

APPLICATION NO. 18191

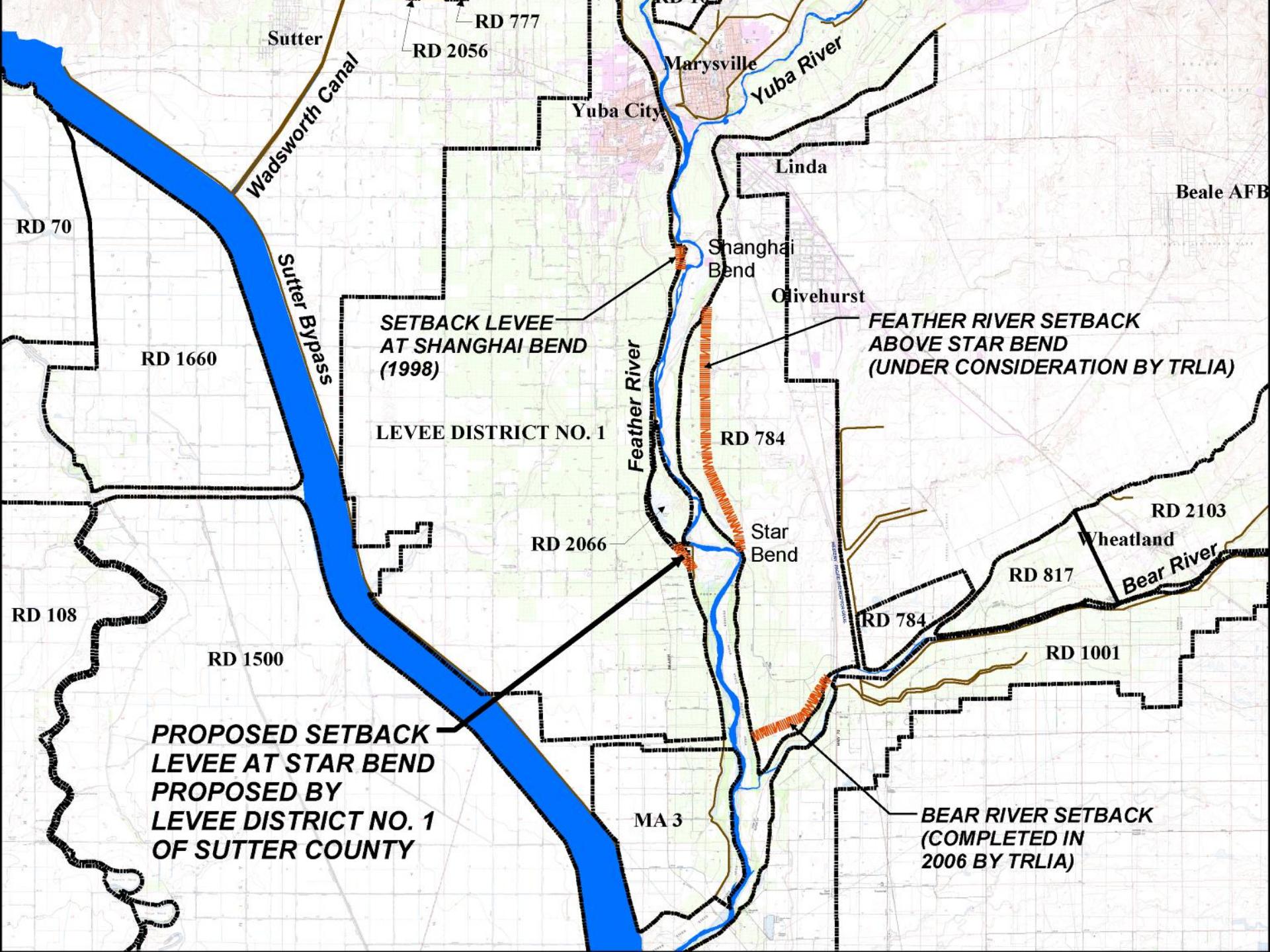
**LEVEE DISTRICT No. 1
Of SUTTER COUNTY**

**STAR BEND SETBACK LEVEE
SUTTER COUNTY**

April 17, 2009

Board Action

**Consider approving Permit No.
18191 to construct a setback
levee and degrade existing
project levee; and to modify
existing irrigation system**



