

**REPORT SUMMARY
FOR
ORESTIMBA CREEK,
WEST STANISLAUS COUNTY, CALIFORNIA**

Feasibility Scoping Meeting:	19 DEC 2001
Alternative Formulation Briefing:	09 JUL 2012
AFB Guidance Memorandum:	01 OCT 2012
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30-Day S&A Review end:	XX DATE 2013
FONSI Executed:	XX DATE 2013

STUDY INFORMATION

Study Authority.

This investigation is being conducted under the authority of the Flood Control Act of 1936 (Public Law [PL] 74-738). Section 2 of this Act states “that, hereafter, Federal investigations and improvements of river and other waterways for flood control and allied purposes shall be under the jurisdiction of and shall be prosecuted by the War Department under the direction of the Secretary of War and supervision of the Chief of Engineers...”.

Section 6 of the 1936 Flood Control Act states: “The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys for flood control at the following named localities: Sacramento and San Joaquin River Valleys, California ... Provided further, That after the regular or formal reports made as authorized on any examination, survey, project, or work under way or proposed are submitted to Congress, no supplemental or additional report or estimate shall be made unless authorized by law or by resolution of the Committee on Flood Control of the House of Representatives or the Committee on Commerce of the Senate. House Document No. 367, dated October 13, 1949, is a Letter from the Secretary of the Army on the Sacramento – San Joaquin Basin Streams, California which states: “A Letter from the Chief of Engineers, United States Army, Dated July 27, 1948, submitting a report, together with accompanying papers and illustrations, on preliminary examinations and surveys of Sacramento-San Joaquin River Basin Streams, California. For Flood Control and allied purposes listed in the Report. This investigation was authorized by the Flood Control Acts of June 22, 1936 and June 28, 1938.”

A House Resolution was adopted on May 8, 1964 which stated: "Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the report on Sacramento-San Joaquin Basin Streams, California, published as House Document No. 367, 81st Congress, 1st Session, and other reports, with a view to determining whether any modifications of the recommendations contained therein are advisable at this time, with particular reference to further coordinated development of the water resources in the San Joaquin River Basin, California."

Funds to initiate the reconnaissance study were provided in the Energy and Water Development Appropriations Act, 1997 (PL 104-206), for the San Joaquin River Basin, West Stanislaus County, California. Beginning in fiscal year (FY) 2003 feasibility funding was provided specifically for the San Joaquin River Basin, West Stanislaus County, Orestimba Creek, California spin-off study.

Study Sponsor.

The U.S. Army Corps of Engineers (USACE) initiated the Feasibility Study at the request of Stanislaus County, the non-Federal sponsor for the study. The State of California Department of Water Resources (DWR) has contributed funding in support of the non-Federal share of the study costs. USACE and Stanislaus County are the lead agencies in the Feasibility Study, with USACE taking the lead under National Environmental Policy Act (NEPA) activities and Stanislaus County taking the lead under the California Environmental Quality Act (CEQA).

Study Purpose and Scope.

The purpose of the Orestimba Creek project is to investigate and determine the extent of Federal interest in plans that reduce flood risk in the City of Newman and the surrounding agricultural areas, which have experienced multiple flooding events in the past 75 years since records have been maintained.

This report: (1) assesses the risk of flooding to the City of Newman and the surrounding agricultural areas; (2) describes a range of alternatives formulated to reduce flood risk; and (3) identifies a recommended plan for implementation.

This study will only partially address the San Joaquin River Basin Authority. Therefore, the Orestimba Creek Feasibility Study will be called an “Interim Feasibility Report” which indicates that the study is addressing the water resource issues of a specific area within the authority, rather than the entire area authorized for study.

This report constitutes both a Feasibility Report that describes the planning process followed to identify the recommended plan and an Environmental Assessment/Initial Study (EA/IS), as required to comply with the NEPA and the CEQA.

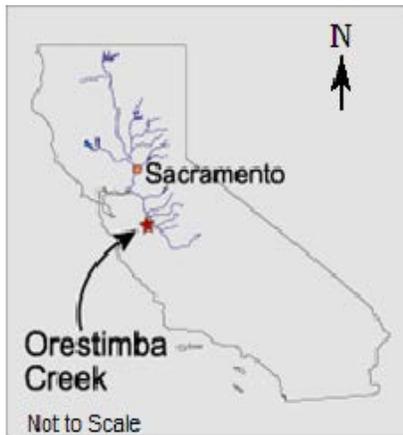
This report has been reviewed by the public and governmental agencies. Once approved by higher USACE authority for review and approval, it will be transmitted to Congress for potential project authorization and funding of the Federal share of the project.

Project Location/Congressional District.

Orestimba Creek is located on the west side of the San Joaquin River in Stanislaus County, California, about 100 miles south of Sacramento (Figure 1). It encompasses approximately 134 square miles of rangeland and very productive irrigated cropland. The farming community of Newman is located several miles from the Creek and has a population of about 10,000 people.

Orestimba Creek is situated on a broad alluvial fan. The creek channel is not large enough to convey flows within its banks and flood water frequently spills over the banks of the creek and flows overland through farm fields and orchards, across roads and bridges and eventually in to the City of Newman. Although Newman is situated approximately 2.5 miles from the channel, there are no existing levees to contain the flood flows. This overland flow collects along the uphill (west) side of the Central California Irrigation District (CCID) Main Canal and the California Northern Railroad (CNRR) embankments. Floodwaters are conveyed

south along Highway 33 and the CNRR berm, eventually inundating the City of Newman. Flood flow overtops the highway and railroad berm and then continues down slope across fields and farm roads until it reaches the San Joaquin River.



Orestimba Creek (Figure 2) is traversed by U.S. Interstate Highway 5 (I-5), the California Aqueduct, the Delta-Mendota Canal, State Highway 33, the Northern California Railroad (NCRR), and the CCID Main Canal. Elevations vary from 45 feet above sea level at the San Joaquin River to about 3,600 feet at the headwaters of Orestimba Creek. The creek is ephemeral, with high flows normally occurring in late winter, and irrigation drainage accounting for low flows during the summer months. The creek flows in a northeasterly direction through steep mountain canyons until it emerges at the edge of the foothills. Here, on the gently sloping valley floor, the decreased slope and size of the streambed reduces the creek's channel capacity. Flood flows spread over a wide undefined

alluvial fan. Most west side tributary streambeds disappear in the area, join other creeks, or are confined to manmade structures due to farming. Orestimba Creek is one of the few tributaries to maintain a definite open channel from the Coast Range to the San Joaquin River.

The study area includes Congressman Jeff Denham of the 10th Congressional District. California Senators are Sen. Barbara Boxer and Sen. Dianne Feinstein.

Prior Reports and Existing Water Projects.

