

**Meeting of the Central Valley Flood Protection Board
August 26, 2011**

**Staff Report
Burlington Northern Santa Fe Railroad Company
Cross Creek, Kings County, CA**

1.0 – ITEM

Consider approval of Permit No. 18672 (Attachment B).

2.0 – APPLICANT

Burlington Northern Santa Fe Railroad Company

3.0 – LOCATION

The project is located at the BNSF railroad bridge over the East Branch of Cross Creek, in Kings County, California (Attachment-C).

4.0 – DESCRIPTION

BNSF is proposing to replace existing Bridge 956.56, Line Segment (LS) 7200 over the East Branch Cross Creek. Existing Bridge 956.56 is a 196-ft. long, Ballast Deck Pile Trestle (BDPT) bridge, skewed with respect to the track, for a total bridge length of 206-ft and an 8-in. track raise. The proposed bridge is 5-feet. longer than existing at each abutment and will require cut along the BNSF track embankment to accommodate the longer bridge. The non-federal levee's adjacent to the abutment may be temporarily impacted during construction. The timber bridge will be removed.

5.0 – PROJECT ANALYSIS

The Applicant is requesting a variance from Ca. Code of Regulations Section 128(a)(16) which requires that replacement railroad bridges must have the soffit members no lower than those of the replacement bridge. The proposed soffit (low chord) elevation is 5 inches lower than the existing. To raise the soffit to match the existing would cause several miles of infrastructure raise which is not feasible. See Attachment-H for request letter.

The Railroad will restore all levee slopes and roadways to pre-project condition and follow all standards and guidelines as applicable, in Title 23 of the California Code of Regulations for construction activities on levees and within the floodway. The relevant Title 23 sections are:

- 112. Streams Regulated and No permissible Work Periods
- 115. Dredged Spoil, and Waste Material
- 116. Borrow and Excavation Activities – Land and Channel
- 121. Erosion Control
- 128. Bridges
- 130. Patrol Roads and Access Ramps

5.1 – Existing Structure

The existing structure is a 15-span, 196-ft. long, Ballast Deck pile Trestle (BDPT) bridge, skewed with respect to the track. Bridge 956.56 serves BNSF's single mainline track generally running in a northwest-southeast direction through the study area, spanning the East Branch of Cross Creek.

The East Branch of Cross Creek is leveed in the vicinity of the bridge for flood protection purposes in the area. The bridge is located along the Bakersfield Subdivision in Kings County, 5 miles northwest of Corcoran, California. The bridge is located in the southern half of Section 20, Township 20 South, Range 22 East; latitude 36° 10' 13" N and longitude 119° 36' 33" W.

Turner Weir is located approximately 700 ft upstream of BNSF Bridge 956.56, which is a 10-cell, 5.15-ft x 13.65-ft concrete box within the East Branch of Cross Creek channel (opening area 703 ft²). It should be noted the top of weir is flush with the top of levee elevation. The Turner Weir is a metering device, limiting the amount of runoff towards Bridge 956.56. As such, runoff in excess of bank full capacity will overtop the levee and leave the system. The bank full capacity of the East Branch of Cross Creek is 5,700 cfs.

The top of levee is approximately 6 feet above the existing ground outside the levee, as such there is significant storage capacity as runoff spread out across the East Branch of Cross Creek floodplain. It should be noted that once runoff overtops the levee it cannot return to the East Branch of Cross Creek channel at Bridge 956.56.

The Corcoran Irrigation District has recharge basins located upstream of the BNSF embankment, along the East Branch of Cross Creek floodplain to capture runoff, during peak runoff events when the East Branch of Cross Creek levee is overtopped.

Further upstream, underneath Highway 43 is an 8-span, 157 ft long bridge (opening area 1,500 ft²). There are no structures immediately downstream of Bridge 956.56. It should be noted the top of levee elevation upstream of the bridge at the BNSF ROW is 3 ft lower than the top of tie elevation and just below the low chord elevation.

Based on the FEMA Flood Insurance Study for Kings County, the drainage area for the East Branch of Cross Creek above the Tule River is 1,412 mi². The Tule River confluence is approximately 8 miles downstream of Bridge 956.56.

The current Flood Insurance Rate Map (FIRM) shows that BNSF Bridge 956.56 is located within a FEMA designated floodway.

Based on the site survey of the bridge, the lowest top of tie (Elev 214.70) to flowline is 17.10 ft and low chord (Elev 211.77) to flowline is 14.17 ft. Elevations are in NAVD 1988 datum to match regulatory base flood elevations. To convert the NAVD 1988 datum to surveyed datum, subtract 112.60.

Bridge 956.56 has an opening area of 1,589 ft², however the 100-year effective flow area is 1,355 ft².

Average annual precipitation is 8.1 inches. The 24-hour, 100-year precipitation is 2.5 inches. According to the Flood Insurance Study, the average flooding season in Kings County occurs from November through June with the rainy season occurring between November and April and snowmelt in the nearby mountains occurring from April to June.

Soils in the vicinity of Bridge 956.56 consist of loam, sandy loam and clay with mostly agricultural land uses. Surface runoff potential is moderate.

Since the site is located within a FEMA-designated Zone AE, care must be given to not increase the base flood elevations.

5.2 – Permitting Issues

Bridge 956.56 is located in FEMA-designated Zone AE and floodway, special flood hazard areas subject to inundation by the 100-year flood, base flood elevations determined; as shown on the Flood Insurance Rate Map for Kings County, California and Incorporated areas (Map Number 06031C 0375 C, June 16, 2009). Since the bridge is located in a FEMA designated floodplain, a Kings County Floodplain Development Permit is required. The Kaweah Delta Water Conservation District will require a review of the bridge replacement plans. The bridge crosses Waters of the United States; therefore, a Section 404 permit is required from the U.S. Army Corps of Engineers. In addition to a Board permit, other permits will be required from the U.S. Coast Guard, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the California Regional Water Quality Control Board, which is affirmed in the Draft Permit.

5.3 – Proposed Replacement Structure

A 6-span, variable length Steel Beam bridge, skewed with respect to the track for a total bridge length of 206-ft and an **8-inch track** raise is proposed. The proposed bridge should be centered over the existing bridge to best align with the channel and avoid the existing bridge. The replacement assumes that the existing substructure will be removed.

A track raise is required to maximize the bridge opening area since the proposed low

chord is 0.40 feet lower than the existing condition.

The proposed bridge will have an opening area of 1,550 ft² compared to 1,589 ft² for the existing bridge, which results in a 2% decrease in opening area. However, it should be noted the effective flow area, at bankfull discharge is increased 3% compared to the existing condition, largely due to fewer bents within the channel.

The proposed design WSE, based on bankfull discharge is 210.38. The top of tie elevation is 215.37 (subgrade elevation is 213.12) and the proposed bridge's low chord elevation is 211.37. The proposed bridge meets BNSF's standard hydraulic design criteria for the 100-year event (WSE_{100} below subgrade). The proposed bridge's design discharge velocity is 4.09 ft/s. The proposed bridge decreases the design WSE 0.04 ft, compared to the existing condition.

Velocities associated with rare flood events do not warrant scour protection measures.

The above recommendation is based on Parsons provided survey information, evaluation of existing information including Kings County Flood Insurance Study and the associated HEC-2 hydraulic model, a detailed hydrologic and hydraulic evaluation, and discussions with BNSF field personnel.

5.4 – Hydraulic Analysis

Olsson acquired the regulatory HEC-2 model that was developed in preparation of the Kings County's FEMA Flood Insurance Study (FIS) of the East Branch of Cross Creek. After review of the regulatory model, Olsson found inconsistencies in the FIS and the HEC-2 model. Specifically, the regulatory HEC-2 model could not be duplicated to match the current FIS profiles.

The Kaweah Delta Water Conservation District (KDWCD) provided 26 years of peak discharges along the East Branch of Cross Creek at the upstream Highway 43 Bridge. The highest recorded peak was 2,400 cfs. The KDWCD maintain the East Branch of Cross Creek channel and levee system in the vicinity of the BNSF Bridge.

As such, a HEC-RAS model was developed, based on Parsons provided survey to represent the existing condition. The design hydraulic study for this project was prepared by Olsson Associates in Lincoln, Nebraska and finalized July 2011. A HEC-RAS Model was used to determine the water surface profile.

Design discharges at BNSF Bridge 956.56 were taken from the FEMA Flood Insurance Study for Kings County, California. Discharges were based on a unit hydrograph developed for sub-basins using a regional S curve developed by the USACE. Published peak flow rates are $Q_{50} \sim 14,100$ cfs and $Q_{100} \sim 19,200$ cfs. However, as stated above, due to the fact the upstream Turner Weir limits the amount of runoff reaching the bridge a bankfull capacity was used as the design discharge. The bankfull capacity is 5,700 cfs with a velocity of 4.23 fps.

The computed design (bankfull capacity) water surface elevation (WSE) is 210.42 (NAVD 88). The lowest top of tie elevation is 214.70 (subgrade elevation is 212.45) and the bridge's low chord elevation is 211.77. Therefore, the existing bridge meets BNSF's standard hydraulic criteria (WSE₁₀₀ below the subgrade elevation).

5.5– Contraction and Pier Scour

The consultant prepared a scour analysis for both existing and proposed conditions using HEC-18 equations. It was found that local contraction scour for existing bridge conditions is less than 0.43 feet and for the proposed condition is approximately 0.0 feet.

The existing pier scour is 2.78 feet and the proposed pier scour is also 2.78 feet.

5.6– Geotechnical Summary

BNSF has not conducted a geotechnical study in this area because their engineers are confident that driven piles for other similar bridges in this area have not presented a problem. Board staff concurs with this assessment.

5.7 – Staff Comments

Staff's opinion of this flood plain area is that the new proposed bridge's 14-inch diameter steel H-piles are a betterment to the numerous existing 14.5-inch diameter timber bents and present less impediment to the flood channel of Cross Creek. Therefore, it is staff's recommendation that the Board grant a variance to the Title-23 standards for this project.

6.0 – AGENCY COMMENTS AND ENDORSEMENTS:

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

- The U.S. Army Corps of Engineers 208.10 comment letter has not yet been received for this application. Upon receipt of a favorable letter and review by Board staff it will be incorporated into the permit as Attachment-B Exhibit-A .
- Kings County Department of Public Works letter dated April 13, 2011 (Attachment-B Exhibit-B).
- Kaweah Delta Water Conservation District letter dated March 18, 2011(Attachment-B Exhibit-C).

6.1 – Owners of the property on which the project is located

This property is located with APN 028-260-031 which is owned by Paul and Barbara Stuber. There are no Sacramento San Joaquin Drainage District (SSJDD) rights in this area. However, it is within the Boards Regulated Stream as discussed in Title-23 of the California Code of Regulations.

6.2 – Survey Elevations

Submitted drawings by BNSF Railway are based on an assumed benchmark elevation of 100.0 feet. HEC-RAS elevations and elevation within the “Replacement Structure Report” by Olsson Assoc. are based on NAVD88 elevations. The two systems differ considerably.

7.0 – PROPOSED CEQA FINDINGS:

Board staff has prepared the following CEQA Findings:

The California Department of Fish and Game, as lead agency under CEQA, approved the project (BNSF Mile Post 956.56 Bridge Replacement Project) on July 16, 2011 and determined that the project was categorically exempt under Class 2 (CEQA Guidelines Section 15302) covering replacement of existing facilities where the new structure will be located on the same site, and have essentially the same purpose and capacity as the structure replaced.