Lower Feather River at Star Bend



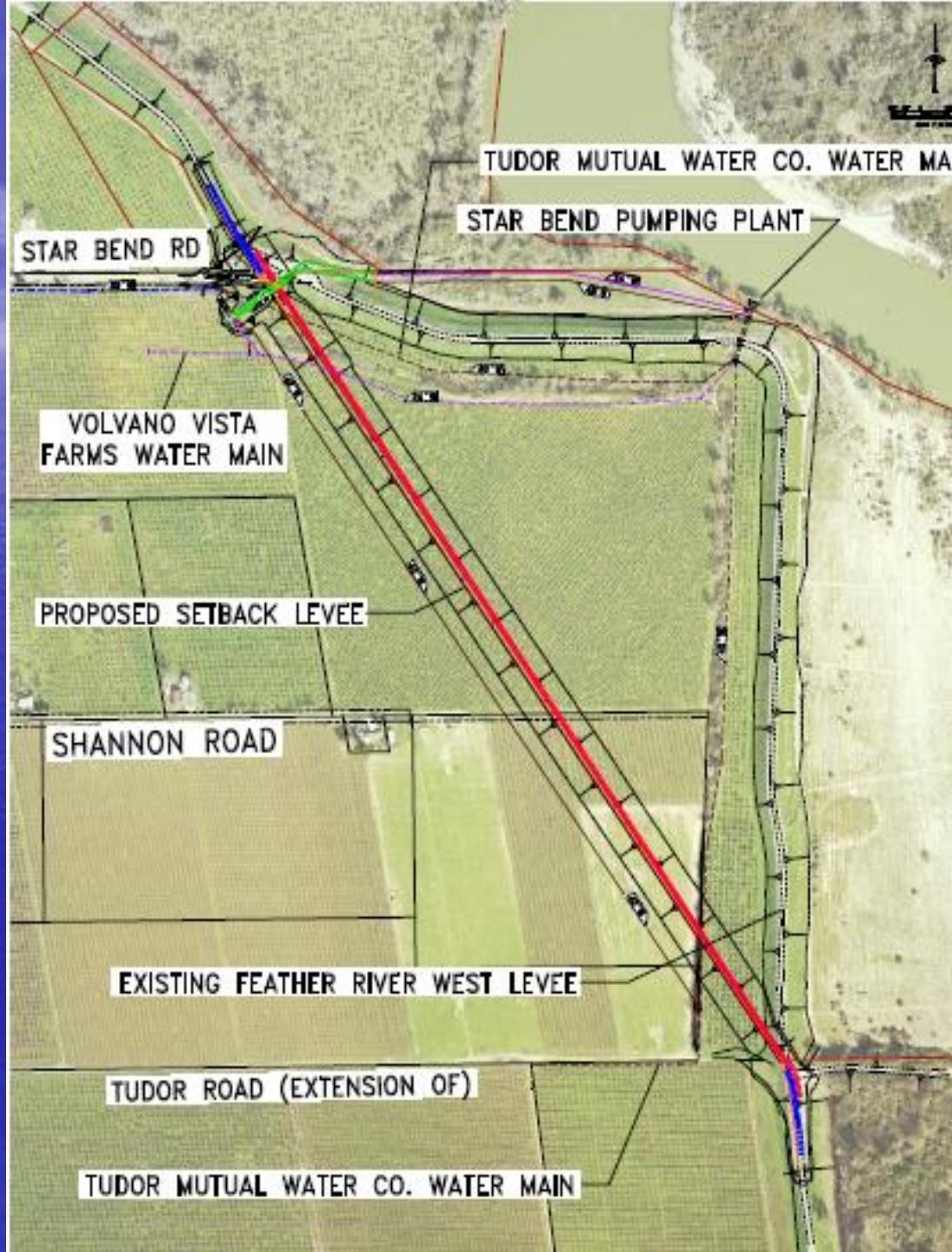
EXISTING PROBLEMS

- Underseepage
- River constriction contributing to excessive river channel erosion

DOCUMENTS REVIEWED

- Feasibility Report (Draft), April 2007
- Geotechnical Report, October 20, 2006 and Addendum to the Geotechnical Report, November 21, 2007
- Hydraulics and Hydrology Report, November 21, 2007 and Addendum
- Draft and Final EIR dated Feb.2007/May 2007
- 100 % Plans and Specifications, February 2009
- Simultaneous Degradation Plan, February 2009
- Safety Assurance Review Plan, March 2009

- Construct setback levee -3,400 feet
- Degrade/remove 4,500 ft of existing project levee
- Modify existing irrigation system (portions of the irrigation system are under separate permits)



Design Criteria

- Minimum freeboard above 1957 hydraulic design flow profile – 3 feet
- Underseepage Exit Gradient – 0.5
- Foundation slurry cutoff wall
- Levee Embankment Material – Title 23 and USACE standards
- Levee cross section – 20-ft crown; 3:1 levee side slopes