As a result of flooding along Orestimba Creek in February 1980, the Reclamation Board of the State of California (now known as the Central Valley Flood Protection Board [CVFPB]) requested that USACE investigate potential solutions to the flooding problems. A reconnaissance investigation by USACE was completed in July 1980 which resulted in a finding that a viable solution may exist to the flooding along Orestimba Creek. This study was not pursued due to lack of landowner support for the project. In March 1995, Orestimba Creek experienced the largest storm over 78 years of record (1932 to 2010). At that time, 12,000 cubic feet per second (cfs) was recorded at the U.S. Geological Survey (USGS) gauge on Orestimba Creek near the California Aqueduct. The floodwater overwhelmed the channel and flowed overland across agricultural fields, backing up against a railroad embankment, and inundating the City of Newman. Stanislaus County subsequently prepared a Hazard Mitigation Grant Application dated January 1996. At the request of Stanislaus County, USACE initiated a Section 905(b) Analysis in April 1997, which is a reconnaissance level investigation based on existing information. This investigation determined there was likely a Federal interest in flood risk reduction measures for Orestimba Creek including increasing the capacity of the Creek and a potential upstream detention facility. The Feasibility Phase was initiated in September 1998.

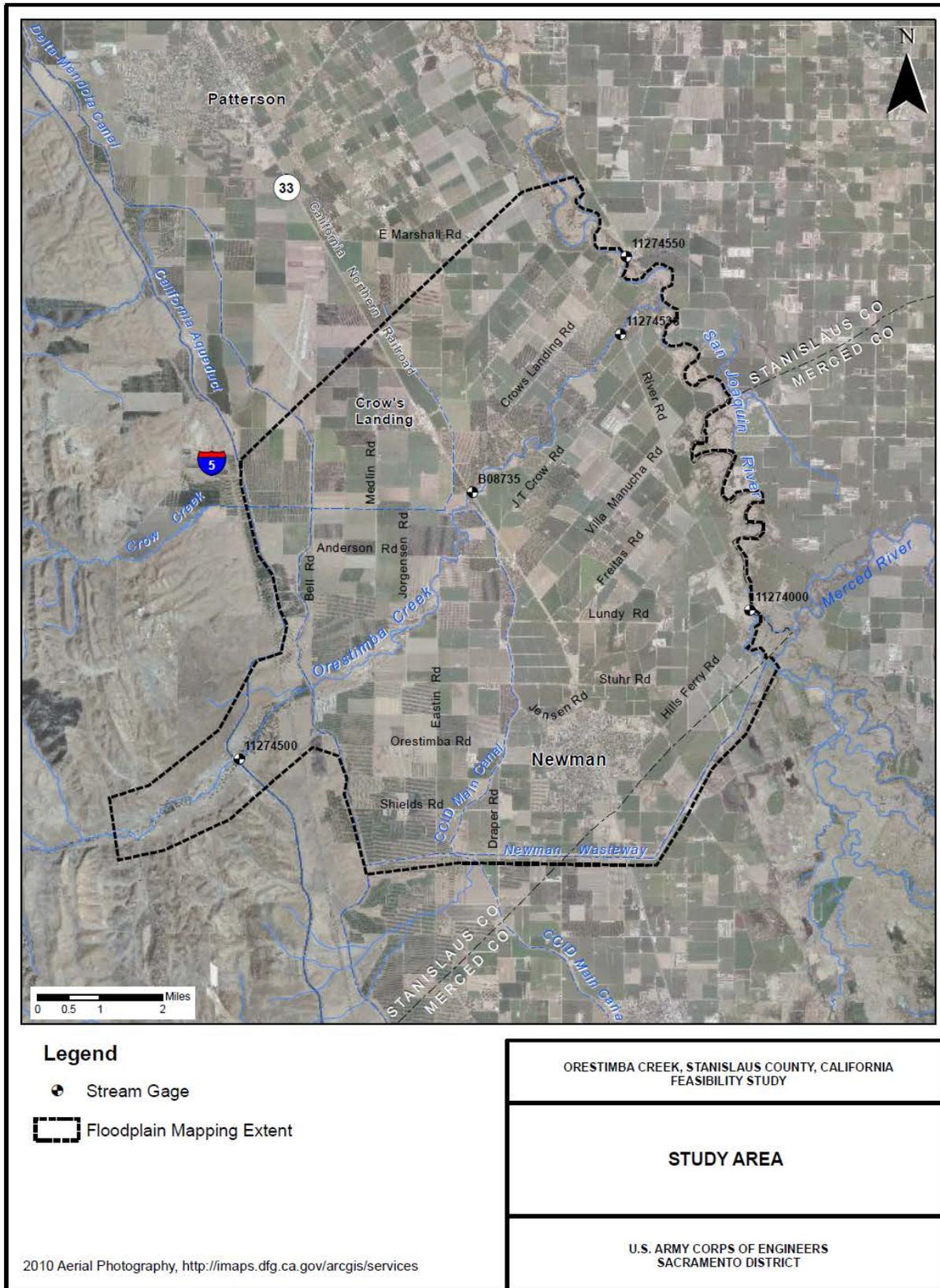


Figure 2 – Orestimba Creek Study Area

STUDY OBJECTIVES

Problems and Opportunities.

Problem: There is a high probability of flooding which threatens public health and safety in the City of Newman and surrounding rural areas.

The City of Newman and the surrounding agricultural areas have flooded at least 12 times since records were initiated in 1932. In March 1995 and again in February 1998,, structures within the city were flooded by over two feet of sediment-laden water. These flood events required evacuations and many public streets and highways, including State Highway 33, were closed. These road closures limited or, in some cases, prevented access for emergency vehicles which resulted in diminished local and regional emergency response capabilities. Similar public health risks caused by area flooding included contamination of domestic water wells and inundation of individual septic systems, many of which were rendered unusable.

Problem: The City of Newman and surrounding agricultural land have incurred damages from past flooding.

Floodwaters have damaged agricultural land and crops, residential and commercial properties, the Delta-Mendota Canal, the CCID Main Canal, bridges, and road crossings. Reported damages from the March 1995 event totaled approximately \$7.8 million (2011 prices). A similar flood event occurred in February 1998 when 9,500 cfs was measured at the Newman gage but only 2,300cfs was still in the channel at the River Road gage downstream. As with the 1995 event, this shows the substantial volume of floodwaters that were conveyed by the floodplain. Damages from the 1998 flood event are estimated to be around \$3-4 million.

Problem: The Orestimba Creek channel has been altered by human activity.

In many areas along Orestimba Creek, farming activities have encroached upon the banks of the creek. Riparian vegetation has been removed and it appears that the creek banks have been mechanically altered. Small private levees exist along portions of the creek but there are no levees in the study area belonging to the State or Federal network of levees. Sand and gravel extraction activities have altered the sediment supply within the creek.

The following opportunities have been identified:

- *Opportunity: Reduce the risk of flooding and flood damages through the use of proven environmental design methods for structural and/or non-structural features.*
- *Opportunity: Sustain and improve aquatic, riparian, and adjacent terrestrial habitats consisting of native plants for use by fish and wildlife.*
- *Opportunity: Reduce the risk of flooding and flood damages through the least environmentally damaging structural or non-structural method.*
- *Opportunity: Restore aquatic, riparian, and adjacent terrestrial habitats consisting of native plants for use by fish and wildlife.*

Planning Objectives.

The planning objectives are:

- Reduce the probability of Orestimba Creek flooding in the study area consistent with existing land use patterns.
- Reduce the consequence of flooding in the study area with an emphasis on public safety.
- Include environmentally sustainable design during construction of the recommended plan.
- Increase natural functions of Orestimba Creek as an incidental benefit while reducing flood risk in the study area.