The Board, acting as a responsible agency under CEQA, has reviewed the Department of Fish and Game determination and has independently determined that the project is exempt from CEQA under Class 2 (CEQA Guidelines Section 15302) covering replacement of existing facilities where the new structure will be located on the same site, and have essentially the same purpose and capacity as the structure replaced.

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 will make its decision based on the evidence in the permit application and attachments, this staff report, and any other evidence presented by any individual or group.

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. The approval of this variance is predicated on a reasonable approach related to the flat topography in this area and the historic sheet flow which remains uncontrolled and would take a large spanse of highway to concentrate flood waters.

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

This project has no negative impacts on the State Plan of Flood Control. Both hydraulic and structural impacts from the project construction are negligible.

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

Climate change issues have not been taken into account in the hydraulic analysis for this project; however, it is assumed to be inland past the point tidal influence raises in WSE, and due to the excessive amount of freeboard in the channel at this location, the project would have an ample factor of safety built into it. Climate change WSE raises are only estimated from 6-inches to 1-foot of impact and would be well within the freeboard of this project in the event that tidal influences did reach further inland than expected. There are no other foreseeable projected future events that would impact this project.

9.0 – STAFF RECOMMENDATION

Staff recommends that the Board determine the project to be exempt from CEQA, approve the Title-23 Section 128 construction variance (as stated in staff report section 5.0 and Attachment-H), and approve Permit No. 18672 based on the U.S. Army Corps of Engineers 208.10 comment letter dated August 5, 2011, with no opposition to the project.

10.0 – LIST OF ATTACHMENTS

A. Resolution No. 11-20

B. Draft Permit No. 18672

Exhibit A – U.S. Army Corps of Engineers 208.10 Comment Letter

Exhibit B – Kings County Department of Public Works dated April 13, 2011

Exhibit C – Kaweah Delta Water Conservation District dated March 18, 2011

C. Location Map

D. Vicinity Map

- E. Project profile and sections F-3,4,6 & 7 (2 pages)
- F. Construction Drawings 1-4
- G. HEC-RAS Cross Section (3 pages)
- H. Olsson Associates, permit variance request dated July 14, 2011 (2 pages)
- I. 6 Photos; (3 page)

Report Completed by:	David R. Williams, P.E.
Design Review:	David R. Williams, P.E.
Environmental Review:	James Herota and Andrea Mauro
Document Review:	Dan S. Fua, P.E. – Supervising Engineer Len Marino, P.E. – Chief Engineer

STATE OF CALIFORNIA
THE RESOURCES AGENCY
CENTRAL VALLEY FLOOD PROTECTION BOARD

RESOLUTION NO. 11-20

FINDINGS AND DECISION AUTHORIZING ISSUANCE OF
ENCROACHMENT PERMIT NO. 18672
BURLINGTON NORTHERN SANTA FE RAILROAD COMPANY
CROSS CREEK, KINGS COUNTY

WHEREAS, the Burlington Northern Santa Fe Railroad Company is proposing to replace existing Bridge 956.56, Line Segment (LS) 7200 over the East Branch of Cross Creek located in Kings County; and

WHEREAS, the Burlington Northern Santa Fe Railroad Company submitted Encroachment Permit Application No. 18672 to the Central Valley Flood Protection Board on April 26, 2011; and

WHEREAS, the California Department of Fish and Game as lead agency under the California Environmental Quality Act, Public Resources Code sections 21000 *et seq.* ("CEQA") approved the project (BNSF Mile Post 956.56 Bridge Replacement Project) on July 16, 2011 and determined that the project was categorically exempt under Class 2 (CEQA Guidelines Section 15302) covering replacement of existing facilities where the new structure will be located on the same site, and have essentially the same purpose and capacity as the structure replaced; and

WHEREAS, on August 5, 2011 the Corps Sacramento District approved Encroachment Permit Application No.18672; and

WHEREAS, the proposed project does not meet the Board's standards in accordance with in Title 23, California Code of Regulations (CCR), Section 128 (a)(16) which requires the soffit members to be no lower than those of the replaced railroad bridge; and

WHEREAS, in accordance with Title 23, CCR Section 11, the Board may grant a variance from the Board's standards for a use that is not consistent with the Board's standards. When approval of an encroachment requires a variance, the applicant must clearly state in the application why compliance with the Board's standards is infeasible or not appropriate; and

WHEREAS, Burlington Northern Santa Fe Railroad Company requests the Board to grant a variance from Title 23, CCR Section 128 (a)(16) and requests the Board's approval for the following reasons:

- 1) The proposed bridge would decrease the design WSE 0.04 ft, compared to the existing condition;
- 2) To raise the soffit to match the existing bridge would cause several miles of infrastructure raise which is not feasible; and

WHEREAS, for all these reasons, staff recommends the Board to grant a variance from Title 23, CCR Section 128 (a)(16) and approve Application No. 18672; and

WHEREAS, the Central Valley Flood Protection Board has conducted a hearing on Encroachment Permit No. 18672 and has reviewed the application, the Report of its staff, the documents and correspondence in its file, and given the applicant the right to testify and present evidence on their behalf;

NOW, THEREFORE, BE IT RESOLVED THAT,

Findings of Fact.

1. The Central Valley Flood Protection Board hereby adopts as findings the facts set forth in the Staff Report.
2. The Board has reviewed all Attachments, Exhibits, Figures, and References listed in the Staff Report.

CEQA Findings.

3. The Board, acting as a responsible agency under CEQA, has reviewed the California Department of Fish and Game determination and has independently determined that the project is exempt from CEQA under Class 2 (CEQA Guidelines Section 15302) covering replacement of existing facilities where the new structure will be located on the same site, and have essentially the same purpose and capacity as the structure replaced.
4. **Custodian of Record.** The custodian of the CEQA record for the Board is its Executive Officer, Jay Punia, at the Central Valley Flood Protection Board Offices at 3310 El Camino Avenue, Room 151, Sacramento, California 95821.

Findings pursuant to Water Code Section 8610.5

5. **Evidence Admitted into the Record.** 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.
6. **Best Available Science.** In making its findings, the Board has used the best available science relating to the issues presented by all parties.
7. **Effects on State Plan of Flood Control.** This project has no effects on the State Plan of Flood Control.

8. **Effects of Reasonably Projected Future Events.** There are no other foreseeable projected future events that would impact this project.

Other Findings/Conclusions regarding Issuance of the Permit.

9. This resolution shall constitute the written decision of the Central Valley Flood Protection Board in the matter of Permit No. 18672.

Approval of Encroachment Permit No. 18672

10. Based on the foregoing, the Central Valley Flood Protection Board hereby approves the Burlington Northern Santa Fe Railroad Company Project and approves issuance of Encroachment Permit No. 18672 in substantially the form provided as Staff Report Attachment B, and final 100% plans and specifications.
11. The Central Valley Flood Protection Board directs the Executive Officer to take the necessary actions to prepare and execute the permit and related documents for Encroachment Permit Application No. 18672.

PASSED AND ADOPTED by vote of the Board on _____, 2011

Benjamin F. Carter
President

Francis Hodgkins
Secretary

DRAFT

STATE OF CALIFORNIA
THE RESOURCES AGENCY
THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18672 BD

This Permit is issued to:

Burlington Northern Santa Fe (BNSF) Railroad Company
4515 Kansas Avenue
Kansas City, Kansas 66106

Remove existing wood trestle RR bridge and construct a new steel and concrete RR bridge over East Branch of Cross Creek, Kings County. Located at the BNSF railroad bridge over the East Branch of Cross Creek, Kings County (Section S 1/2 OF SECT. 20, T20 S, R22E, MDB&M, Cross Creek, Kings 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. 18672 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 demolition and/or construction activities any and all easements, both temporary and permanent, shall be obtained by the applicant.

FIFTEEN: There shall be no plantings within the project area under this permit, except that of native grasses, which may be required for slope protection. The applicant claims that there is no vegetation and that the site will be returned to pre-project conditions.

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 related 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 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, Kings

County Department of Public Works, and the Kaweah Delta Water Conservation District 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: No construction work of any kind shall be done during the flood season from November 1 to July 15 without prior approval of the Central Valley Flood Protection Board.

TWENTY: Prior to start of any demolition and/or construction activities within the floodway, the applicant shall provide the Central Valley Flood Protection Board with two sets of layout plans for any and all temporary, inchannel cofferdam(s), gravel workpad(s), work trestle(s), scaffolding, piles and/or other appurtenances that are to remain in the floodway during the flood season from November 1 through July 15.

TWENTY-ONE: Debris that may accumulate on the permitted encroachment(s) and/or any temporary falsework within the floodway shall be cleared off and disposed of outside the floodway after each period of high water.

TWENTY-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.

TWENTY-THREE: The permittee shall provide continuous supervision and inspection services acceptable to the Central Valley Flood Protection Board.

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

TWENTY-FIVE: Cleared trees and brush 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 July 15.

TWENTY-SIX: Fill material shall be placed only within the area indicated on the approved plans.

TWENTY-SEVEN: Backfill material for excavations shall be placed in 4- to 6-inch layers and compacted to at least the density of the adjacent, firm, undisturbed material.

TWENTY-EIGHT: Density tests by a certified materials laboratory will be required to verify compaction of backfill within the regulated stream.

TWENTY-NINE: The soffit of the bridges shall have a minimum elevation of 211.37 feet. The vertical datum is NAVD 88.

THIRTY: Revetment, if planned, shall be uniformly placed and properly transitioned into the bank, levee slope, or adjacent revetment and in a manner which avoids segregation. This permit dis-allows Rock Rip-Rap within the regulated stream. Existing Rock Rip-Rap shall be removed from the East Branch of Cross Creek 200 feet upstream and downstream from the replacement bridge.

THIRTY-ONE: The recommended minimum thickness of revetment, measured perpendicular to the

bank or levee slope, is 18 inches below the usual water surface and 12 inches above the usual water surface.

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

THIRTY-THREE: The work area shall be restored to the condition that existed prior to start of work.

THIRTY-FOUR: The permittee shall submit as-built drawings to the Department of Water Resources' Flood Project Inspection Section upon completion of the project.

THIRTY-FIVE: If the 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-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: The permittee shall 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 the Department of Water Resources or any other agency responsible for maintenance.

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: The permittee shall comply with all conditions set forth in the letter from the U.S. Army Corps of Engineers dated _____, which is attached to this permit as Exhibit A and incorporated by reference.

FORTY-TWO: The permittee shall comply with all conditions set forth by the Kaweah Delta Water Conservation District letter dated March 18, 2011 who currently maintains this channel, which is attached to this permit as Exhibit C and is incorporated by reference.

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



REPLY TO
ATTENTION OF

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

Flood Protection and Navigation Section (18672)

AUG 05 2011

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 the Burlington Northern Santa Fe Railroad Company (application number 18672). This project includes replacing an existing bridge (Number 956.56) over the East Branch of Cross Creek. The project is located at 36.1704°N 119.6095°W NAD83, Kings County, California.

The District Engineer has no comments or recommendations regarding flood control because the proposed work does not affect a federally constructed project.

