,615 people in 2000 to an estimated 47,782 as of January 1, 2009 (California Department of Finance 2009). According to the Sacramento Area Council of Government's population growth and distribution data, 87,402 people are projected to reside in the city of West Sacramento in 2035 (Sacramento Area Council of Government 2008). Anticipated growth projections described in the General Plan Update are discussed below.

5.1.2.2.2 Current and Planned West Sacramento Development

West Sacramento has experienced extensive growth over the last decade. This growth has been generally consistent with the *City of West Sacramento General Plan* but has slowed considerably as a result of current economic conditions and the pending floodplain mapping (Rikala pers. comm.). The General Plan Update is in the development stages and set to be released in 2010. The General Plan Update will describe the development anticipated to occur by the year 2030 and disclose the fact that growth and development in the city are expected to be strongly tied to flood control improvements because of restrictions by FEMA resulting from existing levee conditions.

The General Plan Update is expected to characterize new development and recently completed development. The City released an alternatives report in October 2009 describing three alternative land use scenarios showing different levels of development over the next 20 years. Public meetings will be scheduled to provide for public comment on the alternatives and the City will eventually approve a preferred alternative to further evaluate for the General Plan Update.

Table 5-1 presents preliminary data describing the three alternatives that are in consideration. The base case describes present conditions and likely future developments in the absence of any changes to existing general plan. The future growth was planned with the assumption that the area will have adequate flood protection. The base case data have been analyzed in the following documents.

- *City of West Sacramento General Plan EIR* (1990)
- *City of West Sacramento General Plan 2000 Update SEIR* (2000)
- *Triangle Specific Plan EIR* (1993)
- *Washington Specific Plan EIR* (1995)
- *Southport Framework Plan EIR* (1994)
- *Triangle Specific Plan SEIR*; anticipated certification October 2009 (2009)

To account for growth relative to flood risk management, the City has in place the following measures (introduced in Chapter 1).

- An Emergency Operations Plan, which includes a Flood Plan and an Evacuation Plan, is reviewed yearly with a more comprehensive update minimally every three years to accommodate changes in population and the built environment.
- The City's municipal code (Chapter 15.50) requires new developments to provide 200-year protection or pay into an in-lieu fee program to fund WSAFCA's flood protection efforts.

5.1.2.2.3 Emergency Response and Evacuation

The City of West Sacramento, RD 537, and RD 900 have entered a joint flood operation agreement. The agreement has established procedures to protect the health, safety, welfare and property of the residents and landowners in the program area. Procedures described in the document consist of flood preparedness, information management, monitoring, flood fighting, and flood evacuation. As discussed above, emergency response is addressed through a Flood Plan and Evacuation Plan as components of the City's Emergency Operations Plan (EOP). City residents and other interested parties are informed of updates to the EOP through the City's website and *City Lights*, a publication specifically for the City of West Sacramento and distributed to all residents. In addition, the Fire Department regularly conducts community outreach and informs residents on the latest information related to emergency preparedness.

Emergency response and evacuation services for the program area are provided by the various departments in the City of West Sacramento and cities nearest to the program area and through Yolo County and Solano County Sheriff, Fire, and Emergency Services Departments. The City established an Emergency Operations Center, a special City facility opened in times of major emergencies. The purpose of the center, also connected to a regional resource system, is to act as the central point of communications directing personnel and resources. The Emergency Operations Center will be managed and operated by City staff members who are trained to fulfill emergency functions. The City has also established a City Slow Rise Flood Plan published on the City's website describing a series of seven stages in which specific actions are taken as water rises in the Sacramento River and Yolo Bypass. Residents are informed of emergencies through several media, including TV, radio, print, the Reverse 911 System, website, fire and law enforcement loudspeakers on vehicles, door–to-door and, as needed, loudspeakers on helicopters. The City is prepared to evacuate citizens with special care needs and those housed within special care facilities during the general public voluntary evacuation stage.

5.1.2.2.4 Previous Flood Improvement Efforts

As described in previous sections, the city lies within the natural floodplain of the Sacramento River, which bounds the city along the east. It is made up of reclaimed land protected from floods by levees and the Yolo and Sacramento Bypass systems. West Sacramento has many residents and the supporting infrastructure and property; however, the people and property require a level of protection greater than that provided currently. Over the past several decades, as portions of the West Sacramento area were converted from agricultural lands and open space to developed areas, many agencies have implemented projects to improve flood control for West Sacramento.

USACE, CVFPB, WSAFCA, and West Sacramento have a long history of working to improve flood protection in the West Sacramento region. Levees have been improved to current standards and development has proceeded with the understanding that levees provide adequate protection for the existing land uses.

The comprehensive levee evaluation has shown that the levees protecting the city need improvements to meet FEMA's minimum acceptable level of flood protection.

Table 5-1. West Sacramento General Plan Update Alternatives

Alternative	Net New Dwelling Units	Net New Population	Net New Employment
Base Case	21,129	48,761	41,369
Alternative A	29,832	65,883	56,042
Alternative B	22,550	50,893	32,175
Alternative C	30,554	72,959	51,125

5.1.3 Environmental Consequences

An action that removes an obstacle to growth is considered to be growth inducing. As such, where flood risk may be seen as an obstacle to growth in an area, levee improvements that would reduce that risk may be considered to remove an obstacle to growth and thereby be indirectly growth-inducing.

Growth inducement may lead to environmental effects, such as increased demand for utilities and public services, increased traffic and noise, degradation of air or water quality, degradation or loss of plant or animal habitats, and conversion of agricultural and open space land to urban uses. Growth within a floodplain area increases the risk to people or property from flooding.

However, if the induced growth is consistent with or provided for by the adopted land use plans and growth management plans and policies for the area affected (e.g., city and county general plans, specific plans, transportation management plans), those plans may ensure that these effects are either less than significant or mitigated to a less-than-significant level. In some instances, significant and unavoidable impacts would occur as a result of implementation of land use plans. All effects associated with this planned growth are the responsibility of the city or county in which the growth takes place, developers, or other entities proposing or approving the development. Local land use plans provide for land use development patterns and growth policies that encourage orderly urban development supported by adequate urban public services such as water supply, roadway infrastructure, sewer services, and solid waste services.

5.1.3.1 Effects and Mitigation Measures

5.1.3.1.1 No Action Alternative

Under the No Action Alternative, WSAFCA would not implement flood control improvements. The levees protecting the city would continue to deteriorate and necessitate improvements to meet FEMA's and the state's minimum acceptable levels of flood protection. In addition, the associated risk to human health and safety, property, and the adverse economic impact that serious flooding could cause would continue, and the risk of a catastrophic flood would remain high. Again, however, regular operations and maintenance of the levee system would continue as prescribed and as presently executed by the local maintaining entities, but no improvements would be implemented. Further detail on the No Action Alternative is provided in Section 2.3 of Chapter 2, Alternatives.

As described in Chapter 2, Alternatives, despite the likelihood of state- or Federal-led implementation of repairs, for the purposes of evaluating impacts under the No Action Alternative, the EIS/EIR assumes that the improvements would not occur. This assumption provides the most conservative approach for disclosure and comparison of potential effects. Therefore, the No Action

Alternative assumes no levee repair or strengthening would be implemented, the purpose and objectives would not be met, and flood risk would continue.

5.1.3.1.2 Proposed Projects

The proposed EIPs would incrementally reduce localized flood risk for the levee reaches proposed for improvement. However, these reaches are a fraction of the total levee system protecting West Sacramento, and the remaining unimproved levees in the system are the determining factor in FEMA mapping and build-out decisions. In other words, the EIPs, if implemented, would not change the current FEMA rating either for the city as a whole or for the northern basin of the city in which the projects occur. Because the projects would not affect FEMA floodplain map designations, they would in turn not affect build-out decisions. Therefore, the projects do not remove any present obstacles for growth. Further, even if the FEMA rating and build-out decisions were affected by the EIPs and the projects were to remove an obstacle for growth, the north basin of the city improved by the EIPs is largely built out and only limited infill development is possible rather than new tracts of growth.

Such growth is part of the planned development of the City. The City is developing a General Plan Update, under which growth and increases in population could lead to effects on air and water quality, water supply, traffic, and noise conditions, and increases in the demand for such public services as schools, fire, police, sewer, solid waste disposal, and electrical and gas utilities. In addition, the expansion of such services could result in significant effects. The effects of this growth will be analyzed in the *West Sacramento 2030 General Plan Update SEIR*. Mitigation measures could include locating the growth in areas where sensitive resources are absent, minimizing the loss of these resources, or replacing any loss. The City of West Sacramento could impose feasible mitigation measures on development that would reduce or eliminate these effects. Ultimately, the effects associated with growth in West Sacramento are the responsibility of West Sacramento and specific project proponents.

In conclusion, while growth in the city may occur in the future, the EIPs do not influence such growth because they do not remove any current obstacle to growth, they would not cause change in FEMA maps or build-out decisions, and they do not directly facilitate growth (like developing new water supply, utilities, or other infrastructure). The EIPs, therefore, have no effect on growth.

5.2 Cumulative Effects

5.2.1 Introduction

The cumulative effects analysis determines the combined effect of the EIPs and other closely related, reasonably foreseeable, projects. This chapter introduces the methods used to evaluate cumulative effects, lists related projects, and describes their relationship to the EIPs, identifies cumulative effects by resource area, and recommends mitigation for significant cumulative effects.

5.2.2 Approach to Cumulative Effect Analysis

5.2.2.1 Legal Requirements

NEPA regulations and State CEQA Guidelines require that the cumulative effects of a proposed project be addressed under NEPA when the cumulative effects are expected to be significant, and under CEQA when the project's incremental effect is cumulatively considerable (Guidelines 15130[a], 40 CFR 1508.25[a][2]). Cumulative effects are effects on the environment that result from the incremental effects of a proposed action when added to other past, present, and reasonably foreseeable future actions (Guidelines 15355[b], 40 CFR 1508.7). Such effects can result from individually minor but collectively significant actions taking place over time.

Section 15130 of the State CEQA Guidelines states that the discussion of cumulative impacts need not provide as much detail as the discussion of impacts attributable to the project alone. The level of detail should be guided by what is practical and reasonable.

5.2.2.2 Methods

According to the State CEQA Guidelines (Section 15130), an adequate discussion of significant cumulative impacts should contain the following elements:

- an analysis of related future projects or planned development that would affect resources in the project area similar to those affected by the proposed project,
- a summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available, and
- a reasonable analysis of the cumulative impacts of the relevant projects. An EIR must examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

To identify the related projects, the State CEQA Guidelines (15130[b]) recommend either the list or projection approach. This analysis uses the list approach, which entails listing past, present, and probable future projects producing related or cumulative effects, including, if necessary, those projects outside the control of WSAFCA. NEPA does not provide specific guidance as to how to conduct a cumulative effect assessment; however, the list approach has been effective at disclosing cumulative effects under NEPA.

A list of past, current, and probable future projects was compiled for the cumulative setting. These projects (cumulative projects) include other flood control projects affecting the Sacramento River, recreation projects in the region, restoration and other water-related projects in and near the Sacramento River that could affect fish or vegetation on the waterside of levees, and development in the West Sacramento area that could result in effects and benefits similar to those of the EIPs. Other cumulative projects considered include:

- potential flood protection projects requesting Section 408 approval,
- City of West Sacramento development projects, and
- projects affecting fish and wildlife that use the EIPs area.

In addition, regional plans were reviewed to characterize development trends and growth projections in Yolo County. These projects are considered with the EIPs to determine if the combined effects of all of the projects would result in significant cumulative effects.

5.2.3 Projects Considered for the Cumulative Assessment

5.2.3.1 Flood Protection Projects

According to the CEQ regulations, when determining the scope of the action assessment, similar actions must be considered. Similar actions are defined as actions that, when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. An agency may wish to analyze these actions in the same environmental assessment. It should do so when the best way to assess adequately the combined effects of similar actions or reasonable alternatives to such actions is to treat them in a single environmental assessment (40 CFR §1508.25[a][3]). (Council on Environmental Quality 1997.)

The following descriptions of related or similar flood protection projects include those that are under active consideration, have been proposed, or have some form of environmental documentation complete. In addition, these projects have the potential to affect the same resources and fall within the same geographic scope and are therefore to be cumulatively considered with the EIPs. In particular, those resources are biological resources (riparian habitat and wildlife disturbance), hydrology, and geomorphology. The geographic scope of consideration for effects on those resources is the Sacramento Valley region and Sacramento River system, respectively.

