Meeting of the Central Valley Flood Protection Board
February 25, 2011

Staff Report

Three Rivers Levee Improvement Authority (TRLIA)
Feather River Levee Repair Project (FRLRP) – Segment 2 Vegetated Wave Buffer, Yuba County

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1.0 – ITEM

Consider approval of Permit No. 18556 (Attachment B)

2.0 – APPLICANT

Three Rivers Levee Improvement Authority (TRLIA)

3.0 – LOCATION

The project is located south of Marysville and west of Highway 70. (Feather River, Sutter County, see Attachment A)

4.0 – DESCRIPTION

The applicant proposes to plant a vegetated wave buffer consisting of approximately 18,000 native riparian plants and trees at a density of 261-plants-per-acre, along approximately 30,000-linear-feet, 100-foot-wide (6 rows, 20-feet apart), beginning at Station 1+00 and continuing to Station 301+00, located within approximately 69 acres, on the overflow area at a minimum distance of 70-feet from the waterside toe of the Feather River Setback Levee (Segment 2) along the left (east) bank of the Feather River.

5.0 – PROJECT ANALYSIS

The proposed project is a vegetated wave buffer, which will be planted and managed in the manner shown in Exhibits A, B, and C to Permit No. 18556. The plantings reflected in the attachments listed above, reflect the following planting quantities:

Name	Density (plants/acre)	Total
Box Elder	26	1,800
Coyote Bush	26	1,800
Fremont Cottonwood	39	2,700
Oregon Ash	22	1,500
Western Sycamore	30	2,100
Wild Rose	35	2,400
Arroyo Willow	30	2,100
Gooding's Black Willow	26	1,800
Sandbar Willow	26	1,800
	261	**18,000**

The entire wave buffer will not be planted at once, due to existing leases on properties adjacent to the new setback levee. These areas consist of existing orchards that will provide the wave protection needed for these stretches of the setback levee (as outlined in Attachment E) and will be suitable until the life of the orchards are reached. At that time the State has the option to either renew the farming leases for orchards or plant the Vegetated Wave Buffer as proposed within this project.

5.1 – Project Background

The proposed project was originally included in the overall hydraulics analysis that was approved for the Feather River Setback Levee (Segment 2) in March of 2008, under permit No. 18227. The inclusive hydraulics allowed for conservative values for vegetation for the area that will be added to the floodway after completion of the setback levee.

In June 2009, the Board approved Permit No. 18430, which included the degradation of the existing setback levee . Per staff recommendation, 2 items that were originally requested as part of Application No. 18430, were removed from that permit and were required by the Board to come back with separate permits. The 2 items that were removed and required separate permits, due to lack of information, were the Feather River Elderberry Transplant Site (FRET) and the Vegetated Wave Buffer .

The FRET permit will come to the Board in the near future and, as stated above, the Vegetated Wave Buffer is the project covered under Permit No. 18556.

5.2 – Project Design Review

Board staff has reviewed the following documents, provided by the applicant, in preparation of this staff report:

- Hydraulics Analysis for the Setback Levee Project (Segment 2), Permit No. 18227 (see Hydraulic Roughness Coefficient Map in Attachment C)
- Analysis of Wave Characteristics, Wind Setup and Wave Run-up, Permit No. 18227 (Attachment C)
- Approved Planting Plan (Exhibit A to Permit NO. 18556)
- Interim Operation and Maintenance Plan (Exhibit B to Permit No. 18556)
- Vegetated Wave Buffer Management Plan (Exhibit C to Permit No. 18556)

5.3 – Hydraulic Analysis

The hydraulics analysis conducted on the Feather River Setback Levee (Segment 2) project assumed dense vegetation in the newly-created and enlarged floodway. The Vegetative Wave Buffer conforms to the vegetation assumptions in the setback levee project's hydraulic analysis and is part of the setback levee project.

As stated above, the proposed project is consistent with the Setback Levee (Segment 2) hydraulics analysis. The hydraulics analysis was conducted using the two-dimensional RMA2 model and 200-year flood event. The analysis utilized composite Manning's roughness coefficients of 0.030 to 0.070 for pre-project conditions and a value of 0.10 for the entire setback levee's post-project values. Increases in the roughness coefficients, represented in the setback levee hydraulics analysis, reflect a dense vegetation scenario within the entire floodway and that a 1 to 2-foot decrease in WSE would be realized as a result of constructing the setback levee.

This buffer provides a much needed protection against erosive wind-wave action for the setback levee and it was an integral part of the hydraulic analysis. This stretch of the setback levee has an unfavorable and long fetch, which can cause destructive waves. However, the utilization of the proposed wave buffer and grassed levee slopes reduces the wind setup and wave run-up from maximum 6.16-feet to 3.76-feet, see Attachment C. This design feature was intended as slope protection for the Segment 2 setback levee that was approved, as stated in Section 5.1, under Permit No. 18227.

The proposed project is going to be maintained, as outlined, in Exhibits B and C to Permit No. 18556, which includes minimal maintenance that the hydraulic analysis does support. Staff has concluded that the project does not adversely affect the Flood Control System and is in all actuality a necessary feature for this stretch of the constructed setback levee.

5.4 – Geotechnical Analysis

Upon completion of staff review of the design plans, staff is in agreement with the applicant's conclusion that this project does not bear any significant geotechnical impacts on the Setback Levee and other flood control works, and all work to be completed will be done in a manner that does not pose a threat to the structural integrity of the levee or floodway. All work within the newly created floodway shall be completed in compliance with Permit No. 18556 (Attachment B) and Title 23 Standards.

5.5 – Project Benefits

The project has the following benefits associated with its completion:

- Provides a necessary mitigation feature for erosion and wind-wave action for the newly constructed Feather River Setback Levee – Segment 2 project.
- Provides native riparian habitat that will not cause any negative hydraulic impacts to the benefit gained under the adopted hydraulics for this stretch of the river.

6.0 – AGENCY COMMENTS AND ENDORSEMENTS

The comments and endorsements associated with this project, from all pertinent agencies are shown below:

- A U.S. Army Corps of Engineers (Corps) 208.10 Comment Letter was received on December 8, 2010 and is incorporated to Permit No. 18556 as Exhibit B.
- Reclamation District (RD) 784 has provided additional comments to be included in Permit No. 18556 and is incorporated by reference as Exhibit C.

7.0 – PROPOSED CEQA FINDINGS

Board staff has prepared the following CEQA Findings:

The Board, acting as a responsible agency under CEQA, has independently reviewed the Draft Environmental Impact Report (DEIR) (August, 2006) and the Final Environmental Impact Report (FEIR) (SCH No. 2006062071, November 2006) for the Feather River Levee Repair Project submitted by the Three Rivers Levee Improvement Authority (TRLIA). TRLIA, as the lead agency determined that the project would have a significant effect on the environment and adopted Resolution 2007-04 dated February 6, 2007 (which includes a Statement of Facts, Findings, Impacts and Mitigation Measures, Statement of Overriding Considerations, and Mitigation Monitoring and Reporting Program). TRLIA adopted an Addendum (January 11, 2011) to the EIR to include a vegetated wave buffer and filed a Notice of Determination with the State Clearinghouse on January 13, 2011, determining there will not be additional effects on the environment resulting from the wave buffer as part of the Feather River Levee Repair Project.

CEQA Guidelines Section 15164 Addendum to an EIR states that a lead agency may prepare an Addendum to a previously certified EIR if some changes or additions are necessary providing the changes do not require the preparation of a subsequent EIR.

The EIR and associated Mitigation Monitoring and Reporting Program remain valid for assessing and mitigating identified impacts that would result from implementation of the approved project. The vegetated wave buffer as described in the Addendum and any altered conditions since certification of the EIR on February 6, 2007 would not result in any new significant environmental effects, and would not substantially increase the severity of previously identified effects. In addition, no new information of substantial importance has arisen in accordance with CEQA Guidelines Section 15162 requiring the preparation of a subsequent EIR that shows:

- the project would have new significant effects;
- the project would have substantially more severe effects;
- mitigation measures or alternatives previously found to be infeasible would in fact be feasible;
- mitigation measures or alternatives that are considerably different from those analyzed in the EIR would substantially reduce one or more significant effects on the environment.

Conditions for preparing a subsequent EIR have not occurred; therefore, an Addendum to include a vegetated wave buffer is in accordance with CEQA Guidelines Section 15164.

These documents including project design and TRLIA resolutions may be viewed or downloaded from the Central Valley Flood Protection Board website at http://www.cvfpb.ca.gov/meetings/2011/02-25-2011.cfm under a link for this agenda item. The documents are also available for review in hard copy at the Board and TRLIA offices.

7.1 – Impacts that can be Mitigated

The significant impacts and the mitigation measures to reduce them to less than significant are adopted in TRLIA Resolution 2007-04 dated February 6, 2007 (which includes a Statement of Facts, Findings, Impacts and Mitigation Measures, Statement of Overriding Considerations and Mitigation Monitoring and Reporting Program). Based on its independent review of the FEIR and TRLIA Resolution 2007-04, the Board finds that for each of the significant impacts described, changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effects as identified in the FEIR. Moreover, such changes or alterations are within the responsibility and jurisdiction of another public agency, TRLIA, and such changes have been adopted by that agency.

7.2 – Significant Unavoidable Adverse Impacts of the Project

The following impacts of the proposed project remain significant following adoption and implementation of the mitigation measures described in the FEIR:

- The proposed project conflicts with land use planning and policies resulting from levee repairs and the levee setback;
- The proposed project would result in the conversion of important farmland to nonagricultural uses resulting from levee repairs and strengthening;
- The proposed project would result in temporary emissions of air pollutants (Reactive Organic Gas (ROG); Nitrogen Oxides (NOx); Particular Matter (PM10)) during construction;
- The proposed project would result in temporary increases in noise levels during construction.

The Board finds that the specific economic, legal, social, technological or other benefits of the project outweigh the unavoidable adverse environmental effects, which are thus considered to be “acceptable.”

7.3 – Statement of Overriding Considerations

TRLIA adopted Resolution 2007-04 including the Statement of Overriding Considerations. The Board concurs with this Statement.

The Board has independently considered the significant and unavoidable environmental impacts of the proposed project. The Board has also considered the benefits of the project on the State Plan of Flood Control as it includes features that will provide 200-year protection.

The Board finds that economic, legal, social, technological, or other benefits of the proposed project outweigh the unavoidable adverse environmental effects of the project, and the adverse environmental effects are considered acceptable when these benefits of the project are considered.

The documents and other materials which constitute the record of the Central Valley Flood Protection Board's proceedings in this matter are in the custody of Jay Punia, Executive Officer, Central Valley Flood Protection Board, 3310 El Camino Ave., Rm. 151, Sacramento, California 95821.

8.0 – SECTION 8610.5 CONSIDERATIONS

1. Evidence that the Board admits into its record from any party, State or local public agency, or nongovernmental organization with expertise in flood or flood plain management:

   The Board has considered all the evidence presented in this matter, including the original and updated applications, past and present Staff Reports and attachments. The Board has also considered all letters and other correspondence received by the Board and in the Board's files related to this matter.

   The custodian of the file is Executive Officer Jay Punia at the Central Valley Flood Protection Board.

2. The best available science that related to the scientific issues presented by the executive officer, legal counsel, the Department or other parties that raise credible scientific issues.

The accepted industry standards for the work proposed under this permit as regulated by Title 23 have been applied to the review of this permit.

3. Effects of the decision on the entire State Plan of Flood Control:

   This project does not have significant impacts on the State Plan of Flood Control, as the project does not impair the structural or hydraulic functions of the system.

4. Effects of reasonable projected future events, including, but not limited to, changes in hydrology, climate, and development within the applicable watershed:

   There are no other foreseeable projected future events that would impact this project.