PROPOSED SETBACK LEVEE CROSS SECTION

LEVEE DISTRICT NO. 1 OF SUTTER COUNTY

YUBA CITY

CALIFORNIA

FEBRUARY 2009

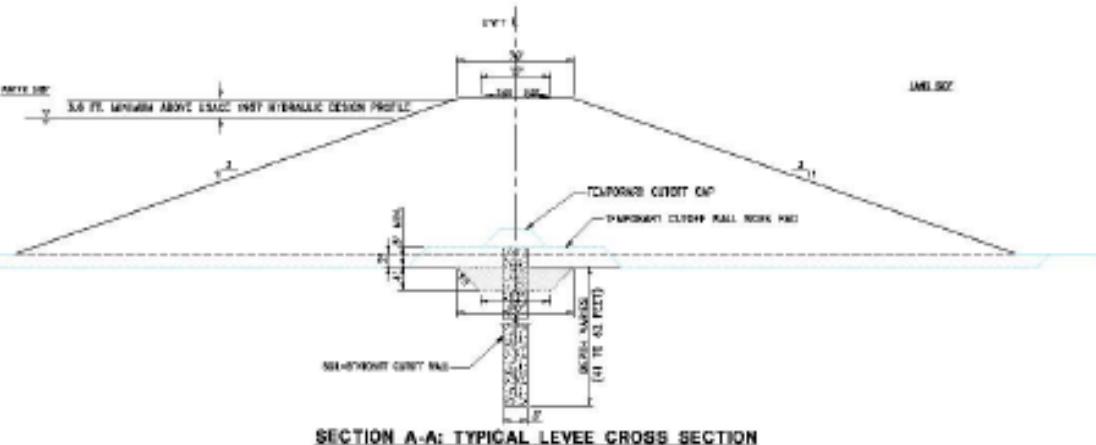
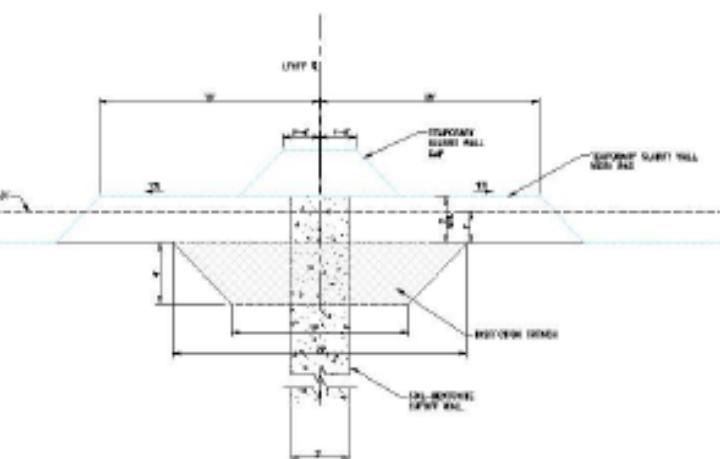


TABLE 7 - MATERIAL REQUIREMENTS

- ① GENERAL LEVEE FILL: 100% PASSING 2-INCH SIEVE
30% PASSING #700 SIEVE & 2 MIL. IL. \leq 45
- ② INSPECTION TRENCH FILL: COMPACTED TRENCH
SPOILS, OR FILL WITH 50 TO 100% PASSING A #4
SIEVE, \geq 70% PASSING A NO. 200 SIEVE AND LL
50.
- ③ CALTRANS CLASS 2 AG



GEOTECHNICAL FINDINGS

- 1-3 ft below the ground surface, 5-20 ft thick layer of very hard clay/silt (top of Modesto Formation)
- 20-50 below ground surface, 10-45 ft thick layer of clay/silt adequate to terminate slurry cutoff wall
- Subsurface soil conditions north, south, and west of proposed alignment similar
- Soil-bentonite slurry cutoff wall reduced exit gradient from 0.6 to less than 0.1
- Slope stability analysis meets Corps requirement
- Settlement Analysis –immediate and primary settlement