A Section 10 and/or Section 404 permit application (SPK-210-1429) is complete 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,

A handwritten signature in black ink that reads "Meegan G. Nagy".

Meegan G. Nagy, P.E.
Chief, Flood Protection and Navigation Section



COUNTY OF KINGS

**DEPARTMENT OF
PUBLIC WORKS**

Kings County Government Center
1400 W. Lacey Boulevard
Hanford, CA 93230
Phone: (559) 582-3211
Extension: 2690
FAX: (559) 582-2506

Kevin J. McAlister, Director

April 13, 2011

Olsson Associates
1111 Lincoln Mall, Suite 111
Lincoln, Nebraska, 68501

Attn: Branden Strahm

Subject: Cross Creek Railway Bridge Crossing (BNSF Bridge 956.56)

Dear Mr. Strahm;

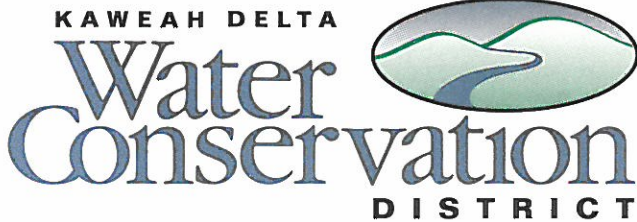
Per your request, Kings County Public Works has reviewed the plans you have provided us for this project we have no objections to the replacement of this structure.

Kings County is not responsible for, nor does it undertake, levee or channel maintenance along Cross Creek. We are unaware of any local agency that has this responsibility.

Sincerely,

A handwritten signature in black ink, appearing to read "Kevin J. McAlister", with a long horizontal line extending to the right.

Kevin J. McAlister
Director of Public Works



March 18, 2011

Olsson Associates
1111 Lincoln Mall, Suite 111
Lincoln, Nebraska, 68501

Attn: Branden Strahm

Subject: Cross Creek Railway Bridge Crossing (BNSF Bridge 956.56)

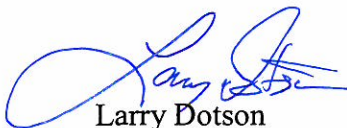
Dear Mr. Strahm:

Kaweah Delta Water Conservation District (District) acknowledges receipt a copy of a letter from Olsson Associates, dated January 3, 2011, addressed to the Kings County Community Development Agency regarding the proposed replacement of BNSF Bridge 956.56 spanning Cross Creek. The District has reviewed the submitted plans and does not anticipate any conflicts with any of its future activities within the channel as a result of the replacement of the bridge.

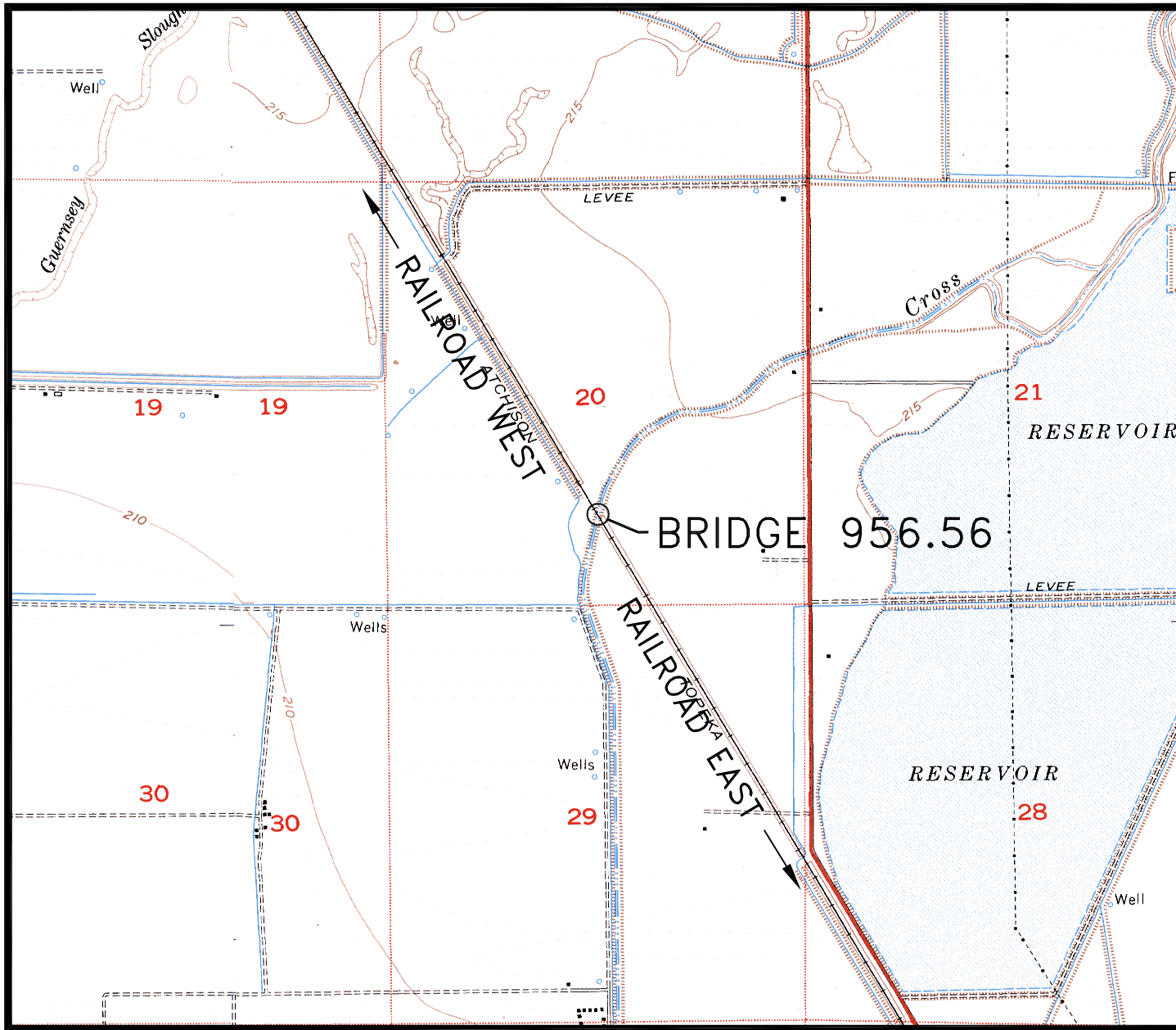
The District performs channel maintenance through the segment of Cross Creek where the BNSF Bridge 956.56 is located, but it is under no legal obligation to do so. The District performs its work in accordance with its powers to maintain facilities for the protection of lands within the District from damage by flood or overflow. The District is not a responsible agency for the maintenance of the identified levees within the section of the Central Valley Flood Protection Board's "Cross Creek Designated Floodway, Kings County, Nevada Avenue to Kansas Avenue." The District is currently unaware of any local agency that has such responsibility.

Please contact myself if there are any further questions or requests regarding this matter.

Respectfully,



Larry Dotson
Senior Engineer



SOURCE:
 USGS TOPOGRAPHIC MAP:
 GUERNSEY (1954), CALIFORNIA
 WAUKENA (1954), CALIFORNIA
 CONTOUR INTERVAL: 5'

BRIDGE LOCATION:
 SECTION 20
 TOWNSHIP 20 SOUTH
 RANGE 22 EAST

LAT: 36° 10' 13" N
 LONG: 119° 36' 33" W

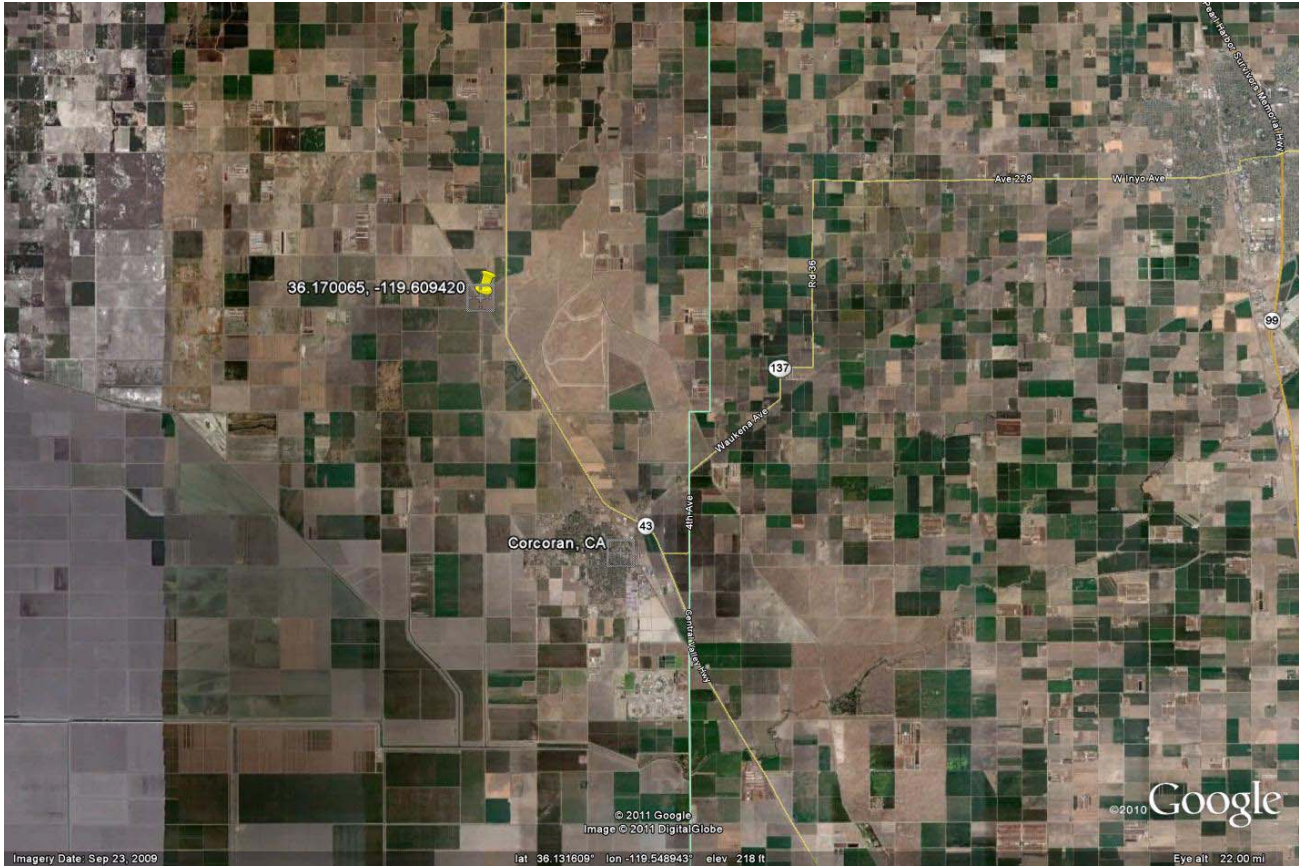
PROJECT: 2010-2339
 DRAWN BY: JDG
 DATE: 4/26/2011

LOCATION MAP

MOLSSON
 ASSOCIATES
1111 Lincoln Mall, Suite 111
 P.O. Box 94608
 Lincoln, NE 68501-4608
TEL: 402.474.8311
 FAX: 402.474.6100
 www.molssonllp.com