9.0 – STAFF RECOMMENDATION

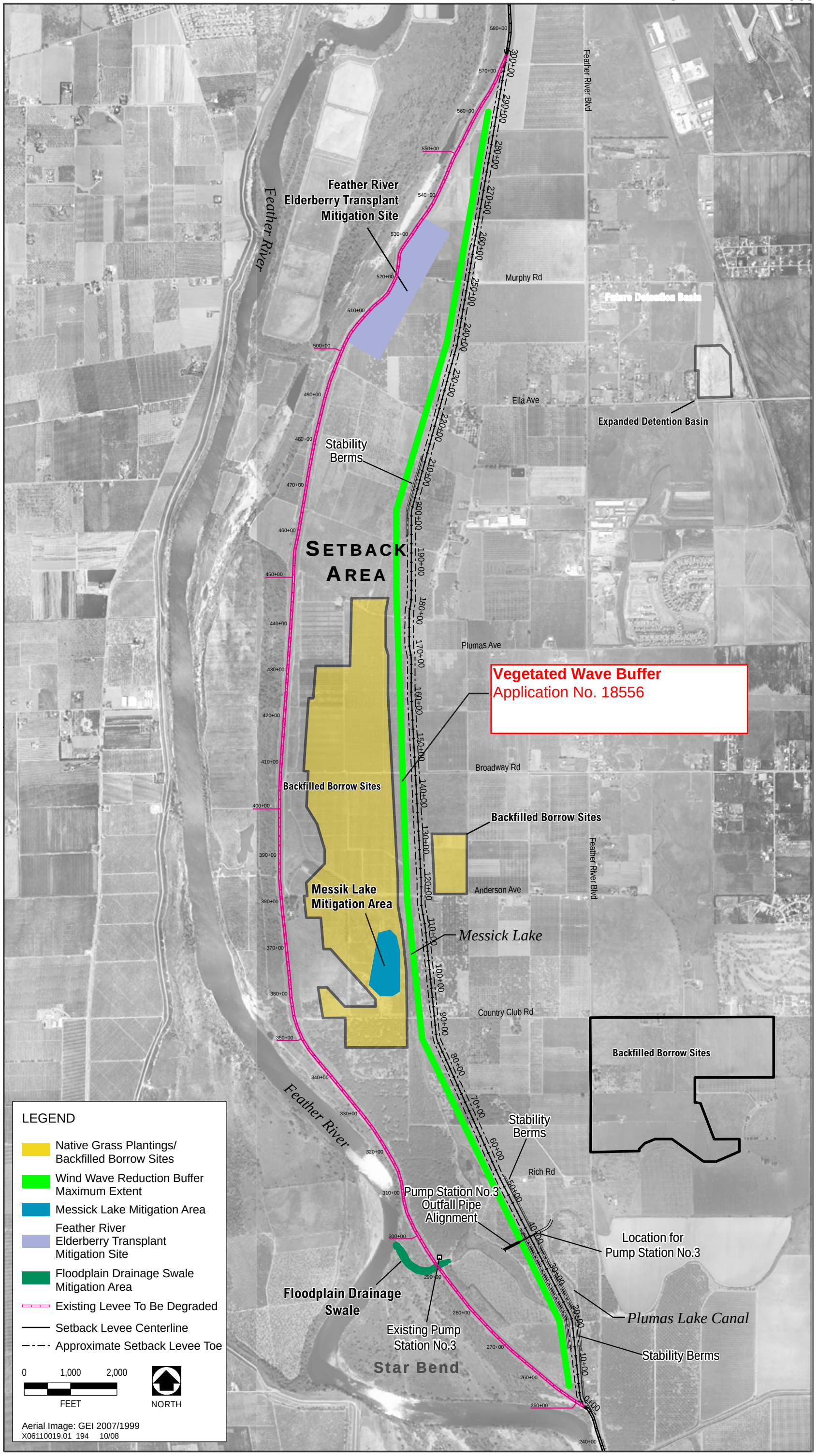
Staff recommends that the Board adopt the Board's CEQA Findings, approve Permit No. 18556, and an order to direct the Executive Officer to take necessary actions to prepare the permit and to prepare and file a Notice of Determination with the State Clearinghouse.

10.0 – LIST OF ATTACHMENTS

A. Location Map
B. Draft Permit No. 18556
   - Exhibit A: Approved Planting Plans
   - Exhibit B: Interim Operation and Maintenance (O&M) Plan
   - Exhibit C: Management Plan, Vegetated Wave Buffer
   - Exhibit D: Corps 208.10 Comment Letter
   - Exhibit E: RD 784 Special Conditions for Permit No. 18556
C. Hydraulic Roughness Coefficient Map (Permit No. 18227) and Summary of Wave Characteristics, Wind setup and Wave Run-up

Design Review:	Nancy C. Moricz, P.E.
Environmental Review:	Andrea Mauro, E.S.
	James Herota, E.S.
Document Review:	David R. Williams, P.E. – Senior Engineer
	Dan S. Fua, P.E. – Supervising Engineer
	Len Marino, P.E. – Chief Engineer

ATTACHMENT A - Location Map



DRAFT

STATE OF CALIFORNIA
THE RESOURCES AGENCY

THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18556 BD

This Permit is issued to:

Three Rivers Levee Improvement Authority
1114 Yuba Street, Suite 218
Marysville, California 95901

To plant a vegetated wave buffer consisting of approximately 18,000 native riparian plants and trees at a density of 261-plants-per-acre, along approximately 30,000-linear-feet, 100-foot-wide (6 rows, 20-feet apart), beginning at Station 1+00 and continuing to Station 301+00, located within approximately 69 acres, on the overflow area at a minimum distance of 70-feet from the waterside toe of the Feather River Setback Levee (Segment 2) along the left (east) bank of the Feather River. The project is located south of Marysville and west of Highway 70 (Section 12,13,24&25, T14N, R3E, MDB&M, Reclamation District 784, Feather River, Yuba County).

NOTE: Special Conditions have been incorporated herein which may place limitations on and/or require modification of your proposed project as described above.

(SEAL)

Dated: _____

_____
Executive Officer

GENERAL CONDITIONS:

ONE: This permit is issued under the provisions of Sections 8700 – 8723 of the Water Code.

TWO: Only work described in the subject application is authorized hereby.

THREE: This permit does not grant a right to use or construct works on land owned by the Sacramento and San Joaquin Drainage District or on any other land.

FOUR: The approved work shall be accomplished under the direction and supervision of the State Department of Water Resources, and the permittee shall conform to all requirements of the Department and The Central Valley Flood Protection Board.

FIVE: Unless the work herein contemplated shall have been commenced within one year after issuance of this permit, the Board reserves the right to change any conditions in this permit as may be consistent with current flood control standards and policies of The Central Valley Flood Protection Board.

SIX: This permit shall remain in effect until revoked. In the event any conditions in this permit are not complied with, it may be revoked on 15 days' notice.

SEVEN: It is understood and agreed to by the permittee that the start of any work under this permit shall constitute an acceptance of the conditions in this permit and an agreement to perform work in accordance therewith.

EIGHT: This permit does not establish any precedent with respect to any other application received by The Central Valley Flood Protection Board.

NINE: The permittee shall, when required by law, secure the written order or consent from all other public agencies having jurisdiction.

TEN: The permittee is responsible for all personal liability and property damage which may arise out of failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agencies and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim.

ELEVEN: The permittee shall exercise reasonable care to operate and maintain any work authorized herein to preclude injury to or damage to any works necessary to any plan of flood control adopted by the Board or the Legislature, or interfere with the successful execution, functioning or operation of any plan of flood control adopted by the Board or the Legislature.

TWELVE: Should any of the work not conform to the conditions of this permit, the permittee, upon order of The Central Valley Flood Protection Board, shall in the manner prescribed by the Board be responsible for the cost and expense to remove, alter, relocate, or reconstruct all or any part of the work herein approved.

SPECIAL CONDITIONS FOR PERMIT NO. 18556 BD

THIRTEEN: All work approved by this permit shall be in accordance with the submitted drawings and specifications except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Central Valley Flood Protection Board.

FOURTEEN: Prior to commencement of excavation, the permittee shall create a photo record, including associated descriptions, of the levee conditions. The photo record shall be certified (signed and stamped) by a licensed land surveyor or professional engineer registered in the State of California and submitted to the Central Valley Flood Protection Board within 30 days of beginning the project.

FIFTEEN: The mitigation measures approved by the CEQA lead agency and the permittee are found in its Mitigation and Monitoring Reporting Program (MMRP) adopted by the CEQA lead agency. The permittee shall implement all such mitigation measures.

SIXTEEN: The permittee shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California, including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages related to the Central Valley Flood Protection Board's approval of this permit, including but not limited to claims filed pursuant to the California Environmental Quality Act. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

SEVENTEEN: The permittee is responsible for all liability associated with construction, operation, and

maintenance of the permitted facilities and shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California; including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages arising from the project undertaken pursuant to this permit, all to the extent allowed by law. The State expressly reserves the right to supplement or take over its defense, in its sole discretion

EIGHTEEN: The Central Valley Flood Protection Board, Department of Water Resources, and Reclamation District No. 784 shall not be held liable for damages to the permitted encroachment(s) resulting from releases of water from reservoirs, flood fight, operation, maintenance, inspection, or emergency repair.

NINETEEN: The permittee shall be responsible for repair of any damages to the project levee and other flood control facilities due to construction, operation, or maintenance of the proposed project.

TWENTY: No construction work of any kind shall be done during the flood season from November 1 to April 15 without prior approval of the Central Valley Flood Protection Board.

TWENTY-ONE: The permittee shall provide supervision and inspection services acceptable to the Central Valley Flood Protection Board. A professional engineer registered in the State of California shall certify that all work was inspected and performed in accordance with submitted drawings, specifications, and permit conditions.

TWENTY-TWO: Other than with respect to work expressly permitted by this permit, the project area shall be restored to the condition that existed prior to the start of work.

TWENTY-THREE: Temporary staging, formwork, stockpiled material, equipment, and temporary buildings shall not remain in the floodway during the flood season from November 1 to April 15.

TWENTY-FOUR: No wild rose, grape, blackberries, or other bushy thickets shall be propagated or otherwise allowed to grow at this site other than those indicated on the submitted drawings.

TWENTY-FIVE: The ground surface shall be kept clear of fallen trees, branches, and debris.

TWENTY-SIX: All debris generated by this project shall be disposed of outside the floodway.

TWENTY-SEVEN: After each period of high water, debris that accumulates at the site shall be completely removed from the floodway.

TWENTY-EIGHT: Tree rows shall be parallel to the direction of the overbank flow and shall not direct the flows toward any levee and in accordance with the Approved Planting Plans, which is attached to this permit as Exhibit A and is incorporated by reference.

TWENTY-NINE: The Central Valley Flood Protection Board may require clearing and/or pruning of trees planted within the floodway in order to minimize obstruction to floodflows.

THIRTY: Cleared trees and brush (or prunings therefrom) shall be completely burned or removed from the floodway, and downed trees or brush shall not remain in the floodway during the flood

season from November 1 to April 15.

THIRTY-ONE: Areas where plantings are lost to erosion shall not be replanted.

THIRTY-TWO: The landscaping, appurtenances, and maintenance practices shall conform to standards contained in Section 131 of the Central Valley Flood Protection Board's Regulations and the Interim Operation and Maintenance (O&M) Plan and Vegetated Wave Buffer Management Plan, attached to this permit as Exhibits B and C respectively and are incorporated by reference.

THIRTY-THREE: Any vegetative material, living or dead, that interferes with the successful execution, functioning, maintenance, or operation of the adopted plan of flood control must be removed by the permittee at permittee's expense upon request by the Central Valley Flood Protection Board, Department of Water Resources, or local maintaining agency. If the permittee does not remove such vegetation or trees upon request, the Central Valley Flood Protection Board reserves the right to remove such at the permittee's expense.