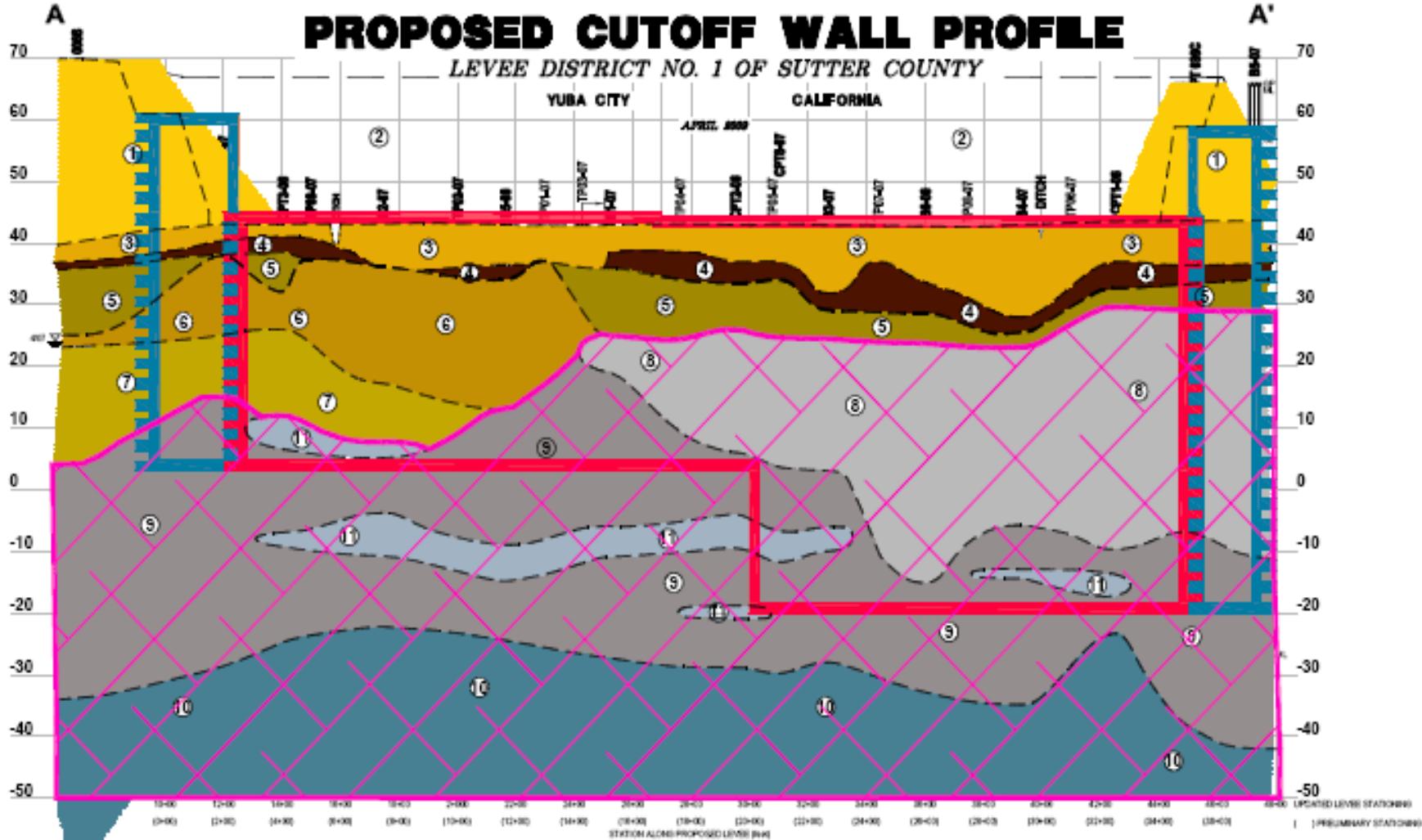
PROPOSED CUTOFF WALL PROFILE

LEVEE DISTRICT NO. 1 OF SUTTER COUNTY

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APRIL 2009



MODESTO FORMATION
 SB WALL
 SCB WALL
 OVERLAP
 FUTURE OVERLAP

LEGEND

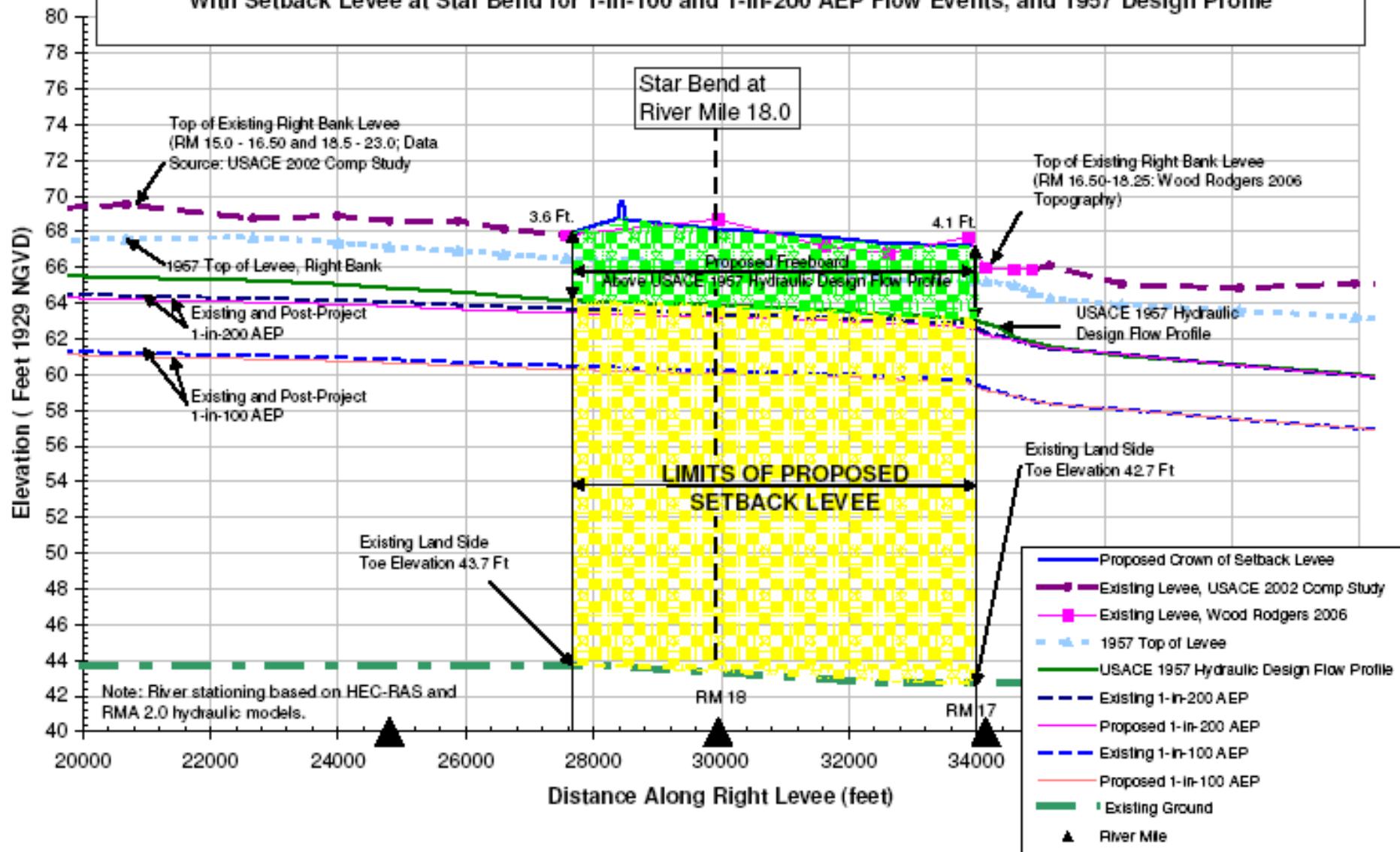
- | | |
|-------------------------------|---|
| Modesto Formation (Gm) | |
| | Sand/Silt/Sand (medium dense to dense) |
| | Clay/Silt (soft to hard) |
| | Sand/Gravel/Sand/Sandy Gravel (medium dense to dense) |
| | Discontinuous Sand/Silt/Sand Seams |
| | Groundwater Elevation in May 2006 |
| Alluvium (Gm/Gms) | |
| | Glo/Clayey Silt/Silt/Clay (firm to very hard, slight to strong cementation) |
| | Sand, Silty Sand, Sandy Silt (loose to medium dense) |
| | Lean Clay/Silt (Locally Cemented) (firm to very hard, slight to strong cementation) |
| | Sand/Silt/Sand (Loose to medium dense) |
| | Clay (very soft to hard) |

HYDRAULIC ANALYSIS

HEC-RAS (TRLIA setback project included)

- WSEL reduction beginning at RM 17.00 to RM 23.00, with maximum WSEL 0.24 ft at RM 18.25 (1957 design)
- WSEL rise between RM 16.50 and 16.75 with maximum WSEL .04 ft. (1957 design)

