Meeting of the Central Valley Flood Protection Board
August 24, 2012

Staff Report – Encroachment Permit

Dixon Regional Watershed – Joint Powers Authority

Dixon Main Drain and V-Drain Project, Solano County

1.0 – ITEM

Consider approval of Permit No. 18488 (Attachment B)

2.0 – APPLICANT

Dixon Regional Watershed – Joint Powers Authority

3.0 – LOCATION

The Dixon Main Drain and V-Drain project is located south of Dixon. The Dixon Main Drain runs from east to west parallel and adjacent to Swan Road for approximately 0.6 miles. The V-Drain runs from north to south perpendicular to Swan Road and parallel to the project levee for approximately 2.3 miles.
(Dixon Regional Watershed Joint Powers Authority, Solano County, see Attachment A)

4.0 – PROJECT DESCRIPTION

The Dixon Regional Watershed Joint Powers Authority (JPA) proposes to increase the capacity of the Dixon Main Drain and V-Drain (DMD-VD) by 375 cfs. The JPA proposes to excavate approximately 189,000 cubic yards of material to widen and deepen the Dixon Main Drain and V-Drain (tributary to Haas Slough), place rock riprap on RD 2098 levee at the south end of the canal, place rock riprap in the channel near a railroad car bridge, construct a weir across the canal, replace the existing culverts in the Main Drain with a conspan structure, and modify an existing trash rack.

5.0 – PROJECT ANALYSIS

Following the 1997 storm event, the Dixon Resource Conservation District, Maine Prairie Water District, Reclamation District No. 2068, the City of Dixon, the Solano County Water Agency, and Solano County Board of Supervisors worked to identify a means to reduce flooding. In 2001 the Dixon Watershed Management Plan was completed by the Solano County Water Agency which identified several major projects to reduce flooding in Northeast Solano County.

In September 2004 The Dixon Regional Watershed Joint Powers Authority(JPA) was formed to implement and manage the projects identified in the Dixon Watershed Management Plan. Of their many objectives, its fundamental one is to manage and improve the regional drainage system in response to both urban and rural development.

To improve regional drainage, the JPA proposed to construct the New South Channel or a comparable channel. A Conceptual Design Report for the New South Channel (NSC), Enlarging the Dixon Main Drain (DMD) and V-Drain (VD), and the Three Mile Extension (3ME) was prepared by West Yost Associates on January 3, 2006. This purpose of the report was to update the cost estimates of the NSC, identify final flow rates for the proposed projects and to evaluate alternative alignments.

On September 16, 2006 West Yost presented the JPA with the recommendation to enlarge the DMD and VD. It was also recommended that the project design provide an increase in capacity of 375 cfs along the DMD-VD. This recommendation was preferred by property owners and other interested parties. The JPA agreed with West Yost's recommendation and moved forward with the Dixon Main Drain and V-Drain Enlargement Project.

5.1 – Hydraulic Analysis

Two hydraulic studies were completed; an initial study incorporated within the Conceptual Design Report and a final Hydraulic Study (Attachment E).

5.1.1 – Conceptual Design Report

A hydraulic analysis was conducted by West Yost Associates as part of a Conceptual Design Report (CDR) for the New South Channel (NSC), Enlarging the Dixon Main Drain and V-Drain, and the Three Mile Extension (3ME) on January 3, 2006. The CDR included the following sections:

1. Spreadsheet analysis of the NSC for a capacity of 375 cfs and a capacity of 494 cfs.
2. Spreadsheet analysis of the enlarging DMD and VD as an alternative to the NSC for a capacity increase of 375 cfs and increase of 494 cfs.
3. Evaluation of the capacity of the railroad car bridge over the VD.
4. XP-SWMM Hydraulic Model results for DMD, VD and RD 2068 Intake Canal

This analysis assumed a constant hydraulic grade line in the channels and excluded head losses at the culverts and railroad car bridge. The initial assumptions and simplifications were eliminated in the XP-SWMM model of the DMD-VD.

The report calculated the head loss and capacity for the railroad car bridge over the VD. For the range of flows analyzed the water velocities ranged from 4.0 to 5.7 feet per second, head losses for the bridge ranged from 0.2 to 0.5 feet and freeboard ranged from 0.1 to 1.6 feet. The velocity range exceeded the typical maximum velocity flow rate for earthen channels of about 4 to 5 feet per second. To combat this, the channel under the bridge needs to be excavated and lined with riprap to prevent erosion and scour. It was concluded that the existing bridge does provide adequate conveyance for existing flows and proposed target flows.

A preliminary steady state XP-SWMM model incorporated a tail water elevation of 8.5 feet in Haas Slough (representing a very high tide) and a Manning's value of 0.040. This modeling resulted in initial profiles for the DMD, V-Drain and RD 2068 Intake Canal. A detailed analysis would be conducted pending the outcome of several outstanding issues (real estate easements, existing utilities, final project alignment, etc.). This report primarily served as a baseline for further study.

5.1.2 – Main Drain and V-Drain – Hydraulic Study (Attachment E)
A hydraulic analysis was conducted by West Yost Associates to verify that the Dixon Main Drain and V-Drain Project channel design is adequate. This report utilized the existing average capacity of the DMD (240 cfs), VD (1132cfs) and proposed increase (375 cfs) identified in the Conceptual Design Report.

Model Conditions	Dixon Main Drain	V-Drain
Existing Condition - Average Capacity	240 cfs	1132 cfs
Future Condition -Target Capacity	615 cfs	1518 cfs

Note – Target Capacity for the V-Drain includes 11 cfs to account for localized runoff

As part of the design, a XP-SWMM model was prepared to verify the design flows of 615 cfs (375 cfs increase) and 1518 cfs (375 cfs increase + 11 cfs for runoff) in the DMD and VD, respectively. This model incorporated the final cross sectional configuration of the enlarged channels as shown in the construction documents.

The XP-SWMM model used the steady state flow capacities listed above for the existing and future conditions. A Manning's n value of 0.035 was used for the channel sections and a value of 0.050 was used for the sections near the bridge where riprap will be placed. This Manning's n value of 0.035 is lower than the value of 0.040 that was utilized in the CDR. The preliminary hydraulic analysis in the CDR included several assumptions for channel slope and channel cross sections where a conservative Manning's n value is appropriate. The updated n value of 0.035 reflects the level of expected vegetation in the channel.

The model resulted in a profile (Attachment E) showing the existing and proposed channel inverts, water surface elevation (WSE) for the existing and future conditions, and bank elevations. As shown in the profile the future water surface elevation is lower than the existing water surface elevation at all locations along the channel.

The conveyance underneath an existing railroad car bridge crossing the VD was initially verified in the CDR; however the Hydraulic Study provides an updated WSE near the bridge. The bridge is located at approximately station 85+00 and has a deck elevation of 16.0 feet (NAVD88) with the bottom of the bridge 23 inches below the deck. As seen in the profile, the future WSE is well below the bottom of the bridge deck. A cross section of the location of the bridge is also provided showing a drop in WSE of 1.9 feet.

Location	Existing WSE (ft)	Future WSE (ft)	Differential WSE (ft)
Section 185 feet Upstream of Bridge	14.5	13.0	1.5
Section at the Bridge (Elev = 16.0ft)	14.4	12.5	1.9
Section 500 feet Downstream of Bridge	13.8	11.8	2.0

Note – Site topography and structure elevations are based on North American Vertical Datum of 1988 (NAVD88)

Figures 2 and 4 in the hydraulic study show the cross sections of the VD upstream and downstream of the bridge. In these figures you can clearly see the low flow channels and maintenance benches. Again at both cross sections the future WSE is lower than the existing.

The results of the model show overall lower WSE in channel and at the railroad car bridge with the Main Drain and V-Drain Enlargement Project than with the current conditions.

5.2 – Geotechnical Analysis

A geotechnical analysis was conducted for the Dixon Main Drain and V-Drain Expansion. The purpose of this report was to explore and evaluate the site subsurface conditions in order to develop geotechnical engineering recommendations for the project design and construction. The analysis concluded that the excavation for the enlarged channel is setback far enough so there will be no adverse effects to the RD 2098 levee.

5.3 – Structural Evaluation of Bridge (Attachment H)

A structural evaluation of the railroad car bridge was performed by a structural engineer, Mr. Brad Friederichs of VE Solutions, on April 7th, 2010 at the request of JPA and West Yost. The purpose of this evaluation was to determine if the bridge would likely remain stable under flood conditions. He concluded that it is possible for the soil behind the abutments to be washed away during flood conditions. He recommended that the soil behind the abutments be protected by riprap on both sides. He also concluded that it appears that the concrete abutment on the west end and steel backwall on the east end will remain in place and provide support and lateral stability for the bridge during and after flood conditions.

5.4 – Protest Letter (Attachment G)

In his May 12, 2009 letter, Mr. Wineman stated that the hydraulic analysis conducted for the project did not adequately model his railroad car bridge, and that the increased flows would not safely pass under his bridge. His bridge, Board Permit No. 16822 (Attachment F) was permitted by the Reclamation Board on February 18, 1998. His concerns are that high water and maximum flow conditions could overtop the bridge and damage the structure and/or the abutments. In addition this could cause water to back up and flood land upstream of the bridge.

Mr. Wineman hired Wagner & Bonsignore Consulting Civil Engineers to determine the affect of the proposed project on his property, including the railroad car bridge. In their April 11, 2012 Memorandum, Mr. Lounsbury of Wagner & Bonsignore Consulting Civil Engineers evaluated the initial hydraulic study (Conceptual Design Report) and

summarizes the potential impacts. Several areas of concern are mentioned in this memorandum and they are as follows:

1. Just upstream of the bridge at full flow the water surface elevation is estimated at 12.2 feet (USACE Topographic Mapping), or the bottom of the bridge.
2. The Manning's n value has not been adjusted for the potential riprap armoring.
3. At full flow and in combination with the increased n value the water surface would rise above the bottom of the bridge deck, thus a lateral and buoyant force would be exerted on the bridge.
4. The bridge abutments are inaccurately assumed to be concrete and have the potential to wash out.
5. Details for the extent and construction methods for the riprap armoring are not provided.
6. Conveyance for the V-Drain is highly dependent on vegetation maintenance.

Board staff, the applicant and the consultant for the applicant have all reviewed the concerns generated within this memorandum. The engineer highlights several valid concerns; however since this evaluation the plans and hydraulic model have been updated. These updates include final construction drawings and provide the final cross sectional configuration of the enlarged channels, thus a more accurate model of the existing and future conditions was produced. The final design and hydraulic report do address Mr. Wineman's concerns.

As stated above in the 5.1.2, the model shows that the future WSE at the bridge is lower than existing, Manning's values are accurately represented and at design flow water will not be at the bridge deck elevation nor will it exert a buoyant or lateral force. Construction documents have been updated to detail the extent of riprap armoring underneath the bridge. The channel will be deepened at the invert and riprap will be placed along the channel 200 feet up and downstream of the bridge. As designed, this riprap will protect the bridge and it's abutments from further scour and erosion. The enlargements to the drains are designed to have a uniform cross section along its length, thus making maintenance efforts easier. A maintenance bench has been added to assist in maintenance, specifically mowing during the dry months.

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 been received for this application. The USACE District Engineer has no objection to the project, subject to conditions. The letter is incorporated into the permit as Exhibit A.

- Reclamation District 2098 endorsed this project on February 25, 2009 with no conditions.

7.0 – CEQA ANALYSIS

The Board, as a responsible agency under CEQA, has reviewed Draft Environmental Impact Report (DEIR, SCH Number: 2007092033, October 2008), Final Environmental Impact Report (FEIR, February 2009) and Mitigation Monitoring Plan for the Dixon Main Drain V-Drain Enlargement Project prepared by the lead agency, Dixon Regional Watershed Joint Powers Authority (JPA). These documents, including project design, may be viewed or downloaded from the Central Valley Flood Protection Board website at http://www.cvfpb.ca.gov/meetings/2012/08-24-2012.cfm under a link for this agenda item. These documents are also available for review in hard copy at the Board and the Dixon Regional Watershed JPA offices.