Non-Federal Objectives. The State of California, recognizing the continuing risk of flooding within the Central Valley, has enacted the Central Valley Flood Protection Act (CVFPA) and other related legislation, which establishes in California law the objective of providing 200 year protection to urban and urbanizing areas. The City of Newman falls into this category. Additionally, the CVFPA requires an immediate analysis of the condition of the system levees, an action plan for achieving the desired level of protection, and associated actions to reduce residual risks to development within the protected area.

Planning Constraints.

A planning constraint is a restriction that limits the extent of the planning process. It is a statement of things the alternative plans must avoid. Constraints are designed to avoid undesirable changes between without and with-project future conditions.

The planning constraints are:

- Comply with all applicable Federal laws, regulations, and policies.
- Avoid adverse effects to Federal and California State listed species in the area including the Valley Elderberry Longhorn Beetle (VELB) and the San Joaquin Kit fox.

ALTERNATIVES**Plan Formulation Rationale.**

A number of strategies were used by the PDT to develop alternative plans. These include:

- Identify plan that reasonably maximized net benefits
- Avoid or minimize environmental impacts while maximizing future safety and economic benefits to the community.
- Preserve the beneficial uses of floodplains in compliance with EO 11988
- Work with local groups to achieve a balance of project goals and public concerns

Management Measures and Alternative Plans.

Table 1 below lists the management measures identified for the feasibility study. The measures listed were screened to determine whether each measure should be retained for use in the formulation of alternative plans.

The retained measures were combined with other retained measures in order to develop complete preliminary alternative plans. While each individual measure contributes to one or more of the flood risk management objectives, most need to be applied in combination with the others in order to provide a complete plan that achieves the multiple objectives identified by the study. The preliminary array of alternatives is presented in Table 2.

Table 1: Summary of Management Measures Retained or Dropped

Measures	Retained	Dropped	Reason for Dropping/Retaining
<i>Non-Structural Measures</i>			
Early Flood Warning & Evacuation	X		
Raise/Floodproof Community		X	Not cost effective to raise several thousand structures.
Raise/Floodproof Individual Structures	X		
Dry Floodproof Individual Structures	X		
Relocate Community		X	Not cost effective or supported by community.
Relocate Individual Structures	X		
Acquire Flowage Easements or Fee Title in Floodplain Lands	X		
<i>Structural Measures</i>			
Create Bypass Channel	X		
Enlarge Orestimba Creek Channel	X		
Construct Levees along Creek		X	Significant environmental effects, not cost effective due to rock riprap.
Construct Setback Levees	X		
Construct Chevron Levee	X		
Construct Upstream Floodwater Attenuation Basin	X		
Construct Downstream Floodwater Attenuation Basin	X		
Construct Training Dike	X		
Remove Orestimba Creek Channel Constrictions	X		
Use Canals for Flood Conveyance		X	Insufficient capacity. Sediment in floodwaters would contaminate water supply.
Use Farm Drains for Flood Conveyance	X		Use network of multiple irrigation canals and drains to disperse flows.
Clearing and Snagging		X	Increased risk of bank erosion and instability. Doesn't significantly increase channel capacity. Environmentally damaging.
Restore Native Vegetation	X		
Removal of invasive plant species	X		

Table 2 – Summary of Screening of Preliminary Alternative Plans

Preliminary Alternatives	Screening Summary	Carried Forward?
Enlarge Channel/ Remove Constrictions	Technically difficult to ensure performance of this alternative due to potential channel instability. To handle large flows (median 1/100 ACE event), the channel would have to be excavated to a size about six times its current geometry. Permitting this excavation work would be difficult due to the existing remnant vegetation along the creek, which would need to be removed. Concerns with ramifications to land use changes (EO 11988).	No
Setback Levees along Creek	High construction cost for about 12 miles of new levees. Hydraulic mitigation would be required for conveying more water downstream. High real estate costs including land and removal of residences. At least 6 bridges would have to be replaced. Concerns with ramifications to land use changes (EO 11988).	No
Chevron Levee to protect Newman	Reduces flood risk in the City of Newman. Benefits exceed the costs.	Yes

Preliminary Alternatives	Screening Summary	Carried Forward?
Bypass Channel	To convey a median 1/100 ACE event, approximately eight additional bypass channels similar in size to the existing creek channel would be required. High real estate costs. New bridges would be required to cross bypass areas. Concerns with ramifications to land use changes (EO 11988).	No
Upstream Flood Attenuation Basin	Dam would be 1 mile long and 60 feet tall. Very high construction costs (greater than \$75 million). State of California opposed to this alternative due to location immediately upstream of the California Aqueduct – a dam failure could jeopardize Southern California’s water supply which is transported by the aqueduct. Concerns with ramifications to land use changes (EO 11988).	No
Downstream Flood Attenuation Basin	Very high construction costs (greater than \$75 million) in addition to high real estate costs (site of existing gravel mining operation). Concerns with ramifications to land use changes (EO 11988).	No
Chevron Levee & Channel Modification	Combining the channel modifications with the chevron levee provides a high level of protection for the City of Newman and also reduces damages in the agricultural area; however, the channel modifications portion was not incrementally justified.	No
Non-structural	The shallow flooding from Orestimba Creek can be effectively managed in part through non-structural measures. These features are cost effective and can be implemented as part of any recommended plan.	Yes

Final Array of Alternatives.

The chevron levee and non-structural alternatives were retained for the final comparison of plans. Various chevron levee alignments and heights were analyzed in the process of identifying the NED plan. Since the topography of the floodplain slopes from the west to the east, only a partial ring levee on the upslope side would be required, rather than a complete ring levee around the town. Flooding threatens the community of Newman only from the west and the north.

Along the west side of town, the CCID Main Canal berm captures flood flows. The berm, in effect, has already established where much of the flooding occurs in the study area. The levee alignment parallel to the CCID Main Canal retains the pattern of flooding that has been established in the rural area. The Lundy Road alignment was identified as the optimal location for the northern segment of the levee. It is located at a topographic high point, near an existing culvert, has the lowest potential for increases of flood depth, and has the least effects to existing infrastructure and private properties when compared to other alignments.

Table 3 shows the economic optimization of the chevron levee height along the CCID Main Canal near Lundy Road. The levee elevation heights correspond to the median ACE flood event water surface elevations in the left column. This table shows that there is very little variation in the water surface elevations for the various events. This is due to the fact that flood waters on an alluvial fan spread out over a large area. The levee height optimized at an elevation of 112.8 feet NAVD88, as highlighted in the table below. This is identified as the NED levee. The chevron levee height was optimized by inserting incrementally higher levees into the Economic model (HEC-FDA) and comparing the increased benefits to the estimated incremental costs. Costs were estimated by Cost Engineering for a levee equal to the 50-year mean water surface elevation (WSEL) and the 200-year mean WSEL with 3 feet of freeboard. These two values were then used to create a linear interpolation between the two points in order to estimate

the cost of incrementally higher levees. This analysis is solely used for optimization of the levee height in order for costs and residual benefits to be determined in more detail on only one plan.