5.2.3.1.1 West Sacramento Levee Improvements Program

WSAFCA is proposing the WSLIP to improve the 50+ miles levees in Yolo and Solano counties that protect the city of West Sacramento. To protect human health and safety and prevent adverse effects on property and its economy, the city of West Sacramento as part of WSAFCA, and in partnership with DWR, embarked on a comprehensive evaluation of the condition of the levees protecting the city in 2006. The evaluation was necessary to determine the level of flood protection provided by the existing levee system, identify the magnitude and severity of deficiencies, and propose potential levee improvements. The results revealed several deficiencies that require substantial improvements to meet current flood protection standards. Along with the WSLIP, WSAFCA launched a parallel process for identifying smaller-scale improvements that may be candidates for EIPs to address urgent needs and can be planned and designed in advance of or concurrent with the overall program. The CHP Academy and The Rivers EIPs are examples of such EIPs. Essentially, these projects cover critical areas where the levee deficiency is well-defined and the most suitable treatments are known.

5.2.3.1.2 Sacramento Area Flood Control Agency Levee Integrity Program

SAFCA's long-term program to improve the Natomas Basin levee system is described in Section 1.6.

5.2.3.1.3 Upper Yuba River Levee Improvement Project

The Upper Yuba River Levee Improvement Project (UYLIP) proposes additional levee improvements to a segment of the upper Yuba River in Yuba County. The proposed improvement includes the installation of slurry walls and seepage berms (from Simpson Lane to the Yuba Goldfields). Previous repairs have occurred on this levee segment. Further studies determined additional work was necessary to provide 200-year flood protection for 40,000 residents in south Yuba County. Environmental review and Section 408 permission for the UYLIP is expected in 2010, and construction is expected to occur in 2010 and 2011.

5.2.3.1.4 Sutter Basin Project

The Sutter Basin Feasibility Study was re-initiated in 2006. The study scope focuses on providing flood damage reduction to the urban areas of Yuba City, Live Oak, Gridley, and Biggs in the Sutter Bypass – Feather River sub-basin and developing a flood warning system for the outlying areas of the sub-basin. Additional study objectives include ecosystem restoration and recreation. The study process involves 6 planning steps that range from problem identification (e.g., geotechnical exploration) to the formulation, evaluation, and selection of alternatives. Problem identification studies are expected to be completed in 2010. Formulation and evaluation of alternatives are expected to begin in 2010. Final environmental documents are expected to be completed in 2012. In addition to the feasibility study, an EIP is under development to improve the west levee of the Feather River from Thermalito Afterbay to south of Yuba City. The EIP is at a 10% level of design.

5.2.3.1.5 Feather River Levee Repair Project

The Feather River Levee Repair Project is a multi-phased levee improvement program on the left bank of the Feather River. It includes approximately 13 miles of levees within the Three Rivers Levee Improvement Authority area in south Yuba County. With the exception of approximately 4 miles of improvements in Phase 4, all other improvements have been constructed. Project features included seepage berms, cutoff walls, and 6-mile setback levee. It reduces flood stages in the river by approximately 1.5 feet and provides 200-year protection to over 40,000 residents.

5.2.3.1.6 Feather River Setback Levee at Star Bend

Levee District No. 1 of Sutter County has constructed the Feather River Setback Levee at Star Bend on the west bank of the Feather River near the eastern boundary of Sutter County. The project replaces a segment of the river's existing levee that currently constricts flood flows in the river and presents an unacceptably high risk for levee failure because of seepage. Construction of the setback levee removes the constriction and reduces water surface elevations in the region.

5.2.3.1.7 West Sacramento Project

The West Sacramento Project is described in Section 1.6.

5.2.3.1.8 Sacramento River Bank Protection Project

The Sac Bank Project is described in Section 1.6.

5.2.3.1.9 Sacramento Urban Levee Program

DWR is evaluating sites similar to the USACE's Sacramento River Bank Protection Project. The state will repair 19 critical erosion sites, one of which is in West Sacramento at RM 55.8.

5.2.3.1.10 Flood Control and Coastal Storm Emergency Act

PL 84-99 is described in Section 1.6.

5.2.3.1.11 North Delta Flood Control and Ecosystem Restoration Project

The purpose of the North Delta Flood Control and Ecosystem Restoration Project is to implement flood control improvements in the northeast Delta in a manner that benefits aquatic and terrestrial habitats, species, and ecological processes. The North Delta project area includes the North and South Fork Mokelumne Rivers and adjacent channels downstream of I-5 and upstream of the San Joaquin River. Solution components being considered for flood control include bridge replacement, setback levees, dredging, island bypass systems, and island detention systems. The project will include ecosystem restoration and science actions in this area, and improving and enhancing recreation opportunities. In support of the environmental review process, a notice of preparation (NOP)/NOI was prepared and public scoping was held in 2003. An EIR was prepared in 2008, but the project is not currently funded for implementation.

5.2.3.1.12 CALFED Levees Program

The goal of the CALFED Levees Program is to uniformly improve Delta levees by modifying cross sections, raising levee height, widening levee crowns, flattening levee slopes, or constructing stability berms. Estimates predict that 520 miles of levees need improvement and maintenance to meet the PL 84-99 standard for Delta levees. The program continues to implement levee improvements throughout the Delta, including the south Delta area.

5.2.3.2 Potential Projects Requesting Section 408 Approval

A number of projects in the Central Valley may request Section 408 approval. Table 5-2 below summarizes potential projects with Section 408 requests. These projects are listed for context.

Table 5-2. Potential Projects Requesting Section 408 Approval

Project	Lead Agency/Agencies	Estimated Date for Section 408 Permission
West Sacramento EIPs 2011	WSAFCA	Summer 2010
RD 17 100-year Seepage Repair Project	RD 17, San Joaquin County	Late 2010
River Islands Levee Alteration	City of Lathrop	Late 2010
Natomas Levee Improvement Project	SAFCA	Winter/Spring 2010
Upper Yuba River Levee Improvement Project	TRLIA	Summer 2010/-mid-2011
Bay Delta Conservation Plan	CA Natural Resources Agency	

5.2.3.3 Relevant Land Use Plans

Relevant land use plans are included to assess past, present, or reasonably foreseeable development actions in the city that may affect the same resources as the WSLIP, or provide for the restoration, preservation, or enhancement of those resources.

5.2.3.3.1 Yolo Natural Heritage Program Habitat Conservation Plan

The Yolo Natural Heritage Program is a county-wide Natural Communities Conservation Plan/Habitat Conservation Plan for the 653,629-acre planning area that provides habitat for many special-status and at-risk species found in five dominant habitats/natural communities. The Yolo Natural Heritage Program will describe the measures that will be undertaken to conserve important biological resources, obtain permits for urban growth and public infrastructure projects, and continue Yolo County's rich agricultural heritage (Yolo Natural Heritage Program 2008).

5.2.3.3.2 City of West Sacramento General Plan

The *City of West Sacramento General Plan* consists of two documents: the *General Plan Background Report* and the *General Plan Policy Document*. The *General Plan Background Report* inventories and analyzes existing conditions and trends in West Sacramento. The *Background Report*, which provides the formal supporting documentation for general plan policy, addresses 11 subject areas: land use, housing, population, economic conditions and fiscal considerations, transportation and circulation, public facilities and services, cultural and recreational resources, natural resources, health and safety, urban structure and design, and child care. The *Background Report* also includes as an appendix the *West Sacramento General Plan Community Concerns Summary Report* prepared following the issue identification process carried out in early 1988. The *City of West Sacramento General Plan Policy Document* includes the goals, policies, standards, implementation programs, quantified objectives, land use diagram, and circulation plan diagram that constitute the formal policy of the City of West Sacramento for land use, development, and environmental quality (City of West Sacramento 2000).

5.2.3.3.3 Washington Specific Plan

Adopted in 1996, the *Washington Specific Plan* area covers the northeast area of the City of West Sacramento. The EIP site lies within the plan area. The area includes plans for mixed use, residential, and commercial development. The CalSTRS building is currently under construction under the plan. It is constructed adjacent to and behind the Sacramento River levee, just south of the EIP project site (City of West Sacramento 1996).

5.2.3.3.4 Triangle Plan

Adopted in 1993, the *Triangle Plan* includes primarily mid-rise to high-rise office, high-density multiple family residential, ancillary retail, government, and institutional uses. Development is proposed to occur through 2012. The *Triangle Plan* outlines the creation of a mixed-use community of local and regional significance. The plan area is south of the project site with the Sacramento River as its eastern border (City of West Sacramento Department of Community Development 2000).

5.2.3.3.5 Southport Framework Plan

The Southport Framework Plan was adopted in 1995. Southport is a 7,180-acre site located in the southern portion of the city of West Sacramento. It is bounded by the DWSC on the north and west, the Sacramento River on the east, and the city limits on the south. Proposed land use in this area includes a mixture of residential, commercial, industrial, public/quasi-public, and parks and open space uses. It outlines provisions for 14,050 residential dwelling units, 17.2 million square feet of commercial uses, 21.1 million square feet of office/business park, 7.7 million square feet of industrial uses, 544 acres of public/quasi-public uses, and 915 acres of parks and open spaces at build out. The Southport Framework Plan was developed to provide an overall vision for the development of Southport with a goal of encouraging a development pattern that is an alternative to urban sprawl.

5.2.3.4 City of West Sacramento Development Projects

City development projects that have the potential to affect similar resource areas such as biological resources, air, and noise have been included for analysis.

5.2.3.4.1 Sacramento Riverfront Master Plan Improvement (River Walk)

This development will create a riverfront promenade, extending from The Rivers development on the north to the Stone Locks near the Port of Sacramento. The first three phases of the park, which extends from the Tower Bridge to the I Street Bridge, are completed. Phase 4 plans are to continue the pavement of the top of the levee to the Broderick Boat Ramp. Phase 5 of the riverfront improvements includes a promenade along the Triangle (described above), which is from the Tower Bridge to the Pioneer Bridge. The City currently also has a Resources Agency grant for Phase 5A of the project that expires in May 2011. Phase 6 will continue the River Walk pathway to Pioneer Bluff.

5.2.3.4.2 California Indian Heritage Center

The California Indian Heritage Center is described in Section 2.6.1.4.2.

5.2.3.4.3 Barge Canal Redevelopment

The City plans to further and enhance current use of the barge canal area for aquatic recreational activities, such as sailing, rowing, kayaking, and canoeing, and supports the establishment of a multi-use aquatic facility along the barge canal. Aquatic parks, boat houses, docks, and other support facilities for boating shall be deemed compatible uses along the DWSC and the barge canal within all land use designations. The City also promotes the development of important visual and scenic areas along the riverfront and barge canal for public access, including water-related activities and possible development of high-intensity and high-density urban uses.

5.2.3.4.4 City of West Sacramento Public Projects

The City of West Sacramento has a 25-year Capital Improvement Program that began in 2005. There are several public projects that are projected to occur over the next 20 years, depending on available funding. These projects are:

- new construction and improvements to bicycle, pedestrian, and transit facilities;

- roadway capacity improvements, including street widening of streets and interchange improvements;
- roadway signal and lighting improvements;
- landscape plantings and street and sidewalk maintenance;
- improvements and maintenance to water treatment, supply, storage, and pumping facilities;
- improvements to sanitary sewer and storm drainage facilities; and
- new construction and maintenance of municipal buildings such as City Hall, fire stations, and police stations.

5.2.3.4.5 City of West Sacramento Private Projects

Several private projects in the city of West Sacramento are in various stages of development and could occur over the next 20 years. Each of these projects fall within a specific plan area (as described above in Section 6.2.3.3, Relevant Land Use Plans). In the Triangle/Bridge District, there are two proposed projects:

- **Fulcrum Capital Properties.** This is a 58-acre site with approximately 3.6 million square feet of commercial (office & retail uses) and up to 2,787 housing units proposed for development.
- **River Edge.** This is a 15-acre site with a mixture of uses proposed for development, including 791 residential units, 84,480 square feet of retail space, and 30,000 square feet of office space.

In the Southport Framework Plan area there are five proposed projects:

- **Yarbrough**. The Yarbrough project is proposed to include approximately 3,004 residential units, 150,000 square feet of retail uses, up to 25,000 square feet of office development, up to 40 live/work residential units, and up to 40,000 square feet of community facilities.
- **River Park.** The River Park project is proposed to include approximately 2,286 residential units, 50,000 square feet of commercial space, and a 40 acre regional park site with community facilities.
- **Liberty.** Specific details regarding the Liberty project are still under development but this project would likely be similar to that of Yarbrough or River Park.
- **Stone Lock District.** The Stone Lock District project is proposed to include up to 2,500 residential units, up to 800 hotel rooms, up to 890,000 square feet of retail space, up to 1.7 million square feet of office space, and 60 acres of parks and open space.
- **Seaway International Trade Center.** Specific detail regarding the Seaway International Trade Center are still under development, but this project would likely propose large-scale industrial and commercial development.