The Dixon Regional Watershed JPA has determined that the project would not have a significant effect on the environment and on February 25, 2009, adopted Resolution 02-2009, including the Mitigation Monitoring Plan. The Notice of Determination was filed with the State Clearinghouse on March, 3, 2009. Board staff finds that although the proposed project could have a potentially significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. The project proponent has incorporated mandatory mitigation measures into the project plans to avoid identified impacts or to mitigate such impacts to a point where no significant impacts will occur. These mitigation measures are included in the project proponent's Mitigation Monitoring Plan and address impacts to agriculture, biological resources, hazards and hazardous materials, hydrology and water quality, land use planning, utilities and service systems. The description of the mitigation measures are further described in the adopted Mitigation Monitoring Plan.

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.

   In making its findings the Board has used the best available science relating to the scientific and technical issues presented by all parties. The accepted industry standards for the work proposed under this permit as regulated by California Code of Regulations Title 23 have been applied to the review of this application.

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

   The project is located west of a project levee; a hydraulic and geotechnical analysis was performed that shows there will not be any adverse or negative effects to the State Plan of Flood Control and the project is consistent with the Central Valley Flood Protection Plan. The proposed project will reduce flooding and increase conveyance of flood waters out of the Dixon Watershed.

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

   Future changes in hydrology due to global climate change may result in higher flows which may result in a higher flood risk. However, there are no foreseeable projected future events that would impact this project.

9.0 – STAFF RECOMMENDATION

Board Staff has concluded that the proposed project will have no adverse effect on the State Plan of Flood Control. The project will increase the conveyance of floodwaters and reduce the risk of flooding within the Dixon Watershed. Staff has reviewed Mr. Wineman's protest; based on the current designs and models all of his concerns have been addressed. The effects of this project to Mr. Wineman's bridge are minimal and

the Dixon Regional Watershed Joint Powers Authority has reasonably accommodated this encroachment within their project.

Based on the submitted information staff recommends that the Board adopt Resolution No. 2012-42 (Attachment A), which constitutes the Board's written findings and decision in the matter of Permit No. 18488. The resolution contains the CEQA findings; Findings of Fact, and approval of Permit No. 18488, and directs the Executive Officer to take necessary action to prepare and execute the permit and related documents and to prepare and file a Notice of Determination with the State Clearinghouse

10.0 – LIST OF ATTACHMENTS

A. Location Maps and Photos
B. Draft Permit No. 18488
C. Resolution 2012-42
D. Project Drawings
E. Hydraulic Report
F. Permit No. 16822
G. Wineman Protest
H. Structural Evaluation

Design Review:	Ashley Cousin, Sterling Sorenson
Environmental Review:	Andrea Mauro, James Herota
Document Review:	Mitra Emami P.E., Len Marino P.E.

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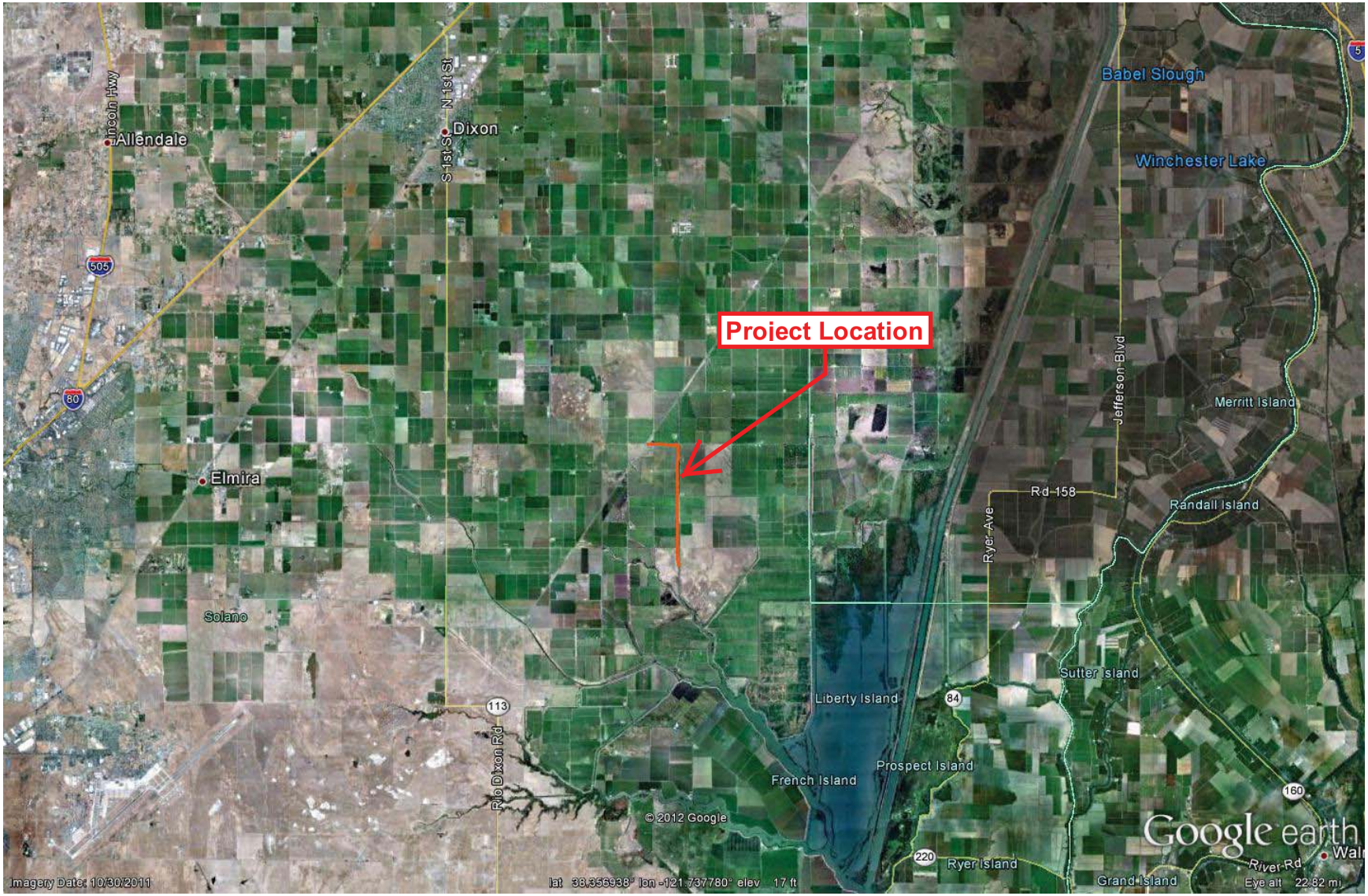
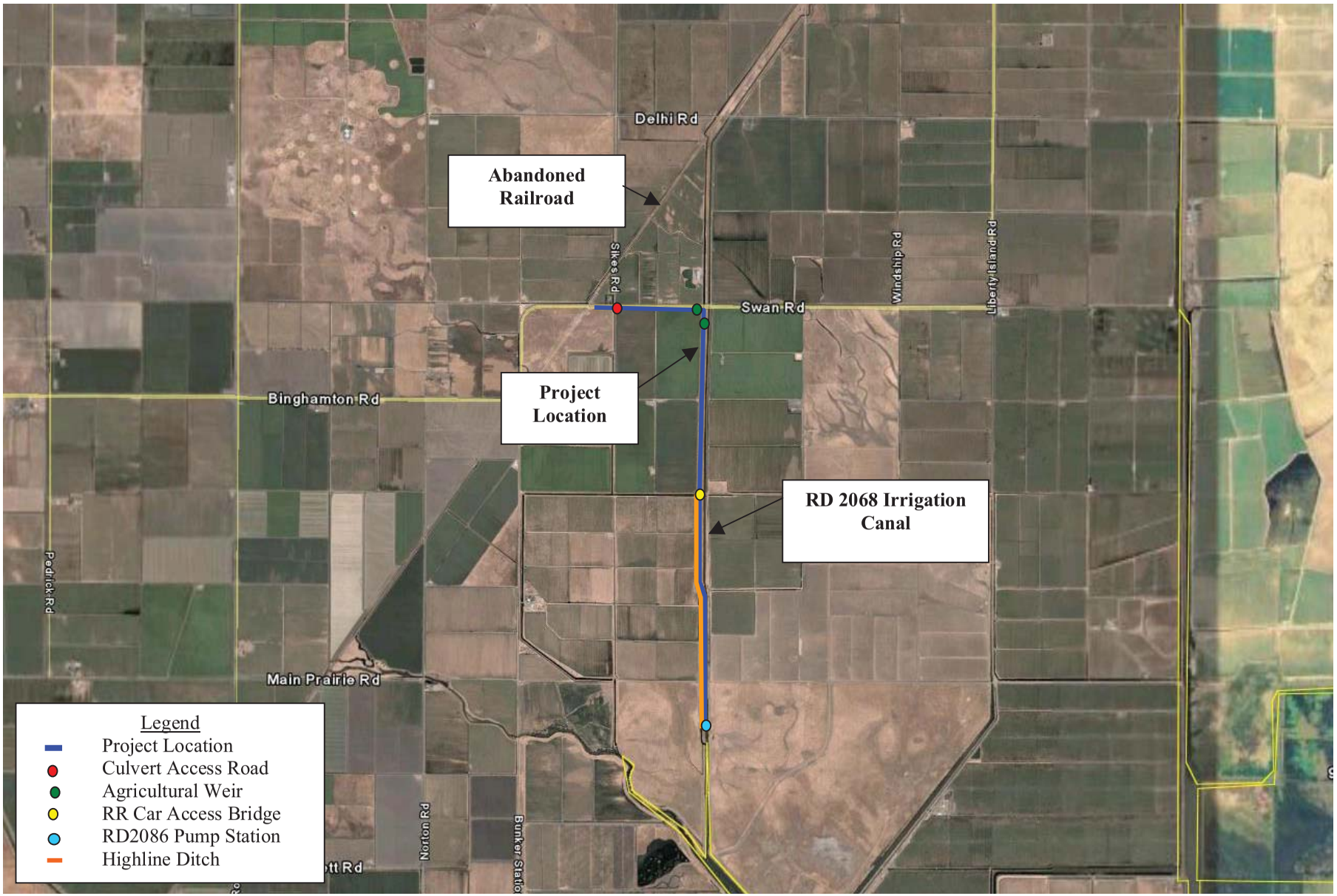
Regional Location Map

Atachment A


Project Location
Allendale
Dixon
N 1st St
S 1st St
Lincoln Hwy
Babel Slough
Winchester Lake
Jefferson Blvd
Merritt Island
Rd 158
Randall Island
Ryer Ave
Elmira
Solano
Liberty Island
Sutter Island
Prospect Island
French Island
Rio Dixon Rd
Ryer Island
Grand Island
River Rd
© 2012 Google
Google earth
Imagery Date: 10/30/2011
lat 38.356938° lon -121.737780° elev 17 ft
Eye alt 22.82 mi

Atachment A


Project Location
Liberty Farms
© 2012 Google
Shag Slough
Google earth
Imagery Date: 10/30/2011
lat 38.338945° lon -121.735712° elev 13 ft
Eye alt 29173 ft


Delhi Rd
Abandoned Railroad
Sikes Rd
Windship Rd
Liberty Island Rd
Swan Rd
Project Location
Binghamton Rd
RD 2068 Irrigation Canal
Pedrick Rd
Main Prairie Rd
Norton Rd
Bunker Statio
tt Rd
Legend
Project Location
Culvert Access Road
Agricultural Weir
RR Car Access Bridge
RD2086 Pump Station
Highline Ditch

Agricultural Weir

Rail Car Access Bridge

Agricultural Weir

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DRAFT

STATE OF CALIFORNIA
THE RESOURCES AGENCY

THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18488 BD

This Permit is issued to:

Dixon Regional Watershed - Joint Powers Authority
1170 N. Lincoln, Suite 110
Dixon, California 95620

To excavate approximately 189,000 cubic yards of material to widen and deepen the Dixon Main Drain and V-Drain (tributary to Haas Slough), place rock riprap on RD 2098 levee at the south end of the canal, place rock riprap in the channel near a railroad car bridge, construct a weir across the canal, replace the existing culverts in the Main Drain with a conspan structure, and modify an existing trash rack. The project is located south of Dixon and adjacent to Swan Road (Section 22,27&34, T6N, R2E, MDB&M, Reclamation District 2098, Haas Slough, Solano 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. 18488 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 written approval of the Central Valley Flood Protection Board.