Table 3 – Optimization of the Chevron Levee Height (at Stuhr Road and the CCID Canal)

Median Annual Exceedance Probability	Levee Elevation (feet-NAVD88)	Annual Benefits (1,000's)	Annual Costs (\$1,000's)	Net Benefits (\$1,000's)	
1/50	111.21	2,172	1568	604	
	111.25	2,281	1629	652	
	111.5	2,505	1690	815	
	111.75	2,705	1751	954	
1/500	112	2,878	1812	1,066	
	112.25	3,003	1862	1,141	
	112.5	3,083	1907	1,176	
NED	112.75 ¹	3,128	1942	1,186	
	113	3,128	2003	1,125	
	113.25	3,128	2064	1,064	
	113.5	3,128	2125	1,003	
	113.75	3,128	2186	942	
	114	3,128	2247	881	
	114.25	3,128	2308	820	
	1/200 +3ft	114.8	3,128	2372	756

Notes:

¹The height of the optimized NED levee height has been rounded to 112.8 FT-NAVD88

²Costs and benefits have been interpolated between known points.

As shown in Table 3, the optimal elevation for the top of levee at this location near Stuhr Road is determined to be around 112.75 feet NAVD88, which equates to a levee 5.5 to 8 feet tall depending on the ground elevation changes along the levee alignment. It is noted here that this height is higher than the mean 1/500-year WSEL, but because of the alluvial fan type of flooding, the mean 1/500-year WSEL is only 9 inches higher than the 1/50-year mean WSEL.

The No Action Plan (Final Alternative 1).

The No Action Plan would essentially be the same as the without project condition described in Section 2.3. The City of Newman and the surrounding agricultural area would remain at risk of flooding.

The NED Plan (Final Alternative 2 – Levee Elevation at 112.8 feet NAVD88).

The NED plan consists of the construction of a chevron levee along the City of Newman's northwestern perimeter. The chevron levee maximizes benefits to the urban area by reducing flood damages associated with Orestimba Creek overflows. The north side of the chevron levee would be constructed along approximately one mile of an unnamed farm road about one mile north of town. The elevation of the northern segment of levee would increase from where it ties in to the railroad berm to the point at which it meets the CCID Main Canal

berm. The western segment would be constructed parallel to the eastern bank of the CCID Main Canal from the farm road south to the Newman Wasteway, a distance of approximately four miles. The design includes four road/railroad stoplog closure structures. The height of the chevron levee would equate to about elevation 112.8 feet NAVD88, which means the levee would be about 3.5 to 8 feet high, depending on the ground elevation changes along the levee alignment. This levee elevation captured the most benefits for the least amount of costs and was therefore identified as the elevation that would be included in the NED plan (Figure 3).

Various chevron levee alignments and heights were analyzed in the process of identifying the NED plan. Alignments in which the chevron levee construction continued further to the north were also considered, but were dropped because of the deeper floodplains which resulted. This northern alignment also directed floodflows to the opposite side of the creek, causing significant induced flooding.

Based on the results of hydraulic modeling, the area north and east of the levee tie-in with the railroad might experience increased depths in some locations with implementation of the project. The depth of the potential increases during peak flows, which are projected to recede within 24 hours, would vary under each flood event scenario based on the existing topography. The range of depths under each frequency scenario is generally similar under both existing and with project conditions. The main difference would likely be during the 1/10 ACE, in which depths in some places could increase by up to six inches.

Implementation of the project would require the levee cross the CNRR embankment to prevent floodwaters from being conveyed south towards Newman. As a result, flood flows may overtop the railroad during more frequent events than under existing conditions. Based on recommendations in the Final Geotechnical Evaluation, the tie-in has been designed to mitigate through-seepage and provide erosion protection for the railroad embankment.

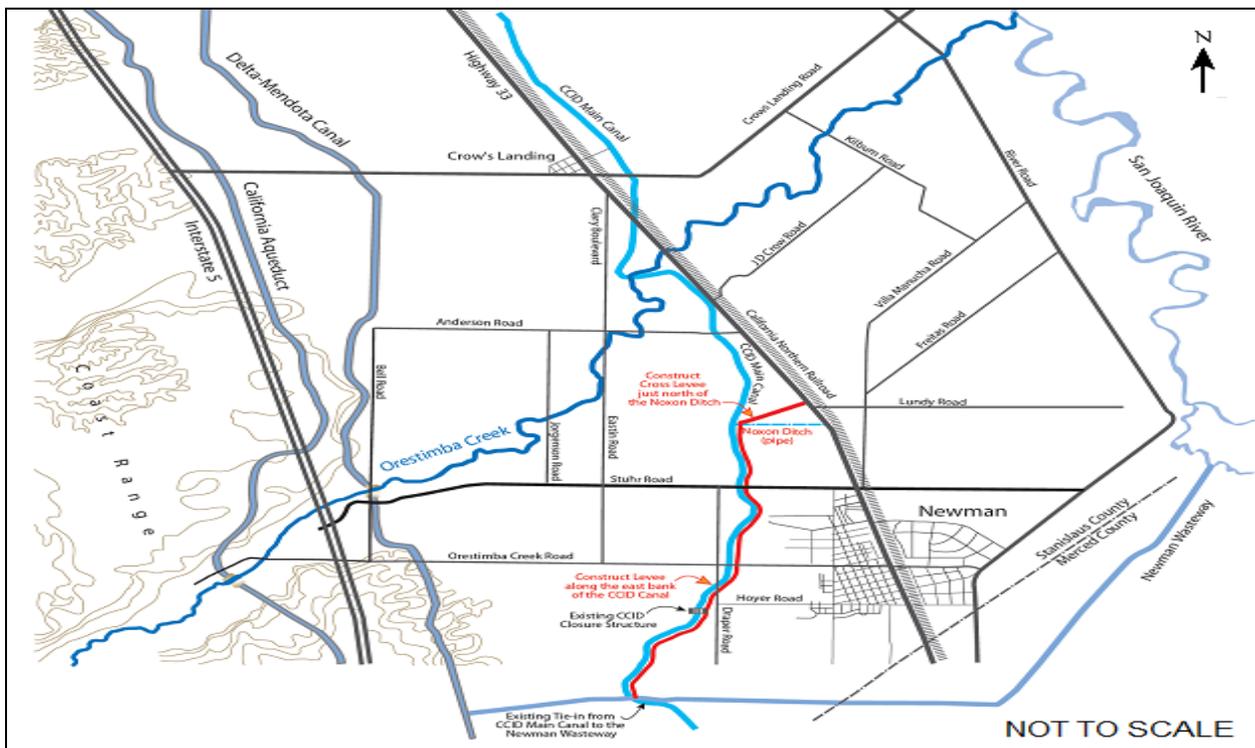


Figure 3 – The NED Plan

In addition to the structural features, the NED plan also includes several non-structural features to further reduce the consequences of flooding. These include an advanced warning system based on several stream gauges at the points where the creek historically has overflowed its banks. This flood warning system would be combined with an emergency evacuation plan. A reverse 911 system would alert surrounding residents of the flood threat, especially if the flood peak occurs during the night, as happened in 1995. Public educational materials would be distributed annually as part of the Orestimba Creek Flood Control District's assessment mailing. The materials would describe the residual risk of flooding through the inclusion of a floodplain map and description of the nature and type of flooding. The material would also describe the risks of traversing flooded roadways. Informational signs would be placed along roads which alert drivers to the possibility of flooding in the area.

The Locally Preferred Plan (Final Alternative 3 - Levee Elevation at 114.8 FT NAVD88).