FIGURE
F-1

Project Vicinity

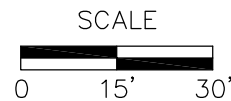
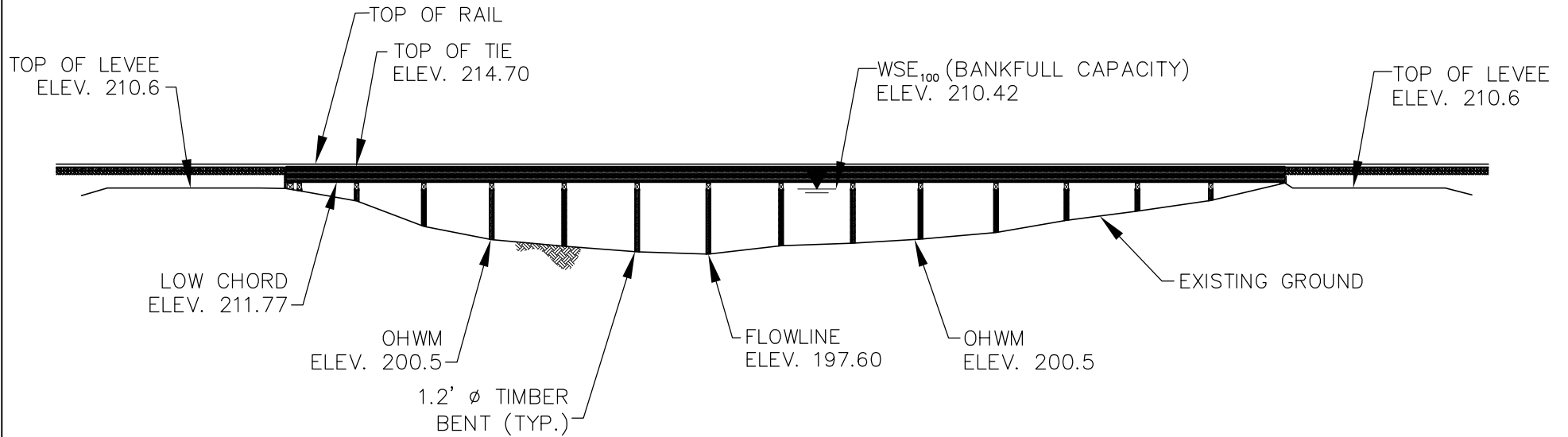


RAILROAD EAST
TO BAKERSFIELD

RAILROAD WEST
TO CALWA

BRIDGE 956.56 – LINE SEGMENT 7200

EXISTING: 15-SPAN, 196' LONG, BALLAST DECK PILE TRESTLE



PROJECT: 2010-2339
 DRAWN BY: JDG
 DATE: 4/26/2011

EXISTING BRIDGE – UPSTREAM FACE PROFILE

MOLSSON
 ASSOCIATES
1111 Lincoln Mall, Suite 111
 P.O. Box 94008
 Lincoln, NE 68501-4608
 TEL: 402-474-8311
 FAX: 402-474-6100
 www.molssonllp.com

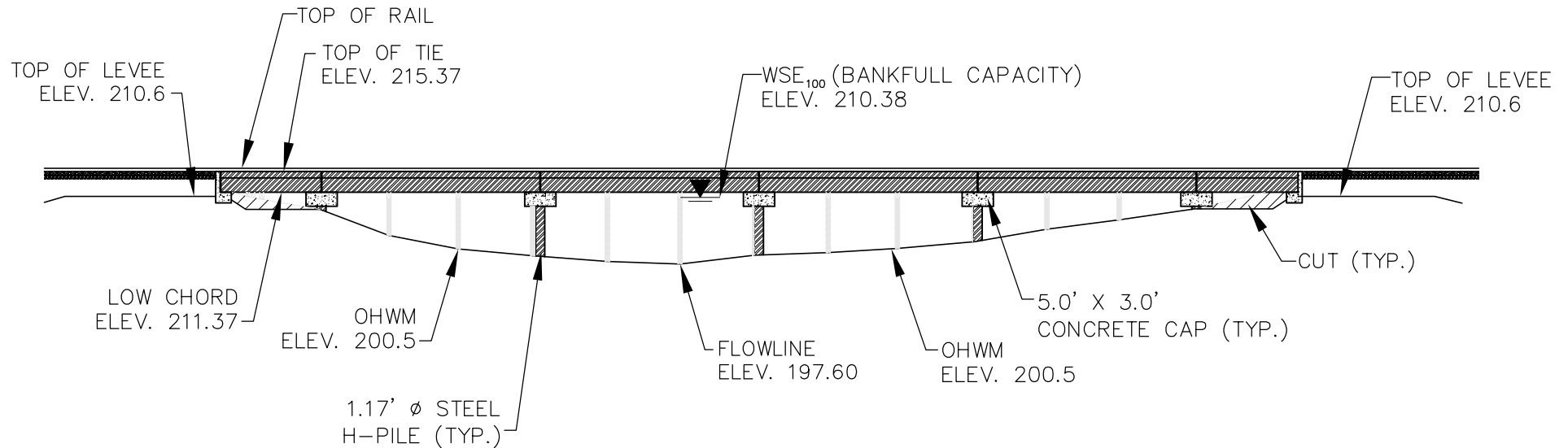
FIGURE
F-3

RAILROAD EAST
TO BAKERSFIELD

RAILROAD WEST
TO CALWA

BRIDGE 956.56 – LINE SEGMENT 7200

PROPOSED: 6-SPAN, VARIABLE LENGTH, 206' LONG, STEEL BEAM BRIDGE



EAST ABUTMENT	
FOOTPRINT	600 FT ²
CUT	30 YD ³

WEST ABUTMENT	
FOOTPRINT	630 FT ²
CUT	40 YD ³



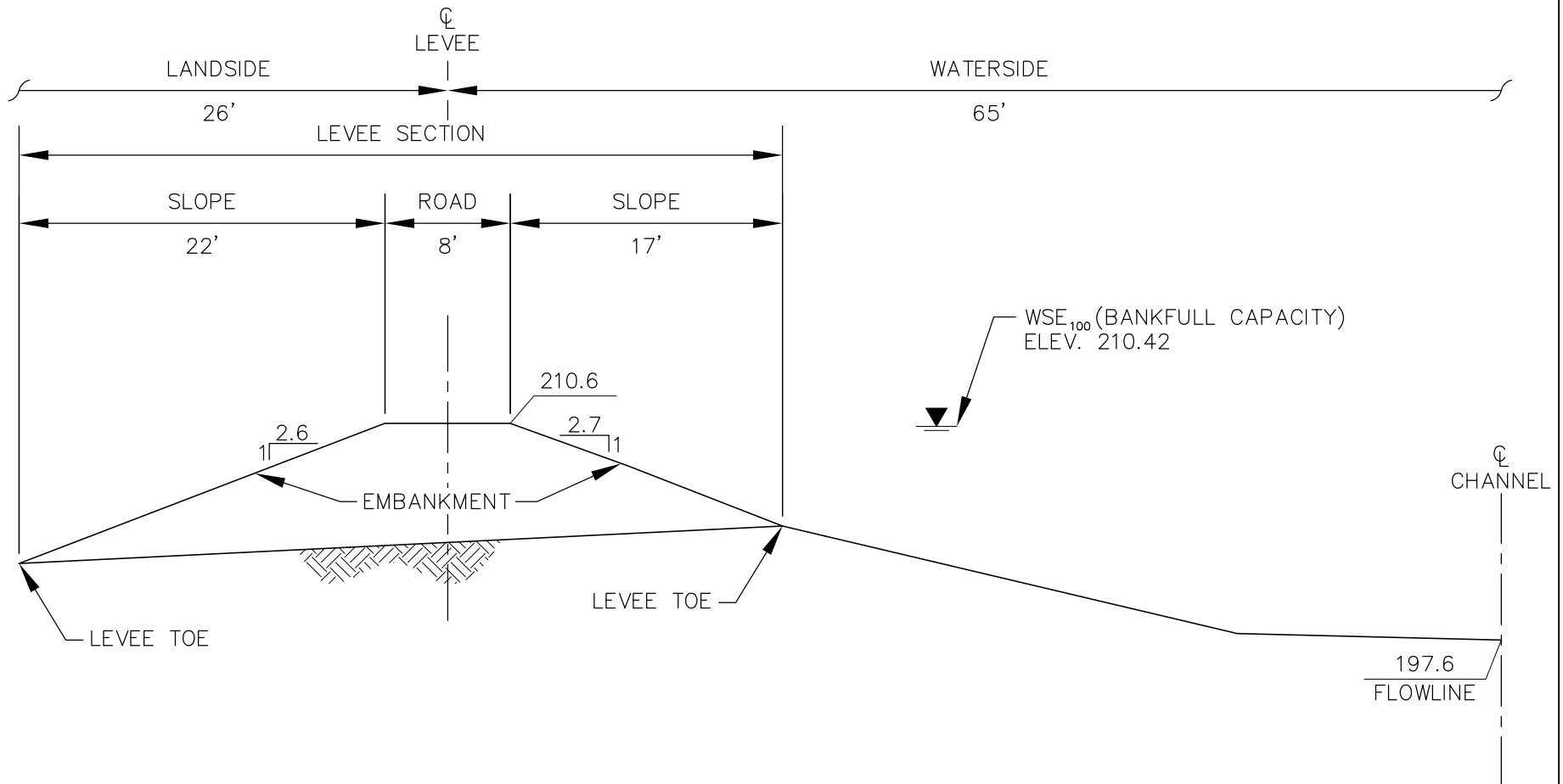
PROJECT: 2010-2339
DRAWN BY: JDG
DATE: 4/26/2011

PROPOSED BRIDGE – UPSTREAM FACE PROFILE

MOLSSON ASSOCIATES
1111 Lincoln Mall, Suite 111
 P.O. Box 94608
 Lincoln, NE 68501-4608
TEL: 402-474-8311
 FAX: 402-474-5100
 www.molsson.com

FIGURE
F-4

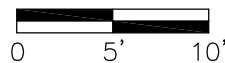
BRIDGE 956.56 – LINE SEGMENT 7200



TYPICAL FLOODWAY

(LOOKING DOWNSTREAM)