FOURTEEN: 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.

FIFTEEN: 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.

SIXTEEN: The Central Valley Flood Protection Board, Department of Water Resources, and/or Reclamation District No. 2098 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.

SEVENTEEN: 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 herein permitted project.

EIGHTEEN: 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.

NINETEEN: No construction work of any kind shall be done within the flood control project works during the flood season from November 1st to April 15th without prior written authorization from The Central Valley Flood Protection Board.

TWENTY: All cleared trees, brush and/or other debris generated by this project shall be disposed of outside the flood control project works and shall not remain in/upon said project works during the flood season from November 1st to April 15th.

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

TWENTY-TWO: Compaction tests by a certified soils laboratory will be required to verify compaction of any/all fill material placed adjacent to the levee or within 10 feet of the levee toe.

TWENTY-THREE: All areas within Reclamation District No. 2098 to receive fill shall have surface vegetation removed to a depth of 6 inches. Organic soil and roots greater than 1-1/2 inches in diameter shall also be removed to a depth of 3 feet.

TWENTY-FOUR: Fill on the levee slope shall be keyed into the existing levee section with each lift.

TWENTY-FIVE: Fill material placed against the levee section and/or within 10 feet of the levee toe shall be placed in 4- to 6-inch layers and compacted to a minimum of 90 percent relative compaction per ASTM Method D1557-91 and above optimum moisture content.

TWENTY-SIX: The fill surface area shall be graded to direct drainage away from the toe of the levee.

TWENTY-SEVEN: In the event existing revetment on the levee slope adjacent to the demolished weirs is disturbed or displaced, it shall be restored to its original condition upon completion of construction of the replacement weirs.

TWENTY-EIGHT: New revetment shall be quarry stone and shall meet the following grading:

Quarry Stone

Stone Size	Percent Passing
15 inches;	100
8 inches;	80-95
6 inches;	45-80
4 inches;	15-45

2 inches; 0-15

TWENTY-NINE: The revetment shall not contain any reinforcing steel, floatable, or objectionable material. Asphalt or other petroleum-based products may not be used as fill or erosion protection on the levee section.

THIRTY: New revetment shall be uniformly placed and properly transitioned into the bank, levee slope, or adjacent revetment and in a manner which avoids segregation.

THIRTY-ONE: The work site shall be restored to at least the same condition that existed prior to commencement of work.

THIRTY-TWO: The permittee shall maintain the herein permitted project and the flood control project works within the utilized area in the manner required and as requested by the authorized representative of the Central Valley Flood Protection Board, Department of Water Resources or any other agency responsible for maintenance.

THIRTY-THREE: The mitigation measures approved by the CEQA lead agency and the permittee are found in the Mitigation Monitoring and Reporting Plan (MMRP) adopted by the CEQA lead agency. The permittee shall implement all such mitigation measures as allowed by law under CEQA Guidelines, Title 14, California Code of Regulations Sections 15000 - 15387.

THIRTY-FOUR: The permittee may be required, at permittee's cost and expense, to remove or alter all or any part of the herein permitted drainage project if modification or alteration 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 modify the herein permitted project at the permittee's expense.

THIRTY-FIVE: The herein permitted project shall not interfere with operation and maintenance of the flood control project. If the herein permitted project is determined by any agency responsible for operation and/or maintenance of the flood control project to interfere, the permittee shall be required, at permittee's cost and expense, to modify the herein permitted project 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 the herein permitted project at the permittee's expense.

THIRTY-SIX: 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 at the permittee's or successor's cost and expense.

THIRTY-SEVEN: The permittee shall comply with all conditions set forth in the letter from the Department of the Army dated February 22, 2012, which is attached to this permit as Exhibit A and is incorporated by reference.

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

REPLY TO
ATTENTION OF

Atachment B
Exhibit A

Flood Protection and Navigation Section (18488)

FEB 22 2012

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 Dixon Regional Watershed – Joint Powers Authority (application number 18488). This project includes excavating approximately 189,000 cubic yards of material to widen and deepen the Dixon Main Drain (non-Project) and V-Drain (a tributary to Haas Slough); removing an existing weir from the Dixon Main Drain; replacing a weir across the V-Drain at Levee Mile 12.08; placing rock riprap upstream and downstream of the bridge across the V-Drain at Levee Mile 11.10; placing rock riprap on the waterside slope of the V-Drain at Levee Mile 9.73; and modifying the trash rack located at Levee Mile 9.76. All levee miles in the above description are within Reclamation District 2098, Unit 4. The project is located south of Dixon and south of Swan Road, between 38.3249°N 121.7406°W and 38.3581°N 121.7405°W NAD83, Solano 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 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.

c. That the proposed work shall not change the channel flow in such a way that may cause damage to the existing embankment.

d. All cleared excess material shall be removed outside the limits of the floodway and project right-of-way.

e. That the proposed riprap shall be placed uniformly and properly transitioned into the natural bank at both ends and that proper bedding shall be provided for the riprap.

A file (200801392) has been opened because a Section 10 and/or Section 404 permit may be required. Please advise the applicant to contact the U.S. Army Corps of Engineers, Sacramento District, Regulatory Division, 1325 J Street, Room 1350, Sacramento, California 95814, telephone (916) 557-5250.

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,

For Rick L. Poeppelman, P.E.
Chief, Engineering Division

STATE OF CALIFORNIA
THE RESOURCES AGENCY
CENTRAL VALLEY FLOOD PROTECTION BOARD

RESOLUTION NO. 2012-42

FINDINGS AND DECISION AUTHORIZING ISSUANCE OF
ENCROACHMENT PERMIT NO. 18488

DIXON REGIONAL WATERSHED - JOINT POWERS AUTHORITY
DIXON MAIN DRAIN AND V-DRAIN, SOLANO COUNTY

WHEREAS, The Dixon Regional Watershed - Joint Powers Authority, submitted Application 18488 to the Central Valley Flood Protection Board on April 9, 2009, to excavate approximately 189,000 cubic yards of material to widen and deepen the Dixon Main Drain and V-Drain (tributary to Haas Slough), place rock riprap on RD 2098 levee at south end of canal, place rock riprap in the channel near a railroad car bridge, construct weir across the canal, replace the existing culverts in the Main Drain with a conspan structure, and modify existing trash rack; and

WHEREAS, The project location for Application 18488 is located south of Dixon and adjacent to Swan Road, in Solano County; and

WHEREAS, Dixon Regional Watershed Joint Powers Authority as lead agency under the California Environmental Quality Act, Public Resources Code sections 21000 et seq. ("CEQA") prepared a Draft Environmental Impact Report (DEIR, SCH Number: 2007092033, October 2008), Final Environmental Impact Report (FEIR, February 2009) on the Dixon Main Drain V-Drain Enlargement Project, including a Mitigation Monitoring Reporting Plan (MMRP) (incorporated herein by reference and available at the Central Valley Flood Protection Board or Dixon Regional Watershed - Joint Powers Authority offices); and

WHEREAS, Dixon Regional Watershed Joint Powers Authority, as the lead agency determined that the project would not have a significant effect on the environment and adopted Resolution 03-2009 dated February 25, 2009 (which includes a Statement of Facts, Findings, and Mitigation Measures, and Mitigation Monitoring and Reporting Program) and filed a Notice of Determination on March 3, 2009 with the State Clearinghouse; and

WHEREAS, on February 25, 2009, Reclamation District 2098 endorsed Application 18488; and

WHEREAS, on February 22, 2012, the U.S. Army Corps of Engineers (USACE) 208.10 comment letter was completed for this application stating that the USACE District Engineer has no objection to the project, subject to conditions. Staff has reviewed the letter and incorporated conditions into the Permit; and

WHEREAS, on May 12, 2009 the Board received correspondence from Mr. Wineman concerning that under high water and maximum flow conditions, the water would pass over the

top of Mr. Wineman's bridge causing damage to it, the approaches, and flood damage to land upstream from the bridge; and

WHEREAS, on April 11, 2012 the Board received correspondence from Mr. Lounsbury, a consultant for Mr. Wineman, concerning that the hydraulic model, and design plans did not accurately account for Mr. Wineman's bridge; and

WHEREAS, Board staff has reviewed the updated hydraulic study and design plans and determined that the protestant's concerns have been adequately addressed; and

WHEREAS, Board staff completed a technical review of Permit Application No. 18488; and

WHEREAS, the Board has conducted a public hearing on Permit Application No. 18488 and has reviewed the Reports of its staff, the documents and correspondence in its file, and the environmental documents prepared by Dixon Regional Watershed - Joint Powers Authority.

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 Central Valley Flood Protection Board, as a responsible agency, has independently reviewed the analysis in the Draft Environmental Impact Report (DEIR, SCH Number: 2007092033, October 2008), Final Environmental Impact Report (FEIR, February 2009), Mitigation Monitoring Plan and findings prepared by the lead agency, Dixon Regional Watershed Joint Powers Authority, and has reached its own conclusions. The Board finds that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. The project proponent has incorporated mandatory mitigation measures into the project plans to avoid identified impacts or to mitigate such impacts to a point where no significant impacts will occur. These mitigation measures are included in the project proponent's MMRP and address impacts to agriculture, biological resources, hazards and hazardous materials, hydrology and water quality, land use planning, utilities and service systems. The description of the mitigation measures are further described in the adopted MMRP, which has been made a condition of Permit No. 18488.

4. The Central Valley Flood Protection Board, after consideration of the Draft Environmental Impact Report (DEIR, SCH Number: 2007092033, October 2008), Final Environmental Impact Report (FEIR, February 2009), Mitigation Monitoring Plan and MMRP, and Dixon

Regional Watershed Joint Powers Authority findings, adopts the project description, analysis and Findings which are relevant to activities authorized by issuance of final encroachment Permit No. 18488 Dixon Regional Watershed Joint Powers Authority, Dixon Main Drain V-Drain Enlargement Project.

5. **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.

Considerations pursuant to Water Code section 8610.5

6. **Evidence Admitted into the Record**. The Board has considered all the evidence presented in this matter, including the original application for Permit No. 18488 and technical documentation provided by the Dixon Regional Watershed Joint Powers Authority on the Dixon Main Drain V-Drain Enlargement Project past and present Staff Reports and attachments, the Environmental Impact Report on the Dixon Main Drain V-Drain Enlargement Project (Draft and Final Versions), Dixon Regional Watershed Joint Powers Authority Resolution 03-2009 dated February 25, 2009 including findings, and the Mitigation Monitoring and Reporting Program. 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, 3310 El Camino Avenue, Room 151, Sacramento, California 95821.

7. **Best Available Science**. In making its findings, the Board has used the best available science relating to the scientific and technical issues presented by all parties. The accepted industry standards for the work proposed under this permit as regulated by California Code of Regulations Title 23 have been applied to the review of this application.