The LPP includes the same elements as the NED plan (including overall length and number of closure structures), but raises the height of the chevron levee to include 3 feet of freeboard above the median 1/200 ACE water surface elevation. This freeboard was requested by the local sponsor in order to meet State of California requirements for an urban area, which is identified as the 1/200 year median Water Surface Elevation (WSEL) plus 3 feet of freeboard. The LPP levee would be 5.5 to 10 feet tall or about 2 feet taller than the NED levee. Pursuant to 44 CFR, Part 65.10, FEMA requires a levee to be either: a) 3 feet above the median 1% WSEL with a 90% assurance for the 1% event or b) 2 feet above the median 1% WSEL with 95 % assurance for the 1% event. The NED levee is about 1.5 feet shorter than these criteria; however, the LPP achieves it. The State of California requires urban and urbanizing areas (with a population of 10,000 or greater) to achieve 1/200 ACE level of protection in order to qualify for State funding of flood management projects. The State's interim levee design guidelines require 3 feet of freeboard above the median 1/200 ACE water surface elevation or higher if required for wind setup and wave run up (Senate Bill [SB] 5, Government Code, Sections 65865.5, 65962, 66474.5). It was determined that additional freeboard to account for wind waves would not be required to meet the criteria. The State's interim urban levee design guidelines also allow for a reduction of freeboard to 2 feet above the median 1/200 ACE water surface elevation if 95% assurance can be provided. The LPP levee height may be reduced during PED if it is determined through more rigorous uncertainty analysis that it will meet FEMA's and the State of California's 95% assurance criteria. The State's "Urban Levee Design Criteria", contained in the "Draft Urban Level of Flood Protection Criteria" (2012), also specifies that civil engineers would be allowed and encouraged to adjust the Design WSEL upward to account for climate change. Additional freeboard was not specified for climate change in the LPP. The median 1/200 ACE water surface profile was found to be relatively insensitive to increased flood discharge.

The difference between the median 1/100 ACE and median 1/200 ACE water surface elevation was found to be less than 0.4 feet along the proposed levee. As discussed for the NED, construction of the chevron levee would alter the nature of the existing floodplain by increasing the depth of flooding to the area north and east of the proposed levee tie-in with the railroad. The potential for increased depths in areas already flooded under existing conditions was analyzed and determined not to constitute a taking. The tie-in has been designed to mitigate through-seepage and provide erosion protection for the CNRR bed.

In addition to the structural features, the recommended plan also includes the same non-structural features as the NED plan to further reduce the consequences of flooding.

Comparison of Alternatives.

The system of accounts is a set of categories which provide a comprehensive framework to demonstrate both the positive and negative effects of each plan. The intent is to provide decision makers with plan rankings based on advantages and disadvantages of each alternative. In addition, the accounts provide a visual display and assessment of the effects as required by NEPA. Table 4 presents the findings of the system accounts analysis.

The decision to recommend the LPP over NED is represented in a tabular comparison of all four accounts, as follows:

Table 4 – Summary System of Accounts Comparison of Final Array of Alternative Plans

	Alternative 1 No Action	Alternative 2 NED Plan	Alternative 3 Locally Preferred Plan
1. PLAN DESCRIPTION			
	The No Action provides no physical project constructed by the Federal Government or local interests.	The NED plan is the chevron levee with a top of levee elevation constructed to about 112.8' (NAVD88)	The LPP plan is the chevron levee with a top of levee elevation constructed to about 114.8' (NAVD88)
2. IMPACT ASSESSEMENT			
A. National Economic Development (NED)			
1. Project Cost	\$0	\$36,308,000	45,333,000
2. Annual Cost	\$0	\$1,875,000	\$2,316,000
3. Total Annual Benefit	\$0	\$3,236,000	\$3,236,000
4. Annual Net Benefits	\$0	\$1,361,000	\$920,000
5. Benefit - Cost Ratio	N/A	1.7	1.4
B. Environmental Quality (EQ)			
1. Air/Noise	No construction activities present; Normal noise levels created by traffic, business, and industrial activities.	Temporary increase of criteria pollutants and noise levels during estimated 2 year construction period.	Temporary increase of criteria pollutants and noise levels during estimated 2 year construction period.
2. Water Quality	Significant impacts possible due to chemical storage area flooding.	Reduction of chemical storage areas exposure to flooding.	Same as NED.
3. Environmental habitat connectivity	Existing vegetation and habitat typical for agricultural area in the San Joaquin River Basin.	Temporary loss of connectivity due to construction activities.	Same as described for NED.
4. Threatened & Endangered Species	No increased impacts to sensitive species.	Temporary disturbance caused by construction. Surveys and monitoring for mitigation.	Same as described for NED
5. Cumulative Effects	No increased effects	Initial construction to effect project area.	Same as described for NED.
6. Cultural	No increased impacts.	Coordination and monitoring	Coordination and monitoring

	Alternative 1 No Action	Alternative 2 NED Plan	Alternative 3 Locally Preferred Plan
Resources & Historic Properties		during construction.	during construction.
C. Regional Economic Development (RED)			
1. Construction Activities	Future flooding would destroy part of infrastructure resulting in a loss in the region's ability to produce goods and services. Little to no RED benefits	Value added: 325 temporary jobs added within the region and 530 jobs added within the State. The gross regional product for the State is about \$34 million while the nationwide amount is about \$47 million.	Slightly higher Value added: 382 temporary jobs added within the region and 584 jobs added within the State. The gross regional product for the State is about \$34 million while the nationwide amount is about \$47 million.
2. Future Residential Development	Parts of the City of Newman lie outside of the FEMA regulatory floodplain and therefore have no development restrictions. New development must be built above the 1% flood elevation, which is economical to accomplish.	Future development associated with the construction of new homes would generate substantial economic activity in the study area. Levee construction would decrease the risk of flooding to the established downtown and older residential areas.	Future development associated with the construction of new homes would generate substantial economic activity in the study area. Levee construction would decrease the risk of flooding to the established downtown and older residential areas.
3. General Economic Gains	Emergency response and recovery activities and reconstructions and repairs. The economic stimulus generated would only be temporary and minor compared to overall losses.	The with project regional economic impacts would emerge from more gradual spending over an extended timeframe. Levee construction is expected to take place over a 2-year period.	The with project regional economic impacts would emerge from more gradual spending over an extended timeframe Levee construction is expected to take place over a 2-year period.
D. Other Social Effects (OSE)			
1. Life, Health, and Safety	Continued flood risk in the City of Newman.	Mitigated by Flood Warning Emergency Evacuation Plan.	Mitigated by Flood Warning Emergency Evacuation Plan.
2. Community Cohesion (displacement of people & businesses)	Future flooding would displace selected businesses and subject the community to potential catastrophic flood risk.	Increased level of protection to homes and businesses within the City of Newman but still within the FEMA regulatory floodplain.	200-year level of protection to homes and businesses within the City of Newman. The City is removed from the FEMA regulatory floodplain.
3. Residual Risk	Residual risk remains high throughout the study area	Residual risk reduced in the City of Newman	Residual risk reduced in the City of Newman.

National Flood Insurance Program: The LPP would provide RED benefits related to a reduction in NFIP Premiums. The NFIP requires flood insurance for those residential properties with Federally-backed mortgages that are deemed as being within FEMA's regulatory 1% Annual Chance Exceedence event floodplain. Those outside the regulatory floodplain are eligible to purchase flood insurance at the preferred rate, which is significantly less than the standard rate charged to those within the regulatory floodplain area. Discussion with a local insurance

representative in Newman indicates that the preferred rate for single family housing, outside the regulatory 1% Annual Chance Exceedence floodplain is \$250 annually for insurance for both structure and contents; while structures without adequate certification required annual insurance premium of \$900 to \$950. The savings of approximately \$700 annually is recognized as significant to those residents located in Newman.