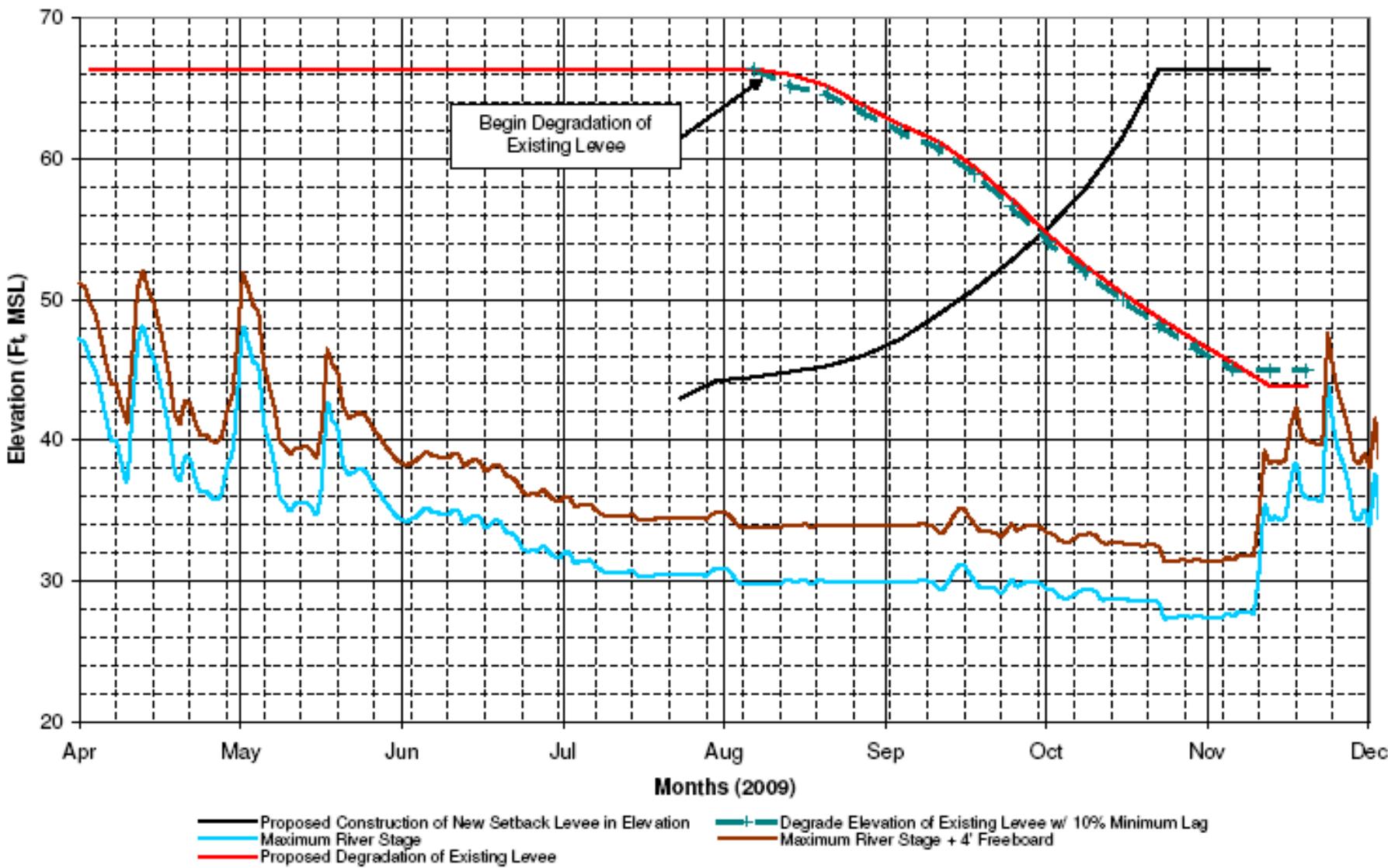
**Pre- and Post-Project Water Surface Profile of Lower Feather River Right Bank
With Setback Levee at Star Bend for 1-in-100 and 1-in-200 AEP Flow Events, and 1957 Design Profile**



Schedule

- 408 approval – mid-May
- Bid Opening – May 15
- Start Construction – June 1
- Degrade Levee for Tie-in – June 8
- Complete foundation cutoff wall – August 7
- Start embankment construction – July 27
- Start degradation of existing levee for borrow material – August 7 (at least 10% of new levee embankment complete)
- Complete construction of embankment – October 16
- Complete degradation of existing levee – October 23
- Complete project – October 31

Figure 12
 Proposed Simultaneous Degradation (in Levee Height)
 of Existing Levee System at Star Bend - Feather River Mile 18.0
 With Degradation as Borrow Material Starting August 7



Environmental Compliance

- LD 1 of Sutter County, as Lead Agency, prepared and certified an Environmental Impact Report and Notice of Determination
- Board staff independently reviewed the analyses in the FEIR, MMRP, LD1 CEQA Findings; and Statement of Overriding Considerations. Staff concurs with analyses

SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

- Conversion of Farmlands to non-agricultural use
- Temporarily expose people and structures to flooding during construction
- Short-term ozone and particulates emissions

Section 8610.5 Compliance

- Admission of Records
- Use of best available science
- Effects on the State Plan of Flood Control
- Effects of reasonable projected events