5.2.3.4.6 City of West Sacramento Parks Master Plan

The Parks Master Plan, prepared in 2003, outlines the City's goals and policies with regard to the provision of parks and related recreational facilities for West Sacramento residents and provides an inventory of current facilities (SmithGroup 2003). As of April 2006, the City had approximately 145 acres of developed parkland (City of West Sacramento 2005a). Based on the estimated 2007 population of 44,928, this represented an 80-acre shortfall from the standard of 5 acres per 1,000 residents established in the general plan. Based on this ratio, it is estimated that by 2025 population growth in West Sacramento would require the City to have a total of 375 acres of parkland available in order to meet this standard. The Parks Master Plan targets several areas as particularly well-suited for park development, including several locations on the city's waterfront (SmithGroup 2003).

5.2.3.5 Projects Affecting Fish and Wildlife that Use the EIPs Study Area

As described in Sections 3.8 and 4.8, the primary long-term effects on vegetation, fish and wildlife are related to the removal of vegetation in compliance with the USACE levee vegetation policy. Regarding wildlife, this could contribute to a cumulative impact when combined with other projects that adversely affect habitat for wildlife that use the West Sacramento levee vegetation. Regarding fish, this could contribute to a cumulative impact when combined with other projects within the geographic range of the fish that would be affected. As such, this list includes projects that could also adversely affect the same species of fish or wildlife that would be affected by vegetation removal under the EIPs.

5.2.3.5.1 CALFED Ecosystem Restoration Program

The goals of the CALFED Ecosystem Restoration Program are to:

- recover 19 at-risk native species and contribute to the recovery of 25 additional species;
- rehabilitate natural processes related to hydrology, stream channels, sediment, floodplains and ecosystem water quality;
- maintain and enhance fish populations critical to commercial, sport and recreational fisheries;
- protect and restore functional habitats, including aquatic, upland and riparian, to allow species to thrive;
- reduce the negative effects of invasive species and prevent additional introductions that compete with and destroy native species; and
- improve and maintain water and sediment quality to better support ecosystem health and allow species to flourish.

The Ecosystem Restoration Program, which is divided into the Sacramento, San Joaquin, and Delta and Eastside Tributary regions, includes the following kinds of actions:

- develop and implement habitat management and restoration actions, including restoration of river corridors and floodplains, reconstruction of channel-floodplain interactions, and restoration of Delta aquatic habitats;
- restore habitat that would specifically benefit one or more at-risk species;
- implement fish passage programs and conduct passage studies;
- continue major fish screen projects and conduct studies to improve knowledge of their effects;
- restore geomorphic processes in stream and riparian corridors;
- implement actions to improve understanding of at-risk species;

- develop understanding and technologies to reduce the effects of irrigation drainage on the San Joaquin River and reduce transport of contaminant (selenium) loads carried by the San Joaquin to the Delta and the Bay; and
- implement actions to prevent, control, and reduce effects from non-native invasive species.

Ecosystem Restoration Program actions contribute to cumulative benefits on fish and wildlife species, habitats, and ecological processes.

5.2.3.5.2 Bay Delta Conservation Plan

The Bay Delta Conservation Plan provides for the recovery of endangered and sensitive species and their habitats in the Delta in a way that also provides for the protection and restoration of water supplies. The plan will identify and implement conservation strategies to improve the overall ecological health of the Delta; identify and implement more ecologically friendly ways to move fresh water through or around the Delta; address toxic pollutants, invasive species, and impairments to water quality; and provide a framework and funding to implement the plan over time.

Alternatives being evaluated include conveyance options using the through-Delta, peripheral aqueduct. The restoration options include various degrees of restoration in the Delta and Suisun Marsh. The final plan and the final EIS/EIR are expected to be complete in 2012. The Bay Delta Conservation Plan could contribute to beneficial cumulative impacts by increasing suitable habitat for fish and wildlife species.

5.2.4 Cumulative Effects by Resource

The following section describes the potential contribution to cumulative effects on each resource.

5.2.4.1 Flood Control and Geomorphic Conditions

The proposed program could contribute to cumulative effects on flood control and geomorphic conditions resulting seepage control treatments. As described in Sections 3.1 and 4.1Flood Control and Geomorphic Conditions for the CHP Academy and The Rivers respectively, seepage control treatments may transfer seepage risk to areas adjacent to the treatment.

Hydraulic modeling was used to determine some of the cumulative effects of levee raises, including flood walls and setbacks. Although a slight change in upstream and downstream conditions is expected to result from program alternatives, this change is less than significant.

Based on the quantitative results from the 2009 MBK Engineers modeling effort, upstream water levels would not be significantly affected by the proposed levee improvements either, assuming that all upstream levee strengthening components are eventually implemented.

Furthermore, as described in MBK Engineers (2009), modeling effort for the overall WSLIP, strengthening portions of the Federal project levee system protecting West Sacramento and implementing in-channel erosion protection measures would not result in any significant hydraulic effects on other sub-basins protected as part of the Flood Control Project. Furthermore, these improvements would be consistent with the principles that have guided the management of the Flood Control Project over the past century and with the policies adopted by the state legislature calling for an immediate and comprehensive effort to increase the level of flood protection provided to West Sacramento and the other urban areas within the Flood Control Project.

Restoration in the Yolo Bypass as proposed in the current Bay Delta Conservation Plan, Delta Vision, and other projects would further increase the flood capacity of the Sacramento River downstream of West Sacramento. It is also important to note that many of the areas adjacent to the West Sacramento levees (excluding the City of Sacramento), are rural and have been designed to flood as part of the overall Sacramento River flood control operation. As such, it is not expected that there would be a significant cumulative effect related to the EIPs.

With respect to mean sea-level change and its effects on the EIPs, the EIP project areas are relatively insensitive to the rates of sea-level rise. Of all the scenarios analyzed, only the high sea-level rise rate 100 years after the project is constructed shows greater than one-tenth of a foot stage increase in the Sacramento River, Yolo Bypass, or Sacramento Bypass in the EIPs project area (MBK Engineers 2009b).

5.2.4.2 Water Quality and Groundwater Resources

No groundwater resources would be affected by the EIPs and, therefore, there would be no cumulative effects. The proposed treatments could affect water quality during construction by increasing turbidity, thus increasing the potential for and accidental release of hazardous materials. Cumulative effects could occur if other projects were constructed at the same time. Many of the West Sacramento development projects and other levee improvements by SAFCA could contribute to localized and temporary effects on water quality. As described in the water quality section, many minimization measures, including a SWPPP, would be implemented, turbidity would be monitored during construction to ensure it stays within the acceptable level identified by the RWQCB, and NPDES permit and WDRs would be obtained to limit discharge into the water table. These minimization measures are standard construction practices and it is assumed that other projects would also implement them. On completion of construction, no additional effects on water quality would occur as part of the EIPs. As such, there would be no significant cumulative effect.

5.2.4.3 Geology, Seismicity, Soils, and Mineral Resources

The EIPs could result in both beneficial and significant effects on geology, seismicity, and soils. There would be no effect on mineral resources, and therefore no cumulative effects associated with the EIPs. Other earth-moving activities in the EIPs area, such as development, could change the stability of soils, increase erosion and sedimentation, and expose structures to groundshaking and liquefaction. Soil stability is addressed through engineering design of structures, including levees, and ground-disturbing activities are required to stabilize soils upon completion of construction or even between stages of construction. As such, no significant cumulative effects related to soil stability are anticipated. A cumulative increase in erosion and sedimentation could occur if other levee improvement projects on the Sacramento River are occurring at the same time. The potential for erosion and sedimentation resulting from the WSLIP and other projects is limited by minimization measures and implementation of a SWPPP. Any cumulative effect would be temporary and minimal, and therefore less than significant. The EIPs replace or upgrade existing flood control facilities (i.e., levees) and there would be no change in risks due to seismicity. However, there could be cumulative effects related to construction of structures that could be subject to seismic activity. The program area is not located within an active seismic area, and therefore any cumulative increase in risk related to groundshaking would be less than significant.

5.2.4.4 Transportation and Navigation

Construction activities associated with the EIPs have the potential to result in short-term disruptions to roadways, including closures, increases in emergency response time and road hazards, effects on alternate transportation modes, disruption to navigation, temporary loss of service to railroads, and decreases in LOS for roads accessed or used for detours during construction. Combined with other projects in West Sacramento and along the Sacramento River, there could be significant cumulative effects on transportation if the EIPs and other projects are implemented at the same time. Specifically, cumulative effects would occur if projects required closing or detours on multiple major roadways at the same time resulting in decreased access to areas within West Sacramento or a cumulative LOS lower than Level C or D, depending on the location of the road (See Sections 3.4 and 4.4), Transportation and Navigation for a description of where these standards apply). With implementation of the environmental commitment to coordinate with the City to ensure minimal overlap in disturbances to traffic during EIPs construction, these effects would be less than significant. No significant cumulative effects would occur.

5.2.4.5 Air Quality and Climate Change

The EIPs would result in temporary construction-related emissions that would be mitigated by reducing vehicle and equipment emissions and implementing a fugitive dust plan. Other projects occurring in the YSAQMD at the same time as the EIPs construction would result in cumulative effects that would be significant, particularly ROG, NO_x, and PM10. It is expected that projects generating these pollutants would also minimize emissions through dust control and vehicle emissions control. However, there could still be a significant unavoidable cumulative effect.

Additionally, the project combined with other projects would result in a cumulative increase in greenhouse gas emissions. Even with emissions reduction mitigation that would be incorporated into the EIPs and other projects, this cumulative effect is significant and unavoidable.

5.2.4.6 Noise

The EIPs would result in substantial increases in noise levels and vibration at sensitive receptors during construction. Other projects in the vicinity of these receptors occurring at the same time as the EIPs could result in cumulative effects. Because construction noise would be temporary and highly localized, the EIPs are not anticipated to make a cumulatively considerable contribution to noise effects in the program area.

5.2.4.7 Vegetation and Wetlands

The implementation of The Rivers EIP would result in the direct loss of 0.9 acre of riparian vegetation as a result of construction. Riparian habitat is considered an important and sensitive habitat because of high species diversity, high productivity, limited distribution, declining status, or a combination of these attributes. Implementation of other levee improvement projects within the Sacramento River Flood Control Project would also likely result in losses to riparian habitat due to construction and implementation of the USACE vegetation policy (or other future agreed upon policy). Implementation of these projects and policy along all of the Sacramento River levees would result in a significant cumulative effect. The Rivers EIP has proposed on-site mitigation for the 0.9 acre of habitat to be affected. Temporal losses would be incurred while the habitat becomes established and mature, but this loss would not be substantial relative to the habitat in the study area that would remain available. With the implementation the proposed mitigation, the EIPs would not result in any net loss of riparian habitat in the long term and their cumulative contribution would not be considerable.

Future EIPs may expand the floodplain within the levee and provide opportunities for habitat restoration. Restoration activities in the Delta and San Joaquin River could restore some of the vegetation lost as a result of projects along Sacramento River.

The levee improvements do not result in any loss of wetlands. Therefore there are no effects on wetlands.

5.2.4.8 Fisheries and Aquatics

The EIPs result in construction-related temporary affects to floodplain habitat (CHP Academy) and the potential for construction-related degradation of fish habitat as a result of sedimentation and turbidity, accidental release of contaminants, or other disturbances. Combined with other projects occurring near the EIPs, there could be significant cumulative effects. The EIPs' contribution to these cumulative effects is not considerable because it would be temporary and minimized by implementation of a SWPPP, SPPCP, BSSCP, limiting construction activities to times when species are not present, and re-seeding and restoring temporarily affect floodplain habitat to pre-project conditions.

5.2.4.9 Wildlife

The EIPs would result in temporary wildlife and habitat disturbance during construction and the permanent conversion of Swainson's hawk foraging habitat for recreation improvements and on-site riparian mitigation. Swainson's hawk and many other special-status species are known to utilize the Sacramento River corridor for nesting, roosting and foraging habitat. The EIPs have incorporated measures to avoid or minimize wildlife and habitat disturbance and take of special-status species. Trees that are proposed for removal do not contain any known nest sites for special status species. Therefore, cumulative effects related to disturbance to wildlife and wildlife habitats would not be considered cumulatively significant.