THIRTY-FOUR: The permittee shall submit as-built drawings to the Department of Water Resources' Flood Project Inspection Section, located at 3310 El Camino Ave, Room 256, Sacramento, California, 95821, upon completion of the project.

THIRTY-FIVE: The permittee shall operate and maintain the permitted encroachment(s) and the project works within the utilized area in the manner required and as requested by the authorized representative of Department of Water Resources or any other agency responsible for maintenance. Maintenance may include actions to preserve the integrity of the flood control system under emergency conditions. These actions will be taken at the sole expense of the permittee.

THIRTY-SIX: In the event that levee or bank erosion injurious to the adopted plan of flood control occurs at or adjacent to the permitted encroachment(s), the permittee shall repair the eroded area and propose measures, to be approved by the Central Valley Flood Protection Board, to prevent further erosion.

THIRTY-SEVEN: If the proposed project result(s) in an adverse hydraulic impact, the permittee shall provide appropriate mitigation measures, to be approved by the Central Valley Flood Protection Board, prior to implementation of mitigation measures.

THIRTY-EIGHT: The permitted encroachment(s) shall not interfere with operation and maintenance of the flood control project. If the permitted encroachment(s) are determined by any agency responsible for operation or maintenance of the flood control project to interfere, the permittee shall be required, at permittee's cost and expense, to modify or remove the permitted encroachment(s) under direction of the Central Valley Flood Protection Board or Department of Water Resources. If the permittee does not comply, the Central Valley Flood Protection Board may modify or remove the encroachment(s) at the permittee's expense.

THIRTY-NINE: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted encroachment(s) if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or future flood control plan or project or if damaged by any cause. If the permittee does not comply, the Central Valley Flood Protection Board may remove the encroachment(s) at the permittee's expense.

FORTY: If the project, or any portion thereof, is to be abandoned in the future, the permittee or successor shall abandon the project under direction of the Central Valley Flood Protection Board and Department of Water Resources, at the permittee's or successor's cost and expense.

FORTY-ONE: A copy of this permit shall be included as an attachment to any Long-Term Management Plan for the permitted project area.

FORTY-TWO: The permittee shall contact the Department of Water Resources by telephone, (916) 574-0609, and submit the enclosed postcard to schedule a preconstruction conference. Failure to do so at least 10 working days prior to start of work may result in delay of the project.

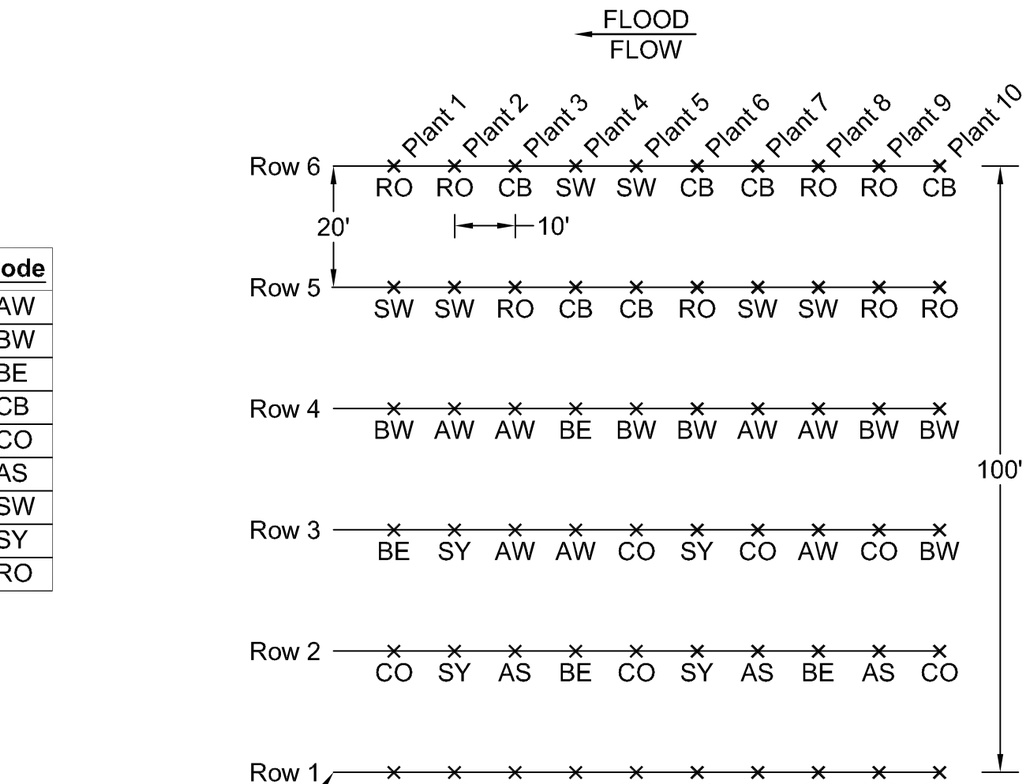
FORTY-THREE: The permittee should contact the U.S. Army Corps of Engineers, Sacramento District, Regulatory Branch, 1325 J Street, Sacramento, California 95814, telephone (916) 557-5250, as compliance with Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act may be required.

FORTY-FOUR: The permittee shall comply with all conditions set forth in the comment letter from the U.S. Army Corps of Engineers dated December 8, 2010, which is attached to this permit as Exhibit C and is incorporated by reference.

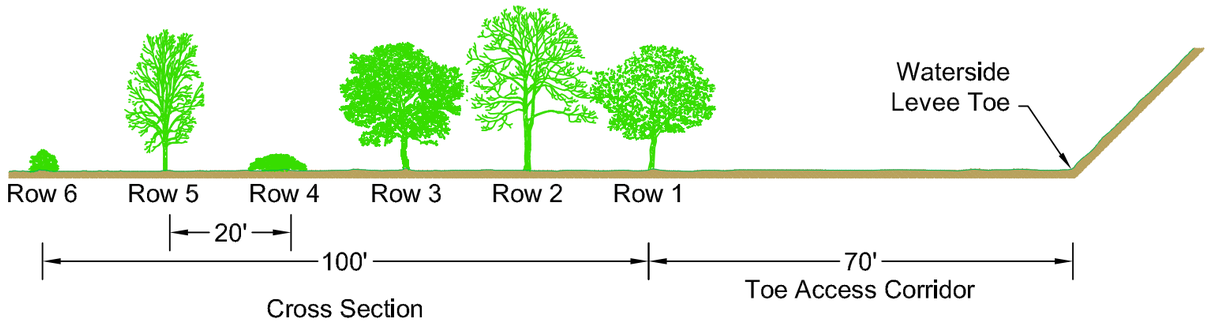
FORTY-FIVE: The permittee shall comply with all conditions set forth in the letter from Reclamation District 784 dated September 1, 2009, which is attached to this permit as Exhibit D and is incorporated by reference.

FORTY-SIX: This permit shall run with the land and all conditions are binding on permittee's successors and assigns.

Common Name	Code
Arroyo Willow	AW
Black Willow	BW
Box Elder	BE
Coyote Bush	CB
Fremont Cottonwood	CO
Oregon Ash	AS
Sandbar Willow	SW
Western Sycamore	SY
Wild Rose	RO



Plan View - Planting Tile



Cross Section

Notes:

1. Plant on Existing Ground Elevation
2. Begin at Station 1+00 and Continue to Station 301+00 (30,000 Linear feet)
3. Repeat Planting Tile in 100 Foot Increments

N

MBK ENGINEERS
2450 Alhambra Boulevard, 2nd Floor
Sacramento, California 95817
(916) 456-4400

Three Rivers Levee Improvement Authority
Vegetated Wave Buffer Planting Tile
Plan and Section

0 25
Scale in Feet

ATTACHMENT B: Exhibit A - Approved Planting Plans

Vegetated Wave Buffer
Plant Species and Density

69 Acres

Common Name	Scientific Name	Species Code	Plants per Tile	Density (plants/acre)	Total Number 69 Acres
Box elder	*Acer negundo L.*	BE	6	26	1,800
Coyote bush	*Baccharis pilularis DC.*	CB	6	26	1,800
Fremont cottonwood	*Populus fremontii S.Watson ssp. fremontii*	CO	9	39	2,700
Oregon ash	*Fraxinus latifolia Benth*	AS	5	22	1,500
Western sycamore	*Platanus racemosa Nutt.*	SY	7	30	2,100
Wild rose	*Rosa californica Cham. & Schldl.*	RO	8	35	2,400
Arroyo willow	*Salix lasiolepis Benth.*	AW	7	30	2,100
Gooding's black willow	*Salix goodingii C.R. Ball*	BW	6	26	1,800
Sandbar (narrow-leaf) willow	*Salix exigua Nutt.*	SW	6	26	1,800
			60		
				261	18,000

Vegetated Wave Buffer Planting Tile

This tile is repeaed every 100 feet along the Buffer

Plant#\Row	1	2	3	4	5	6
1	CO	CO	BE	BW	SW	RO
2	AS	SY	SY	AW	SW	RO
3	BE	AS	AW	AW	RO	CB
4	SY	BE	AW	BE	CB	SW
5	CO	CO	CO	BW	CB	SW
6	AS	SY	SY	BW	RO	CB
7	BE	AS	CO	AW	SW	CB
8	SY	BE	AW	AW	SW	RO
9	CO	AS	CO	BW	RO	RO
10	SY	CO	BW	BW	RO	CB

ATTACHMENT B: Exhibit A - Approved Planting Plans

FEATHER RIVER SETBACK AREA AND ADJACENT LANDS
INTERIM OPERATION AND MANAGEMENT PLAN
January 25, 2010
Updated July 26, 2010

The Three Rivers Levee Improvement Authority (TRLIA) is completing construction of the Feather River Setback Levee (Setback Levee) in 2010. Along with this new levee, the existing levee will be degraded and approximately 1,500 acres will be added to the Feather River floodway in this reach. Prior to construction, those lands were in agriculture; see Appendix A for detail on land use prior to construction. The Setback Levee was built in partnership with the California Department of Water Resources (DWR) as an Early Implementation Project (EIP) of the State-Federal Flood Control System Modifications Grant Program. The State provided over 80% of the funding required for implementing the Setback Levee. All of the real estate acquired for constructing the Setback Levee will ultimately be transferred to the State for future management. To accomplish this transfer, TRLIA will need to settle all court cases, complete the DWR certification process for all parcels, and assemble all real estate documents required to complete the transfer of these lands to the State. These steps are expected to take approximately two years to accomplish.

During that time period TRLIA will have control of approximately 1,800 acres. See Table 1 for a breakdown of these areas under TRLIA control.

Land use on theses acres will be divided among several different categories. Each category will have different maintenance needs which will be the responsibility of different entities. The purpose of this document is to identify (1) the different land use categories, (2) their operation and maintenance (O&M) needs, and (3) who will be responsible for meeting those O&M needs, and to develop a cost estimate for O&M for the interim period that TRLIA is responsible for these lands.

Land Use Categories

At the end of construction, the areas under TRLIA control will contain approximately nine different land uses. These uses are described below. Figure 1 shows the extent of the different land uses. Table 1 lists the original parcels and the land use categories on those parcels after the Setback Levee was constructed.

Uppal Landside Remnant. The Uppal parcel was acquired in its entirety for levee construction. A portion of the parcel on the landside of the Setback Levee was excavated for material to be used in the levee embankment. This borrow area has now been filled to its original ground elevation and approximately 24.2 acres on the landside of the levee are excess to the levee footprint needs. This area has been planted with grasses to control erosion. This is an open space with no other facilities. This remainder parcel on the landside of the Setback Levee is provided 200-year flood protection by the new Setback Levee like the rest of the RD 784 area.