8. **Effects on State Plan of Flood Control**. This project is located west of a project levee; a hydraulic and geotechnical analysis was preformed that shows there will not be any adverse or negative effects to the State Plan of Flood Control and the project is consistent with the Central Valley Flood Protection Plan. The proposed project will reduce flooding and increase conveyance of flood waters out of the Dixon Watershed.

9. **Effects of Reasonably Projected Future Events**. Future changes in hydrology due to global climate change may result in higher flows which may result in a higher flood risk. However, there are no foreseeable projected future events that would impact this project.

Other Findings/Conclusions regarding Issuance of the Permit.

10. This resolution shall constitute the written decision of the Central Valley Flood Protection Board in the matter of Permit No. 18488.

Approval of Encroachment Permit No. 18488

11. Based on the foregoing, the Central Valley Flood Protection Board hereby approves issuance of Encroachment Permit No. 18488 in substantially the form provided as Staff Report Attachment B.

12. The Board directs the Executive Officer to take the necessary actions to prepare and execute Encroachment Permit No. 18488 and all related documents and to prepare and file a Notice of Determination under the California Environmental Quality Act for the Dixon Regional Watershed Joint Powers Authority, Dixon Main Drain V-Drain Enlargement Project.

PASSED AND ADOPTED by vote of the Board on _____, 2012

_____
Bill Edgar
President

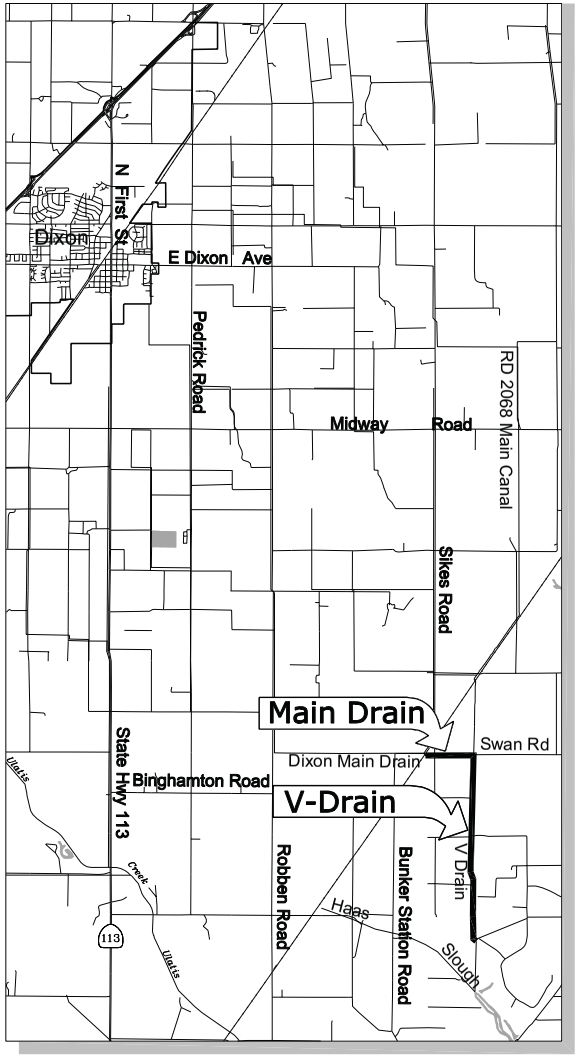
_____
Jane Dolan
Secretary

Atachment D

Dixon Regional Watershed Joint Powers Authority

PLANS FOR

Dixon Main Drain and V-Drain Enlargement



VICINITY MAP

LOCATION MAP

SHEET INDEX

Accepted by Dixon Regional Watershed Joint Powers Authority

_____

REGISTERED PROFESSIONAL ENGINEER MARK LEWIS YOUNG No. 39713 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

SUBMITTED: _____ DATE: _____

APPROVED: _____ DATE: _____

THIS LINE IS 1 INCH AT FULL SCALE IF NOT SCALE ACCORDINGLY

SCALE : AS SHOWN
DESIGNED BY : MLY
CHECKED BY : DTM
PROJ. MGR. : MLY

No.	ZONE	REVISIONS	BY	DATE

WEST YOST ASSOCIATES Consulting Engineers
2020 Research Park Drive
Suite 100
Davis, California 95618
(530) 756-5905
FAX (530) 756-5991

DIXON WATERSHED JOINT POWERS AUTHORITY MAIN DRAIN AND V-DRAIN ENLARGEMENT

TITLE SHEET AND LOCATION MAPS

PRELIMINARY, NOT FOR CONSTRUCTION

JOB NUMBER 298-01-07-02
DRAWING NUMBER G1
SHEET NUMBER 1 OF 40
REVISION

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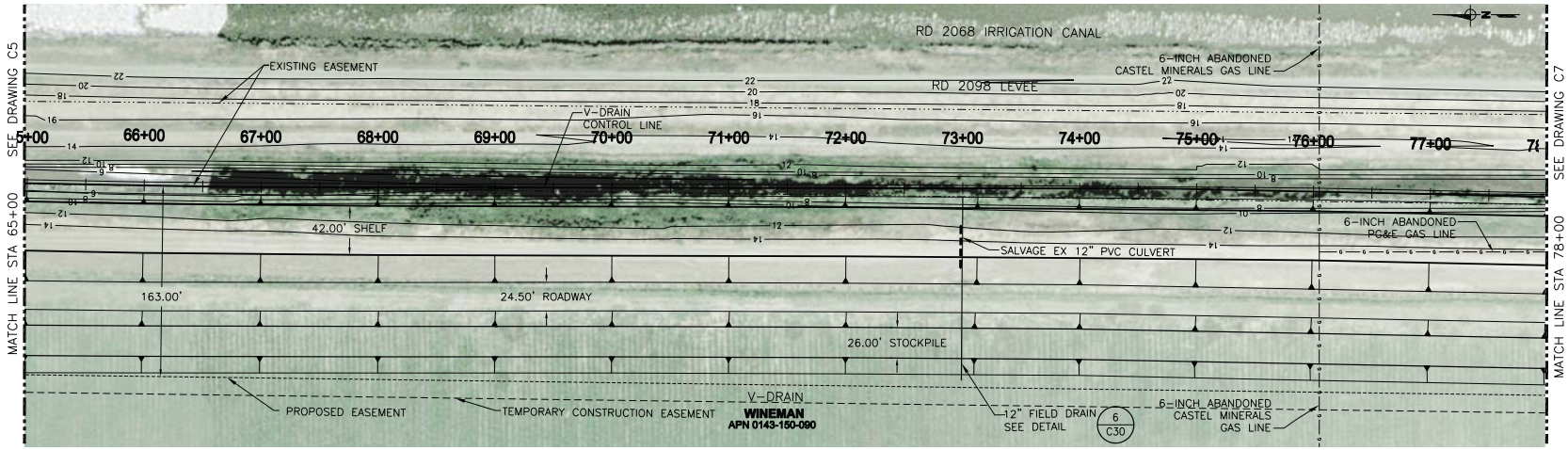
Atachment D

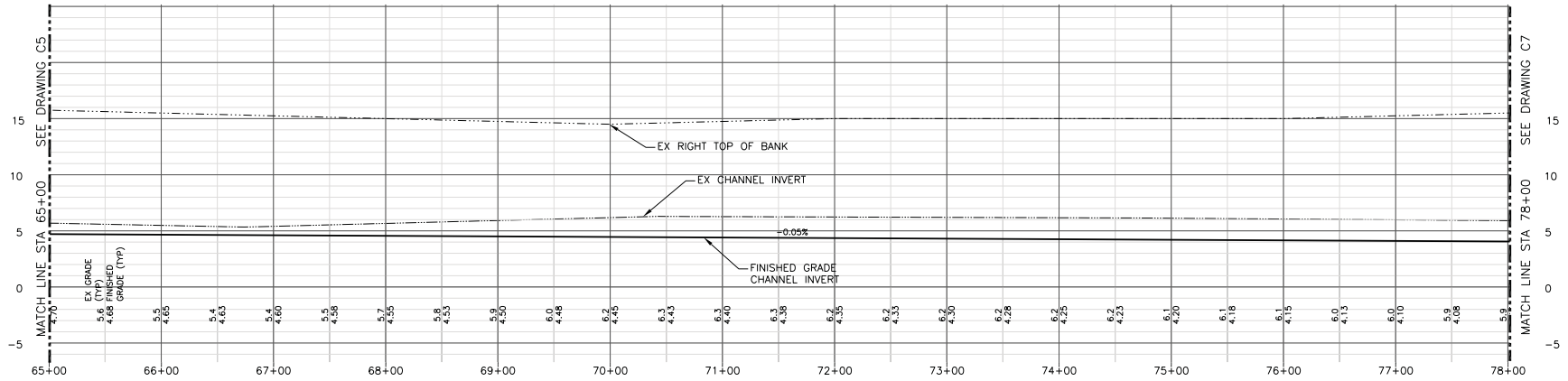


PLAN

0 50 100
SCALE IN FEET

NOTES:

1. SEE SHEETS C13-C27 FOR CHANNEL CROSS SECTIONS
2. HYDROSEED EXCAVATED CHANNEL BANK, ROADWAY, STOCKPILE AND OTHER DISTURBED AREAS, SEE SPECIFICATION SECTION 02910



PROFILE

SCALE: H:1"=50', V:1"=5'

REGISTERED PROFESSIONAL ENGINEER MARK LEWIS YOUNG No. 39713 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

SUBMITTED: _____ DATE: _____

APPROVED: _____ DATE: _____

THIS LINE IS 1 INCH AT FULL SCALE IF NOT SCALE ACCORDINGLY

SCALE : AS SHOWN
DESIGNED BY : MLY
CHECKED BY : DTM
PROJ. MGR. : MLY

No.	ZONE	REVISIONS	BY	DATE

WEST YOST ASSOCIATES
Consulting Engineers
2020 Research Park Drive
Suite 100
Davis, California 95618
(530) 756-5905
FAX (530) 756-5991

DIXON WATERSHED JOINT POWERS AUTHORITY
MAIN DRAIN AND V-DRAIN ENLARGEMENT

PLAN AND PROFILE 6

PRELIMINARY, NOT FOR CONSTRUCTION

JOB NUMBER	298-01-07-02
DRAWING NUMBER	C6
SHEET NUMBER	10 OF 40
REVISION	

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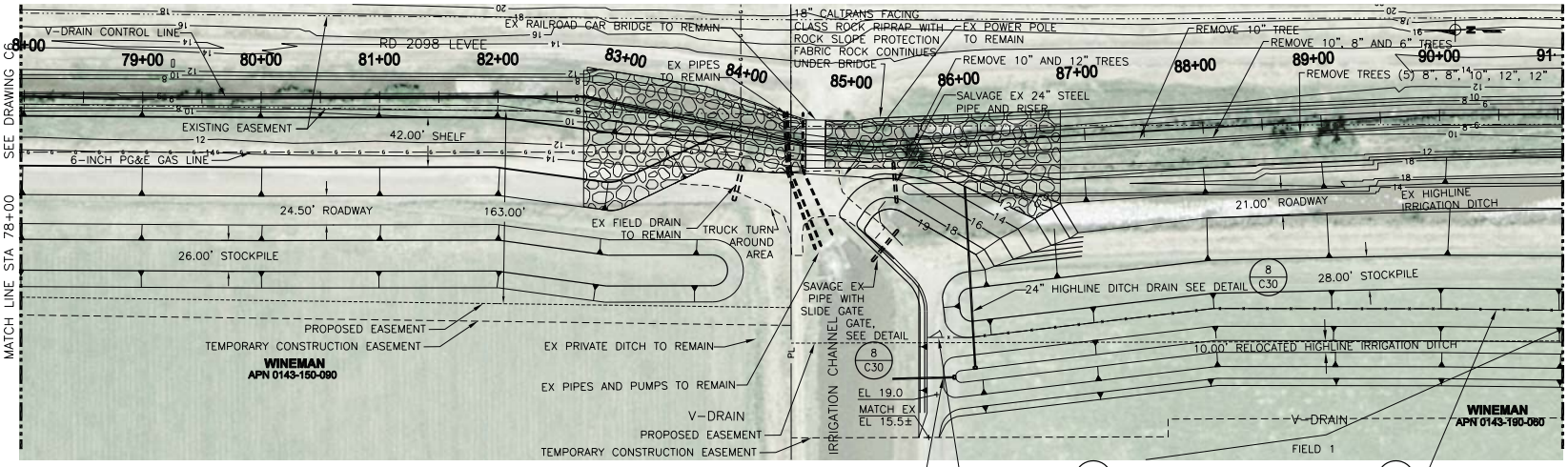
Atachment D