SCALE



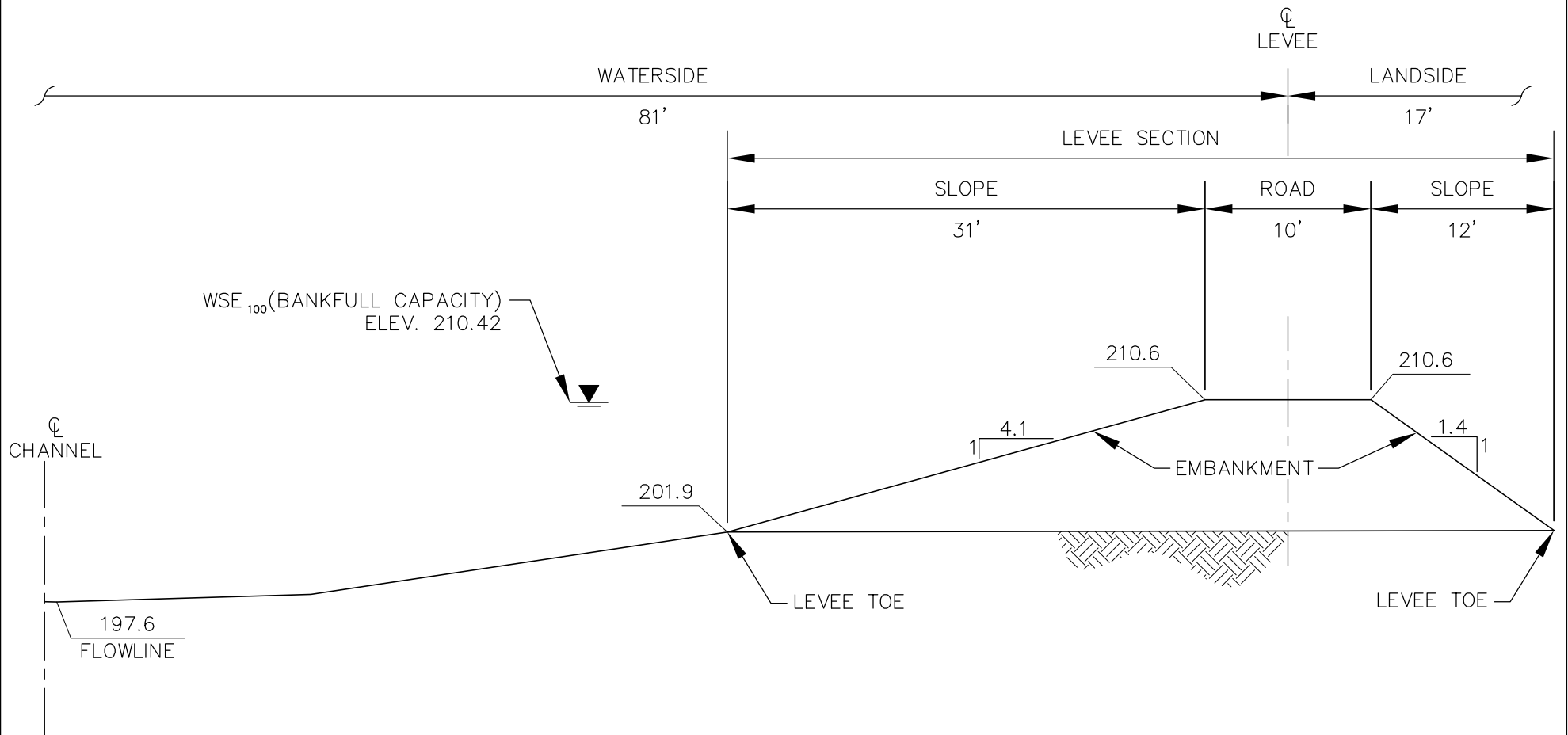
LEFT BANK LEVEE SECTION

PROJECT: 2010-2339
 DRAWN BY: JDG
 DATE: 4/26/2011

OLSSON
 ASSOCIATES
1111 Lincoln Mall, Suite 111
 P.O. Box 94008
 Lincoln, NE 68501-4608
TEL: 402.474.8311
 FAX: 402.474.5100
 www.olsonsa.com

FIGURE
F-6

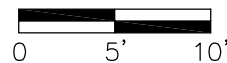
BRIDGE 956.56 – LINE SEGMENT 7200



TYPICAL FLOODWAY

(LOOKING DOWNSTREAM)

SCALE

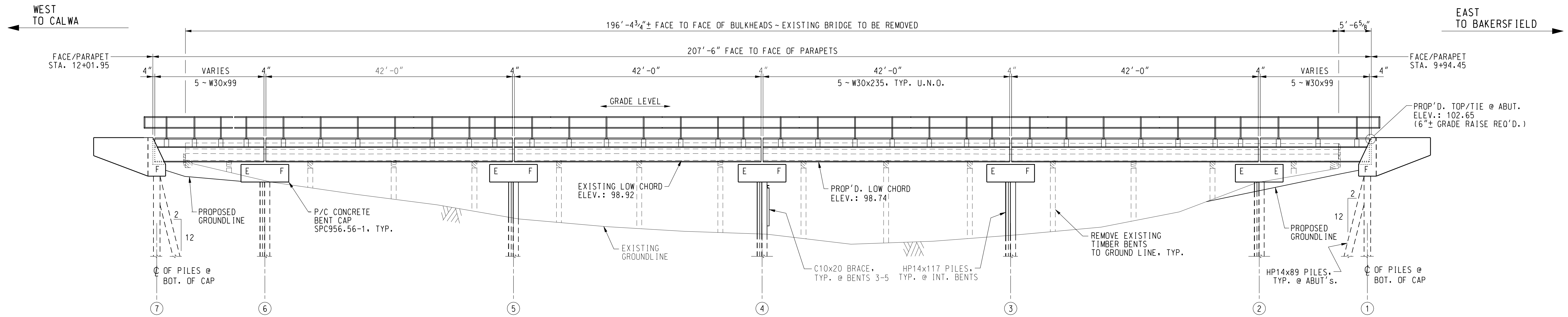


PROJECT: 2010-2339
 DRAWN BY: JDG
 DATE: 4/26/2011

RIGHT BANK LEVEE SECTION

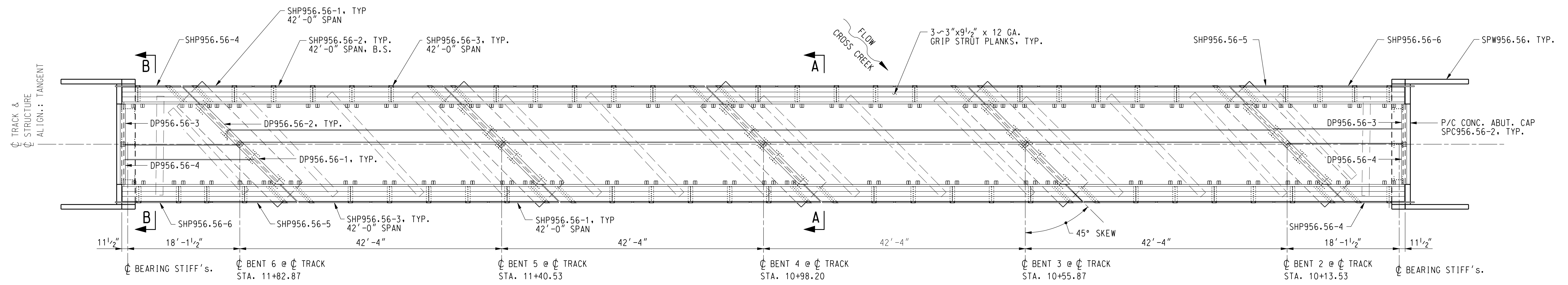
OLSSON ASSOCIATES
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 www.olsona.com

FIGURE
F-7



ELEVATION

(LOOKING NORTH AT CENTERLINE OF BRIDGE - BEARINGS NOT SHOWN)



PLAN

SEE SHEET 3 FOR SECTION VIEWS A-A & B-B

LIST OF SHEETS

1. GENERAL PLAN - REBUILD BRIDGE
2. PILE PLAN
3. TYPICAL SECTIONS
4. BEARING LAYOUT ELEVATION VIEW
5. PRECAST CONCRETE DETAILS (1 of 2)
6. PRECAST CONCRETE DETAILS (2 of 2)
7. FRAMING PLAN
8. FRAMING DETAILS
9. BEAM ELEVATIONS
10. BEARING DETAILS
11. BALLAST PAN PLAN - INTERIOR SPANS
12. BALLAST PAN PLAN - APPROACH SPANS
13. HANDRAIL PANEL DETAILS
14. MISCELLANEOUS STEEL DETAIL (1 of 2)
15. MISC. STEEL DETAIL (2 of 2) AND B.O.M.

ESTIMATED LIFTING WEIGHTS:

PRECAST MATERIAL	
SPC956.56-1	51,700 LB.
SPC956.56-2	27,500 LB.
SPW956.56	8,500 LB.
STRUCTURAL STEEL	
INTERIOR SPANS - UNIT 1	30,500 LB.
INTERIOR SPANS - UNIT 2	43,500 LB.
APPROACH SPANS - UNIT 1	10,800 LB.
APPROACH SPANS - UNIT 2	10,500 LB.
INTERIOR SPANS - TOTAL	73,900 LB.
APPROACH SPANS - TOTAL	21,300 LB.

GENERAL NOTES:

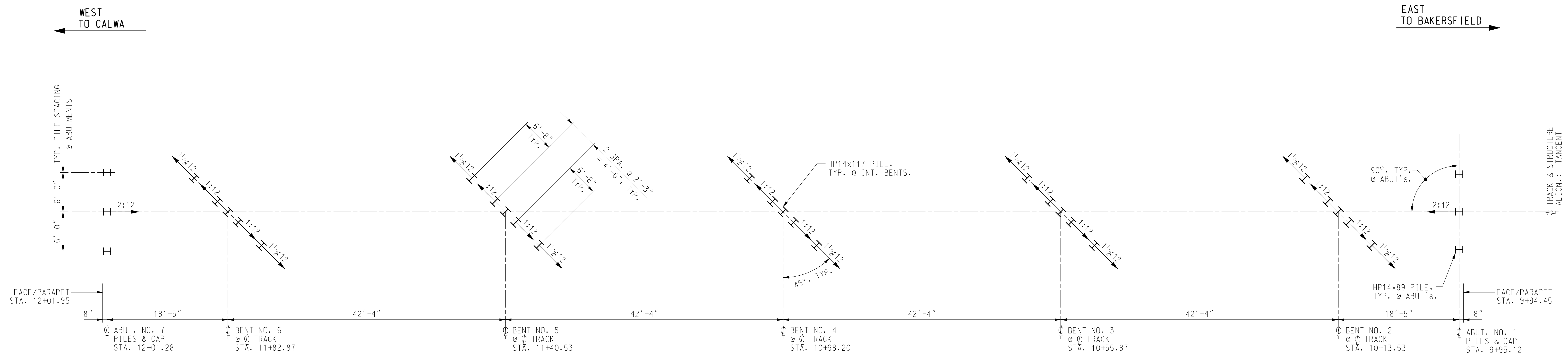
DESIGN LOADING : COOPER E80 WITH DIESEL IMPACT.
 NEW CONSTRUCTION SHOWN IN HEAVY LINES. EXISTING STRUCTURE TO BE REMOVED SHOWN IN LIGHT DASHED LINES.
 STATIONING AND ELEVATIONS BASED ON SURVEY BY PARSONS DATED 03/01/2010. BENCHMARK: PK NAIL EAST TIMBER BULKHEAD OF BRIDGE 956.56 (PAINTED ORANGE), STA. 10+00.00 - 11.58' NORTH OF C. ASSUMED ELEV. = 100.00.
 U.N.O. DENOTES UNLESS NOTED OTHERWISE.
 B.S. DENOTES BOTH SIDES.
REFERENCES:
 PARSONS SURVEY OF BRIDGE 956.56, NEAR CORCORAN, CA. LINE SEGMENT 7200, DATED 03/01/2010.
 CORR. FILE BR. 7200-956.56

LOCATION	TOP/TIE	TOP/CAP	PILE CUTOFF	TT/CO
ABUT. 1	102.65	98.32	96.32	6'-4"
BENT 2	102.65	98.32	95.32	7'-4"
BENT 3	102.65	98.32	95.32	7'-4"
BENT 4	102.65	98.32	95.32	7'-4"
BENT 5	102.65	98.32	95.32	7'-4"
BENT 6	102.65	98.32	95.32	7'-4"
ABUT. 7	102.65	98.32	96.32	6'-4"

ATTENTION !

INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND OR ABOVE GROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE.
 THE SUPERVISOR OF STRUCTURES OR THE FOREMAN IN CHARGE WILL VERIFY THE LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES BEFORE BEGINNING CONSTRUCTION AND PER THE BNSF ENGINEERING INSTRUCTIONS CHAPTER 26.

STIFF. SPACING - 2/9/2011 KHJ	DES: BEF - OA	BNSF RAILWAY	BAKERSFIELD TO CALWA	
	DRAWN: BEF - OA		BRIDGE NUMBER 956.56	
	CHECK: KHJ-OA		OVER CROSS CREEK NEAR CORCORAN, CA	
	DATE: AUG 2010		GENERAL PLAN ~ REBUILD BRIDGE	
REVISIONS	AUTH: A11-	APPROVED:	ASST. DIRECTOR STRUCTURES DESIGN	PLAN NO: 7200-956.56-01
	LINE SEG: 7200			SHEET: 1 of 15



PILE NOTES:

PILES SHALL BE DRIVEN TO REFUSAL, IF POSSIBLE, OR TO A MINIMUM ULTIMATE RESISTANCE OF 250 TONS AS DETERMINED BY THE MODIFIED ENGINEERING NEWS RECORD FORMULA AS PER THE BNSF ENGINEERING INSTRUCTIONS 17.2.4.

ESTIMATED PILE LENGTH BELOW CUTOFF = 90'.

PILE SPACINGS SHOWN ARE AT PILE CUTOFF ELEVATIONS. SEE SHEET 1 FOR PILE CUTOFF ELEVATIONS.

SYMBOL X:12 DENOTES DIRECTION AND AMOUNT OF PILE BATTER.

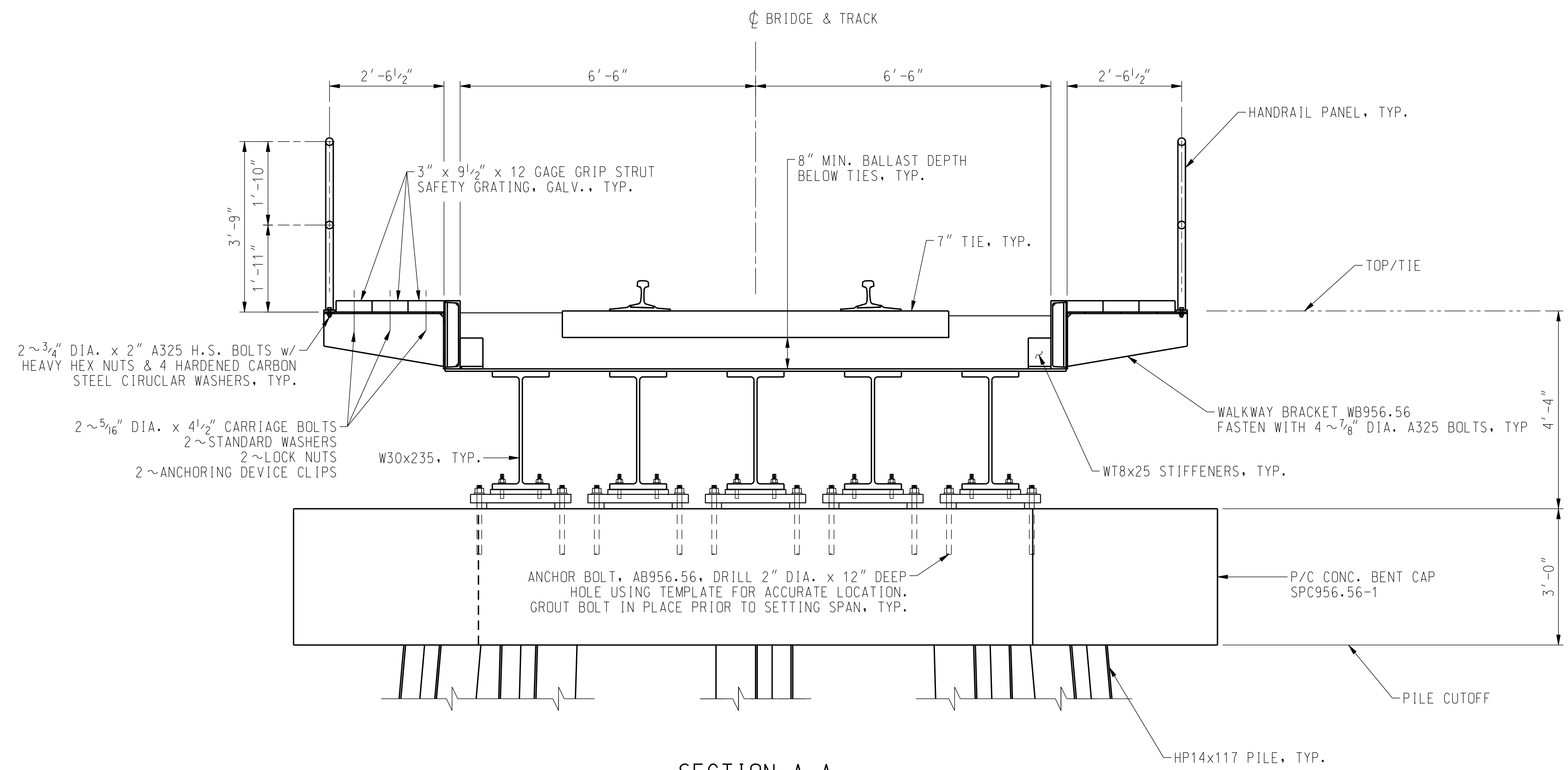
DES: BEF - OA
DRAWN: BEF - OA
CHECK: KHJ - OA
DATE: SEPT 2010
AUTH: A11-
LINE SEG: 7200

BNSF
RAILWAY

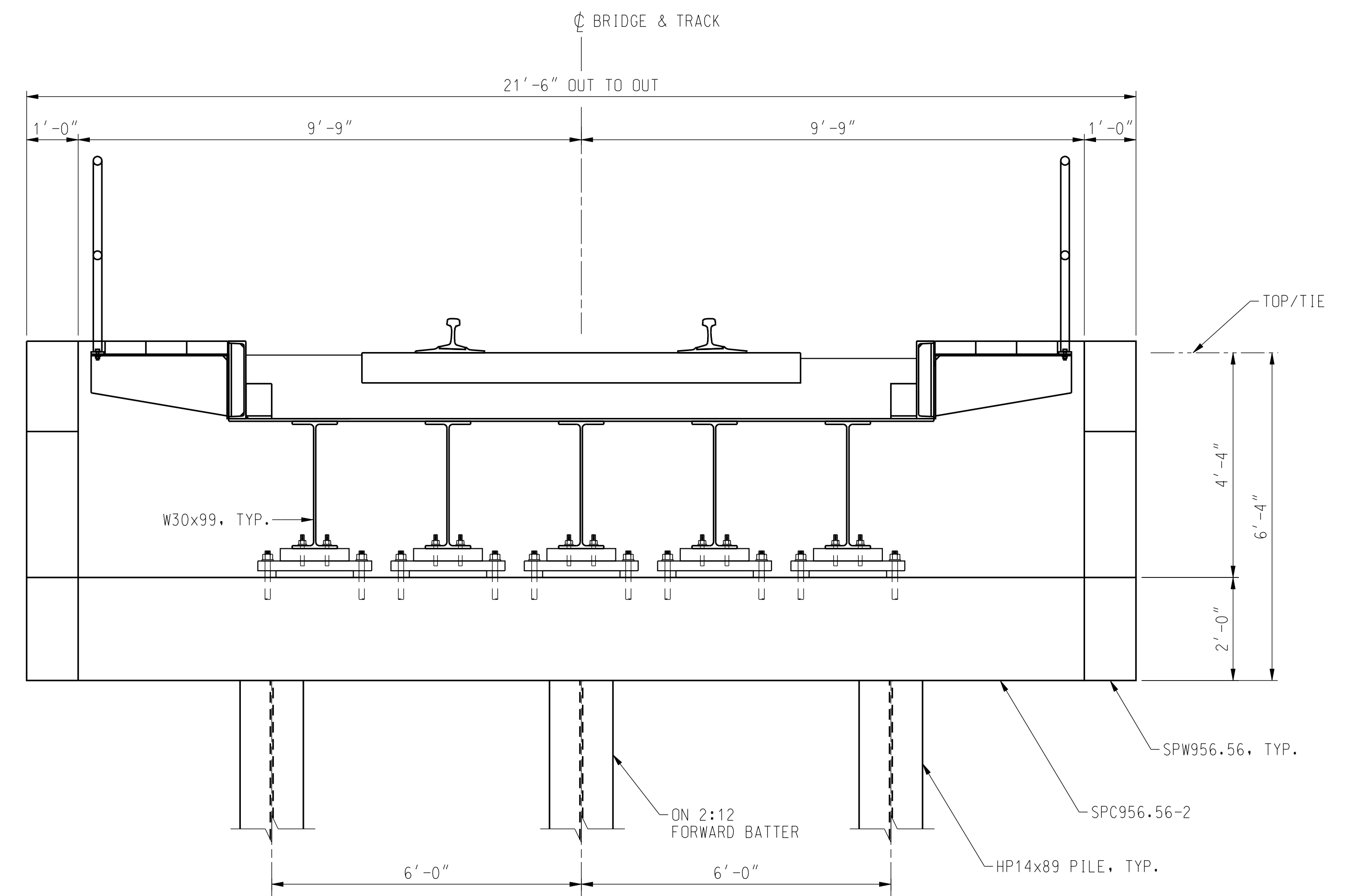
BRIDGE ENGINEERING KANSAS CITY, KS

APPROVED: _____
ASST. DIRECTOR STRUCTURES DESIGN

BAKERSFIELD TO CALWA BRIDGE NUMBER 956.56 OVER CROSS CREEK NEAR CORCORAN, CA	
PILE PLAN	
PLAN NO: 7200-956.56-02	SHEET: 2 of 15