Setback Levee Area. The Setback Levee Area is the area from the east right of way line to the west edge of the toe access corridor. This area contains all of the facilities of the levee structure itself. Those facilities consist of the landside drainage ditch, ditch maintenance road, the landside toe access corridor, piezometers, relief wells, the levee embankment (including patrol road on the crest, ramps and berms), and the waterside toe access corridor. Much of this area is planted with erosion control grasses. The maintenance and patrol roads have a rock aggregate base and portions of the drainage ditch are concrete. This area covers approximately 236 acres.

Vegetated Wave Buffer. To protect the levee embankment from wave erosion, a vegetated buffer will be planted on the waterside of the levee embankment. This buffer will start at the waterside edge of the toe access corridor and will be 100 feet wide. The buffer will eventually be planted the extent of the levee embankment, approximately 30,000 linear feet. Six rows spaced 20 feet apart of trees and brush will be planted in the buffer. This area will eventually cover approximately 68 acres. Currently some of the area that is designated as wave buffer is planted in walnut orchards. These orchards provide almost the same wave protection as the vegetated wave buffer and are actively farmed. Because of the desire to continue existing farming operations, the existing orchards will not be displaced by the vegetated wave buffer. As the orchards are no longer farmed and become abandoned, the vegetated wave buffer will be planted in its designated area. The land use map and table indicate the entire vegetated wave buffer, even in those areas which are orchards. Therefore, currently the wave buffer is actually slightly smaller (by approximately 21 acres) than it will eventually be and the actively farmed area is slightly larger (again by approximately 21 acres).

Mitigation Lands (Messick Lake and Floodplain Drainage Swale). As a requirement of the Setback Levee Section 404 permit, TRLIA had to mitigate for impacts to open water, wetlands, and associated riparian habitat. Mitigation consists of 24 acres adjacent to Messick Lake and 6 acres in and surrounding the floodplain drainage swale. The mitigation areas grading and planting plans are given in detail in the *Habitat Mitigation and Monitoring Proposal Plan for the TRLIA Messick Lake and Floodplain Drainage Swale Mitigation Areas, Wildlands and River Partners, November 2008*. These lands will need to be maintained as mitigation areas in perpetuity.

Feather River Elderberry Transplant (FRET) Area. Impacts to elderberry shrubs occurred as a result of implementing the Setback Levee and had to be mitigated. TRLIA chose to mitigate these impacts onsite by transplanting the impacted elderberry plants into the newly created Setback Area along with the planting of associated vegetation as required by USFWS protocols. Mitigating elderberry impacts in this way was less expensive than acquiring additional land offsite or buying credits at a mitigation bank. The entire area is covered with transplanted elderberry shrubs and their associated vegetation and covers approximately 44 acres.

Limited Disturbance Environmental Area. There is an environmentally sensitive area along Messick Lake where, according to mitigation requirements, access needs to be controlled and surface disturbance should not occur except in the event of an

extreme emergency. To prevent potential erosion during high water events, this area will be planted with a dense thicket of blackberry bushes and riparian vegetation. Any vegetation removal required should be done in a way to minimize ground disturbance. This area covers approximately 5 acres.

Actively Farmed Agricultural Lands. Much of the new floodway area was farmed prior to construction of the Setback Levee. Some of that area remains in agriculture. Some of the former owners have chosen to continue farming their original agricultural lands under lease to TRLIA. These leases are for no longer than 5 years and can be terminated by TRLIA at their convenience. These leases will have to be renegotiated and renewed with DWR once these lands are transferred to DWR. There is no guarantee that these lands will remain in agriculture in the long term even though the TRLIA Board has expressed a desire to continue agriculture in the Setback Area for as long as possible. These areas are covered with the original orchard crops and contain irrigation wells and appurtenant irrigation facilities. The predominant crop on these lands is walnuts with approximately 413 acres within the Actively Farmed Agricultural lands category.

Open Area. This land use is made up of former borrow areas, portions of the degraded levee footprint, and abandoned agricultural lands. The borrow areas were stripped of topsoil and then excavated for material to construct the Setback Levee embankment. These borrow areas have been partially filled, graded to provide drainage out of the newly created floodway area, and planted with erosion control grasses. No other facilities were placed in the former borrow areas. The old levee was degraded to design grades to approximately match surrounding topography. The degraded material was used to fill the borrow areas. Once degraded, the old levee footprint was planted with erosion control grasses. Portions of the old levee footprint not owned by the Sacramento San Joaquin Drainage District (SSJDD) (see discussion below of "Areas Owned by Others") fall within the Open Area category. Some of the former orchards were not leased for continuing farming. Because abandoned orchards can serve as a haven for agricultural pests, TRLIA chose to remove the trees from these abandoned orchards. No additional grading or planting was performed on these areas and they have become fallow. The Open Area in the Setback Area and Adjacent Lands is approximately 989 acres.

Area Owned by Others. Once the existing levee is completely removed, the newly created floodway area will be joined to the previously existing floodway. Much of this previous floodway is owned by others, predominantly the SSJDD. The SSJDD is the real estate entity of the Central Valley Flood Protection Board. Much of the land under the existing levee is part of these SSJDD parcels and it is assumed that this degraded footprint will return to the responsibility of the SSJDD. Maintenance of the Area Owned by Others has been and will continue to be the responsibility of the owners. TRLIA will need to ensure continued access to these areas as part of its interim O&M of the Setback Area and Adjacent Lands.

Wetlands. Within the Setback Area and Adjacent Lands are wetland areas which have not been explicitly mapped on Figure 1 and are not shown as a separate land use in Table 1. These include Messick Lake and other open waters. These wetlands will continue to have

the same regulatory protection which they currently possess. No interim O&M actions propose to fill or impact these areas. However TRLIA and the State will need to continue to be aware of these wetlands and coordinate with the Corps (Section 404), Regional Water Quality Control Board (Section 401), and the Department of Fish and Game (Streambed Alteration Agreement) if impacts to these wetlands are considered as part of future actions. These lands don't have "protected in perpetuity" status like the wetland mitigation areas, but do have permitting requirements associated with disturbance of these sensitive habitats.

O&M Needs

There are some overall O&M requirements for lands within the Setback Area and Adjacent Lands as well as specific requirements for the different land uses within the Setback Area and Adjacent Lands. Both overall and specific O&M requirements are discussed below.

Overall O&M Requirements

Erosion Control. The areas that were disturbed during construction will have erosion control grasses planted at the end of construction. These grasses prevent winter rains and flood overflows from causing excessive erosion. Continuation of these grasses will need to be ensured during the interim maintenance period.

Mowing. The open areas will need to be periodically mowed. This will serve to help control the invasion of exotics and establishment of elderberries in these open areas. It will also help to minimize the fire threat. Mowing will occur at least twice a year.

Security Patrol. One other concern will be security for the area. Neglect would encourage trespassing, dumping, and other undesirable activities. Access is somewhat controlled by levee gates at access points, but past experience has shown that individuals will find ways around these controls. This creates a need for regular patrols of the Setback Area and Adjacent Lands. These patrols establish a presence in this area which will help to diminish unauthorized activities as well as provide early detection of any unauthorized activities. The area should be patrolled at least once each day, including weekends. To aid these patrols, aggregate base security roads should be established in the area. The minimal security road system would consist of an access to the Setback Area at Broadway, a security road through the Setback Area at Country Club, and a security road along the footprint of the degraded existing levee, See Figure 2. These roads would be 15 feet wide and would also allow access for fire fighting and other emergencies.

Signage. The Setback Area and Adjacent Lands should have signage to designate the area as posted and indicate that trespassing is prohibited.

Trash Removal. Even with controlled access and patrols, there could be occasions when someone dumps material illegally in the area controlled by TRLIA. Any

dumped material will need to be removed quickly so that no area becomes informally designated as a dump site and so that further dumping is not encouraged.

Maintenance of Drainage Facilities and Irrigation Wells. Drainage in the newly created floodway generally occurs from north to south. Culvert crossings of patrol roads and the orchard roads in the Setback Area include two culverts at Anderson Avenue, one culvert at Country Club Road, and one culvert at an orchard road approximately 750 feet north of Rich Road. The existing culverts are in varying states of disrepair and partly or nearly completely filled with sediment. The culverts will need to be maintained and kept clear of sediment to reduce the potential for ponding and fish stranding during overbank flood events.

Approximately 12 wells, with assigned state well numbers, have been left active within the newly created floodway. Details on the wells are given in Table 2 and locations of active wells shown on Figure 2. Most of these wells have power serviced by PG&E distribution lines. The wells have been retained for possible use in environmental enhancement activities or to support continuing agricultural operations. If or when the wells are no longer needed, they will need to be destroyed in accordance with California's water well regulations. Typically a functioning well includes the pump, motor, electrical panel, and transformer. If the wells are not to be used by TRLIA during the Interim O&M period, preventive maintenance activities could include the removal and storage of valuable equipment and the welding of a steel plate to the top of the well casing to discourage dumping and to prevent flow of surface water into the aquifer during flood events. Table 2 provides the future action for these currently active wells.

Specific Interim O&M Requirements

Uppal Landside Remnant. The Uppal Landside Remnant is unique in that it is on the landside of the new Setback Levee. The final use for this parcel is uncertain. Interim O&M will require erosion control, mowing, patrol, and trash removal. Since land acquisition actions are complete for this parcel, TRLIA has the option of turning this land over to DWR right away. RD 784 has expressed an interest in acquiring an interest in this parcel to relocate their RD District Headquarters and appurtenant shops and storage areas here. The RD will have to move from its current location sometime in the near future. No agreements have been reached at this time and it is unclear if the RD should be negotiating with TRLIA (the current owner) or with DWR (the future owner), which provided funds for acquisition.

Setback Levee Area. Since this area contains the levee features, it has unique maintenance requirements that will be described in detail in an O&M Addendum to the existing O&M Manual. A draft O&M Addendum has been prepared and is under review by the Corps, DWR and the CVFPB. Since these features replace the existing levee, responsibility for maintaining this area will reside with RD 784 for the interim time period and in the future.

Vegetated Wave Buffer. The interim O&M period will coincide with the establishment period for the vegetated wave buffer. The planting contractor will be responsible for the maintenance of this area for the first three years. Once the plants are established, there will be some continual maintenance to patrol the area, remove any trash, and to ensure the continued existence of the vegetation buffer. This may require some limited replanting to replace trees and shrubs lost to fire, pest attacks, or natural morbidity. Since this vegetated wave buffer is being established to protect the Setback Levee from wave erosion, it is reasonable to assign long term maintenance responsibility to the local levee maintenance agency, RD 784. Maintenance of this feature has the same importance as maintenance of other levee features in the Setback Levee Area.

As noted earlier, an important additional O&M responsibility will be the planting of the portions of the vegetated wave buffer that are now occupied with existing orchards (currently walnut trees). Planting and establishment of trees in these portions of the wave buffer will need to occur once the orchards are no longer farmed and become abandoned.

Mitigation Lands (Messick Lake and Floodplain Drainage Swale). Development of these Section 404 mitigation areas also required the preparation of a long term O&M Plan. This plan is described in the *Messick Lake and Floodplain Drainage Swale Mitigation Areas, Long-Term Operations and Maintenance Plan, November 2008*, prepared by Wildlands and River Partners. These mitigation areas also have specific monitoring requirements. The monitoring requirements are described in the *Messick Lake and Floodplain Drainage Swale Mitigation Areas, Habitat Mitigation and Monitoring Proposal/Plan, November 2008* prepared by Wildlands and River Partners. The initial maintenance and monitoring for these areas will be accomplished by the planting contractor during the establishment of the mitigation plantings for approximately 3 years. TRLIA has created an endowment fund to pay for the long term O&M and monitoring of these areas after the establishment period is over. O&M activities will consist of ensuring the approved plant community is maintained, removing invasive species, and cleaning up the area after flood flows. Patrol of these areas will be part of the overall patrol of the Setback Area and Adjacent Lands.