PLAN

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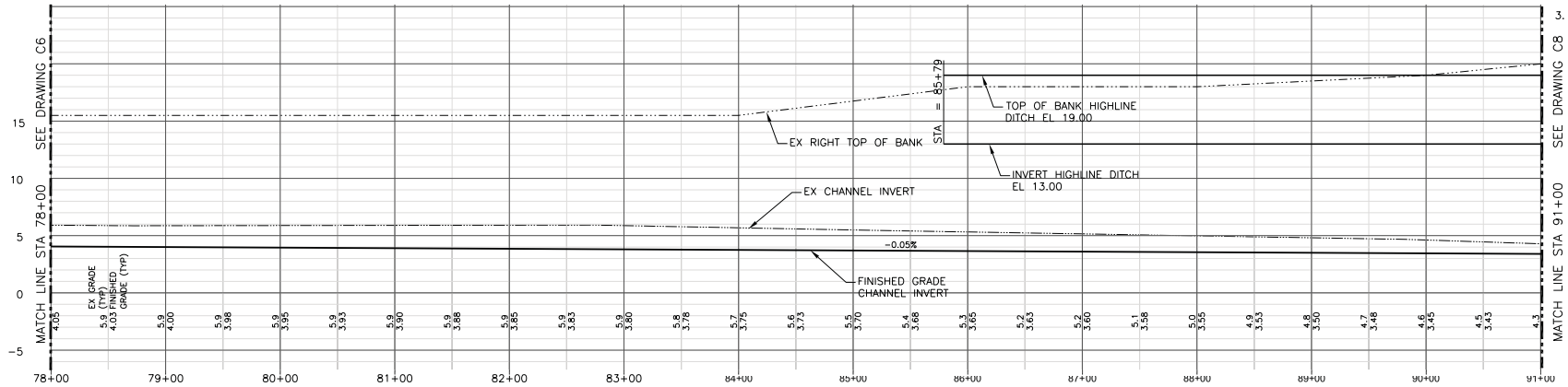
SCALE IN FEET



PROFILE

SCALE: H:1"=50', V:1"=5'

NOTES:

1. SEE SHEETS C13-C27 FOR CHANNEL CROSS SECTIONS
2. HYDROSEED EXCAVATED CHANNEL BANK, ROADWAY, STOCKPILE AND OTHER DISTURBED AREAS, SEE SPECIFICATION SECTION 02910
3. SEE G5 FOR HIGHLINE DITCH CONSTRUCTION SEQUENCING

REGISTERED PROFESSIONAL ENGINEER MARK LEWIS YOUNG No. 39713 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

SUBMITTED: _____ DATE: _____
APPROVED: _____ DATE: _____

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CHECKED BY : DTM
PROJ. MGR. : MLY

No.	ZONE	REVISIONS	BY	DATE

WEST YOST ASSOCIATES
Consulting Engineers
2020 Research Park Drive
Suite 100
Davis, California 95618
(530) 756-5905
FAX (530) 756-5991

DIXON WATERSHED JOINT POWERS AUTHORITY
MAIN DRAIN AND V-DRAIN ENLARGEMENT

PLAN AND PROFILE 7

PRELIMINARY, NOT FOR CONSTRUCTION

JOB NUMBER	298-01-07-02
DRAWING NUMBER	C7
SHEET NUMBER	11 OF 40
REVISION	

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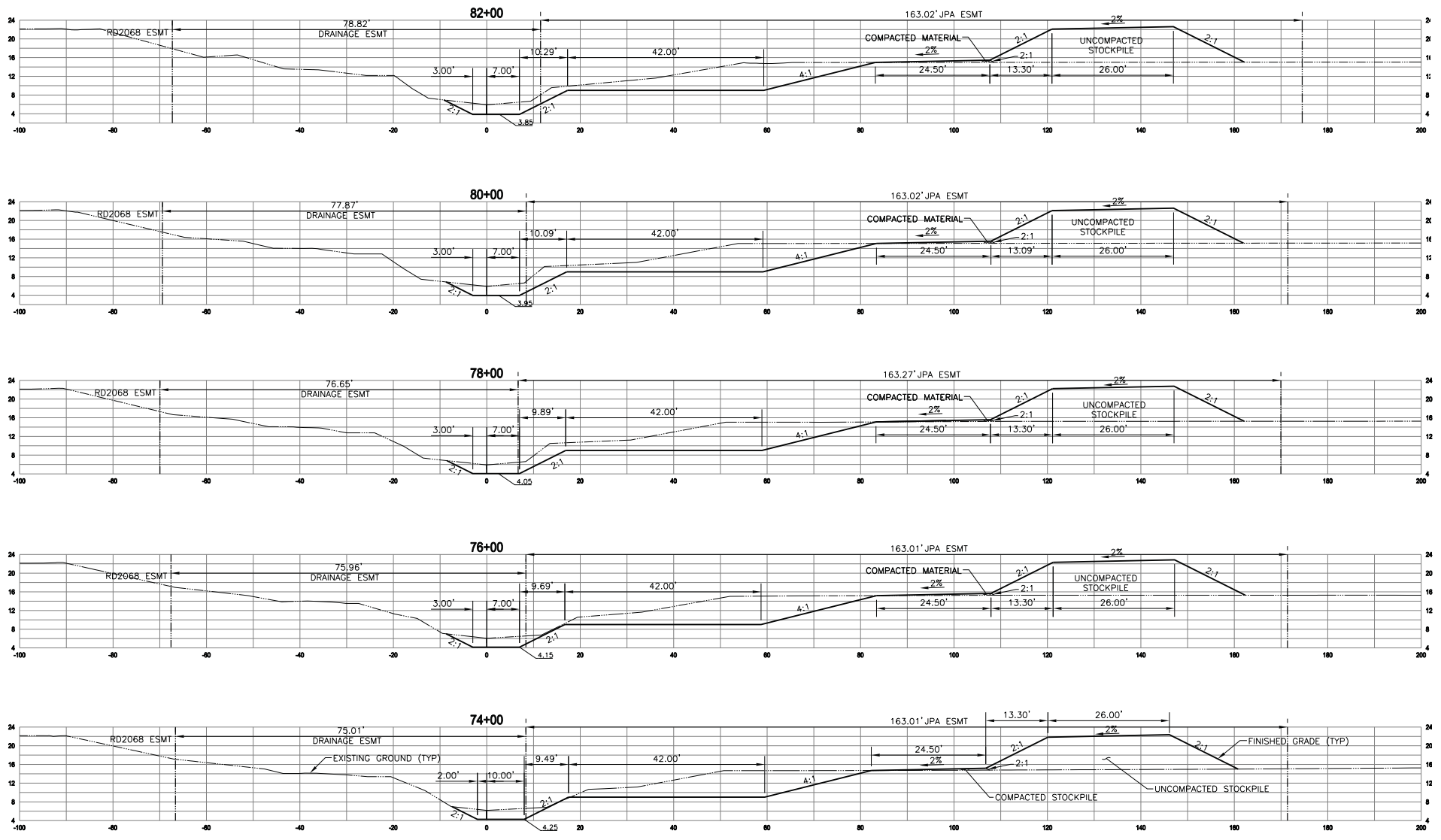
Atachment D



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REGISTERED PROFESSIONAL ENGINEER
MARK LEWIS YOUNG
No. 39713
Exp. 12-31-11
CIVIL
STATE OF CALIFORNIA

SUBMITTED: _____ DATE: _____
APPROVED: _____ DATE: _____

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SCALE : AS SHOWN
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CHECKED BY : DTM
PROJ. MGR. : MLY

No.	ZONE	REVISIONS	BY	DATE

WEST YOST ASSOCIATES
Consulting Engineers
2020 Research Park Drive
Suite 100
Davis, California 95618
(530) 756-5905
FAX (530) 756-5991

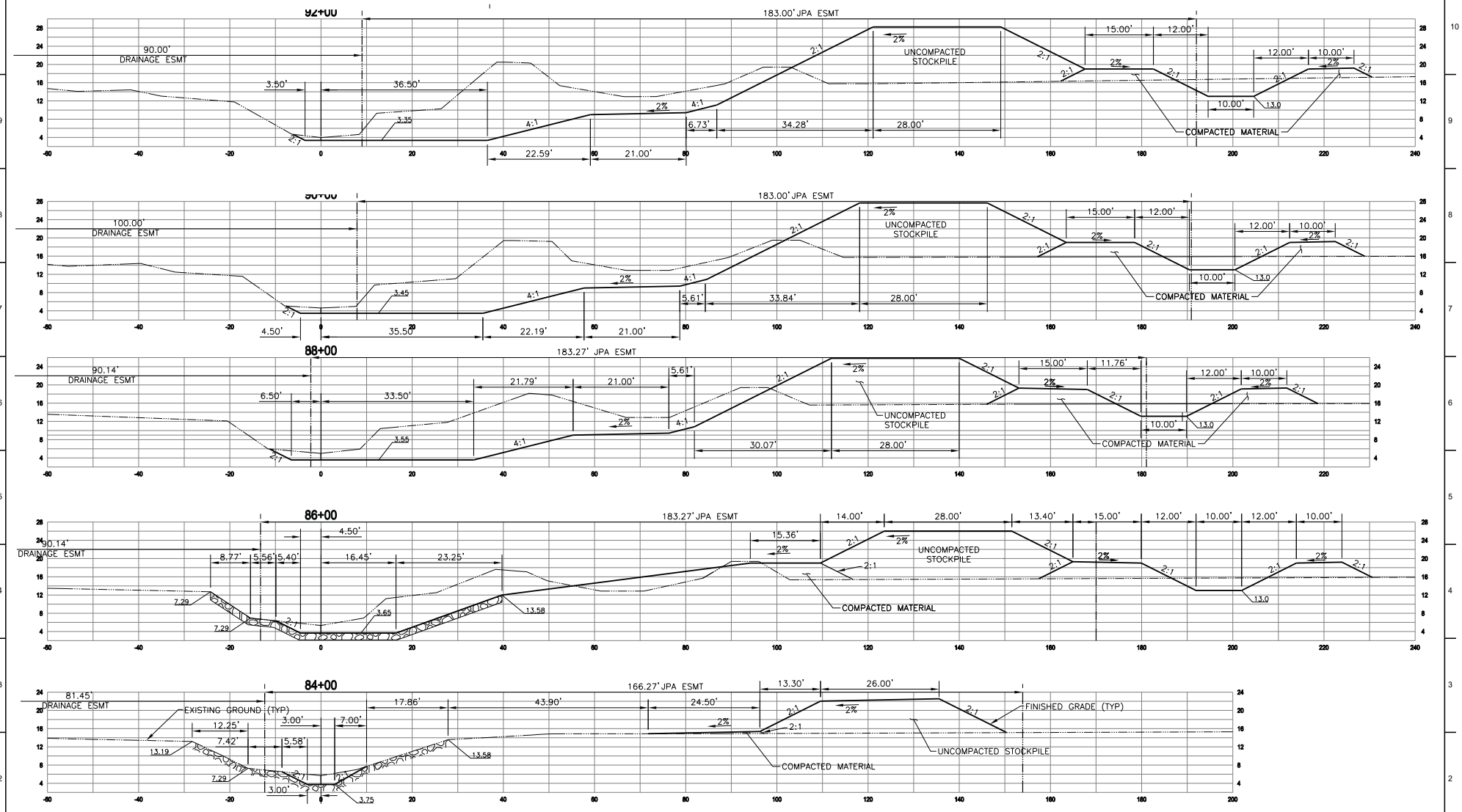
DIXON WATERSHED
JOINT POWERS AUTHORITY
MAIN DRAIN AND V-DRAIN ENLARGEMENT

CROSS SECTION 7

PRELIMINARY, NOT FOR CONSTRUCTION

JOB NUMBER 298-01-07-02
DRAWING NUMBER C19
SHEET NUMBER 23 OF 40
REVISION

Atachment D



SUBMITTED: _____ DATE: _____

APPROVED: _____ DATE: _____

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SCALE : AS SHOWN
DESIGNED BY : MLY
CHECKED BY : DTM
PROJ. MGR. : MLY