Based upon the Corps' existing condition analyses, 1,062 residential structures are in the 1% (1/100) ACE floodplain. Theoretically, these 1,062 structures could be in the standard rate area if FEMA was re-mapped. Accordingly, an annual savings of \$743,000 (700 x 1,062) could be attributed to the LPP as a direct result of accommodating the FEMA flood requirements. According to the existing FEMA floodplain maps, there are approximately 700 residential structures subject to the higher rate; however, FEMA is currently re-mapping the floodplains within the study area.

Table 5 shows the economic benefits, costs, and net benefits of the final alternatives. There is essentially no quantifiable difference between the annual NED economic benefits attributed to the NED and the LPP; however final Alternative 3 would allow the sponsor to meet State of California requirements as well as FEMA accreditation requirements.

Investment costs, annual costs, and annual benefits for the NED and LPP plans are displayed in Table 6 below.

Table 6 – Comparison of Total Annual Benefits and Costs for the NED and LPP^{1,2}

Item	NED Plan	LPP Plan
Investment Costs:		
Flood Risk Management First Costs	\$36,308,000	\$45,333,000
Interest During Construction	\$2,068,000	\$2,582,000
Total	\$38,376,000	\$47,915,000
Annual Cost		
Interest and Amortization	\$1,711,000	\$2,136,000
OMRR&R ³	\$164,000	\$180,000
Total	\$1,875,000	\$2,316,000
Annual Benefits	\$3,236,000	\$3,236,000
Net Annual Flood Risk Management Benefits	\$1,361,000	\$920,000
Benefit to Cost Ratio	1.7	1.4

¹ Based on October 2013 price levels, 3.75% interest rate, and a 50-year period of analysis.

² Some numbers have been rounded and may be slightly different than those displayed in the appendices.

³ Operation, Maintenance, Repair, Replacement and Rehabilitation.

Table 7 shows estimated project performance, specifically that both the NED and LPP provide over 99% Assurance (described in the table as conditional non-exceedence probability) of passing the 1% ACE event. The FEMA requirement for accreditation within the NFIP is 95%. Both the NED and the LPP show very little probability of flooding in any given year with an Annual Exceedence Probability of less than 0.04% (1/2,500). Additional information on project performance is located in the Economic Appendix (Appendix E).

Table 7 – Project Performance – Urban Economic Impact Area

Alternative	Annual Exceedence Probability		Long-Term Risk			Assurance (Conditional Non-Exceedence Probability)			
	Median	Expected	10 year Period	30 year Period	50 year Period	10%	2%	1%	0.20%
No Action	14.43%	15.13%	81%	98%	99%	13%	0%	0%	0%
NED Plan (Chevron Levee at 112.8 feet)	0.01%	0.04%	0%	1%	2%	99%	99%	99%	98%
LPP Plan (Chevron Levee at 114.8 feet)	0.00%	0.00%	0%	0%	0%	99%	99%	99%	99%

Key Assumptions.

Some of the key assumptions used in the formulation and development of the recommended plan include:

- Flood events would continue to erode the bed and banks of Orestimba Creek, removing vegetation, causing banks to collapse, and threatening infrastructure. This condition is usually addressed with the placement of broken concrete or rock, which has little to no habitat value. A decline in resource values within the creek and adjoining properties may be expected to continue in the future.
- Sand and gravel mining within Orestimba Creek would continue to reduce the amount of sediment transported by the creek to downstream reaches causing the creek channel to become further incised.
- Hydrology would not substantially change. The study area would primarily remain non-urban so runoff would not increase. The potential impacts of climate change are estimated to be more significant in the without project condition than with the proposed project. This is because the damages with the project in place were found to be relatively insensitive to peak flow. As a result, the benefits of the project would be underestimated if flood magnitudes were to increase in the future.
- There would be limited development within the urban area.
- Critical infrastructure, including the California Aqueduct, the Delta-Mendota Canal, the CCID Main Canal, Highway 33, the CNRR, and the existing county roads would remain in place.
- The existing culverts under Highway 33 and the CNRR would continue to operate, and the government will not be responsible for any culvert maintenance cost.
- CCID and CNRR will maintain their embankment height to be no higher than the existing conditions from the north end of the proposed levee for a distance of two miles.

Recommended Plan.

The recommended plan is the LPP. Selection of this plan over the NED plan is justified due to overriding reasons based on State and local concerns. This plan allows the local community to meet both FEMA accreditation requirements and the State of California's criteria for funding of flood management projects. This plan meets the study objectives of reducing flood risk and flood damages.

In addition to the structural features, the recommended plan also includes several non-structural features to further reduce the consequences of flooding. These include an advanced warning system based on stream gauges located at the points where the creek has historically

overflowed its banks. This flood warning system would be combined with an emergency evacuation plan. A reverse 911 system would alert surrounding residents of the flood threat, especially if the flood peak occurs during the night, as happened in 1995. Public educational materials would be distributed annually as part of the Orestimba Creek Flood Control District's assessment mailing. The materials would describe the residual risk of flooding through the inclusion of a floodplain map and description of the nature and type of flooding. The material would also describe the risks of traversing flooded roadways. Informational signs would be placed along roads which alert drivers to the possibility of flooding in the area.

The estimated total project first cost for the recommended plan is \$45,333,000. Federal costs are capped at the Federal cost of the NED plan which is estimated to cost \$36,308,000. A summary of cost sharing responsibilities is presented later (Table 10).

This plan is justified and has a benefit to cost ratio of 1.4. This plan allows the local community to meet both FEMA certification requirements and the State of California's criteria for funding of flood risk management projects. An exception from the Assistant Secretary of the Army for Civil Works (ASA(CW)) has been granted to allow USACE to recommend the LPP over the NED plan. Due to the small increase in costs of the LPP over the NED, this exception is warranted in order for the local community to meet FEMA and State of California requirements in addition to reducing the residual risk associated with the project.

Systems/Watershed Context.

Orestimba Creek is a tributary to the San Joaquin River and is therefore located within the larger San Joaquin River Watershed. The San Joaquin River valley is one of the most productive agricultural regions in the United States and the world based on the climate, soils, and availability of water. Agriculture is a major economic driver in the region and many jobs are dependent upon it. The Recommended Plan has been optimized to reduce the risk of flooding to the established rural community of Newman while removing the minimal amount of land from the floodplain which would preserve the natural and beneficial uses of the vast majority of the remainder of the floodplain and ensure the land remains in agricultural production or open space.

Environmental Operating Principles.

The Recommended Plan supports each of the seven USACE Environmental Operating Principles (EOPs). The environmental operating principles are met in the following ways:

Environmental balance and sustainability (EOP 1,2,3 &4)

- Project avoids or minimizes environmental impacts while maximizing future safety and economic benefits to the community
- Project constructed away from creek to avoid disturbance to riparian corridor

Planning with the environment (EOP 1,2 4, and 5)

- Worked with local resource agencies during planning minimizing impacts to the environment
- The recommended plan allows for continued floodplain flooding while focusing the flood risk reduction on the established urban area

Integrate scientific, economic and social knowledge base (EOP 6)

- LPP policy exception request was granted by ASA(CW) to recommended the plan that meets FEMA accreditation requirements and State criteria for urban areas

Seeks Public input and Comment (Win-win solutions) (EOP 7)

- Held stakeholder meetings and public workshops throughout the process
- Worked with local groups to achieve a balance of project goals and public concerns

Peer Review.