Feather River Elderberry Transplant (FRET) Area. Interim O&M for the FRET area will be accomplished by the planting contractor during the plant establishment period for approximately three years. After the plants are established, limited maintenance will be required to ensure continuation of the plant community, particularly elderberry plantings, and to clean up the area after flood flows. No long-term O&M plan is required but a short term (5 year) compliance/establishment report will be prepared by the planting contractor. A conservation easement will likely be established as part of negotiations between DWR and the USFWS regarding elderberry impacts during flood emergencies for the entire Setback Area. Patrol of this area will be part of the overall patrol of the Setback Area and Adjacent Lands.

Limited Disturbance Environmental Area. Interim O&M for this area will be accomplished by the planting contractor during the plant establishment period for approximately three years. After the plants are established, limited maintenance will be required to ensure continuation of the plant community that limits disturbance and to

remove trash that may become deposited during flood flows. Patrol of this area will be part of the overall patrol of the Setback Area and Adjacent Lands.

Actively Farmed Agricultural Lands. Maintenance of these areas currently resides and will continue to reside with the lessees of these agricultural areas. The farmers control weeds and invasive species in these areas as well as maintain the irrigation facilities. The farmers will continue to maintain these areas during this interim period or until their leases are to be renewed. Continued maintenance of these areas will depend on whether the farmers renew the agricultural leases in the future. As part of the Section 401 Certification, TRLIA joined the Butte-Yuba-Sutter Water Quality Coalition which provides Best Management Practices (BMP) for agriculture accomplished in a floodway. The Sacramento Valley BMP Handbook has been adopted for the agricultural practices that continue in the Setback Area and the farming that continues in the Setback Area is to follow the directions given in the BMP Handbook. The farmers are expected to patrol these agricultural areas and remove any trash that may be deposited there.

Open Area. This area will be maintained by TRLIA in the interim period. Maintenance activities will consist of continuation of erosion control grasses, mowing of the area twice a year, patrolling the area, and removal of debris that is either deposited illegally by trespassers or deposited by floods. The National Marine Fisheries Service (NMFS) has imposed a requirement that the Setback Area be monitored to ensure that the area drains and fish are not stranded in this area after a flood event. TRLIA has filled the borrow areas in the Setback area in such a manner to ensure drainage to Messick Lake and ultimately out to the Feather River through the Floodplain Drainage Swale. In addition minor swales at the northern end of the Setback Area were constructed to facilitate drainage out of naturally occurring low areas. The NMFS monitoring will need to occur after filling of the borrow area is complete and the minor drainage swales are complete. This monitoring will also need to occur after a flood event which covers the flood plain. The purpose of the monitoring is to observe how well the area drains and to determine if sedimentation or other actions have impaired drainage from the Setback Area.

Area Owned by Others. Maintenance in this area will continue as it has been under the responsibility of the current owners. Construction of the Setback Levee has not changed maintenance requirements for these lands and TRLIA has no responsibilities in these areas.

O&M Responsibilities

The following table lists who would have the major responsibility for maintenance of each land use category during the interim period before the Setback Area lands are transferred to the State.

LAND USE	RESPONSIBLE AGENCY INTERIM O&M
Uppal Landside Remnant	TRLIA
Setback Levee Area	RD 784
Vegetated Wave Buffer	TRLIA/Planting Contractor
Mitigation Lands	TRLIA/Planting Contractor
FRET Area	TRLIA/Planting Contractor
Limited Disturbance Environmental Area	TRLIA/Planting Contractor
Actively Farmed Agricultural Lands	Farmer Lessee
Open Area	TRLIA
Area Owned by Others	Current Owners

Interim O&M Costs

The Interim O&M Plan described in this document will require expenditures over the period of interim O&M. Failure to enact this plan may not cause a failure in the Setback Levee project but could result in lands being transferred to the State in a degraded condition which may not be in the condition anticipated by the State for their long term management or use. Some Interim O&M actions are also required as part of permitting or mitigation obligations and failure to implement these actions could result in violations of environmental laws. The costs developed for this Interim O&M Plan are considered project costs and would be covered under Element 6 of the Work Plan for the Setback Levee EIP Grant Agreement. Some of these costs would be initial costs to aid the O&M activities. Other costs are annual costs to accomplish the overall O&M activities described above. Costs are developed for a 4 year interim period. The estimated cost of the Interim O&M Plan is approximately $2,570,000 with a break out of costs shown in Table 3 below. This cost does not include the O&M activities for which others (RD 784, Planting Contractor, Farmer Lessees, and Other Owners) have responsibility. Therefore, the cost of specific O&M activities for the following land uses is not included:

- The Setback Levee Area
- The Vegetated Wave Buffer
- The Mitigation Lands (Messick Lake and Floodplain Drainage Swale)
- The Feather River Elderberry Transplant (FRET) Area
- The Actively Farmed Agricultural Lands
- The Areas Owned by Others

Table 3
Summary of Setback Area and Adjacent Lands Interim O&M Costs

ITEM	COST
Install Security Roads	$ 574,000
Daily Patrol	$ 300,000
Maintain Erosion Grasses	$ 300,000
Mowing	$ 562,000
Trash/Debris Removal	$ 250,000
Program Management	$ 208,000
Total 4 Years Interim O&M	**$ 2,194,000**

The actions and cost detailed in this Interim O&M Plan for the Setback Area and Adjacent Lands are considered adequate to ensure that this area is maintained in the condition that exists at the end of construction of the Setback Levee until they are transferred to the State. The purpose of the interim maintenance plan is not to enhance or restore these lands but provide them to the State in a condition that can be easily adapted to the final purpose for which the State chooses to use them. While TRLIA does not propose to direct how the State may ultimately choose to utilize these lands, TRLIA did investigate potential future uses for the area. Appendix A presents a Land Management Plan that explores the opportunities and constraints for habitat restoration and recreation in this area. The Setback Area and Adjacent Lands offer unique opportunities for both of these purposes and it is hoped that the State will give strong consideration to partially using these lands for these ultimate purposes.

Existing Documents that Discuss Land Management within the Setback Area

PWA Memorandum, Preliminary Concepts for Floodplain Enhancement Actions, August 1, 2009

Messick Lake and Floodplain Drainage Swale Mitigation Areas, Habitat Mitigation and Monitoring Proposal/Plan, prepared by Wildlands and River Partners, November 2008

Messick Lake and Floodplain Drainage Swale Mitigation Areas, Long-Term Operations and Maintenance Plan, prepared by Wildlands and River Partners, November 2008

Land Management Plan for the Feather River Setback Levee Project, prepared by River Partners, December 21, 2009 (including recreation component)

Grading Plans for backfilling the setback area borrow area, GEI, September 2009

Excavation Plans to implement drainage swales to Mitigate Fish Stranding, GEI, November 2008

Sacramento Valley BMP Handbook for Best Farming Practices in a Floodway

BRI Real Estate Acquisition Plan

EIP Executed Funding Agreement

Feather Segment 2 O&M Addendum (To be Developed)

Original Parcel Data																
Parcel Number	APN	Parcel Owner	Historic Crop	Parcel Area	(1) Setback Levee Area	(2) Wave Buffer Area	(3) Mitigation Area	(4) FRET Area	(5) Open Area	(6) Active Farming Area	(7) Uppal Remnant Area	(8) Not Controlled by TRLIA Area	(9) Limited Disturbance Enviro Area	% of Parcel Not Utilized in Setback Project	% of Parcel Utilized in Setback Project
84	013-010-046	M. Smith	Fallow	63.90	4.29									59.61	6.72%
85	013-010-026	M. Smith	Prunes	68.66	9.01	2.34			3.63					53.67	21.83%
86	013-010-010	Danna	Pears	132.87	12.50	4.52			29.13					86.72	34.73%
87	013-010-035	Danna	Pears	39.11	8.28	1.88		0.45						28.51	27.11%
88	013-010-034	Danna	Pears	38.46	3.36									35.10	8.74%
89	013-010-011	SSJDD		110.40								110.40		0.00	100.00%
90	013-010-013	Mann	Peaches	65.18	1.62	2.80		43.14	17.61					0.00	100.00%
91	013-010-016	Mann	Prunes	37.00										37.00	0.00%
92	013-010-012	SSJDD		2.17				0.43	1.74					0.00	100.00%
93	013-010-014	Davit	Walnut & Peaches	104.11	12.29	4.70				81.39				5.74	94.48%
94	014-240-022	Terry	Walnuts	14.66	3.28	0.71			1.64					9.03	38.37%
95	014-250-028	Naumes	Pears	168.40					168.40					0.00	100.00%
96	014-250-027	Naumes	Pears	797.14	35.91	16.49			609.65					135.09	83.05%
97	014-250-029	T. Rice	Peaches	6.29	4.59									1.70	73.04%
98	014-290-004	B. Heir	Peaches	78.47	19.75	1.36								57.37	26.89%
99	014-250-022	SSJDD		98.47								98.47		0.00	100.00%
100	014-290-001	SSJDD		182.15								182.15		0.00	100.00%
101	014-290-033	Dang	Peaches	40.02	10.31	2.91			0.29					26.52	33.74%
102	014-290-034	Uppal	Peaches	39.21	10.00	2.99			2.04		24.18			0.00	100.00%
103	014-370-001	SSJDD		52.17								52.17		0.00	100.00%
104	014-370-026	Webb	Residential	3.42					3.42					0.00	100.00%
105	014-370-037	Johl	Walnuts	51.01					51.01					0.00	100.00%
106	014-370-036	Nordic	Unknown	81.29			24.39		56.90					0.00	100.00%
107	014-370-039	Anderson	Walnuts	26.62	7.10	2.12			2.71					14.68	44.86%
108	014-370-006	Anderson	Walnuts	11.57	2.95	0.89			1.82					5.91	48.92%
109	014-370-007	Cummings	Walnuts	39.77	10.07	3.07			3.77				4.98	17.88	55.04%
110	014-370-002	SSJDD	Unknown	0.60					0.60					0.00	100.00%
111	014-370-003	H & H	Walnuts	15.12					15.12					0.00	100.00%
112	014-370-024	Maxey	Walnuts	21.52						21.52				0.00	100.00%
113	014-370-033	Miller	Walnuts	39.53					19.85	19.68				0.00	100.00%
114	014-370-020	Hadley	Walnuts	31.16	10.54	2.80				7.64				10.19	67.31%
115	014-370-017	P. Heir	Prunes	77.84	0.19									77.65	0.24%
116	014-370-030	Foster	Citrus	31.70						31.70				0.00	100.00%
117	014-370-029	Foster	Unknown	20.72						20.72				0.00	100.00%
118	016-020-005	Foster	Walnuts	239.22	17.70	5.67	0.54			109.87				105.45	55.92%
123	016-010-016	Nieschulz	Walnuts	76.41	31.86	7.90				26.59				10.06	86.83%
124	016-010-015	Souza	Prunes	19.87	0.89									18.98	4.48%
125	016-010-013	SSJDD		133.09			4.50					128.59		0.00	100.00%
126	016-010-002	Foster	Walnuts	85.18	0.26	1.32	0.28			83.32				0.00	100.00%
127	016-010-002	Foster		3.63								3.63		0.00	100.00%
128	016-010-006	Nieschulz	Walnuts	21.22	1.00									20.22	4.71%
129	016-010-007	Foster	Walnuts	26.15	9.23	2.03				10.05				4.85	81.47%
130	016-010-008	Foster	Walnuts	2.51	2.51									0.00	100.00%
131	016-010-009	Herold	Walnuts	1.14	1.14									0.00	100.00%
132	016-010-010	Flores	Residential	4.97	3.54	0.64			0.79					0.00	100.00%
133	016-010-018	SSJDD		9.06								9.06		0.00	100.00%
134	016-010-017	State		9.16								9.16		0.00	100.00%
135	016-010-019	Zwissig		1.30		0.00						1.30		0.00	100.00%
136	016-060-001	Foster	Unknown	8.40	1.80	0.87			5.73					0.00	100.00%
137	016-010-014	State		38.685								38.685		0.00	100.00%
				Area Totals	**236**	**68**	**30**	**44**	**996**	**412**	**24**	**634**	**5**		