No.	ZONE	REVISIONS	BY	DATE

REGISTERED PROFESSIONAL ENGINEER MARK LEWIS YOUNG No. 39713 Exp. 12-31-11 CIVIL STATE OF CALIFORNIA

WEST YOST ASSOCIATES
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DIXON WATERSHED
JOINT POWERS AUTHORITY
MAIN DRAIN AND V-DRAIN ENLARGEMENT

CROSS SECTION 8

PRELIMINARY, NOT FOR CONSTRUCTION

JOB NUMBER 298-01-07-02
DRAWING NUMBER C20
SHEET NUMBER 24 OF 40
REVISION

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WEST YOST ASSOCIATES
Consulting Engineers

May 10, 2012 Project No.: 298-00-07-02

Mr. John Currey
Dixon Regional Watershed Joint Powers Authority
Dixon Resource Conservation District
1170 N. Lincoln Street, Suite 110
Dixon CA 95620

SUBJECT: Main Drain and V-Drain—Hydraulics Study

Dear John:

West Yost Associates (West Yost) prepared this hydraulic study to confirm the Dixon Main Drain and V-Drain Project channel design. Information in this report on the existing average capacity and the proposed increase to that capacity was taken from the letter report titled, *Conceptual Design of the New South Channel, Enlarging the Dixon Main Drain and V-Drain, and the Three Mile Extension* dated January 3, 2006 prepared by West Yost. The January 3, 2006 report included a Mannings Equation analysis of the Main Drain and V-Drain channels and was used in planning the project. The following information from the January 3, 2006 report was used as the basis for the design of the improvement plans for the Dixon Main Drain and V-Drain Enlargement Project and is used in the analysis presented in this letter report:

- Existing average capacity Dixon Main Drain – 240 cfs
- Existing average capacity V-Drain – 1,132 cfs
- Target capacity for the enlarged Dixon Main Drain – 615 cfs (increase of 375 cfs)
- Target capacity for the enlarged V-Drain – 1,518 cfs (increase of 386 cfs)

The January 3, 2006 report presented some basic channel dimensions to provide the increased capacity. It also discussed the existing bridge over the channel and concluded that the existing channel section at the bridge provides adequate conveyance capacity for the increased flows and that the bridge does not need to be replaced.

In 2010 and 2011, West Yost prepared improvement plans for the Dixon Main Drain and V-Drain Enlargement Project. These construction documents show the final cross sectional configuration of the enlarged channels. As a part of the design, an XP-SWMM model was prepared to verify the adequacy of the final channel improvements for the design flows of 615 cfs in the V-Drain and 1,518 cfs in the V-Drain. The model was also used to compare the flow and resulting water surface elevations of the enlarged channel to the existing channel. This letter report presents the results of the XP-SWMM modeling.

MODEL INPUT

The existing condition model used a steady state flow of 240 cfs in the Dixon Main Drain and 1,132 cfs in the V-Drain. The existing condition channel was taken from surveyed cross sections. A tail water elevation in Hass Slough of 8.5 feet was assumed, which represents a very high tide, but not flooding of the Yolo Bypass. A Manning's n value of 0.035 was used.

The future conditions model used a steady state flow of 615 cfs in the Dixon Main Drain and 1,518 cfs in the V-Drain. The future condition channel was taken from the cross sections shown on the Dixon Main Drain and V-Drain Enlargement Project improvement plans. A tail water elevation in Hass Slough of 8.5 feet was assumed. A Manning's n value of 0.035 was used for the earth channel sections and a value of 0.05 was used for the sections near the bridge where the channel will be lined with rock rip rap.

The Manning's n value of 0.035 used in the XP-SWMM model differs from the value of 0.040 used in the conceptual design analysis done in the January 2006 report. The conceptual design analysis was preliminary and used assumed channel slope and channel cross sections with which the more conservative n value of 0.040 was appropriate. The enlarged channel XP-SWMM model cross sections and channel slope were as per the design. The Manning's n value of 0.035 reflects the roughness of the earth sections of the channel. Table 5-6 of Chow (attached in Appendix 1) shows a range of n values for earth channels from 0.016 for clean and recently completed channel to 0.12 for non-maintained channels with weeds and brush uncut and dense and as high as the flow depth. The 0.035 value selected reflects the level of expected vegetation in the Main Drain and V-Drain channel. Additionally the publication "Roughness Characteristics of Natural Channels", US Geological Survey Paper 1849 was consulted for a recommended n value. An excerpt from this text is shown in Appendix 2. This second reference depicts a calibrated stream that is quite similar in appearance to the Main Drain and V-Drain and confirms our selection of a 0.035 n value.

MODEL RESULTS

Figure 1 presents a profile of the channel showing the existing and proposed channel inverts along with the channel banks. It shows the water surface elevations for the existing channel flowing at its existing average capacity of 240 cfs in the Main Drain and 1,132 cfs in the V-Drain. It also shows the water surface elevation for the enlarged channel flowing at the target capacities of 615 cfs in the Main Drain and 1,518 cfs in the V-Drain. As shown in Figure 1, the future conditions water surface is lower at all locations along the channel than the existing conditions results. The bridge crossing at the V-Drain is also shown on Figure 1. Bridge elevations were taken from a topographic survey. The bridge deck is at elevation 16.0 feet and the bottom of the bridge is 23 inches below the deck. The water surface elevation of the enlarged channel at the target capacity is below the bottom of the bridge.

Figure 2 shows the existing and enlarged cross section of the V-Drain approximately 185 feet upstream of the bridge. The proposed channel cross sections north of the bridge have a 10-foot wide low flow channel with 2:1 side slopes. There is a 42-foot wide maintenance bench at elevation 9.0. This bench will be above the tidal elevation and will be dry during the summer so that it can be mowed. The side slope above the maintenance bench is 4:1. As shown on Figure 2 the maximum water surface with the enlarged channel at target flows is about 1.5 feet lower than the existing condition channel flowing at its existing average capacity.

Figure 3 shows the channel section at the bridge. The channel will not be widened at the bridge; it will only be deepened approximately two feet along the invert. Model results show the maximum water surface at the target flows after the project is constructed will be below the bottom of the bridge and about 1.9 feet lower than the existing condition channel flowing at its existing average capacity. The modeled channel velocity at the bridge section in the existing condition is approximately 4.4 feet per second. In the proposed conditions model it is approximately 6.8 feet per second. Because of this higher channel velocity at the bridge, the channel will be lined with rock rip-rap to prevent scour.

Figure 4 shows the existing and enlarged cross section of the V-Drain approximately 500 feet downstream of the bridge. The proposed channel cross sections south of the bridge have a 40-foot wide low flow channel with 2:1 side slopes on the east and 4:1 side slopes on the west. There is a 21-foot wide maintenance bench at elevation 9.0. The channel south of the bridge experiences more tidal inundation; however this bench will facilitate channel cleaning and maintenance. The side slope above the maintenance bench is 4:1 and the side slope of the adjacent high line canal is 2:1. As shown on Figure 4, the maximum water surface with the enlarged channel at target flows is about two feet lower than the existing condition channel flowing at its existing average capacity.

The modeling results presented in this letter report confirm that there should be lower overall water surface elevations in the channel and at the bridge with the Main Drain and V-Drain Enlargement Project than for current conditions. Please call or email me if you have questions or need additional information.