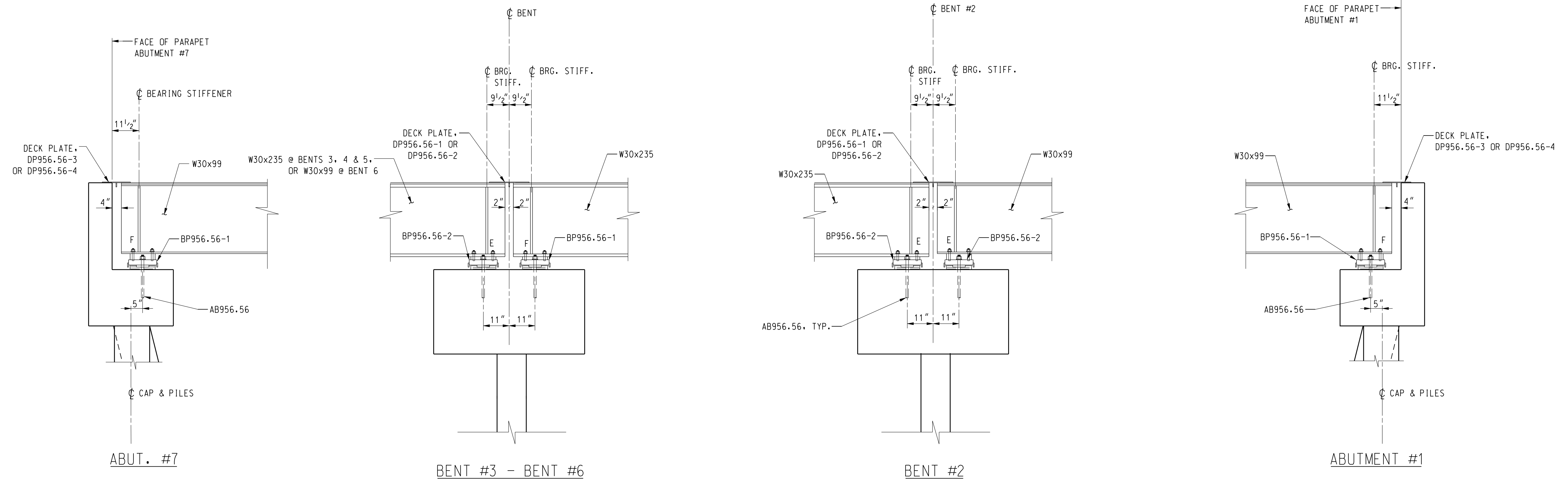
NOTES:
FOR BRACING OF INTERIOR BENTS, USE STANDARD C10x20.
SEE SHEET 1 FOR LOCATION OF SECTION VIEWS.



DES: BEF - OA	<p>BRIDGE ENGINEERING KANSAS CITY, KS</p>	BAKERSFIELD TO CALWA		
DRAWN: BEF - OA		BRIDGE NUMBER 956.56		
CHECK: KHJ - OA		OVER CROSS CREEK NEAR CORCORAN, CA		
DATE: SEPT 2010		TYPICAL SECTIONS		
AUTH: A11-		APPROVED:	PLAN NO: 7200-956.56-03	
LINE SEG: 7200		ASST. DIRECTOR STRUCTURES DESIGN	SHEET: 3 of 15	

WEST
TO CALWA


EAST
TO BAKERSFIELD

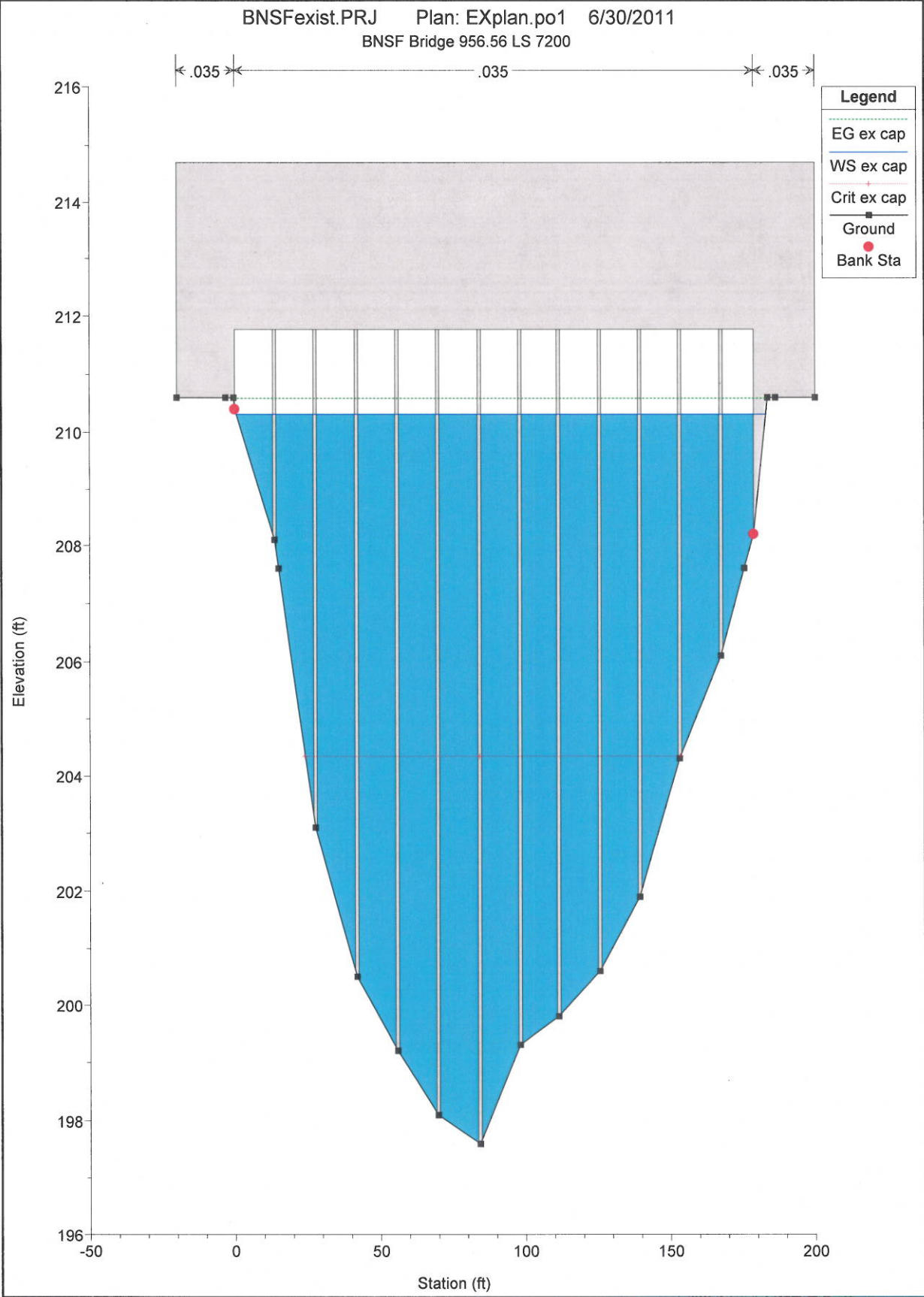


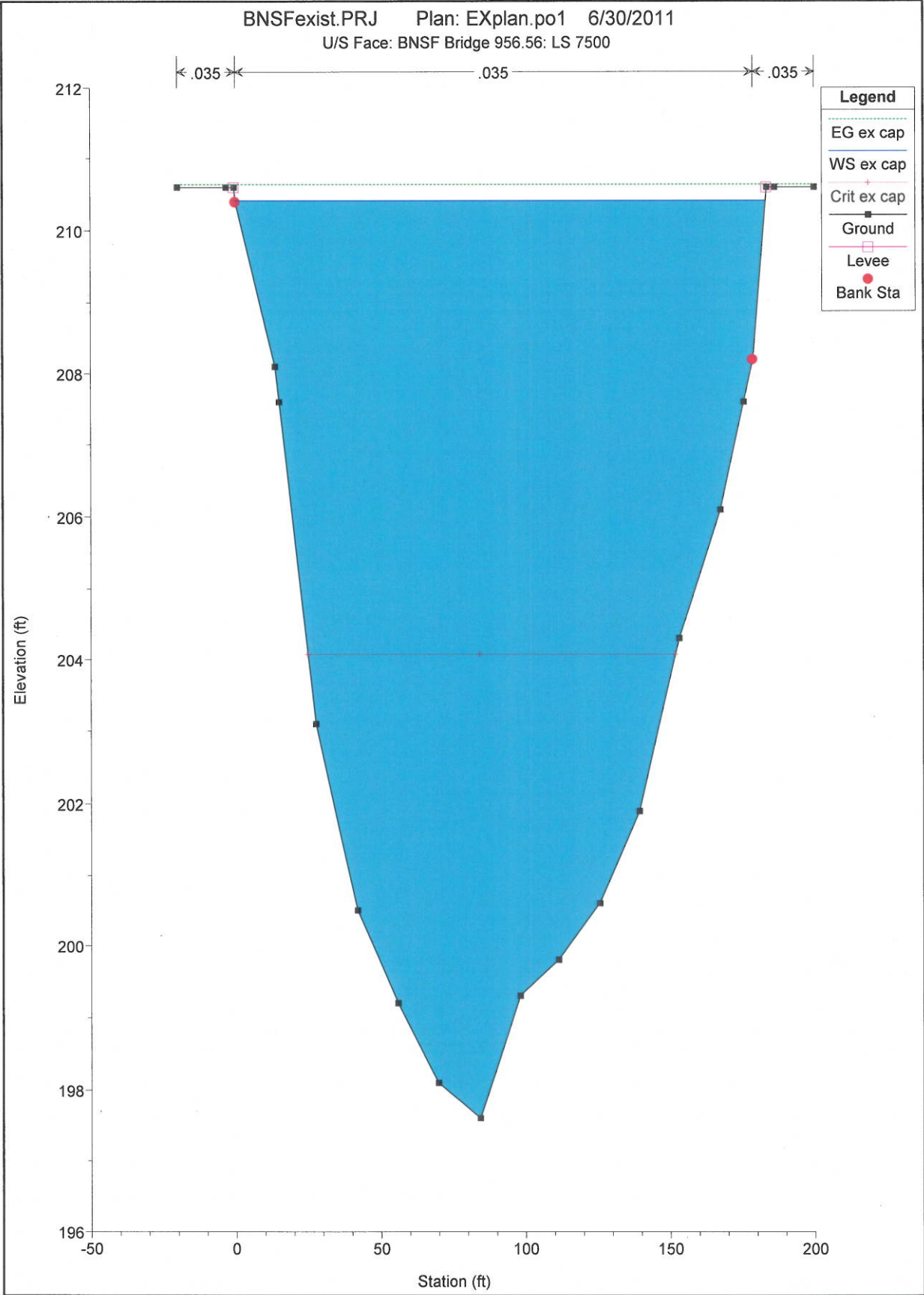
ELEVATION Δ
(LOOKING RAILWAY NORTH)