ATR was conducted by a qualified interdisciplinary team of Corps of Engineers personnel from the Louisville (LRL), Los Angeles (SPL), Buffalo (LRB), Seattle (NWS) and Walla Walla (NWW) Districts with ATR lead being assigned to the Louisville District.

Comments included clarification of the following issues:

- Coordination with the California Northern RR and Union Pacific RR
- Without project condition H&H and economics
- Geotechnical underseepage issues with proposed levee
- O&M, and associated environmental concerns
- Adequacy of the project cost estimates
- Formulation of the NED plan and the recommended locally preferred plan
- Potential induced hydraulic effects

ATR of the draft feasibility report was certified on 25 February 2013. The HQUSACE Policy Review comments via the Policy Guidance Memorandum were addressed and responses incorporated into the report. The ATR of the final report with PGM responses incorporated was certified on 13 March 2013.

Independent External Peer Review of the final report was coordinated by a representative of the Corps Flood Risk Management Center of Expertise (FRM-PCX) via a contract with Battelle, Inc, and conducted by appropriate outside resources familiar with the study area and its resources. Comments made by the IEPR team and responses to those comments, are documented in the IEPR package which will be **completed in May 2013.**

EXPECTED PROJECT PERFORMANCE

Project Costs. Project Costs are presented in Table 8.

Table 8: Cost Summary
(October 2013 Price Levels)¹

MCACES Account²	Description	Total First Cost
01	Lands and Damages ³	\$2,779,000
02	Relocations ⁴	\$8,285,000
11	Levees	\$25,196,000
18	Cultural Resource compliance contingency ⁵	\$233,000
30	Planning, Engineering, Design ⁶	\$6,005,000
31	Construction Management ⁷	\$2,835,000
	Total First Cost⁸	\$45,333,000

Notes:

¹Based on October 2013 price levels, 3.75% interest rate, and a 50-year period of analysis.

²Micro Computer-Aided Cost Engineering System (MCACES) is the software program and associated format used by USACE in developing cost estimates. Costs are divided into various categories identified as “accounts.” Detailed costs estimates are presented in Appendix C, part 4, Cost Engineering.

³Real Estate land costs, which include no damages.

⁴Relocations include ramping Highway 33, and relocating affected utilities and irrigation ditches.

⁵Contingency costs for cultural resource compliance is specifically for data recovery as needed.

⁶12 percent of 02, 11, and 18 accounts.

⁷8.5 percent of 02, 11, and 18 accounts.

⁸ Numbers reported may be slightly different than those presented in the appendices due to rounding.

Equivalent Annual Costs and Benefits. Equivalent annual costs and benefits are presented in Table 9.

**Table 9 – Equivalent Annual Benefits and Costs¹
(October 2013 Price Level, 50-Year Period of Analysis, 3.75% Discount Rate)**

Item	LPP Plan
Investment Costs:	
Flood Risk Management First Costs	45,333,000
Interest During Construction	2,582,000
Total	47,915,000
Annual Cost	
Interest and Amortization	2,136,000
OMRR&R ²	180,000
Total	2,316,000
Annual Benefits	3,236,000
Net Annual Flood Risk Management Benefits	920,000
Benefit to Cost Ratio	1.4
Benefit to Cost Ratio (computed at 7%)³	.8x

*Notes:

¹ Some numbers have been rounded and may be slightly different than those displayed in the appendices.

² Operation, Maintenance, Repair, Replacement and Rehabilitation.

³ Per Executive Order 12893

TABLE 9-2: Summary of Cost Sharing Responsibilities for the Recommended Plan¹

Item	Federal ²	Non-Federal	Total
Construction	\$17,146,831	\$1,804,169	\$18,951,000
LERRDs ³		\$10,159,000	\$10,159,000
PED ⁴	\$4,279,695	\$450,305	\$4,730,000
Construction Management ⁵	\$2,255,224	\$212,776	\$2,468,000
Subtotal Total (NED Plan Cost Sharing)	\$23,681,750	\$12,626,250	\$36,308,000
Percentage	65%	35%	
Additional LPP Project Costs		\$9,025,000	\$9,025,000
Construction		\$6,245,000	
LERRDs		\$905,000	
PED		\$1,275,000	
Construction Management		\$367,000	
Total Project Costs	\$23,681,750	\$21,651,250	\$45,333,000

Notes:

¹ Based on October 2013 price levels, 3.75% interest rate, and a 50-year period of analysis.

² Federal Project First Costs are based on 65% of the NED Plan of \$36.3 million.

³ Non-Federal interests must provide all LERRDs and a minimum cash contribution of 5% of the total project cost. LERRDs include Lands, Easements, Rights-of-way, Relocations, and Disposal sites.

⁴ Planning, Engineering, and Design. Includes supplemental environmental compliance work and efforts to identify and evaluate cultural resources, as well as alternative mitigations aside from data-recovery activities.

⁵ Includes a Cultural Resources contingency for Data Recovery as needed.

Project Implementation.

The City of Newman, as the non-Federal sponsor, plans to seek funding from the State of California, and possibly others to cost share the non-Federal portion of the project. Stanislaus County and the City of Newman intend to form a Benefit Assessment District to raise funds to pay for the local share and maintenance of the project. A local levee district may also be formed to operate and maintain the flood control portions of the project. It is anticipated that the local levee district would be formed prior to construction of the project.

Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R).

Once project construction is complete, the project would be turned over to the non-Federal sponsor. The non-Federal sponsor would then be responsible for the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project in accordance with the OMRR&R manual. Operation and maintenance (O&M) requirements would include maintenance of the project levees and periodic operation of roadway and railroad closure structures. The annual cost for O&M of the recommended plan is estimated to be about \$180,000. Floodwaters are assumed to reach the levee and associated features at the 1/10 ACE. Additional detail on the OMRR&R can be found in Appendix C-3, Civil Design. Some of the additional requirements and assumptions for O& M are listed below:

- Caltrans will take full responsibility to repair flood water-caused erosion of the embankment along Highway 33 in the study area.
- The existing culverts under Highway 33 and the CNRR would continue to operate, and the government will not be responsible for any culvert maintenance cost.
- CCID will allow residual floodwaters to be discharged into their canal following any overtopping failure of the canal. The Sponsor will be required to maintain and use portable pumps for this purpose.
- After construction CCID will obtain Section 408 approvals for any modification to the project including any modification necessary to meet irrigation delivery objectives.
- The sponsor will insure stop log structures and flood gates are tested and are fully operational.
- CCID and CNRR will maintain their embankment height to be no higher than the existing conditions from the north end of the proposed levee for a distance of two miles.

Key Social and Environmental Factors.