The primary cumulative effect on wildlife is related to removal of habitat. It is possible that similar levee improvement projects proposed along the Sacramento River levee system will result in some loss of riparian habitat as a result of construction and/or implementation of USACE's policy regarding levee vegetation (or other future agreed upon policy). However, these projects will be required to coordinate with USFWS, NMFS, DFG and appropriate local agencies to ensure appropriate compensation for effects to riparian habitat. Many of the species that would be affected by the EIPs and other similar projects rely on riparian and other habitat associated with the river system. Because these species are protected under applicable state and Federal laws, other projects would also be required to minimize take and compensate for loss of species and their habitats.

The Rivers EIP proposes on-site mitigation for the loss of 0.9 acre of riparian habitat and the purchase of mitigation credits to compensate for any loss of Swainson's hawk foraging habitat (in coordination the Yolo Natural Heritage Program HCP/NCCP currently being developed). Therefore, implementation of the EIPs would not result in any net loss of wildlife habitat and the cumulative effect of the EIPs would not be considered significant.

5.2.4.10 Land Use and Agriculture

The EIPs would result in temporary land use changes to accommodate construction, or the acquisition of portions of right of way to maintain flood infrastructure. If acquisition were deemed necessary, it would be a small portion within The River gated community. Acquisition would not conflict with land use designations and would not result in the division of a community. The cumulative effect of the EIPs is considered less than significant.

5.2.4.11 Socioeconomics

Implementation of the EIPs could result in temporary disruptions to local business activities during construction and growth in West Sacramento as a result of improved levee stability. Similar project implemented within the same timeframe as the EIPs may result in a significant effect to local business activities, but this temporary disruption is not expected to contribute considerably to a cumulative impact.

5.2.4.12 Environmental Justice

The EIPs would not result in environmental justice effects and, therefore, there would be no cumulative effect.

5.2.4.13 Visual Resources

The EIPs would result in temporary changes in the visual quality of construction areas and access roads as a result of construction activities and equipment in areas that do not normally include construction-associated views. This effect may make a considerable contribution to a cumulative effect if other projects were occurring at the same time and affecting the same viewer groups along the Sacramento River corridor. However, this cumulative effect would be less than significant because effect would be temporary and localized.

5.2.4.14 Recreation

The EIPs would result in both beneficial and negative effects on recreation. Negative effects would occur as a result of vegetation removal and other construction activities that could disrupt recreation along levees, bikepaths, or other trails. Other projects affecting the same bikepaths, or trails could result in a cumulative effect on recreation. This cumulative effect would be less than significant because effects would be temporary and localized, and other facilities would be available for use during construction.

Beneficial recreation effects include the addition of a recreational trail. This would be a beneficial cumulative effect on recreation in the West Sacramento area.

5.2.4.15 Utilities and Public Services

The EIPs combined with other proposed projects could result in cumulative effects related to disruption to utility services, increased rates of landfill use, and expansion of drainage facilities. Cumulative effects related to utility service and landfill use would occur only during construction. Utility service disruptions would be avoided by implementation of Mitigation Measure PUB-MM-1: Verify Utility Locations, Coordinate with Utility Providers, Prepare a Response Plan, and Conduct Worker Training. These measures are standard and it is expected that other projects occurring at the same time as the WSLIP would minimize their potential for disruption similarly. Effects on landfill capacity are not expected to be considerable because much of the materials removed from existing levees would be reused, construction would be temporary, and the Central Landfill has plenty of capacity (see Sections 3.15 and 4.15, Utilities and Public Services, for the CHP Academy and The Rivers respectively). As such, there would be no significant cumulative effect.

5.2.4.16 Public Health and Environmental Hazards

The EIPs have the potential to slightly increase risks to the public during construction as a result of equipment and fuel usage. These risks would be minimized through implementation of the SWPPP and other environmental commitments. As these are standard practice for construction projects, it is expected that other projects would implement them and the overall cumulative effect would be less than significant.

The EIPs would improve flood protection for West Sacramento. They include all of the flood protection features protecting West Sacramento, but other projects that reduce stress on these levees could result in a beneficial cumulative effect by reducing the overall public risk resulting from levee failure.

5.2.4.17 Cultural Resources

No cumulative effects on cultural resources have been identified. Cultural resources are generally not considered subject to cumulative effects because they are either individually directly or indirectly affected in a way that changes the significance of the property or they are not affected in a way that changes the significance of the property.

It is possible that the projects could cause a significant effect on historic properties and unidentified buried archaeological resources, including buried human remains, through possible ground disturbance associated with levee repair, construction, and maintenance activities.

The incorporation of mitigation, and compliance with the existing state and Federal laws and the policies set forth in the *City of West Sacramento General Plan*, the *Yolo County General Plan*, and the *Solano County General Plan* would reduce these effects. The cumulative effect on archaeological and architectural resources would be less than significant.

Chapter 6
Compliance with Applicable Laws, Policies, Plans, and Regulatory Framework

6.1 Introduction

This chapter provides preliminary information on the major requirements for permitting and environmental review and consultation for implementation of the CHP Academy EIP and The Rivers EIP. Certain local, state, and Federal regulations require issuance of permits before project implementation; other regulations require agency consultation but may not require issuance of any authorization or entitlements before project implementation.

6.2 Regulatory Framework

6.2.1 Federal Requirements

6.2.1.1 National Environmental Policy Act

NEPA is the nation's broadest environmental law, applying to all Federal agencies and most of the activities they manage, regulate, or fund that have the potential to affect the environment. It requires Federal agencies to disclose and consider the environmental implications of their proposed actions. NEPA establishes environmental policies for the nation, provides an interdisciplinary framework for Federal agencies to prevent environmental damage, and contains action-forcing procedures to ensure that Federal agency decision makers take environmental factors into account.

NEPA requires the preparation of an appropriate document to ensure that Federal agencies accomplish the law's purposes. The President's CEQ has adopted regulations and other guidance that provide detailed procedures that Federal agencies must follow to implement NEPA.

This document is the instrument for NEPA compliance for the CHP Academy EIP and The Rivers EIP under the USACE's authority, as described in Chapter 1, Introduction.

6.2.1.2 Federal Endangered Species Act

Section 7 of the ESA requires Federal agencies, in consultation with USFWS and/or NMFS, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species. The required steps in the Section 7 consultation process are as follows.

- Agencies must request information from USFWS and/or NMFS on the existence in a project area of special-status species or species proposed for listing.
- Agencies must initiate formal consultation with USFWS and/or NMFS if the proposed action may adversely affect special-status species.

The CHP Academy EIP and The Rivers EIP may affect special-status species. USACE and WSAFCA are in coordination with USFWS and NMFS and consultation was initiated under Section 7 in December 2010. USACE is seeking concurrence from USFWS and NMFS with a finding that the projects will not likely adversely affect species.

6.2.1.3 Migratory Bird Treaty Act

The MBTA implements a series of international treaties that provide for migratory bird protection. The MBT A authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it is unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird..." (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBT A includes several hundred species and essentially includes all native birds. Permits for take of non-game migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and personal property.

Compliance with the MBTA would be addressed through compliance with the ESA and CESA. The CHP Academy EIP and The Rivers EIP incorporate mitigation measures that would help ensure that construction activities do not result in the take of migratory birds, as discussed in Sections 3.9 and 4.9, Wildlife.

6.2.1.4 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds.

The CHP Academy EIP and The Rivers EIP study areas do not contain bald eagle or golden eagle nesting habitat, and the EIPs would not result in the take of bald or golden eagles. The CHP Academy EIP and The Rivers EIP incorporate mitigation measures that would ensure that construction activities do not result in the take of any raptors, as discussed in Sections 3.9 and 4.9, Wildlife.

6.2.1.5 Clean Water Act Section 404, 404(b)(1) Guidelines, and Section 401

Section 404

Section 404 of the CWA requires that a permit be obtained from USACE for the discharge of dredged or fill material into "waters of the United States, including wetlands."

Waters of the United States include wetlands and lakes, rivers, streams, and their tributaries. *Wetlands* are defined for regulatory purposes, at 33 CFR § 328.3 as:

> (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide; (2) All interstate waters, including interstate wetlands; (3) All other waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; (4) All impoundments of waters otherwise defined as waters of the United States under

> the definition; (5) Tributaries of waters identified in paragraphs 1–4 in this section; (6) The territorial seas; and (7) Wetlands adjacent to waters identified in paragraphs 1–6 in this section.

CWA Section 404(b) requires that USACE process permits in compliance with guidelines developed by EPA. These guidelines (404[b][1] Guidelines) require that there be an analysis of alternatives available to meet the project purpose and need, including those that avoid and minimize discharges of dredged or fill materials in waters. Once this first test has been satisfied, the project that is permitted must be the least environmentally damaging practicable alternative before USACE may issue a permit for the proposed activity.

(Note: Section 404 does not apply to authorities under the Rivers and Harbors Appropriation Act of 1899, except that some of the same waters may be regulated under both statutes; the USACE typically combines the permit requirements of Section 10 and Section 404 into one permitting process.)

Coordination is in process with USACE regulatory staff regarding the presence of waters of the United States in the CHP Academy EIP and The Rivers EIP study areas. A wetland delineation has been submitted for verification and jurisdictional determination. The draft delineation indicates that the proposed EIPs would not affect waters of the United States and a permit is not required. USACE has verified the delineations (as described in Sections 3.7 and 4.7, Vegetation and Wetlands). If the proposed EIPs change to affect waters of the United States, a permit will be applied for and appropriate revisions under NEPA will be made in the Final EIS.

Section 401

Under the CWA Section 401, applicants for a Federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a Federal component and may affect state water quality (including projects that require Federal agency approval [such as issuance of a Section 404 permit]) must also comply with CWA Section 401. In California, the authority to grant water quality certification has been delegated to the State Water Board, and applications for water quality certification under CWA Section 401 are typically processed by the RWQCB with local jurisdiction. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States.

As Section 408 permission for the proposed EIPs constitutes a Federal action that may affect state water quality, a request for certification under CWA Section 401 will be submitted.

6.2.1.6 River and Harbors Appropriation Act of 1899

The River and Harbors Appropriation Act of 1899 addresses activities that involve the construction of dams, bridges, dikes, and other structures across any navigable water, or that place obstructions to navigation outside established Federal lines and excavate from or deposit material in such waters. Such activities require permits from USACE. *Navigable waters* are defined in Section 329.4 of the act as:

> Those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A

determination of navigability, once made, applies laterally over the entire surface of the water body, and is not extinguished by later actions or events which impede or destroy navigable capacity.

Section 9

Section 9 (33 USC 401) prohibits the construction of any bridge, dam, dike, or causeway across any navigable water of the United States in the absence of congressional consent and approval of the plans by the Chief of Engineers and the Secretary of the Army. Where the navigable portions of the water body lie wholly within the limits of a single state, the structure may be built under authority of the legislature of that state, if the location and plans or any modification thereof are approved by the Chief of Engineers and by the Secretary of the Army.

Section 10

Section 10 (33 USC 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters, is unlawful unless the work has been authorized by the Chief of Engineers.

Section 13

Section 13 (33 USC 407) provides that the Secretary of the Army, whenever the Chief of Engineers determines that anchorage and navigation would not be injured thereby, may permit the discharge of refuse into navigable waters. In the absence of a permit, such discharge of refuse is prohibited. While the prohibition of this section, known as the Refuse Act, is still in effect, the permit authority of the Secretary of the Army has been superseded by the permit authority provided the Administrator, EPA, and the states under Sections 402 and 405 of the CWA, respectively.

As described above (Section 6.2.1.5.1), the proposed EIPs would not affect waters of the United States under Section 404 or navigable waters under the Rivers and Harbors Appropriation Act of 1899.

Section 14

Section 14 (33 USC 408) requires approval from the Chief of Engineers, or designee, for alterations to certain public works, including Federal project levees, so long as the alteration would not be injurious to the public interest and does not impair the usefulness of the work, such as the levee sections proposed for modification by the EIPs. Section 408 alterations would include actions that change the hydraulic capacity of the floodway or change the authorized geometry of the Federal project. As described in Chapter 1, WSAFCA is seeking approval under 33 USC § 408, supported by this document.