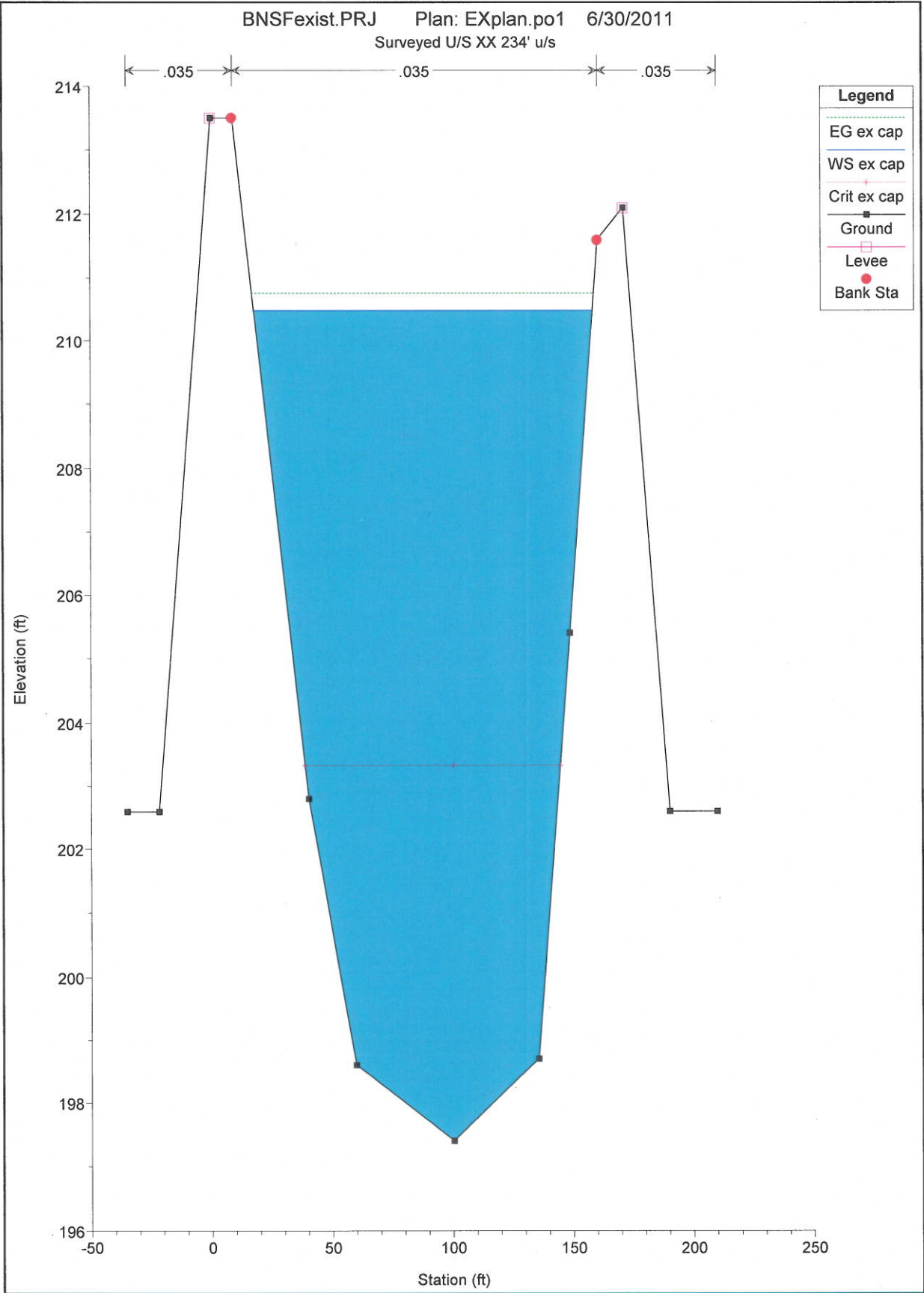
NOTES:

1. HORIZONTAL DIMENSIONS ARE ALONG ϕ BEAM.
2. SEE SHEET 10 FOR BEARING DETAILS.

Δ STIFF. SPACING - KHJ 2/9/2011 REVISIONS	DES: BEF - OA	 BRIDGE ENGINEERING KANSAS CITY, KS	BAKERSFIELD TO CALWA BRIDGE NUMBER 956.56	
	DRAWN: BEF - OA		OVER CROSS CREEK NEAR CORCORAN, CA	
	CHECK: KHJ - OA		BEARING LAYOUT ELEVATION VIEW	
	DATE: SEPT 2010		APPROVED:	PLAN NO: 7200-956.56-04
AUTH: A11-	LINE SEG: 7200	ASST. DIRECTOR STRUCTURES DESIGN		







14 July 2011

David R. Williams R.C.E.
Central Valley Flood Protection Board
Chief Levee Improvement Section
3310 El Camino Ave., Room 151

Re: **Bridge 956.56, Line Segment 7200 (East Branch Cross Creek) – Kings County**
CVFPB Permit Application No.: 18672
Near Corcoran, California
Olsson Project No. 010-2339

Dear David:

Below are responses to our phone conversation dated 6 July 2011.

I'm writing you to request a variance to California Code of Regulations Section 128; (a); (10) (B) regarding the bottom structural members of the proposed bridge replacement relative to the existing bridge. Matching the low superstructure horizontal members (low chord) of the existing bridge will require a substantial track raise of the railroad bridge. It should be noted the proposed bridge will already be raised 6-inches to increase the low chord elevation, however the additional 5-inches required to match the existing low chord will require modification to existing at-grade crossings, public roads and infrastructure for several miles in each direction of the bridge. Therefore, due to railroad grade restraints substantially raising the BNSF track is not an option. It should also be noted, the dimension from top of tie to low chord is the minimum distance required to maintain the structural components for a steel beam bridge, which substantially increases the hydraulic efficiency of the bridge and decreases the risk of debris collection due to the longer spans.

Per California Code of Regulations Section 128; (a); (14) the existing timber bents will be removed at least one foot below the natural ground line and at least three feet below the bottom of the East Branch Cross Creek channel.

BNSF has driven H piling for several bridges along Line Segment 7200 in the past and are confident of their piling depths. As a result, BNSF decided not to conduct a geotechnical study. The proposed H pile bents shall be driven to refusal, if possible, or to a minimum ultimate resistance of 250 tons as determined by the modified engineering news record formula as per the BNSF Engineering Instructions 17.2.4. The estimated H pile depth below the low chord is 90 feet.

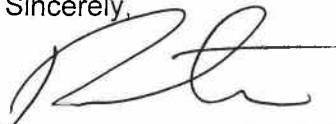
After reviewing the site photos and discussion with BNSF field personnel its unknown when the large diameter riprap was placed along the bridge abutments or its intended use. However since they have such a small footprint, are located along the top of levee and in an ineffective flow area of the bridge (due to bridge skew), they were ignored in the bridge hydraulics. The small diameter rock (ballast) located along the face of the bridge is an overflow from the ballast/track maintenance over the bridge. The ballast overflow will easily wash away during peak flow events. As such a manning's n value of 0.035 was used in the hydraulic analysis at BNSF Bridge 956.56.

Central Valley Flood Protection Board
14 July 2011
Page 2 of 2

I've included the complete set of construction drawings (sheets 1 through 15) for your use. Per your request, the 100-year Water Surface Elevation (WSE) is located on Sheet 1. Please find attached Table 1, which summarizes the existing and proposed bridge Water Surface Elevations (WSE). The hydraulic model extends 557 feet downstream of the bridge and results in no change to the 100-year WSE downstream of the bridge.

If you have any questions concerning this project, or need additional information, please contact me at 402.458.5015 or bstrahm@oaconsulting.com, at your earliest convenience. Please refer your future correspondence to **Bridge 63.37, Line Segment 0081**.

Sincerely,

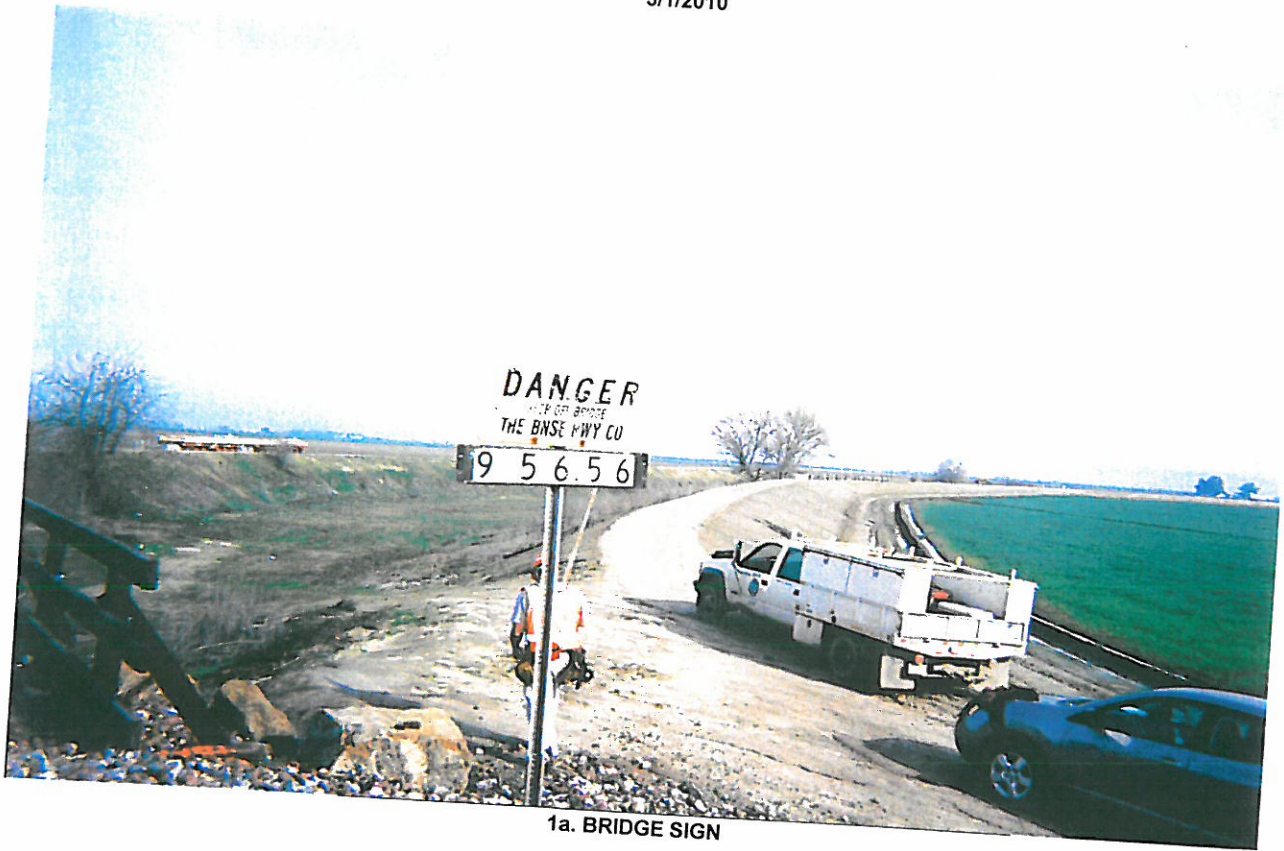
A handwritten signature in black ink, appearing to read 'B. Strahm', with a long horizontal flourish extending to the right.

Branden Strahm, PE, CFM.

Encls.

cc: Mr. Howard Perry, BNSF

BRIDGE 956.56
LS 7500
CORCORAN, CA
3/1/2010



1a. BRIDGE SIGN



1b. TEMPORARY BENCH MARK LOCATION

BRIDGE 956.56
LS 7500
CORCORAN, CA
3/1/2010

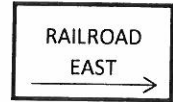


2a. LOOKING RAILROAD WEST ALONG NORTH SIDE OF BRIDGE

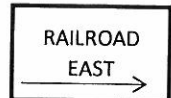


2b. LOOKING RAILROAD WEST ALONG CENTERLINE OF TRACK

BRIDGE 956.56
LS 7500
CORCORAN, CA
3/1/2010



6a. SOUTH FACE OF BRIDGE



6b. SOUTH FACE OF BRIDGE

BRIDGE 956.56
LS 7500
CORCORAN, CA
3/1/2010



7. CALIFORNIA HIGHWAY 43 BRIDGE +/- 3450' UPSTREAM OF C/L BRIDGE