SUMMARY OF FINDINGS

- Design of new levee is in accordance with current Board and Corps standards
- Alignment is located in a geotechnically sound foundation
- No hydraulic impacts
- Setback levee is subject to less erosion potential
- Simultaneous degradation of existing levee will be conducted in a manner that protects public safety
- CEQA compliance
- Section 8610.5 compliance

RECOMMENDATION

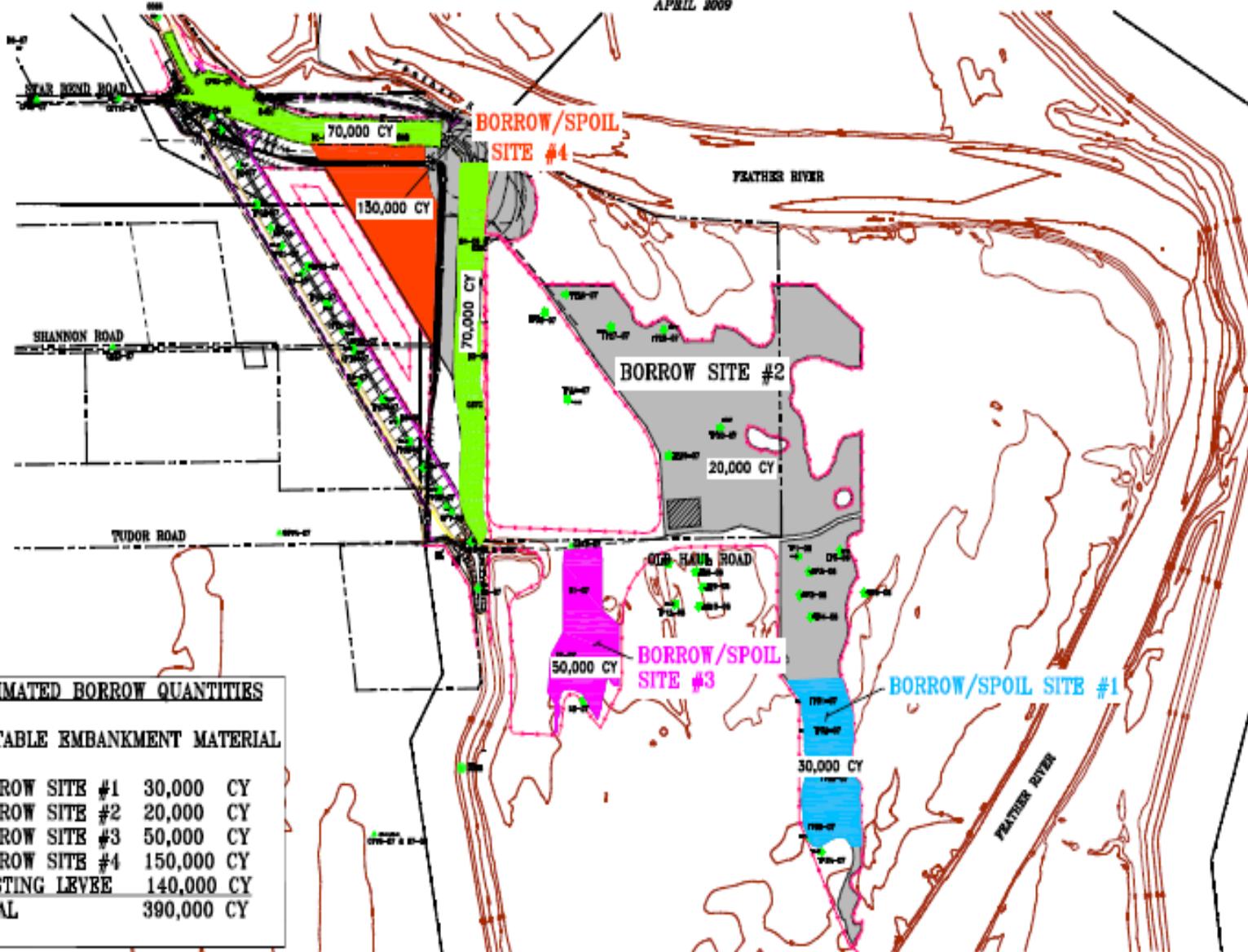
Approve Resolution No. 2009-09 which includes approval of the project and issuance of Permit No. 18191, findings for the Environmental Impact Report on the setback levee project, and directing staff to file a Notice of Determination with the State Clearinghouse