6.2.1.7 Section 208 (33 CFR 208.10)

Section (33 CFR 208.10) authorizes the USACE District Engineer to approve relatively minor, low impact alterations/modifications related to the operation and maintenance responsibilities of the non-Federal sponsors, provided these alterations and modifications do not adversely affect the functioning of the project and flood fighting activities. The CHP Academy and The Rivers EIPs are considered to fall under Section 408, as described in the preceding paragraph, the process for which includes and goes beyond the Section 208 District Engineer level to the Chief of Engineers.

6.2.1.8 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires that all Federal agencies consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect essential fish habitat (EFH). EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation states that migratory routes to and from anadromous fish spawning grounds are considered EFH. The phrase *adversely affect* refers to the creation of any effect that reduces the quality or quantity of essential fish habitat. Federal activities that occur outside of an essential fish habitat but that may, nonetheless, have an impact on essential fish habitat waters and substrate must also be considered in the consultation process.

Under the Magnuson-Stevens Act, effects on habitat managed under the Pacific Salmon Fishery Management Plan must also be considered. The Magnuson-Stevens Act states that consultation regarding essential fish habitat should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other Federal statutes, such as NEPA, Fish and Wildlife Coordination Act, CWA, and ESA. EFH consultation requirements can be satisfied through concurrent environmental compliance if the lead agency provides NMFS with timely notification of actions that may adversely affect EFH and if the notification meets requirements for essential fish habitat assessments.

As described above under ESA compliance, USACE and WSAFCA are in coordination with USFWS and NMFS and consultation will be initiated under Section 7 prior to the completion of the EIS/EIR process. That consultation process will include consideration of and compliance with the Magnuson-Stevens Act to determine effects on EFH. At this time, it is considered that no EFH would be affected.

6.2.1.9 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act in general requires Federal agencies to coordinate with USFWS and state fish and game agencies whenever streams or bodies of water are controlled or modified. This coordination is intended both to promote the conservation of wildlife resources by providing equal consideration for fish and wildlife in water project planning and to provide for the development and improvement of wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to include recommendations made by USFWS and state fish and game agencies in project reports, and give full consideration to these recommendations.

USACE initiated coordination with USFWS under the Fish and Wildlife Coordination Act and a Draft Coordination Act Report has been prepared (Appendix K).

6.2.1.10 Farmland Protection Policy Act and Memoranda on Farmland Preservation

Two policies require Federal agencies to include assessments of the potential effects of a proposed project on prime and unique farmland. These policies are the FPPA and the Memoranda on Farmland Preservation, dated August 30, 1976, and August 11, 1980, respectively, from the CEQ.

Under requirements set forth in these policies, Federal agencies must determine these effects before taking any action that could result in converting designated prime or unique farmland for non-agricultural purposes. If implementing a project would adversely affect farmland preservation, the agencies must consider alternative actions to lessen those effects. Federal agencies also must ensure that their programs, to the extent feasible, are compatible with state, local, and private programs to protect farmland. NRCS is the Federal agency responsible for ensuring that these laws and policies are followed.

The CHP Academy and The Rivers EIPs would have no effect on farmland.

6.2.1.11 National Historic Preservation Act

Section 106 of the NHPA requires Federal agencies to evaluate the effects of their undertakings on historic properties, which are those properties listed or eligible for listing on the NRHP. Implementing regulations at 36 CFR Part 800 require that Federal agencies, in consultation with SHPO, identify historic properties within the APE of the proposed project and make an assessment of adverse effects if any are identified. If the project is determined to have an adverse effect on historic properties, the Federal agency is required to consult further with SHPO and the Advisory Council on Historic Preservation to develop methods to resolve the adverse effects. The Section 106 process has five basic steps.

1. Initiate the Section 106 process, including the identification of consulting parties, such as Native American tribes.
2. Identify and evaluate cultural resources to determine whether they are historic properties.
3. Assess the effects of the undertaking on historic properties within the APE.
4. If historic properties may be subject to an adverse effect, the Federal agency, the SHPO, and any other consulting parties (including Native American tribes and the ACHP) continue consultation to seek ways to avoid, minimize, or mitigate the adverse effect. An MOA is usually developed to document the measures agreed upon to resolve adverse effects. Alternatively, the Federal agency may prepare and execute a PA with the aforementioned parties to comply with 36 CFR 800, particularly in the context of complex undertakings that entail years of implementation actions or where the undertaking's effects on historic properties cannot be well characterized during the planning phase.
5. Proceed in accordance with the terms of the MOA or PA.

The efforts taken to identify cultural resources within the APE and any potential effects are discussed in Sections 3.17 and 4.17, Cultural Resources. Consultation with SHPO will be initiated prior to the completion of the EIS/EIR process.

6.2.1.12 American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 is also applicable to Federal undertakings. This act established "the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites" (Public Law 95-431).

It is not anticipated that actions related to the CHP Academy EIP and The Rivers EIP will conflict with the American Indian Religious Freedom Act. Consultation with the Native American Heritage Commission and the Sacred Lands database was negative for findings in the project areas, which is discussed in Sections 3.17 and 4.17, Cultural Resources.

6.2.1.13 Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act (16 USC 1271 *et seq*.) establishes a National Wild and Scenic Rivers System for the protection of rivers with important scenic, recreational, fish and wildlife, and other values. Rivers are classified as wild, scenic, or recreational. The act designates specific rivers for inclusion in the System and prescribes the methods and standards by which additional rivers may be added. The lower American River is included in the system and is designated as Recreational.

None of the internal water features of the CHP Academy EIP and The Rivers EIP project areas are tributary to the lower American River or any other river included in the system. Therefore, the EIPs would have no effect on Wild or Scenic Rivers.

6.2.1.14 Executive Order 11988 (Floodplain Management)

Executive Order 11988 (May 24, 1977) requires Federal agencies to prepare floodplain assessments for proposed actions located in or affecting floodplains. If an agency proposes to conduct an action in a floodplain, it must to the degree possible avoid short and long term adverse effects associated with the occupancy and the modification of a floodplain and to avoid direct and indirect support of floodplain development whenever there is a reasonable and feasible alternative. If the only reasonable and feasible alternative involves siting in a floodplain, the agency must minimize potential harm to or in the floodplain and explain why the action is proposed in the floodplain.

The CHP Academy EIP and The Rivers EIP propose to improve existing flood protection facilities and would not directly or indirectly propose floodplain development. Please see further discussion in Chapter 5, Growth-Inducing and Cumulative Effects.

6.2.1.15 Executive Order 11990 (Protection of Wetlands)

Executive Order 11990 (May 24, 1977) requires Federal agencies to prepare wetland assessments for proposed actions located in or affecting wetlands. Agencies must avoid undertaking new construction in wetlands unless no practicable alternative is available and the proposed action includes all practicable measures to minimize harm to wetlands. Sections 3.7 and 4.7, Vegetation and Wetlands, describe effects on wetlands and mitigation measures for reducing significant effects for the CHP Academy EIP and The Rivers EIP.

6.2.1.16 Executive Order 12898 (Environmental Justice)

Executive Order 12898 (February 11, 1994) requires Federal agencies to identify and address adverse human health or environmental effects of Federal programs, policies, and activities that could be disproportionately high on minority and low-income populations. Federal agencies must ensure that Federal programs or activities do not directly or indirectly result in discrimination on the basis of race, color, or national origin. Federal agencies must provide opportunities for input into the NEPA process by affected communities and must evaluate the potentially significant and adverse environmental effects of proposed actions on minority and low-income communities during environmental document preparation. Even if a proposed Federal project would not result in significant adverse impacts on minority and low-income populations, the environmental document must describe how Executive Order 12898 was addressed during the NEPA process.

Environmental justice issues are discussed in Section 3.13, Environmental Justice. In summary, the proposed EIPs would not result in any significant effects on minority or low-income populations. In reality, the proposed EIPs would increase flood protection to nearby established diverse communities of mixed income and ethnicity.

6.2.1.17 Executive Order 13007 (Indian Sacred Sites) and April 29, 1994, Executive Memorandum

Executive Order 13007 (May 24, 1996) requires Federal agencies with land management responsibilities to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies are to maintain the confidentiality of sacred sites. Among other things, Federal agencies must provide reasonable notice of proposed actions or land management policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites. The agencies must comply with the April 29, 1994, Executive Memorandum, *Government-to-Government Relations with Native American Tribal Governments*.

Based on the analysis described in Sections 3.17 and 4.17, Cultural Resources, no sacred sites would be significantly affected by the implementation of the CHP Academy EIP and The Rivers EIP.

6.2.1.18 Federal Clean Air Act

The Federal CAA was enacted to protect and enhance the nation's air quality in order to promote public health and welfare and the productive capacity of the nation's population. The CAA requires an evaluation of any Federal action to determine its potential impact on air quality in the project region. California has a corresponding law, which also must be considered during the EIR process.

For specific projects, Federal agencies must coordinate with the appropriate air quality management district as well as with EPA. This coordination would determine whether the project conforms to the CAA and the State Implementation Plan (SIP).

Section 176 of the CAA prohibits Federal agencies from engaging in or supporting in any way an action or activity that does not conform to an applicable SIP. Actions and activities must conform to a SIP's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and in attaining those standards expeditiously. EPA promulgated conformity regulations (codified in 40 CFR 93.150 *et seq.*).

The potential air quality impacts of the CHP Academy EIP and The Rivers EIP resulting from construction (such as equipment emissions and fugitive dust) are discussed in Sections 3.5 and 4.5, Air Quality and Climate Change, which analyzes and documents compliance with the CAA.

6.2.1.19 Federal Water Project Recreation Act

The Federal Water Project Recreation Act requires Federal agencies with authority to approve water projects to include recreation development as a condition of approving permits. Recreation development must be considered along with any navigation, flood control, reclamation, hydroelectric, or multi-purpose water resource project. The act states that,

> consideration should be given to opportunities for outdoor recreation and fish and wildlife enhancement whenever any such project can reasonably serve either or both purposes consistently.

Recreation effects, such as temporary loss to river access, are described in Sections 3.14 and 4.14, Recreation.

6.2.1.20 Resource Conservation and Recovery Act

The Federal Resource Conservation and Recovery Act enables EPA to administer a regulatory program that extends from the manufacture of hazardous materials to their disposal, thus regulating the generation, transportation, treatment, storage, and disposal of hazardous waste at all facilities and sites in the nation.

No materials classified as hazardous are proposed to be used for the proposed EIPs.

6.2.1.21 Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA (also known as Superfund) was passed to facilitate the cleanup of the nation's toxic waste sites. In 1986, the act was amended by the Superfund Amendment and Reauthorization Act Title III (community right-to-know laws). Title III states that past and present owners of land contaminated with hazardous substances can be held liable for the entire cost of the cleanup, even if the material was dumped illegally when the property was under different ownership.

No hazardous waste sites were identified in the EIP study areas during reconnaissance surveys and record searches (Appendix I).

6.2.1.22 Wildlife Hazards on or Near Airports

The Federal Aviation Administration addresses control of hazardous wildlife in Advisory Circular 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports*. The Federal Aviation Administration provides direction on where public-use airports should restrict land uses that have the potential to attract hazardous wildlife. The Federal Aviation Administration recommends a distance of 10,000 feet separating wildlife attractants and aircraft movement areas. The area within a 10,000-foot radius of the Airport Operations Area is designated as the Critical Zone. The definition of wildlife attractants in Advisory Circular 150/5200-33A includes human-made or natural areas, such as poorly drained areas, retention ponds, agricultural activities, and wetlands. Advisory Circular 150/5200-33A recommends against the use of airport property for agricultural production within a 5-mile radius of the Airport Operations Area unless the income from the agricultural crops is necessary for the economic viability of the airport.

The Federal Aviation Administration has a regulatory interest in managing wildlife attractants within 5 miles of the edge of the Sacramento County Airport's Area of Operations. If potential borrow sites are identified within the 10,000-foot Airport Critical Zone, management of the grasslands created by borrow operations would be consistent with the Airport's *Wildlife Hazard Management Plan* (Sacramento County Airport System 2007).

6.2.1.23 Sustainable Fisheries Act

In response to growing concern about the status of United States fisheries, Congress passed the Sustainable Fisheries Act of 1996 (PL 104-297) to amend the Magnuson-Stevens Fishery

Conservation and Management Act (PL 94-265), the primary law governing marine fisheries management in the Federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect EFH. EFH includes those habitats that fish rely on throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem. The Sacramento River has been designated as EFH by the Pacific Fishery Management Council. As described above under ESA compliance, USACE and WSAFCA are in coordination with USFWS and NMFS and consultation will be initiated under Section 7 before publication of the Draft EIS/EIR and that process will include consideration of and compliance with the Magnuson-Stevens Act to determine effects on EFH. At this time, it is considered that no EFH would be affected.