Sincerely,

WEST YOST ASSCOCIATES

Mary L. Young
Principal Engineer
R.C.E. #C39713

MLY:np

Figure 1
Profile Main Drain and V Drain

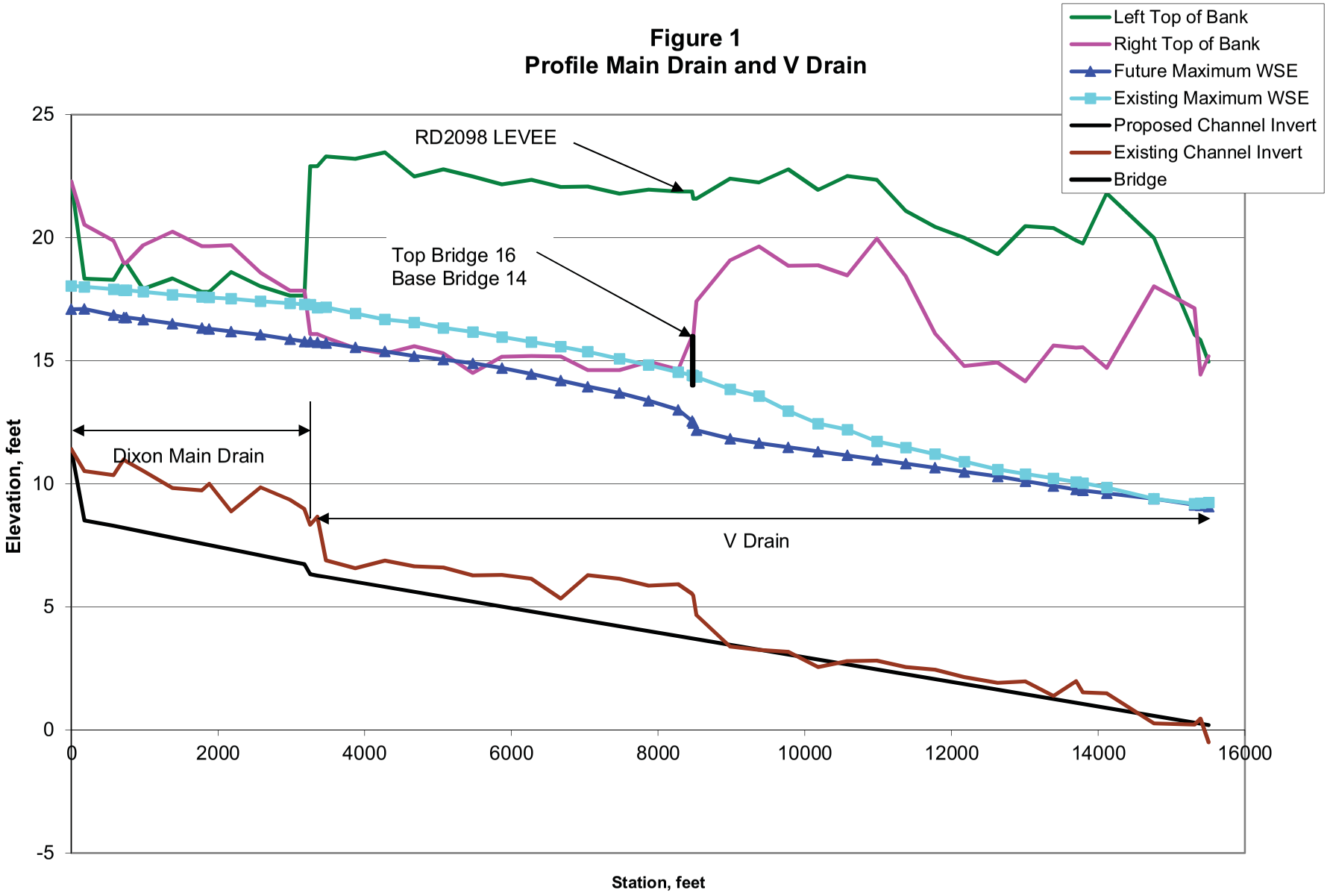


Figure 2
Section 185 Feet Upstream of Bridge

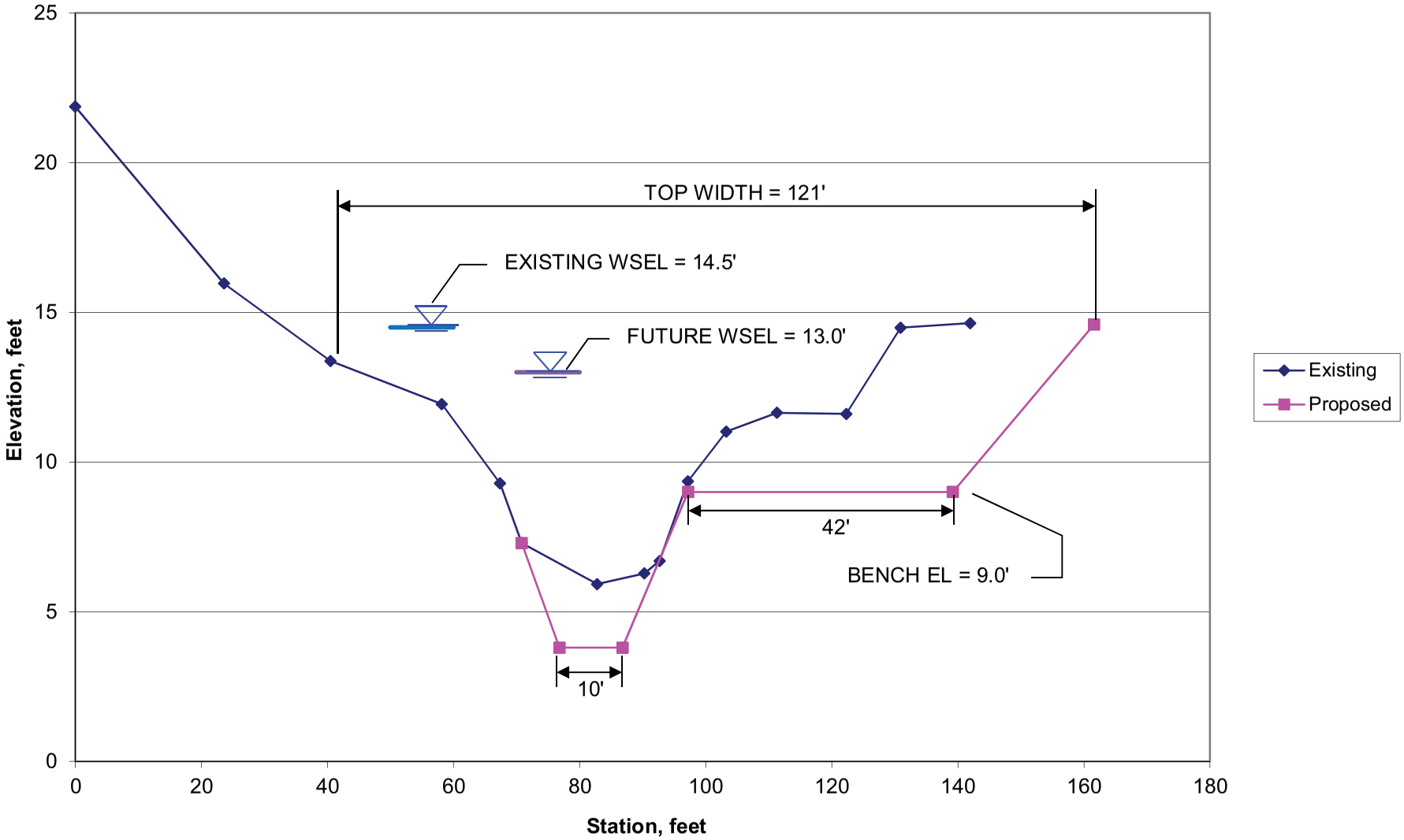


Figure 3
Section at Bridge

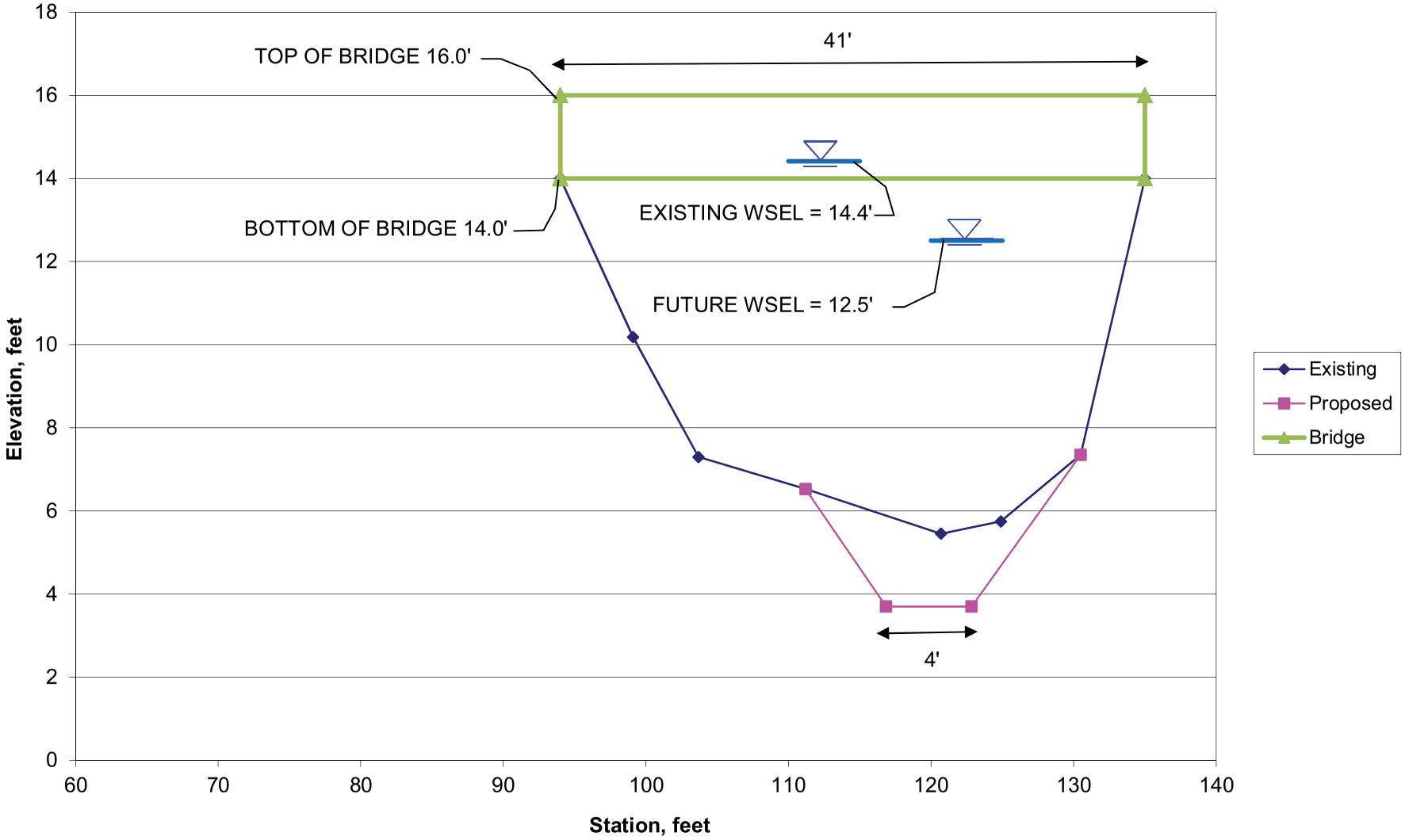
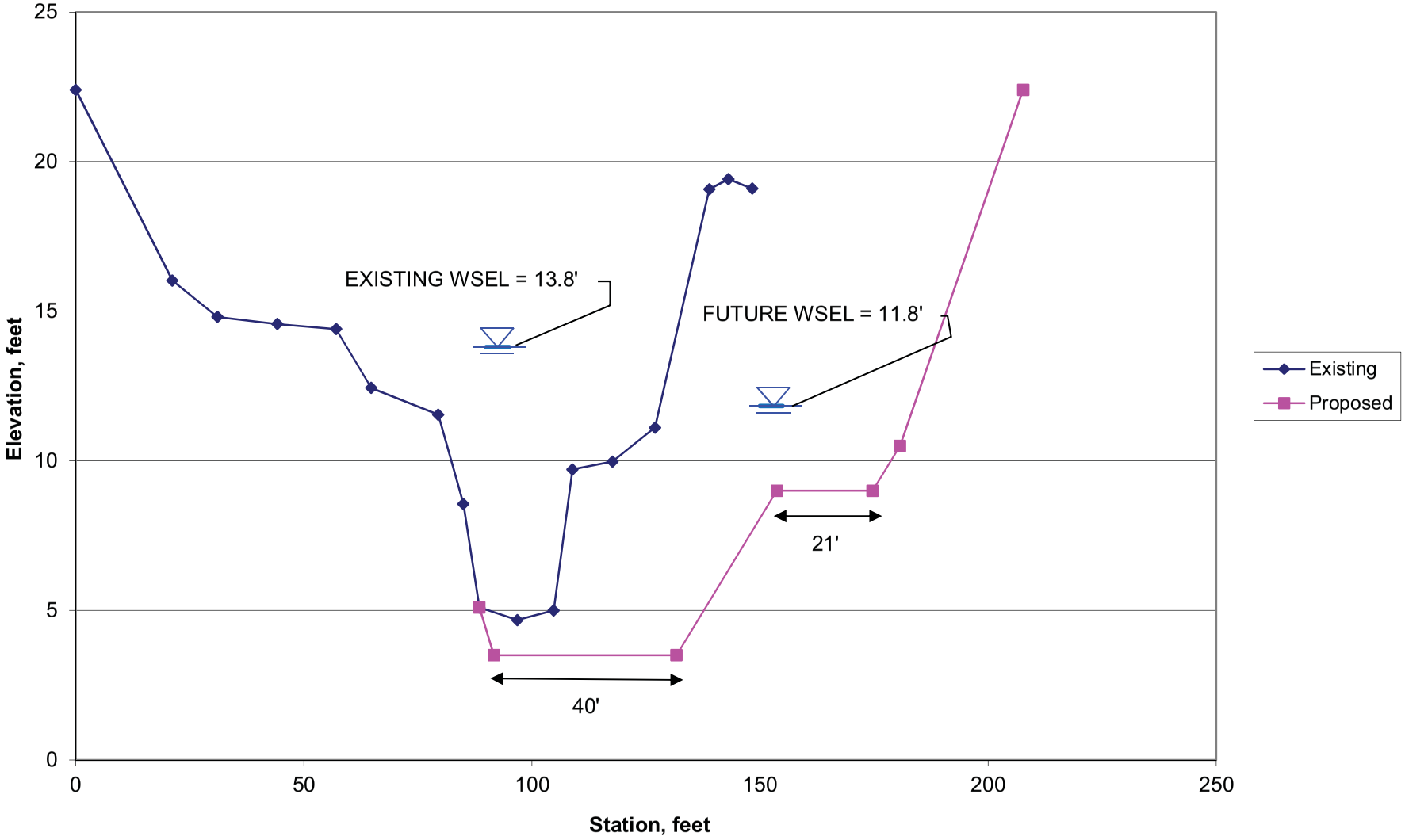