BORROW SITES

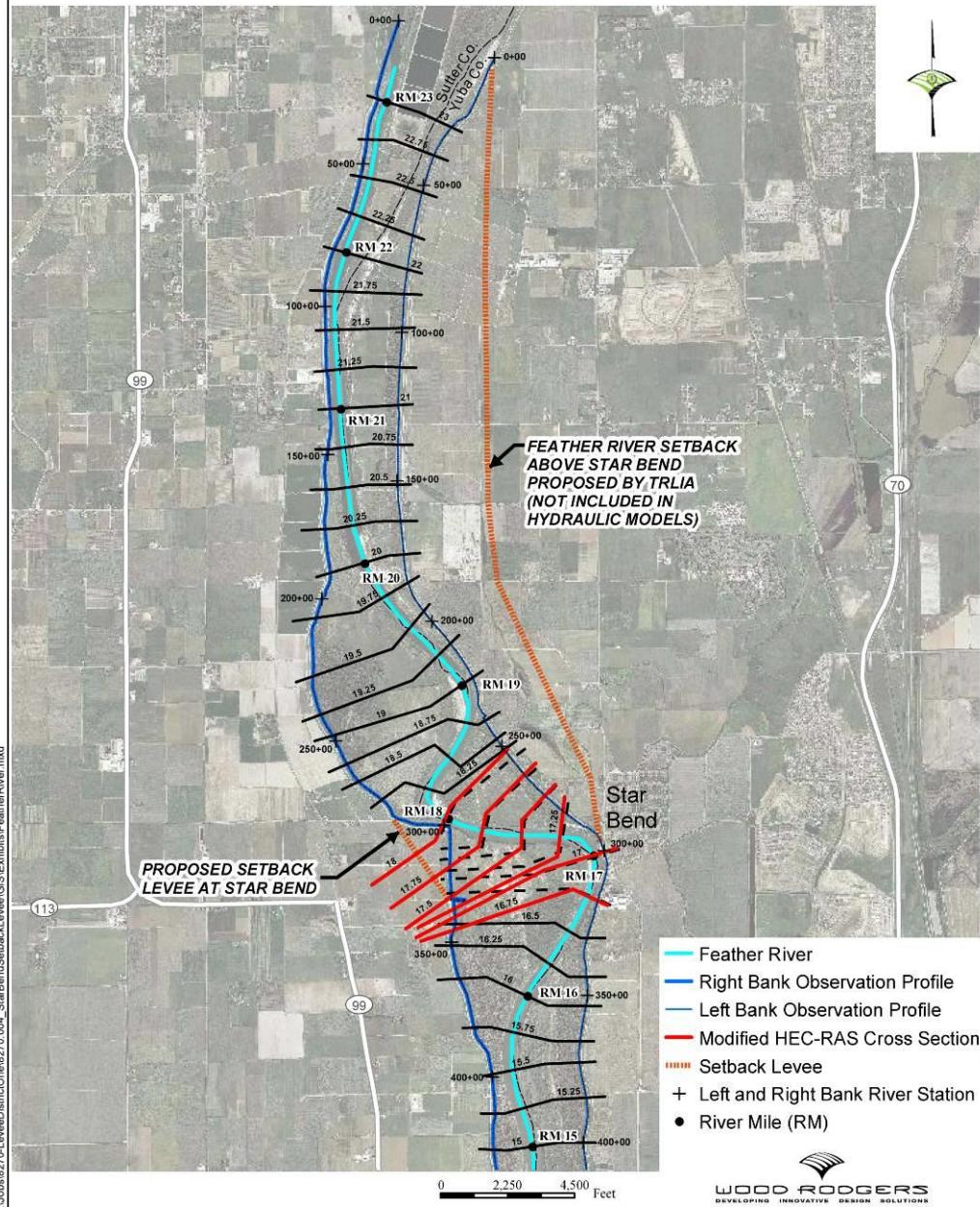
LEVEE DISTRICT NO. 1 OF SUTTER COUNTY
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APRIL 2009



LEVEE DISTRICT NO. 1 OF SUTTER COUNTY
 RIGHT AND LEFT BANK RMA2 OBSERVATION PROFILES AND
 MODIFIED HEC-RAS CROSS SECTIONS FOR SETBACK LEVEE AT STAR BEND



Hydraulics Analysis

FIGURE 1

HYDRAULIC ANALYSIS (CONTINUATION)

- RMA2 MODEL –without TRLIA setback levee project
1. Maximum WSE reduction 0.64 ft between RM 18.0 and 18.25 with lesser reductions upstream (1957 design)
 2. WSE elevation rises from 0.01 ft to 1.11 ft between RM 17.995 and RM 17.495
 3. Velocity along the right bank are reduced 4-5 feet/second to 3ft/sec