6.2.1.24 Uniform Relocation Assistance and Real Property Acquisition Policies Act

All or portions of parcels within the CHP Academy EIP and The Rivers EIP footprints may need to be acquired to construct either of the action alternatives. Federal, state, local government agencies, and others receiving Federal financial assistance for public programs and projects that require the acquisition of real property must comply with the policies and provisions set forth in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended in 1987 (42 USC 4601 *et seq*.) (Uniform Act), and implementing regulation, Title 49 CFR Part 24. Relocation advisory services, moving costs reimbursement, replacement housing, and reimbursement for related expenses and rights of appeal are provided for in the Uniform Act.

If necessary, property acquisition and relocation services, compensation for living expenses for temporarily relocated residents, and negotiations regarding any compensation for temporary loss of business would be accomplished in accordance with the Uniform Act and California Government Code Section 7267 *et seq*.

6.2.2 State Requirements

6.2.2.1 California Environmental Quality Act

CEQA requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. The environmental review required imposes both procedural and substantive requirements. At a minimum, an initial review of the project and its environmental effects must be conducted. CEQA's primary objectives are to:

- disclose to decision makers and the public the significant environmental effects of proposed activities,
- identify ways to avoid or reduce environmental damage,
- prevent environmental damage by requiring implementation of feasible alternatives or mitigation measures,
- disclose to the public reasons for agency approval of projects with significant environmental effects,
- foster interagency coordination in the review of projects, and

- enhance public participation in the planning process.

CEQA applies to all discretionary activities proposed to be carried out or approved by California public agencies, including state, regional, county, and local agencies, unless an exemption applies. The act requires that public agencies comply with both procedural and substantive requirements. Procedural requirements include the preparation of the appropriate public notices (including notices of preparation), scoping documents, alternatives, environmental documents (including mitigation measures, mitigation monitoring plans, responses to comments, findings, and statements of overriding considerations), completion of agency consultation and State Clearinghouse review, and provisions for legal enforcement and citizen access to the courts.

CEQA's substantive provisions require agencies to address environmental impacts disclosed in an appropriate document. When avoiding or minimizing environmental damage is not feasible, CEQA requires agencies to prepare a written statement of overriding considerations when they decide to approve a project that will cause one or more significant effects on the environment that cannot be mitigated. CEQA establishes a series of action-forcing procedures to ensure that agencies accomplish the purposes of the law. In addition, under the direction of CEQA, the California Resources Agency has adopted regulations, known as the State CEQA Guidelines, which provide detailed procedures that agencies must follow to implement the law.

This document is the instrument for CEQA compliance for the proposed EIPs under the USACE's authority, as described in Chapter 1.

6.2.2.2 California Endangered Species Act

CESA is similar to ESA but pertains only to state-listed endangered and threatened species. CESA requires state agencies to consult with DFG when preparing documents under CEQA to ensure that the actions of the state lead agency do not jeopardize the continued existence of listed species. CESA directs agencies to consult with DFG on projects or actions that could affect listed species, directs DFG to determine whether there would be jeopardy to listed species, and allows DFG to identify "reasonable and prudent alternatives" to the project consistent with conserving the species. Agencies can approve a project that affects a listed species if the agency determines that there are "overriding considerations;" however, the agencies are prohibited from approving projects that would cause the extinction of a listed species.

Mitigating impacts on state-listed species involves avoidance, minimization, and compensation (listed in order of preference). Unavoidable impacts on state-listed species are typically addressed in a detailed mitigation plan prepared in accordance with DFG guidelines. DFG exercises authority over mitigation projects involving state-listed species, including those resulting from CEQA mitigation requirements.

CESA prohibits the "take" of plant and wildlife species state-listed as endangered or threatened. DFG may authorize take if there is an approved habitat management plan or management agreement that avoids or compensates for impacts on listed species.

Take of state-listed species or substantial degradation of habitat is not presently anticipated during construction or operation of the CHP Academy EIP and The Rivers EIP, so specific take authorization is not triggered. Effects on wildlife resources are discussed in Sections 3.9, and 4.9, Wildlife.

6.2.2.3 Natural Community Conservation Planning Act

The NCCPA (California Fish and Game Code Section 2800 *et seq.*) was enacted to support broad-based planning for effective protection and conservation of the state's wildlife heritage, while continuing to allow appropriate development and growth. The purpose of natural community conservation planning is to sustain and restore those species and their habitat identified by DFG that are necessary to maintain the continued viability of biological communities affected by human changes to the landscape. A Natural Community Conservation Plan identifies and provides for those measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible use of the land. DFG may authorize the take of any identified species, including listed and non-special-status species, pursuant to Section 2835 of the NCCPA, if the conservation and management of such species is provided for in a Natural Community Conservation Plan approved by DFG.

The CHP Academy EIP and The Rivers EIP would not affect the take of state-listed species or substantially degrade habitat, so a Natural Community Conservation Plan is not triggered. Effects on biological resources are discussed in Sections 3.7 and 4.7, Vegetation and Wetlands, and Sections 3.9 and 4.9, Wildlife.

6.2.2.4 Section 1602 of the California Fish and Game Code

DFG regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to Fish and Game Code Sections 1600 to 1607. Any action from a public project that substantially diverts or obstructs the natural flow or changes the bed, channel, or bank of any river, stream, or lake, or uses material from a streambed must be previously authorized by DFG in a lake or streambed alteration agreement under Section 1602 of the Fish and Game Code. This requirement may in some cases apply to any work undertaken within the 100-year floodplain of a body of water or its tributaries, including intermittent streams and desert washes. As a general rule, however, it applies to any work done within the annual high-water mark of a wash, stream, or lake that contains or once contained fish and wildlife, or that supports or once supported riparian vegetation.

Applications for Streambed Alteration Agreements will be submitted to DFG to authorize the CHP Academy EIP and The Rivers EIP under Section 1602.

6.2.2.5 Porter-Cologne Water Quality Control Act of 1969

In 1967, the Porter-Cologne Act established the State Water Board and nine RWQCBs as the primary state agencies with regulatory authority over California water quality and appropriative surface water rights allocations. Under this act (and the CWA), the state is required to adopt a water quality control policy and WDRs to be implemented by the State Water Board and nine RWQCBs. The State Water Board also establishes Basin Plans and statewide plans. The RWQCBs carry out State Water Board policies and procedures throughout the state.

Basin Plans designate beneficial uses for specific surface water and groundwater resources and establish water quality objectives to protect those uses. The project has the potential to affect water quality in surface water or groundwater within the project area which is governed by the Central Valley RWQCB.

Sections 3.2 and 4.2, Water Quality and Groundwater Resources, describe water quality effects and mitigation measures for the CHP Academy EIP and The Rivers EIP.

6.2.2.6 Central Valley Flood Protection Board Encroachment Permit

The CVFPB (formerly The Reclamation Board) requires an encroachment permit for any non-Federal activity along or near Federal flood damage reduction project levees and floodways or in CVFPB-designated floodways to ensure that proposed local actions or projects do not impair the integrity of existing flood damage reduction systems to withstand flood conditions. The permits are conditioned upon WSAFCA's receipt of permission from USACE for alteration of the Federal project works pursuant to Section 408.

6.2.2.7 California Surface Mining and Reclamation Act

The California Surface Mining and Reclamation Act of 1975 (PRC Section 2710 *et seq*.) (SMARA) addresses surface mining. Activities subject to SMARA include, but are not limited to, mining of minerals, gravel, and borrow material. The SMARA statute requires mitigation to reduce adverse impacts on public health, property, and the environment. Because SAFCA would require borrow material for project construction, SAFCA must comply with SMARA. SMARA applies to an individual or entity that would disturb more than 1 acre or remove more than 1,000 cubic yards of material through surface mining activities, including the excavation of borrow pits for soil material. SMARA is implemented through ordinances for permitting developed by local government "lead agencies" that provide the regulatory framework under which local mining and reclamation activities are conducted. The State Mining and Geology Board reviews the local ordinances to ensure that they meet the procedures established by SMARA.

The CHP Academy EIP and The Rivers EIP would use borrow from permitted sources; therefore, a SMARA permit would not be required.

6.2.2.8 California Important Farmland Inventory System and Farmland Mapping and Monitoring Program

The California Department of Conservation, Office of Land Conservation, maintains a statewide inventory of farmlands. These lands are mapped by the Division of Land Resource Protection as part of the Farmland Mapping and Monitoring Program. The maps are updated every 2 years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance. Farmlands are divided into the following five categories based on their suitability for agriculture.

- Prime Farmland: land that has the best combination of physical and chemical characteristics for crop production. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed.
- Farmland of Statewide Importance: land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production.
- Unique Farmland: land that does not meet the criteria for Prime Farmland or Farmland of Statewide Importance, but that has been used for the production of specific crops with high economic value.
- Farmland of Local Importance: land that is either currently producing crops or has the capability of production, but that does not meet the criteria of the categories above.

- Grazing Land: land on which the vegetation is suited to the grazing of livestock.

These categories are sometimes referred to as Important Farmland. Other categories used in the mapping system are urban and built-up lands, lands committed to non-agricultural use, and other lands (land that does not meet the criteria of any of the other categories).

Prime Farmland and Farmland of Statewide Importance that occurs in the city of West Sacramento is concentrated in areas adjacent to the Sacramento River in the southern portion of the city (California Department of Conservation 2008). No farmland would be affected by the CHP Academy EIP or The Rivers EIP.

6.2.2.9 California Land Conservation Act (Williamson Act)

The California Land Conservation Act of 1965, commonly known as the Williamson Act (California Government Code Section 51200 *et seq*.), enables local governments to enter into contracts with private landowners for the purpose of promoting the continued use of the relevant land in agricultural or related open space use. In return, landowners receive property tax assessments that are based on farming and open space uses instead of full market value. Local governments receive an annual subvention (subsidy) of forgone property tax revenues from the state via the Open Space Subvention Act of 1971.

The Williamson Act empowers local governments to establish agricultural preserves consisting of lands devoted to agricultural uses and other compatible uses. Upon establishment of such preserves, the locality may offer to owners of included agricultural land the opportunity to enter into annually renewable contracts that restrict the land to agricultural use for at least 10 years (i.e., the contract continues to run for 10 years following the first date upon which the contract is not renewed). In return, the landowner is guaranteed a relatively stable tax rate, based on the value of the land for agricultural/open space use only and unaffected by its development potential.

As a public agency that may acquire lands within agricultural preserves, including lands under contract, SAFCA is exempt from the normal cancellation process for Williamson Act contracts, because the contract is nullified for the portion of the land actually acquired (California Government Code Section 51295). SAFCA must provide notice to the California Department of Conservation prior to acquiring such lands (California Government Code Section 51291[b]). A second notice is required within 10 working days after the land is actually acquired (California Government Code Section 51291 (c J). As the land would be acquired for flood damage reduction measures, SAFCA is exempt from the findings required in California Government Code Section 51292 (California Government Code Section 51293[e][1]) because the proposed project consists of flood control works. The preliminary notice to the California Department of Conservation, provided before lands are actually acquired, would demonstrate the purpose of the project and the exemption from the findings.

There are no Williamson Act contracts within the city limits.

6.2.2.10 California Fish and Game Code Section 3503 and 3503.5—Protection of Bird Nests and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders *Falconiformes* and *Strigiformes*), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

6.2.2.11 California Fish and Game Code—Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take of fully protected species. DFG has informed non-Federal agencies and private parties that their actions must avoid take of any fully protected species.

6.2.2.12 Basin Plan

Pursuant to the Porter-Cologne Act, the Central Valley RWQCB prepares and updates the Basin Plan for the Sacramento and San Joaquin River Basins every 3 years; the most recent update was completed in February 2007 (Central Valley Regional Water Quality Control Board 2007). The Basin Plan describes the officially designated beneficial uses for specific surface water and groundwater resources and the enforceable water quality objectives necessary to protect those beneficial uses. The Natomas Basin is located within the Central Valley RWQCB jurisdiction and is subject to the Basin Plan.

The Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. Numerical objectives are set for temperature, DO, turbidity, and pH; TDS, electrical conductivity, bacterial content, and various specific ions; trace metals; and synthetic organic compounds. Narrative objectives are set for parameters such as suspended solids, biostimulatory substances (e.g., nitrogen and phosphorus), oil and grease, color, taste, odor, and aquatic toxicity. Narrative objectives are often precursors to numeric objectives. The primary method used by the Central Valley RWQCB to ensure conformance with the Basin Plan's water quality objectives and implementation policies and procedures is to issue WDRs for projects that may discharge wastes to land or water. WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

6.2.2.13 California Toxics Rule and State Implementation Policy

The CTR was promulgated in 2000 in response to requirements of the EPA NTR. The NTR and CTR criteria are regulatory criteria adopted for inland surface waters, enclosed bays, and estuaries in California that are subject to regulation pursuant to Section 303(c) of the CWA. The NTR and CTR include criteria for the protection of aquatic life and human health. Human health criteria (water and organisms) apply to all waters with a Municipal and Domestic Supply beneficial use designation as indicated in the RWQCBs' basin plans. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Plan, was adopted by the State Water Board in 2000 to establish provisions for translating CTR criteria, NTR criteria, and basin plan water quality objectives for toxic pollutants into the following:

- NPDES permit effluent limits,
- compliance determinations,

- monitoring for dioxin (2,3,7,8-TCDD) equivalents,
- chronic toxicity control provisions,
- initiating site-specific objective development, and
- granting exceptions.

See Sections 3.2 and 4.2, Water Quality and Groundwater Resources, for information related to the CHP Academy EIP and The Rivers EIP.

6.2.2.14 California Register of Historic Resources

The CRHR includes resources that are listed in or formally determined eligible for listing in the NRHP (see Section 3.18, Cultural Resources) as well as some California State Landmarks and Points of Historical Interest (PRC Section 5024.1, 14, CCR Section 4850). Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA unless a preponderance of evidence indicates otherwise (State CEQA Guidelines Section 15064.5[a][2]). The eligibility criteria for listing in the CRHR are similar to those for NRHP listing but focus on the importance of the resources to California history and heritage. A cultural resource may be eligible for listing in the CRHR if it:

1. is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. is associated with the lives of person important in our past;
3. embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important individual, or possesses high artistic values; or
4. has yielded, or may be likely to yield, information important in prehistory or history.

6.2.2.15 Native American Heritage Commission

NAHC identifies and catalogs places of special religious or social significance to Native Americans and known graves and cemeteries of Native Americans on private lands, and performs other duties regarding the preservation and accessibility of sacred sites and burials and the disposition of Native American human remains and burial items. Consultation with NAHC and the Sacred Lands database was negative for findings in the study area.

6.2.2.16 California Climate Solutions Act

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that CARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Contributions of GHG emissions related to the CHP Academy EIP and The Rivers EIP are discussed in Sections 3.2 and 4.2, Air Quality and Climate Change.

6.2.2.17 State of California General Plan Guidelines

The OPR published the *State of California General Plan Guidelines* (Governor's Office of Planning and Research 2003), which provides guidance for the acceptability of projects within specific L_{dn} contours. Generally, residential uses (e.g., mobile homes) are considered to be acceptable in areas where exterior noise levels do not exceed 60 dBA L_{dn}. Residential uses are normally unacceptable in areas exceeding 70 dBA L_{dn} and conditionally acceptable within 55–70 dBA L_{dn}.

Schools are normally acceptable in areas up to 70 dBA Ldn and normally unacceptable in areas exceeding 70 dBA L_{dn}. Commercial uses are normally acceptable in areas with a CNEL of up to 70 dBA. Commercial uses are conditionally acceptable where the Ldn is between 67.5 and 77.5 dBA, depending on the noise insulation features and the noise reduction requirements. The guidelines also provide adjustment factors for determining noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

Noise studies and project-related impacts and mitigation are discussed in Sections 3.6and 4.6, Noise.

6.2.2.18 California Code of Regulations, Title 24

Title 24 of CCR establishes standards governing interior noise levels that apply to all new multi-family residential units in California. These standards require that acoustical studies be performed before construction begins at locations where the existing L_{dn} exceeds 60 dBA. Such acoustical studies are required to establish mitigation measures that limit maximum L_{dn} levels to 45 dBA in any habitable room. Although no generally applicable interior noise standards are pertinent to all uses, many communities in California have adopted an L_{dn} of 45 dBA as an upper limit on interior noise in all residential units.

Noise studies are discussed in Section 3.6 and 4.6, Noise.

6.2.2.19 Central Valley Flood Control Act of 2008

The Central Valley Flood Control Act of 2008, passed in 2007, recognizes that the Central Valley of California, which includes the City of West Sacramento, is experiencing unprecedented development, resulting in the conversion of historically agricultural lands and communities to densely populated residential and urban centers. Because of the potentially catastrophic consequences of flooding, the Act recognizes that the Federal government's current 100-year flood protection standard is not sufficient to protect urban and urbanizing areas within flood-prone areas throughout the Central Valley and declares that the minimum standard for these areas is a 200-year level of flood protection. To continue with urban development, cities and counties must develop and implement plans for achieving this new standard by 2025. With respect to flood risk reduction, the Central Valley Flood Control Act also calls upon DWR to develop a comprehensive CVPP by the end of 2012 for protecting the lands currently within the Sacramento–San Joaquin River Flood Management System.

6.2.2.20 California Regulations for Environmental Justice

Most state governments have plans and policies intended to protect and expand the local and regional economies affecting the communities within their jurisdictions. State plans and policies also frequently address other social and economic impact topics, including fiscal conditions and related public services that affect local residents' quality of life.

Within California, SB 115 (Chapter 690, Statutes of 1999) was signed into law in 1999. The legislation established OPR as the coordinating agency for state environmental justice programs (California Government Code, Section 65040.12[a]) and defined environmental justice in statute as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Government Code Section 65040.12(e). SB 115 further required the CalEPA to develop a model environmental justice mission statement for boards, departments, and offices within the agency by January 1, 2001 (Public Resources Code, Sections 72000–72001).

In 2000, SB 89 (Chapter 728, Statutes of 2000) was signed, which complemented SB 115 by requiring the creation of an environmental justice working group and an advisory group to assist CalEPA in developing an intra-agency environmental justice strategy (PRC Sections 72002–72003). SB 828 (Chapter 765, Statutes of 2001) added and modified due dates for the development of CalEPA's intra-agency environmental justice strategy and required each board, department, and office within CalEPA to identify and address, no later than January 1,2004, any gaps in its existing programs, policies, and activities that may impede environmental justice (PRC, Sections 71114–71115).

Cal/EP A adopted its environmental justice policy in 2004 (California PRC, Sections 71110–71113). This policy (or strategy) provides guidance to its resource boards, departments, and offices. It is intended to help achieve the state's goal of "achieving fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation and enforcement of environmental laws and policies."

AB 1553 (Chapter 762, Statutes of 2001) required OPR to incorporate environmental justice considerations in the General Plan Guidelines. AB 1553 specified that the guidelines should propose methods for local governments to address the following:

- planning for the equitable distribution of new public facilities and services that increase and enhance community quality of life,
- providing for the location of industrial facilities and uses that pose a significant hazard to human health and safety in a manner that seeks to avoid over-concentrating these uses in proximity to schools or residential dwellings,
- providing for the location of new schools and residential dwellings in a manner that avoids proximity to industrial facilities and uses that pose a significant hazard to human health and safety, and

- promoting more livable communities by expanding opportunities for transit-oriented development.

Although environmental justice is not a mandatory topic in the general plan, OPR is required to provide guidance to cities and counties for integrating environmental justice into their general plans. The 2003 edition of the *General Plan Guidelines* included the contents required by AB 1553 (see pages 8, 12, 20–27, 40, 114, 142, 144, and 260 of the revised *General Plan Guidelines*).

Environmental justice issues pertaining to the CHP Academy EIP and The Rivers EIP are discussed in Sections 3.12 and 4.12, Environmental Justice.

6.2.2.21 Water Use Efficiency

The California Constitution prohibits the waste or unreasonable use of water. Further, Water Code Section 275 directs DWR and the State Water Board to “take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste or unreasonable use of water.” Several legislative acts have been adopted to develop efficient use of water in the state:

- Urban Water Management Planning Act of 1985,
- Water Conservation in Landscaping Act of 1992,
- Agricultural Water Management Planning Act,
- Agricultural Water Suppliers Efficient Management Practices Act of 1990,
- Water Recycling Act of 1991, and
- Agricultural Water Conservation and Management Act of 1992.

The purpose of the CHP Academy EIP and The Rivers EIP is to address flood issues; they would not result in the waste or unreasonable use of water.

6.2.2.22 Public Trust Doctrine

When planning and allocating water resources, the State of California is required to consider the public trust and preserve for the public interest the uses protected by the trust. The public trust doctrine embodies the principle that certain resources, including water, belong to all and, thus, are held in trust by the state for future generations.

In common law, the public trust doctrine protects navigation, commerce, and fisheries uses in navigable waterways. However, the courts have expanded the doctrine’s application to include protecting tideland, wildlife, recreation, and other public trust resources in their natural state for recreational, ecological, and habitat purposes as they affect birds and marine life in navigable waters. *The National Audubon Society v. Superior Court of Alpine County* (1983) 33 Cal 3d 419 decision extended the public trust doctrine’s limitations on private rights to appropriative water rights, and also ruled that longstanding water rights could be subject to reconsideration and could possibly be curtailed. The doctrine, however, generally requires the court and the State Water Board to perform a balancing test to weigh the potential value to society of a proposed or existing diversion against its impact on trust resources.

The 1986 Rancanelli decision applied the public trust doctrine to decisions by the State Water Board and held that this doctrine must be applied by the State Water Board in balancing all the competing interests in the uses of Bay-Delta waters (*United States v. State Water Resources Control Board* [1986] 182 Cal. App. 3d 82).

The CHP Academy EIP and The Rivers EIP are consistent with the public trust doctrine, as their primary goals include improved flood control.

6.2.2.23 Davis-Dolwig Act

The Davis-Dolwig Act declares that recreation and fish and wildlife enhancement are among the purposes of state water projects. It specifies that costs for recreation and fish and wildlife enhancement not be included in prices, rates, and charges for water and power to urban and agricultural users. Under the Davis-Dolwig Act, land for recreation and fish and wildlife enhancement must be planned and initiated at the same time as any other land acquisition for the project. Implementation of the Program would include the construction of recreation facilities such as wildlife viewing areas, trails, boat ramps, and a promenade. Therefore, the CHP Academy EIP and The Rivers EIP would be consistent with this act.

6.2.2.24 Relocation Assistance and Property Acquisition

The State of California's Government Code Section 7260, *et seq.* brings the California Relocation Act into conformity with the Federal Uniform Act. In the acquisition of real property by a public agency, both the Federal and state acts seek to (1) ensure consistent and fair treatment of owners of real property, (2) encourage and expedite acquisition by agreement to avoid litigation and relieve congestion in the courts, and (3) promote confidence in public land acquisition.

The Relocation Assistance and Real Property Acquisition Guidelines were established by 25 CCR 1.6. The guidelines were developed to assist public entities with developing regulations and procedures implementing Title 42, Chapter 61 of the USC, the Uniform Act, for Federal and Federally-assisted programs. The guidelines are designed to ensure that uniform, fair, and equitable treatment is given to people displaced from their homes, businesses, or farms as a result of the actions of a public entity. Under the act, persons required to relocate temporarily are not considered displaced, but must be treated fairly. Such persons have a right to temporary housing that is decent, safe, and sanitary, and must be reimbursed for all reasonable out-of-pocket expenses. In accordance with these guidelines, people may not suffer disproportionate injury as a result of action taken for the benefit of the public as a whole. Additionally, public entities must ensure consistent and fair treatment of owners of such property, and encourage and expedite acquisitions by agreement with owners of displaced property to avoid litigation.

Property acquisition and relocation services, compensation for living expenses for temporarily relocated residents, and negotiations regarding any compensation for temporary loss of business would be accomplished in accordance with the Uniform Act (see above) and California Government Code Section 7267 *et seq*.

6.2.3 State and Regional Plan Consistency

6.2.3.1 Clean Water Act, Section 303(d)

Under CWA Section 303(d), the RWQCB and the State Water Board list water bodies as impaired when not in compliance with designated water quality objectives and standards. A TMDL program must be prepared for waters identified by the state as impaired. A TMDL is a quantitative assessment of a problem that affects water quality. The problem can include the presence of a pollutant, such as a heavy metal or a pesticide, or a change in the physical property of the water, such as DO or temperature. A TMDL specifies the allowable load of pollutants from individual sources to ensure compliance with water quality standards. Once the allowable load and existing source loads have been determined, reductions in allowable loads are allocated to individual pollutant sources.