Area Controlled by TRLIA **1815 Acres**

Feather River Setback Levee

Summary/Status of Wells In the Setback Area

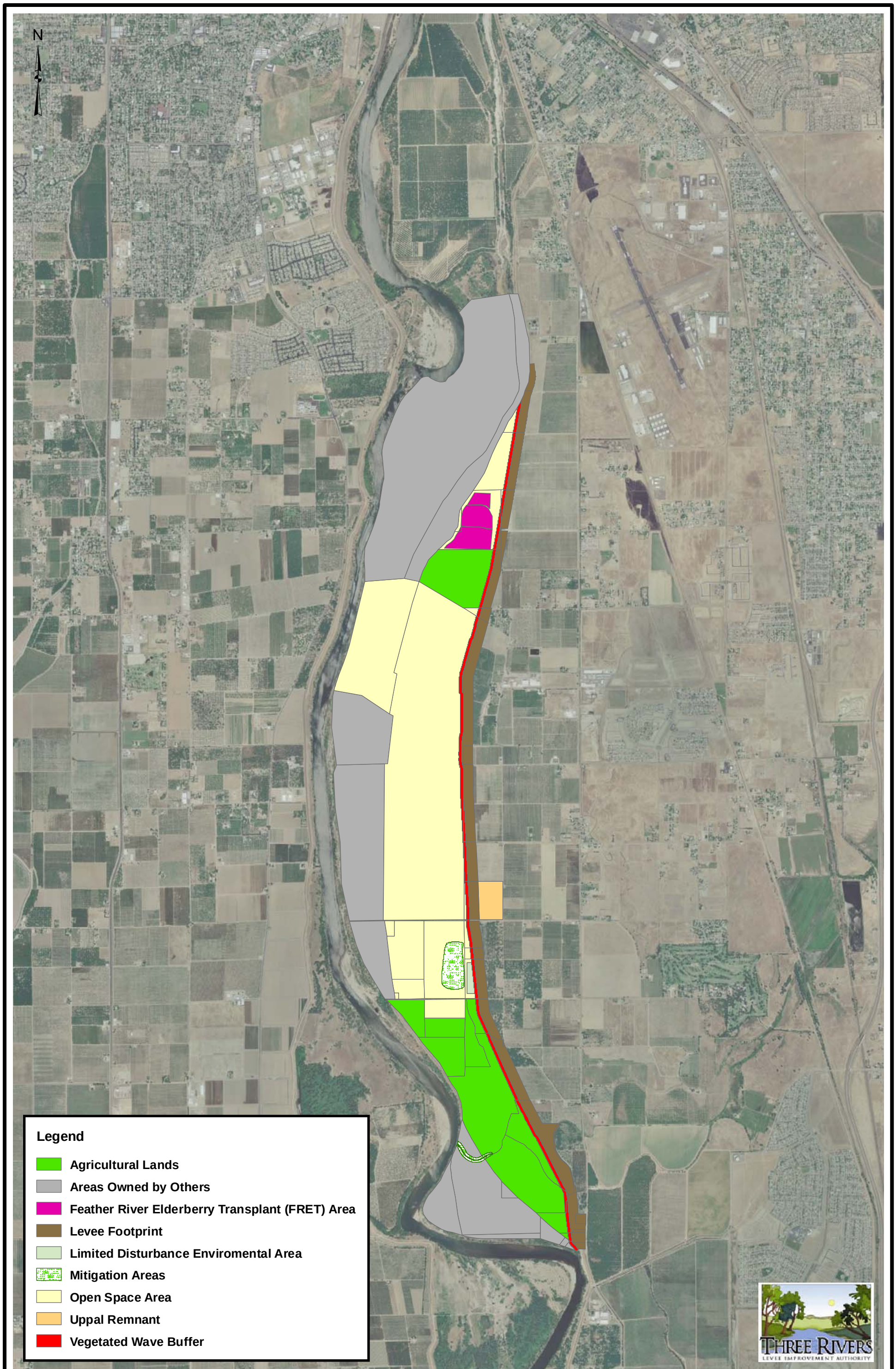
TABLE 2

Denotes well has been destroyed

Denotes abandoned relief well

Work-In-Progress Current as of 6-08-10

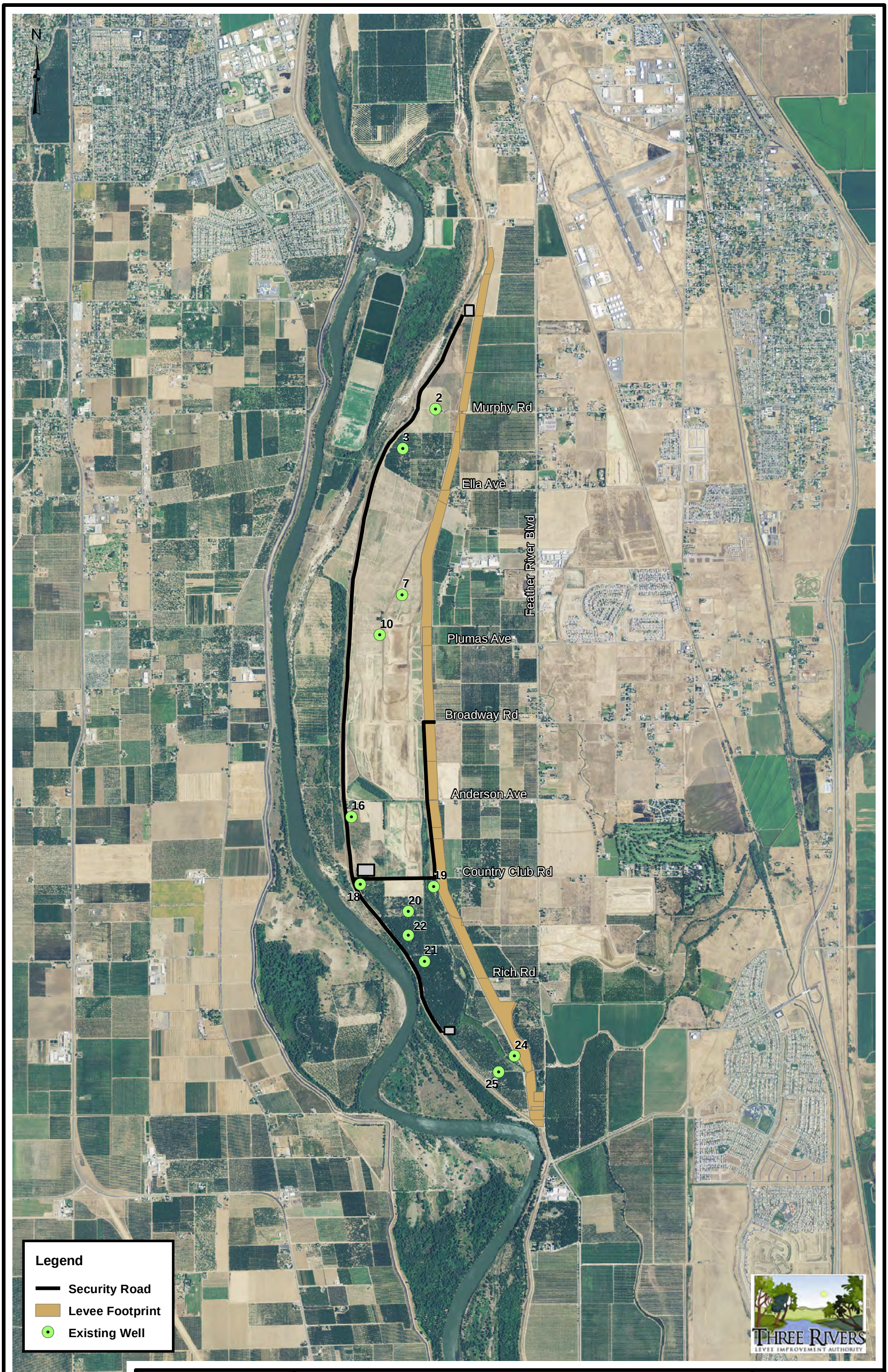
Well ID No.		Well Location					Plan for Well				Condition of Well				
Current Field ID #	State Well ID	Approx. Easting	Approx. Northing	Approx Levee Station	APN #	Former Property Owner	Destroy/Retain (see above)	Date Destroyed	Well Destruction Permit #	Is Well In Use (y/n)	Live Power (y/n)	Pump (y/n)	Motor (y/n)	Operational (y/n)	Comments / Condition
1	14N03E12G	6,678,671	2,154,928	260+00	013-010-035	DANNA AND DANNA	***To be destroyed***			Y	N	Y	Y	Y	- Well ~130 ft from toe of Levee
		6,678,710	2,154,240	253+00	013-010-035	DANNA AND DANNA	**DESTROYED**	10/29/2009	08-9441DES	-	-	-	-	-	
				253+00	013-010-035	DANNA AND DANNA	**DESTROYED**	10/29/2008	08-9508DES	-	-	-	-	-	
2	14N03E12F	6,677,849	2,154,403	252+00	013-010-013	MANN	Retained			Y	Y	Y	n	n	- Used to irrigate elderberry mitagation area. - Vandelized on or about 2/11/10: Stolen Motor, wires and bent shaft
	14N03E12K	6,678,593	2,153,457	245+00	013-010-034	DANNA AND DANNA	**DESTROYED**	10/29/2008	08-9440DES	-	-	-	-	-	
3	14N03E12N	6,676,893	2,152,525	230+00	013-010-014	DAVIT	Retained			Y	Y	Y	N	N	- used by leaseholder Davit for orchard irrigation - Vandalized on or about 2/11/10: Stolen Motor, all wiring cut out
4	14N03E12P	6,677,808	2,152,262	230+00	013-010-014	TERRY	***To be destroyed***			N	N	N	N	N	- 24 inch riser pipe - cap welded at top - well ~588 ft from toe of levee
5	14N03E13D	6,677,091	2,150,413	212+00	014-250-027	NAUMES	***To be destroyed***			N	Y	Y	N	N	- No identified post-construction use - Vandalized on or about 2/11/10: Stolen Motor, all wiring cut out
				211+00			**DESTROYED**	8/14/2009	09-9745DES	-	-	-	-	-	
6				205+00			***To be destroyed***			N	Y	Y	Y	N	- No identified post-construction use - Vandalized on or about 2/11/10: Copper wiring cut and stolen. Motor still intact.
		6,677,546	2,148,948	199+00	014-250-027	NAUMES	**DESTROYED**	8/14/2009	09-9743DES	-	-	-	-	-	
7	14N03E13M	6,676,748	2,148,291	191+00	014-250-027	NAUMES	Retained			N	N	Y	Y	N	- To be used by River Partners for restoration/mitigation - power would need to be reconnected by PG&E
8	14N03E14R	6,675,891	2,147,016	180+00	014-250-027	NAUMES	***To be destroyed***			N	N	Y	Y	N	- No identified post-construction use - old pump, likely not operational
9	14N03E13P	6,677,154	2,146,741	180+00	014-250-027	NAUMES	***To be destroyed***			Y	N	Y	Y	Y	- No identified post-construction use - well ~271 ft from toe of levee
10	14N03E14R	6,675,884	2,146,649	178+00	014-250-027	NAUMES	Retained			N	N	Y	Y	N	- To be used by River Partners for restoration/mitigation - Vandalized on or about 2/11/10: Stolen Motor, all wiring cut out
11	14N03E24F	6,677,239	2,143,832	147+00	014-250-027	NAUMES	***To be destroyed***			N	N	N	N	N	- open pipe; ~170 feet from levee toe
12	14N03E23H	6,675,575	2,143,804	146+00	014-250-027	NAUMES	***To be destroyed***			Y	Y	Y	Y	N	- No identified post-construction use - Vandalized on or about 2/11/10: Copper wiring cut and stolen. Motor still intact.
13	14N03E24E	6,676,835	2,143,693	145+00	014-250-027	NAUMES	***To be destroyed***			Y	Y	Y	Y	N	- No identified post-construction use - Vandalized on or about 2/11/10: Copper wiring cut and stolen. Motor still intact.
	14N03E24L	6,677,747	2,143,532	144+00	014-290-033	DANG	**DESTROYED**	8/14/2009	09-9746DES	-	-	-	-	-	
	14N03E24P	6,677,858	2,142,123	129+00	014-290-034	UPPAL	**DESTROYED**	8/14/2009	09-9739DES	-	-	-	-	-	
14				116+00		Clar	***To be destroyed***			N	N	N	N	N	- open well casing adjacent to Webb property
36		6,677,529	2,140,395	113+00	AG Well 8	Anderson	***To be destroyed***			N	N	N	N	N	- well reported to be buried in spoil berm
	14N03E25B	6,677,613	2,140,185	110+00	014-370-039	ANDERSON	**DESTROYED**	10/20/2008	08-9442DES	-	-	-	-	-	
16	14N03E26D	6,674,982	2,139,974	110+00	014-370-037	CLAR	Retained			N	N	Y	Y	N	- To be used by leaseholder Miller for orchard irrigation - Vandalized on or about 2/11/10: Copper wiring cut and stolen. Motor still intact.
33	14N03E25H	6,676,868	2,139,066	100+00	014-370-036	NORDIC INDUSTRIES	***To be destroyed***			N	N	N	N	N	- well buried by debris - needs to be located - AG Well 7? - likely only a casing
17	14N03E26E	6,675,037	2,138,491	98+00	014-370-002	SSJDD	Retained			N	N	N	N	N	- open standpipe; to be used by leaseholder Miller
				98+00		P Rice	**DESTROYED**	8/11/2009	09-9742DES	-	-	-	-	-	- well located on CA-YUB-5
				96+50		P Rice	**DESTROYED**	8/11/2009	09-9741DES	-	-	-	-	-	- well located on CA-YUB-5
18	14N03E26J	6,675,113	2,138,177	95+00	014-370-024	MAXEY	Retained			Y	Y	Y	N	N	- used by leaseholder Maxey for orchard irrigation - Vandalized on or about 2/11/10: Copper wiring cut and stolen. Motor still intact.
19	14N03E25L	6,677,851	2,137,789	87+00	014-370-020	HADLEY	Well ultimately to be destroyed			Y	Y	Y	Y	Y	- used by leaseholder Hadley for orchard irrigation - well ~90 ft from toe of levee - condition needs to be confirmed by BRI
20	14N03E25M	6,676,950	2,137,100	80+00	014-370-033	MILLER	Retained			Y	Y	Y	Y	Y	- used by leaseholder Miller for orchard irrigation - Vandalized on or about 2/11/10: Copper wiring cut and stolen. Motor still intact.
22				75+00		FOSTER	Retained			Y	Y	Y	Y	Y	- Used by leaseholder Foster for orchard irrigation
21	14N03E36C	6,677,442	2,135,242	66+00	016-020-005	FOSTER	Retained			Y	Y	Y	Y	Y	- Used by leaseholder Foster for orchard irrigation
	14N03E36H	6,680,294	2,133,732	40+00	016-010-016	NIESCHULZ	**DESTROYED**	8/29/2008	08-9357DES	-	-	-	-	-	
28				40+00	016-020-005	FOSTER	**DESTROYED**	40150	2009-10198	-	-	-	-	-	- relief well near old Pump Station No. 3 (North West Well)
29				40+00	016-010-002	FOSTER	**DESTROYED**	40150	2009-10199	-	-	-	-	-	- relief well near old Pump Station No. 3(South East Well)
31				40+00	016-020-005	FOSTER	**DESTROYED**	40150	2009-10200	-	-	-	-	-	- relief well near old Pump Station No. 3(North East Well)
32				40+00	016-010-002	FOSTER	**DESTROYED**			-	-	-	-	-	- relief well near old Pump Station No. 3 (South West Well) - not located - likely destroyed with pump station demolition
24				25+00		NIESCHULZ	Retained			Y	Y	Y	Y	Y	- new well installed by TRLIA ~188 feet from toe of levee - used by leaseholder Nieschulz for orchard irrigation
25				20+00		Foster	Retained			Y	Y	Y	Y	Y	- new well installed by TRLIA - used by leaseholder Foster for orchard irrigation
23	14N03E36J	6,680,681	2,131,779	20+00	016-010-002	FOSTER	***To be destroyed***			N	N	Y	Y	N	- Currently being used for construction (destroy in 2010)
26				6+00		Herold	***To be destroyed***			N	N	N	N	N	- well on TRLIA property east of setback levee on former Herold Property
	13N03E01A	6,681,109	2,130,336	6+00	016-010-010	FLORES	**DESTROYED**	8/14/2009	09-9740DES	-	-	-	-	-	
		6,681,153	2,130,103	2+00	016-010-010	FLORES	**DESTROYED**	8/17/2009	09-9738DES	-	-	-	-	-	Same Permit Number as below. Within Yuba 1677
		6,681,241	2,130,110	2+00	016-010-010	FLORES	**DESTROYED**	8/14/2009	09-9738DES	-	-	-	-	-	Same Permit Number as above. Just outside Yuba 1677
27				1+00	016-06-0001	FOSTER	**DESTROYED**	12/2/2009	2009-10202	-	-	-	-	-	- east of setback levee
		6,681,526	2,136,096	---		Platter	**DESTROYED**	8/14/2009	09-9747DES	N	N	N	N	N	Well on JTS/Platter Property East of ROW