The Recommended Plan greatly reduces the risk of flooding within the City of Newman and areas immediately adjacent to the city. Even with the construction of the levee, there remains a very slight residual risk of flooding within the city. This risk would be in the form of a breach of the proposed levee. However, the probability of a breach in the proposed levee would be extremely rare. Based on risk and uncertainty analysis the assurance calculated for the Recommended Plan using hydrologic, hydraulic, and geotechnical considerations was 99.9%. Thus the residual risk of flooding from Orestimba Creek within the City of Newman would be extremely low. The residual risk to Newman from localized storm drainage (interior) flooding within the study area is also considered low because the consequences associated with this type of relatively shallow and localized flooding is considered low. Residual storm drainage flooding was accounted for in the economic analysis.

The City of Newman has an Emergency Action Plan in place intended to reduce the risk of human life loss and injury and minimize property damage during an unusual or emergency

event. It defines responsibilities and provides procedures designed to identify conditions that may endanger the community's residents and to specify preplanned actions to be followed to minimize property damage and loss of life in the event of a flood. As soon as an emergency event is observed or reported, the City Manager shall immediately determine the emergency level. After the emergency level has been determined, the people on the corresponding emergency level notification chart shall be notified immediately. The Stanislaus County Office of Emergency Services has responsibility for notifying and evacuating downstream people at risk and setting up road closures. If and when the public needs to be notified, the medium for notification will be the Emergency Broadcast System and Reverse 911.

The Recommended Plan does not address rural roads that are subject to flooding. Stanislaus County has taken proactive steps to warn travelers of road closures. Crossing arms which are activated by rising water in creeks have been installed to halt travelers from entering into hazardous crossings. Signs have also been installed to alert motorists to potential hazardous flooding conditions.

Both the Stanislaus County General Plan and the city of Newman General Plan identify steps and include regulations to manage population growth within their area of influence and balance this growth within the existing agricultural context. Agriculture is a significant socioeconomic driver in the study area and surrounding region, and it is important to area residents that new development minimizes loss of agricultural land.

Any new construction within the flood hazard area must be approved by the Stanislaus County floodplain administrator as stipulated in the County General Plan. The floodplain administrator is tasked with, among other things, ensuring that the lowest floor be elevated above the base flood elevation and provide adequate drainage paths around these structures. All manufactured homes must meet anchoring standards and constructed to prevent floatation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads. A Floodplain Management Plan specifically would be developed within one year after the date of signing a project cooperation agreement for construction of the project.

Additional information regarding community cohesion and resilience, population at risk, evacuation routes and critical infrastructure may be found in Appendix E, Economics, Attachment D – Other Social Effects (OSE).

Stakeholder Perspectives and Differences.

In addition to the public workshops, a series of stakeholder meetings have been held since 2005 to discuss the problems, opportunities, significant resources, and potential measures and alternatives and the residual risk of flooding associated with each alternative. The meetings included study team members, representatives from the local community, and interested agencies and organizations. Information provided by the local and regional stakeholders guided the identification of resources problems and helped formulate the alternative plans to address the problems and identification of the tentatively selected plan. Participants in the meetings included: Local Landowners and Residents; Stanislaus County; USFWS; The Nature Conservancy; California Department of Fish and Game; CCID; Orestimba Creek Flood Control District; City of Newman; And Congressmen Dennis Cardoza and Jeff Denham staff members.

The Recommended Plan allows the City of Newman to achieve FEMA level accreditation that would result in lower NFIP flood insurance premiums for the residents of the community. The Recommended Plan also meets criteria established by California Senate Bill

(SB) 5 for urban and urbanizing areas with of population of 10,000 or greater (which includes Newman).

The current design includes a closure structure across the Railroad tracks to prevent floodwater from overtopping the levee at this point. The Union Pacific Railroad, which owns the tracks, has stated that the preferred method of dealing with the floodwater would be to raise the railroad berm rather than include a closure structure. The costs associated with raising the railroad berm, along with the additional levee height that would be required to implement this measure, means this measure would not be economically justified.

Environmental Compliance.

An evaluation of environmental effects determined that the proposed action has the potential for adverse effects on a variety of environmental resource areas.

In all cases the potential adverse environmental effects would be reduced to a less than significant level through project design, construction practices, preconstruction surveys and analysis, regulatory requirements, and best management practices. No compensatory mitigation would be required. A geotechnical analysis of underlying substrates and water quality analysis of construction activities and methods would be conducted during the PED phase to further refine potential impact analysis. A National Pollutant Discharge Elimination System (NPDES) general construction permit and a San Joaquin Valley Flood Control District (SJVFC) encroachment permit would also be required. A Storm Water Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasures Plan (SPCCP) would be developed by the contractor prior to construction.

The potential for impacts to wetlands, vegetation communities, and special status species has been greatly reduced through construction design. Direct impacts to nesting birds and other sensitive species would be avoided by implementing preconstruction surveys and scheduling of construction activities. The Final Coordination Act Report received from the USFWS states that the Service has no recommendations for design refinement or mitigation for the project as currently proposed (USFWS 2013). USACE has determined that the project is not likely to adversely affect any special status species with the potential to occur in the project area. USFWS concurred with this determination in March 2013. The District and the State Historic Preservation Office (SHPO) negotiated and signed a Programmatic Agreement (PA) that describes the specific process the Corps will follow to consider and treat any significant cultural resources that would be impacted by the project. The District chose to develop the PA because time and funding did not allow for a complete consideration of cultural resources prior to finalization of the EA. For this reason, the PA is very comprehensive and would guide the entire process; including definition of the Area of Potential Effect (APE), inventory and evaluation of cultural resources, and the resolution of any potential adverse effects to significant resources that might be encountered. The signed PA was legally executed when the Corps transmitted it to the Advisory Council on Historic Preservation (ACHP). The ACHP acknowledged receipt of the signed document in a letter sent on November 20, 2012.

The draft Feasibility Report/EA/IS was circulated for 30 days to agencies, organizations, and individuals who have an interest in the proposed project. All comments received were considered and incorporated into the final EA/IS, as appropriate. This project is being coordinated with all appropriate Federal, State, and local government agencies. USACE Headquarters would coordinate the public comments, receive comments from affected Federal and State agencies, and complete its own independent review of the final report.

After its review of the final Feasibility Report/EA/IS, including consideration of public comments, USACE Headquarters would prepare the Chief of Engineers' Report. This report would be submitted to the ASA(CW), who would coordinate with the Office of Management and Budget and submit the report to Congress.

State and Agency Review.

(To be inserted by HQUSACE after the S&A Review ends.)

Certification of Peer and Legal Review.

Final Agency Technical Review (ATR) was certified on 12 March 2013 with all review comments, with the exception of one previously discussed, satisfactorily addressed. Final legal certification was completed 8 April 2013 by Sacramento District Council with the Feasibility Report and EA/IS considered legally sufficient. Legal review of the Real Estate Plan was completed and certified on 17 May 2013. The Cost Engineering Center of Expertise (CX) Review was completed by the Walla Walla District CX and certified 17 May 2013. The Walla Walla CX review comments resulted in improvement in some of the computations, characterization, descriptive elements and format of the total project cost estimate, but did not significantly affect the relative magnitude of the numbers or plan recommendation.

Policy Compliance Review.

The Policy Compliance Review conducted to date is documented in the Policy Guidance Memorandum **dated 8 April 2013**, which contains the District responses to all comments. All comments have been incorporated into the final report, EA/IS and appendices as appropriate. The final policy review findings will be documented herein when completed by HQUSACE.