The CHP Academy EIP and The Rivers EIP would have no effect on TMDL issues for the Sacramento River.

6.2.3.2 Water Rights

The State of California recognizes riparian and appropriative surface water rights. Riparian rights are correlative entitlements to water that are held by owners of land bordering natural watercourses. California requires a statement of diversion and use of natural flows on adjacent riparian land under a riparian right. Appropriative water rights allow the diversion of a specified amount of water from a source for reasonable and beneficial use during all or a portion of the year. In California, previously issued appropriative water rights are superior to and take precedence over newly granted rights. The State Water Board has authority to issue permits to grant appropriative water rights. The CHP Academy EIP and The Rivers EIP are consistent with current water rights.

6.2.4 Local Plan Consistency and Regulatory Requirements

In addition to the Federal and state regulatory and local plan requirements, the project may be subject to certain zoning or other ordinances and general plans of Yolo County and the City of West Sacramento. For more discussion on local plans and requirements applicable to the project, refer to the Regulatory Setting part of the specific resource sections of interest within this document.

Chapter 7
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7.21.1 Personal Communications

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Chapter 8
List of Preparers

This EIS/EIR was prepared by ICF International at the direction of USACE, with participation from WSAFCA as the applicant and CEQA lead agency. The following individuals participated in the preparation of this EIS/EIR.

8.1 U.S. Army Corps of Engineers

Name	Education/Experience	Responsibility
John Suazo	B.A. Environmental Studies; 17 years experience	USACE Project Manager (environmental)
Claire Marie Turner	B.S. Marine Biology; 3 years experience	Section 408 Project Manager
Lisa Clay	J.D.; 22 years experience	Legal Review

8.2 West Sacramento Area Flood Control Agency

Name	Education/Experience	Responsibility
John Powderly	B.S. Electrical Engineering; 6 years experience	Environmental Project Manager/City of West Sacramento Associate Planner
Michael Bessette	B.S. Civil Engineering; 19 years experience	Flood Program Manager, City of West Sacramento
Dave Shpak	B.S. Environmental Policy Analysis and Planning; 22 years experience	Park Development Manager, City of West Sacramento
Ken Jameson	B.A. Anthropology/Geology, Licensed Professional Geologist; 12 years experience	Engineering Assistant, City of West Sacramento
Ken Ruzich	B.S. Civil Engineering; 30 years experience	General Manager, WSAFCA, Reclamation District 900

1 # 8.3 ICF International

Name	Education/Experience	Responsibility
Christopher Elliott	B.S. Landscape Architecture; 15 years experience	Project Director
Tanya D. Matson	B.A. Environmental Studies; 10 years experience	Project Manager
Laurel Armer	B.S. Environmental Horticulture and Urban Forestry; 7 years experience	Project Manager
Jennifer Rogers	B.A Journalism; 6 years experience	Project Coordinator
Sara Martin	B.A. Anthropology & German; 8 years experience	Environmental Resource Analyst
Carol-Anne Hicks	B.S. Environmental & Resource Sciences; 7 years experience	Publications Specialist
Kate Walsh	B.A. Art History & Photography; 8 years experience	Publications Specialist
Laura Cooper	B.A. Psychology; 20 years experience	Editor
Darle Tilly	B.A. English Literature; 25+ years experience	Editor
Andrew Humphrey	B.A. History; 1 year experience	Environmental Resource Analyst
Lesa Erecius	B.S. Physiology, M.S. Pharmacology & Toxicology (aquatic toxicology focus); 3.5 years of experience	Environmental Resource Analyst
Julia Hooten	B.A. Geography (concentration in Biology/Physical Environment); 1 year experience	Environmental Resource Analyst
Joshua Carman	B.A. Environmental Studies; 5 years experience	Noise Analyst
Jim Wilder	B.S Civil Engineering, M.S. Environmental Engineering; 32 years experience	Air Quality and Climate Change and Noise
Kai-Ling Kuo	B.S. Civil Engineering, M.S. Civil & Environmental Engineering; 6 years experience	Air Quality and Climate Change
Kristin Teddy	B.S. Landscape Architecture; 3 years experience	Visual Resources
Jeff Peters	B.A. Geology, M.S. Geography; 7 years experience	Geology, Seismicity, Soils, and Mineral Resources
Nate Martin	B.A. Environmental Studies, M.S. Public Policy; 9 years experience	Water Quality and Groundwater Resources
Andrea Mauro	B.S. Geography (emphasis on soil science); 3 years experience	Geology, Seismicity, Soils, and Mineral Resources
Jennifer Stock	BLA Landscape Architecture; 10 years experience	Visual Resources
Jessica Hughes	B.S. Biology, M.S. Botany & Plant Pathology; 4 years experience	Vegetation and Wetlands
Brad Schafer	B.S. Biology; 12 years experience	Vegetation and Wetlands
Erin Hitchcock	B.S. Wildlife, Fisheries, and Conservation Biology; 7 years experience	Wildlife
Gabriel Roark	B.A. Anthropology; 10 years experience	Cultural Resources
Madeline Bowen	B.A. Liberal Studies/Social Science, M.S. History; 13 years experience	Cultural Resources
Traci O'Brien	B.A. Anthropology; 22 years experience	Cultural Resources
Trish Fernandez	B.A. Anthropology, M.S. Anthropology; 14 years experience	Cultural Resources

Name	Education/Experience	Responsibility
Donna Maniscalco	B.S. Wildlife, Fish, and Conservation Biology; 8.5 years experience	Fisheries and Aquatics
Bill Mitchell	M.S. Fisheries Biology; 24+ years experience	Fisheries and Aquatics
Becky Crosswhite	B.S. Community & Regional Development; 9 years experience	GIS technician
Alan Barnard	Graphic & Web Designer;13 years experience	Graphic designer
John Durnan	B.S. Biochemistry, Web site Design; 6 years experience	Graphic designer
Sacha Selim	B.A. Business Management Economics; 8 years experience	GIS technician

8.4 Other Contributors

Name	Education/Experience	Responsibility
Ric Reinhardt, P.E.(MBK Engineers	M.S. Civil Engineering, B.S. Civil Engineering; 15 years experience	Program Manager (consultant to WSAFCA)
Derek Larsen, P.E. (MBK Engineers)	Master of Business Administration, B.S. Environmental Engineering; 14 years experience	Program Coordinator (consultant to WSAFCA)
Ben Tustison, P.E. (MBK Engineers)	M.S. Civil Engineering, B.S. Geological Engineering; 11 years experience	Hydraulic Analyst (consultant to WSAFCA)
Eric Nagy, P.E. (HDR)	B.S. Civil Engineering; 12 years experience	Engineering Project Manager (consultant to WSAFCA)
Michael Vecchio, P.E. (HDR)	M.S. Civil Engineering, B.S. Geological Sciences, B.A. English; 13 years experience	Engineering Lead Designer (consultant to WSAFCA)

Chapter 9
List of Recipients

The following elected official and representatives, Federal, state, local agencies, private organizations, businesses, and residents of the City of West Sacramento would either receive a copy of the draft EIS/EIR or a notification of document availability. Individuals who may be affected by the project or have expressed interest through the public involvement process would also be notified.

9.1 Elected Officials and Representatives

- Alyson Huber, Assemblymember, 10th Assembly District
- Barbara Boxer, Senator, United States Senate
- Barbara Kondylis, Supervisor, Solano County—District 1
- Bill Berryhill, Assemblyman, 26th Assembly District
- Darrell Steinberg, State Senator, 6th Senate District
- Dianne Feinstein, Senator, United States Senate
- Don Nottoli, Supervisor, Sacramento County—District 5
- Doris Matsui, U.S. Congresswoman, 5th Congressional District
- Duane Chamberlain, Supervisor, Yolo County—District 5
- Helen Thomson, Supervisor, Yolo County—District 2
- James P. Spering, Supervisor, Solano County—District 3
- Jim Provenza, Supervisor, Yolo County—District 4
- Jimmie Yee, Supervisor, Sacramento County—District 2
- Joan Buchanan, Assemblymember, 15th Assembly District
- John Garamendi, U.S. Congressman, 10th Congressional District
- John M. Vasquez, Supervisor, Solano County—District 4
- Linda J. Seifert, Supervisor, Solano County—District 2
- Lois Wolk, State Senator, 5th Senate District
- Marika Yamada, Assemblymember, 8th Assembly District
- Matt Rexroad, Supervisor, Yolo County—District 3
- Michael J. Reagan, Supervisor, Solano County—District 5
- Mike McGowan, Supervisor, Yolo County—District 1
- Mike Thompson, U.S. Congressman, 1st Congressional District
- Roberta MacGlashan, Supervisor, Sacramento County—District 4
- Roger Dickinson, Supervisor, Sacramento County—District 1
- Susan Peters, Supervisor, Sacramento County—District 3

9.2 Government Department and Agencies

9.2.1 U.S. Government

- Federal Emergency Management Agency
- National Marine Fisheries Service
- Native American Heritage Commission
- U.S. Army Corps of Engineers, Sacramento District Environmental Analysis Section
- U.S. Bureau of Reclamation - Mid-Pacific Region
- U.S. Department of the Interior
- U.S. Environmental Protection Agency, Region 9
- U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office
- United States Coast Guard, District 11
- USDA Natural Resources Conservation Service
- U.S. Environmental Protection Agency, San Francisco Office

9.2.2 State of California

- California Department of Boating and Waterways
- California Department of Conservation
- California Department of Fish and Game
- California Department of General Services
- California Department of Parks and Recreation
- California Department of Transportation - District 3
- California Department of Water Resources
- California Highway Patrol Academy
- California Public Utilities Commission
- California State Lands Commission
- Central Valley Flood Protection Board
- Central Valley Regional Water Quality Control Board
- Delta Protection Commission
- Office of Historic Preservation
- Reclamation District 537
- Reclamation District 811
- Sacramento Metropolitan Air Quality Management District
- State Clearinghouse, Office of Planning & Research
- State Water Resources Control Board, Division of Water Rights
- West Sacramento Area Flood Control Agency
- Yolo-Solano Air Quality Management District

9.2.3 Regional, County and City

- City of Sacramento
- City of West Sacramento
- Contra Costa County
- Napa County Planning Commission
- Sacramento Area Flood Control Agency
- Sacramento County Planning and Community Development
- Sacramento County Regional Sanitation District
- Sacramento Public Library
- Solano County
- Solano County Library
- Sutter County Planning Division
- Washington Unified School District
- Yolo County Agricultural Commissioner
- Yolo County Environmental Health Department
- Yolo County Library
- Yolo County Planning Department
- Yolo County Transit District
- Yolo County - Yolo Natural Heritage Program

9.3 Private Organizations, Businesses, and Residents

- Alvin Inenaga
- Bill Falik
- Brown and Caldwell
- Cheryl and Bobby Cobbs
- Cindy Kawano
- Cliff Jones
- Dan Ramos
- Dan Young
- David Doomey
- David Sanders
- Dee Young
- Dena Kirtley
- Dennis Wood
- Don Ratly
- Downey Brand

- Frank Herrera
- Friends of the Swainson's Hawk
- Greg Potnick
- HDR Engineering
- Helen Smith
- James Bruchill & Associates
- Jeffrey Twitchell
- Jeralyn and William Wingfield
- JF Schneider
- Joan Miszak & Doug Berg
- Joe Goeden
- John Ohslan
- John and Leticia Yap
- Kiewit Pacific
- Laren Brandon
- Manuela Rumsey
- MBK Engineers
- Myriam Fravsto
- Pat Flint
- Port of West Sacramento
- Randall Patterson
- Residents surrounding the CHP EIP and Rivers EIP Project sites
- Robert Himes
- Rodney Watson
- Russell Liebig
- Ruth Alexander
- Save our City
- Scott Doyle
- Sierra Holdings LLC
- Sierra Northern Railway
- The Grupe Company
- The Pacific Gas and Electric Company
- Thomas & Louise Chiu
- Trevor Burwell
- Wesley Andrews
- Wildlands

9.4 Non-Governmental Organization

- Sacramento Area Bicycle Advocates
- Sierra Club Mother Lode Chapter
- Sierra Club, Yolano Group
- Sierra Club, Yolano Group
- Friends of the Swainson's Hawk
- Defenders of Wildlife
- West Sacramento Conservancy
- West Sacramento Historical Society
- Yolo Audubon Society
- Tuleyome
- Sierra Club
- Habitat 2020, Sacramento

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