MBK ENGINEERS

Figure 1 - Feather Setback Area and Adjacent Lands
Land Use after Construction Completion

0 1,500 3,000
Scale in Feet



MBK ENGINEERS

Figure 2 - Feather Setback Area and Adjacent Lands Facilities

0 1,500 3,000
Scale in Feet

Wednesday, March 24, 2010 7:21:59 AM - R:\5141.432\2009-10 Land Use\ArcMap\Figure 2.mxd

Feather River Setback Levee
Vegetated Wave Buffer
Management Plan
August 16, 2010

The purpose of the vegetated wave buffer is to disperse wave energy that can develop over long stretches of water during high flood stages and high winds. These waves can cause severe erosion on the slopes of a levee if the energy is not absorbed in some other manner. In addition these waves can overtop the levee and cause erosion on the landside slope of the levee. The vegetated wave buffer will be 100 feet wide all along the setback levee alignment, see Figure 1. There will be 6 rows of plants with 20 feet between rows and a plant spacing of 10 feet in each row, see Planting Tile Plan and Section. The plantings will be made up of mostly riparian tree species with some lower canopy brushes and trees, see Plant Density Table. In some areas, the existing orchards achieve the needed protection and do not need to be replaced with the vegetated wave buffer initially. Should the orchards be removed, they will need to be replaced with 6 rows of trees as identified in this plan. This feature is a levee erosion protection feature and in order to accomplish its task, the plant density must be maintained close to the initial established density.

The vegetated wave buffer will be managed initially by TRLIA as a Feather River EIP activity as a Project Element 6 expense. TRLIA will hire a planting contractor which will provide management activities for the first three years after planting. This is to ensure that the plants will survive and establish in a manner to be self sustaining. Management after 3 years will be very minor with the primary goal of maintaining plant existence and density in the vegetated wave buffer 100 foot corridor. Management after this time period (3 years) will be performed by RD 784 (the local maintaining agency for the other levee features) using funds from the TRLIA Maintenance Assessment passed in May 2009. RD 784 will budget for this work as part of their annual expenses allowed in the TRLIA Assessment District. TRLIA may opt to transfer a portion of the first three-year management efforts for the vegetated wave buffer to RD 784. TRLIA will coordinate any transfer with DWR and CVFPB and also ensure adequate funding is in place for continued maintenance.

- Maintenance actions for the first three years will consist of:

    1. Patrolling the vegetated wave buffer (planted trees and orchards). To the best of TRLIA ability, people will be prevented from unauthorized cutting or clearing of the vegetated wave buffer.
    2. Removal of any trash disposed by vandals or debris deposited by flood flows.
    3. Vegetation irrigation.
    4. Accomplish replanting to maintain design density and to replace vegetation lost to fire or natural causes.

5. The vegetated wave buffer is parallel to the levee and the flood flow direction. A 50 foot clear toe access corridor exists between the buffer and the waterside levee toe. The Setback levee was designed assuming that the entire setback area would be restored to riparian vegetation. Thus the establishment of the plant density for the wave buffer will not detract from the design effectiveness of the setback levee.
6. Replace any removed orchards with the required rows of riparian vegetation.

- Maintenance actions after three years will consist of:

1. Patrolling the vegetated wave buffer. To the best of RD 784 ability, people will be prevented from unauthorized cutting or clearing of the vegetated wave buffer.
2. Removal of any trash disposed by vandals or debris deposited by flood flows.
3. Accomplish occasional replanting to replace vegetation lost to fire or natural causes. Natural recruitment may accomplish this on its own.

- DWR Responsibilities:

1. Should the state (CVFPB or DWR) opt to remove orchards once the property is transferred to state ownership then the state (DWR) will pay for the orchard removal and the establishment of the strip of vegetated wave buffer in place of the removed orchard.

DEPARTMENT OF THE ARMY
U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

REPLY TO
ATTENTION OF

Flood Protection and Navigation Section (18556)

DEC 8 2010

Mr. Jay Punia, Executive Officer
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, California 95821

Dear Mr. Punia:

We have reviewed a permit application by Three Rivers Levee Improvement Authority (application number 18556). These plans include planting approximately 18,595 native plants (66% trees and 34% shrubs) in a 100 foot wide corridor along the left bank overflow area of the Feather River from 39.0104°N 121.5796°W, upstream to 39.0890°N 121.5852°W NAD83. The proposed plantings will be in 6 rows, 20 feet apart with 10 foot spacing between plants. This project is located south of Marysville and west of Highway 70, in Yuba County, California.

The District Engineer has no objection to approval of this application by your Board from a flood control standpoint, subject to the following conditions:

a. That the proposed work shall not be performed during the flood season of November 1 to April 15, unless otherwise approved in writing by your Board.

b. That an operation and maintenance plan shall be developed and provided to the Central Valley Flood Protection Board, prior to planting, for their approval prior to planting (with a copy to the Corps). The plan shall ensure that the proposed plantings will not grow uncontrolled and will not impact the existing hydraulic conditions of the Flood Damage Reduction Project.

c. That the applicant shall remove all buildup of debris or underbrush from the plantings, outside the limits of the project right-of-way, prior to the beginning of the flood season, November 1, and after each high water event.

d. That the proposed work shall not interfere with the integrity or hydraulic capacity of the flood damage reduction project; easement access; or maintenance, inspection, and flood fighting procedures.

e. That in the event trees and brush are cleared, they shall be properly disposed of by either complete burning or complete removal outside the limits of the project right-of-way.

f. That the proposed work shall not change the streamflow velocity in such a way that might cause damage to the existing waterside levee slope or reduce the channel flow velocity.

g. That the sponsor shall ensure an effective rodent control program is in place.

h. That the vegetation shall be maintained within the 100 foot wide corridor. Any vegetation reaching outside the corridor shall be removed.

A Section 10 and/or Section 404 permit (SPK-2007-00578) has been issued for this work.

A copy of this letter is being furnished to Mr. Don Rasmussen, Chief, Flood Project Integrity and Inspection Branch, 3310 El Camino Avenue, Suite LL30, Sacramento, CA, 95821.

Sincerely,

Michael D. Mahoney, P.E.
Chief, Construction-Operations Division

THREE RIVERS LEVEE IMPROVEMENT AUTHORITY

1114 Yuba Street, Suite 218
Marysville, CA 95901
Office (530) 749-7841 Fax (530) 749-6990

September 1, 2009

Mr. Mike Petersen
Central Valley Flood Protection Board
3310 El Camino Avenue, LL40
Sacramento, CA 95821

Subject: Central Valley Flood Protection Board Encroachment Permit Application Package
Three Rivers Levee Improvement Authority – Reclamation District No. 784 Levees
Establishing a Vegetated Wave Buffer along the Segment 2 Setback Levee
(DWR Early Implementation Program (EIP) Agreement No. 4600008049)

Dear Mr. Petersen,

Enclosed are four copies of an encroachment permit application package and environmental questionnaire for activities associated with establishing a vegetated wave buffer along the Segment 2 Setback Levee of the Feather River Levee Repair Project (FRLRP). This vegetation strip would serve to buffer waves that could form during the presence of high water and high winds. Buffering of waves serves to reduce wave run-up and erosion on the slope of the levee. In some reaches of the setback levee this strip already exists due to the presence of orchards. In other reaches the strip will have to be created through vegetation plantings.

Three Rivers Levee Improvement Authority (TRLIA) has received Central Valley Flood Protection Board (CVFPB) encroachment Permit No. 18227 BD to cover project activities associated with construction of the setback levee in Segment 2 (Stage 1 construction activities) and encroachment Permit No. 18430 to cover degradation of the existing levee (Stage 2 construction activities). Stage 1 of the overall Segment 2 work consists of constructing the setback levee foundation, constructing the setback levee embankment, constructing a new Pump Station No. 3 and tying in the setback levee with the existing Feather River levee. Stage 2 consists of degrading portions of the existing Feather River levee as the setback levee nears completion to allow floodwaters to enter the newly created setback area, decommissioning and removal of the existing Pump Station No. 3 and construction of a floodplain drainage swale. The Segment 2 setback levee project is part of the larger FRLRP, which is divided into three project segments. Segment 2 forms the middle levee segment along the east bank of the Feather River from approximately Project Levee Mile (PLM) 17.2 to PLM 23.4. This work is part of the State EIP Feather River Levee Improvement project.

The establishment of a vegetated wave buffer was not explicitly defined in prior encroachment applications and it was decided that a separate encroachment permit application for this feature was appropriate. Activities associated with establishing a vegetated wave buffer are the subject of this permit application and are described in the enclosed application materials.

Please contact me anytime at (530) 749-5679, or Ric Reinhardt, TRLIA Program Manager at (916) 456-4400, on any matter related to the subject encroachment permit application for establishing a vegetated wave buffer along the Segment 2 setback levee.

Sincerely,

Paul G. Brunner
Executive Director
Three Rivers Levee Improvement Authority

cc: Steve Fordice – Reclamation District No. 784
Len Marino – Chief Engineer, Central Valley Flood Protection Board
Charles Rabamad – DWR
Darryl Brown – DWR
Ric Reinhardt – MBK Engineers
Alberto Pujol – GEI Consultants
Dan Wanket – GEI Consultants
Sean Bechta – EDAW

Attachments:

Forms DWR 3615 and 3615a
Attachment A: Project Description
Attachment B: Adjacent Property Owners Sharing a Common Boundary with the Project
Attachment C: Project Exhibits
Attachment D: Photographs Depicting the Project Site

State of California
DEPARTMENT OF WATER RESOURCES
CENTRAL VALLEY FLOOD PROTECTION BOARD
The Resources Agency

APPLICATION FOR A CENTRAL VALLEY FLOOD PROTECTION BOARD ENCROACHMENT PERMIT

Application No. _____
(For Office Use Only)

1. Description of proposed work:
This application is for a vegetated wave buffer to be constructed along the waterside of the Feather River Setback Levee. The vegetated buffer would begin at the edge of the 50-foot waterside toe access corridor and would be 100 feet wide. The buffer would exist along the entire length of the setback levee for approximately 3,000 linear feet. Planting would be in 5 rows 20-feet apart with 10-foot spacing between plants in each row. See Attachment A and C for more details on the type and density of plantings proposed for the buffer.

2. Location: South of Marysville, Yuba County, in Section Multiple Sections,
Township: 13N and 14N (N) (S), Range 3E and 4E (W), M. D. B. & M.

3. Three Rivers Levee Improvement Authority (Name of Applicant) of 1114 Yuba Street, Suite 218 (Address)

Marysville (City) | CA (State) | 95901 (Zip Code) | 530-749-7841 (Telephone Number)

530-749-6990 (Fax Number)

4. Endorsement: (of Reclamation District)
We, the Trustees of Reclamation District No. 784 (Name and District Number)

approve this plan, subject to the following conditions:

☐ Conditions listed on back of this form ☒ Conditions Attached ☐ No Conditions

RD 784 endorsement approved by Board on 09/01/09
Trustee Date

Rick Brown 9-1-09
Trustee Date

5. Names and addresses of adjacent property owners sharing a common boundary with the land upon which the contents of this application apply. If add ional space is required, list names and addresses on back of the application form or an attached sheet.

See Attachment B
Name | Address | Zip Code

6. Has an environmental determination been made of the proposed work under the California Environmental Quality Act of 1970? ☒ Yes ☐ No ☐ Pending

If yes or pending, give the name and address of the lead agency and State Clearinghouse Number:

Three Rivers Levee Improvement Authority
1114 Yuba Street, Suite 218
Marysville, CA 95901

SCH No. 2006062071

7. When is the project scheduled for construction? Existing levee degradation, August 2009 thru October 2009
WAVE BUFFER PLANTING MARCH 2010 THRU MAY 2010

8. Please check exhibits accompanying this application.

A. ☒ Map showing the location of the proposed work.

B. ☒ Drawings showing plan and elevation views of the proposed work, scale, materials of construction, etc.

C. ☐ Drawings showing the cross section dimensions and elevations of levees, berms, stream banks, flood plain, low flow, etc.

D. ☐ Drawings showing the profile elevations of levees, berms, flood plain, low flow, etc.

E. ☒ Photograph depicting the project site.

9. Is the applicant acting for the owner of the proposed works? ☒ Yes ☐ No

If yes, the name, address and telephone number of the owner is

Reclamation District No. 784; Attn. Steve Fordice; 1594 Broadway Street, Marysville, CA 95901; 530-742-0520

Paul A. Brunner 9-1-09
Signature of Applicant Date

For additional information:

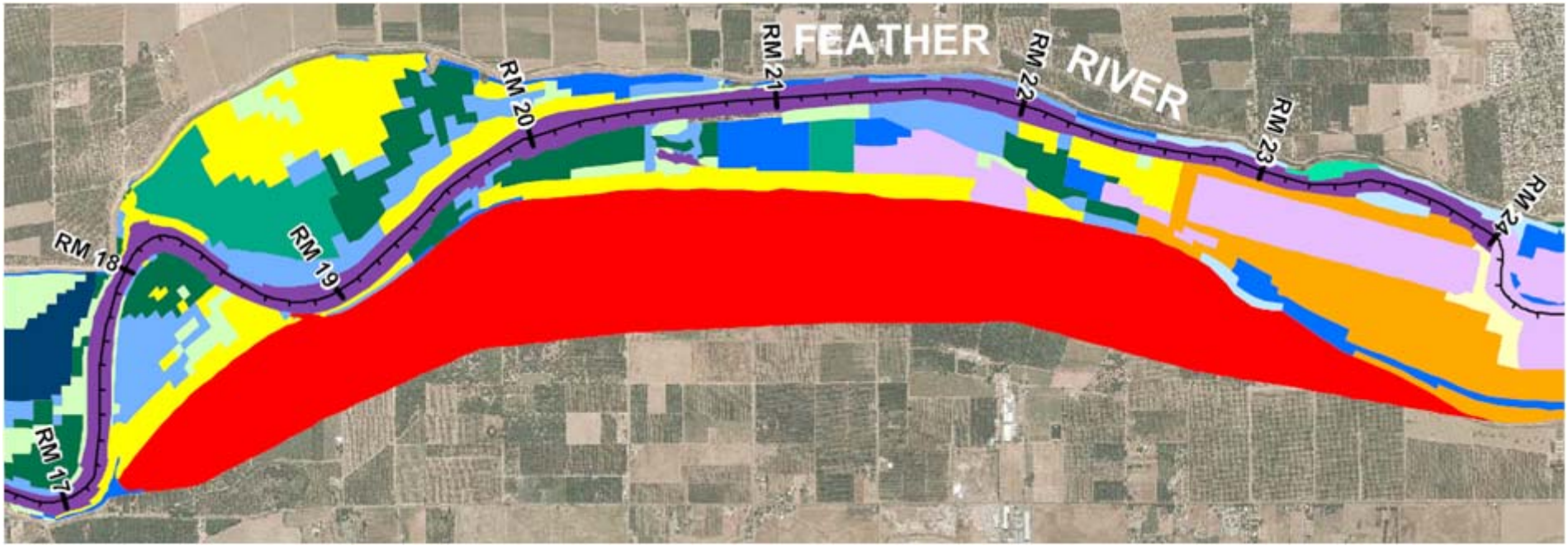
Contact:

Paul Brunner	Or	Ric Reinhardt
Executive Director		TRLIA Consultant
TRLIA		MBK Engineers
1114 Yuba Street, Suite 218		2450 Alhambra Blvd
Marysville, CA 95901		Sacramento, CA 95817
Ph. 530-749-7841		916-456-4400
pbrunner@co.yuba.ca.us		reinhardt@mbkengineers.com

Reclamation District No. 784 has the following conditions to be included on the Central Valley Flood Protection Board Encroachment Permit:

- All improvements shall meet Central Valley Flood Protection Board Standards
- Grading or Tree Plantings shall be designed not to direct water towards the existing levee or the diversion levees. Grading shall not affect the hydraulic characteristics of the river in a negative manner.
- A copy of operation and maintenance manual shall be provided to Reclamation District No. 784 upon completion of the work.
- A set of As-Built Mylar plans shall be provided to Reclamation District No. 784 upon completion of the work.
- A copy of the final Central Valley Flood Protection Board Permit shall be provided to Reclamation District No. 784 prior to any work.
- Reclamation District No. 784 shall be notified five (5) working days prior to any construction activities.

Permit No. 18227 Roughness Coefficient Map



Legend

Manning's n-value

0.022		
0.025		
~~0.030~~	grasses	
0.035		
0.040		
0.042	mixed channel trees	
0.050		
0.052		
0.055		
0.060		
0.062		
0.070		
0.075		
~~0.080~~	sparse trees	
0.085		
0.100		
~~0.120~~	dense trees	

ATTACHMENT C - Hydraulic Roughness and Wave Characteristics Summary

Table 2 Summary of Wave Characteristics, Wind Setup and Wave Runup

	Maximum Wind from Southeast	Maximum Wind from North
Maximum 60-minute Wind Speed (mph)	50.0	39.0
Fetch (mile)	3.63	3.66
Average water depth (ft)	23.6	18.5
Significant Wave height (ft)	4.4	3.5
Wave period (sec)	3.5	3.2
Wave-driven fluid velocity (ft/sec)	3.98	3.48
Wind setup (ft)	0.89	0.69
Unadjusted Maximum Wave runup (ft)	6.16	4.86
Slope Roughness Factor	0.85	0.85
Angle Adjusting Factor (60 Degrees from Shore Normal)	0.83	0.83
Vegetation Adjusting Factor	0.66	0.66
Final Wave Runup (ft)	2.87	2.26
Wave runup and wind setup (ft)	3.76	2.95