Figure 4
Section 500 Feet Downstream of Bridge



APPENDIX 1

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

Type of channel and description	Minimum	Normal	Maximum
C. EXCAVATED OR DREDGED			
a. Earth, straight and uniform			
1. Clean, recently completed	0.016	0.018	0.020
2. Clean, after weathering	0.018	**0.022**	0.025
3. Gravel, uniform section, clean	0.022	0.025	0.030
4. With short grass, few weeds	0.022	0.027	0.033
b. Earth, winding and sluggish			
1. No vegetation	0.023	0.025	0.030
2. Grass, some weeds	0.025	0.030	0.033
3. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. Earth bottom and rubble sides	0.028	0.030	0.035
5. Stony bottom and weedy banks	0.025	0.035	0.040
6. Cobble bottom and clean sides	0.030	0.040	0.050
c. Dragline-excavated or dredged			
1. No vegetation	0.025	0.028	0.033
2. Light brush on banks	0.035	0.050	0.060
d. Rock cuts			
1. Smooth and uniform	0.025	0.035	0.040
2. Jagged and irregular	0.035	0.040	0.050
e. Channels not maintained, weeds and brush uncut			
1. Dense weeds, high as flow depth	0.050	0.080	0.120
2. Clean bottom, brush on sides	0.040	0.050	0.080
3. Same, highest stage of flow	0.045	0.070	0.110
4. Dense brush, high stage	0.080	0.100	0.140
D. NATURAL STREAMS			
D-1. Minor streams (top width at flood stage <100 ft)			
a. Streams on plain			
1. Clean, straight, full stage, no rifts or deep pools	0.025	**0.030**	0.033
2. Same as above, but more stones and weeds	0.030	0.035	0.040
3. Clean, winding, some pools and shoals	0.033	0.040	0.045
4. Same as above, but some weeds and stones	0.035	0.045	0.050
5. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
6. Same as 4, but more stones	0.045	0.050	0.060
7. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
8. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

Type of channel and description	Minimum	Normal	Maximum
b. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages			
1. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
2. Bottom: cobbles with large boulders	0.040	0.050	0.070
D-2. Flood plains			
a. Pasture, no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Dense willows, summer, straight	0.110	0.150	0.200
2. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. Same as above, but with heavy growth of sprouts	0.050	0.060	0.080
4. Heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. Same as above, but with flood stage reaching branches	0.100	0.120	0.160
D-3. Major streams (top width at flood stage >100 ft). The n value is less than that for minor streams of similar description, because banks offer less effective resistance.			
a. Regular section with no boulders or brush	0.025	.....	0.060
b. Irregular and rough section	0.035	.....	0.100

Atachment E

APPENDIX 2

$n = 0.030$

No. 825 downstream from below section 2,
Salt Creek at Roca, Nebr.

Atachment F

STATE OF CALIFORNIA
THE RESOURCES AGENCY
THE RECLAMATION BOARD

PERMIT NO. 16822 GM

This Permit is issued to:

Edward S. Wineman
Post Office Box 109
Santa Maria, California 93456

To replace an existing bridge with a railroad flatcar on the west levee of Reclamation District No. 2098. The project is located north of the confluence of Duck and Hass Sloughs, 1 mile south of Swan Road, and 1 mile east of Bunker Station Road. Section 27, T6N, R2E, M.D.B.&M. (Reclamation District No. 2098), Duck and Hass Sloughs, Solano County.

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

The Reclamation Board, on the _____ day of _____, 19___, approved this application and the plans attached thereto. Permission is granted to proceed with the work described in this application, which is incorporated herein by reference, subject to the following General and Special Conditions.

(SEAL)

Dated: FEB 18 1998

Peter J. Rabbon
General Manager

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 Reclamation 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 Reclamation 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 Reclamation 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 Reclamation 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:

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 the prior approval of The Reclamation Board.

FOURTEEN: The permittee shall notify the Department of Water Resources by telephone, (916) 445-6386, at least ten working days prior to start of work. not done.

FIFTEEN: Backfill material for the excavation shall be placed in 4- to 6-inch layers and shall be compacted to a density equal to that of the adjacent undisturbed material. unknown

SIXTEEN: If erosion occurs at the bridge site, the permittee shall repair the eroded areas and place adequate revetment on the affected areas to prevent further erosion.

SEVENTEEN: The work area shall be restored to the condition that existed prior to start of work. OK

EIGHTEEN: Trees, brush, sediment and other debris shall be kept cleared from the bridge site and disposed of outside the floodway prior to the flood season to maintain the design flow capacity and flowage area. OK

NINETEEN: The permittee shall maintain the project works within the utilized area in the manner required and as requested by the authorized representative of Reclamation District No. 2098 or any other agency responsible for maintenance. OK

✓ TWENTY: The Reclamation Board, Department of Water Resources, and Reclamation District No. 2098 shall not be held liable for any damages to the encroachments within the levee section and within 10 feet of the levee toes resulting from flood fight, operations, maintenance, inspection, or emergency repair.

✓ TWENTY-ONE: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted work 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.

TWENTY-TWO: The permittee should contact the California Department of Fish and Game at telephone (916) 653-7664 for any permits that may be required.

SPECIAL CONDITIONS FOR PERMIT NO. 16822 GM (Continued)

TWENTY-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 a Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act permits may be required.

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Atachment G

Edward S. Wineman
Post Office Box 109
Santa Maria, California 93456

May 12, 2009

Central Valley Flood Protection Board
3110 El Camino Avenue Room LL40
Sacramento CA 95821

RE Dixon Main Drain and V-Drain

Dear Board:

In response to your letter dated April 22, 2009, I would like to comment on a potential problem with the drainage project referred to above as it is currently designed.

I own property through which the new drain ditch would be constructed. At the center of the North line of Section 27, I have a bridge consisting of two forty foot railroad flat cars which are placed side by side over the existing ditch (see enclosed map). This bridge was permitted by the Reclamation Board in February of 1988 (Permit Number 16822 GM). The engineering firm that designed the drain enlargement used models (see enclosures) which calculated that all of the increased flows would pass under my bridge but I see differently. Their calculations used the top of the deck for the height of the bridge and did not allow for the two beams underneath the bridge which support the deck. When these support beams are taken into consideration, this lowers the flow volume by two feet from the top of the bridge.

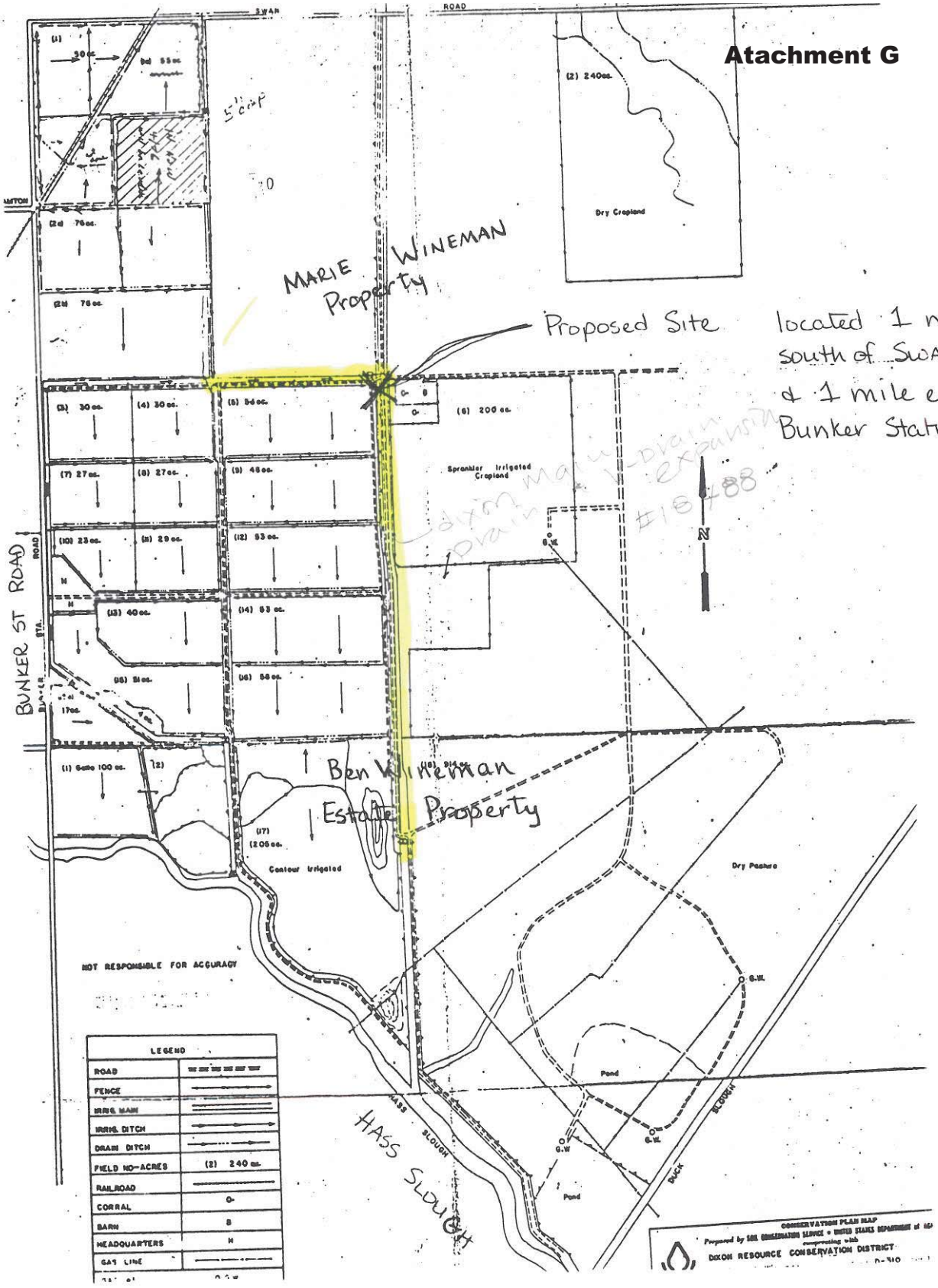
This area is designated as a Flood Plain. As the causeway fills from seasonal flooding, water backs up from Hass Slough and floods the area where my bridge is located. (I have enclosed a topography map of the area for you to refer to). The existing drain ditch under my bridge will easily fill with five to six feet of flood water. This would certainly diminish the area under the bridge for additional drain waters to pass. I am very concerned that under high water and maximum flow conditions, the water would pass over the top of my bridge causing damage to it as well as the approaches. It is possible that the bridge could even be destroyed. In addition to harming my property, the additional water will likely cause flood damage to land upstream from the bridge.

If you have any questions, I can be reached at 805-922-5197.

Sincerely,

Edward S Wineman

Atachment G



Replacement Bridge West Levee Reclamation District
2068 Opposite Stations 100+90'C' and 48+20'C'

EDWARD S WINEMAN

PREPARED 12-11-97

Atachment G

Wagner & Bonsignore
Consulting Civil Engineers, A Corporation

Nicholas F. Bonsignore, P.E.
Robert C. Wagner, P.E.
Paula J. Whealen
Henry S. Matsunaga

Brad E. Newton, Ph.D., P.G.
David Houston, P.E.
David P. Lounsbury, P.E.
Vincent Maples, P.E.
Emily MacDonald
Ryan E. Stolfus

James C. Hanson
Consulting Civil Engineer
A Corporation

April 12, 2012

Mr. John Currey
Dixon Regional Watershed Joint Powers Authority
1170 North Lincoln Suite 110
Dixon, CA 95620

RE: Dixon Main Drain and V-Drain Enlargement Project

Dear Mr. Currey:

Our office has been asked to review the proposed Dixon Main Drain and V-Drain Enlargement Project (Project) and assist Mr. Wineman in determining the affect of the project on the Wineman property interests. Mr. Wineman requested that we forward our report presenting the results of our evaluation of the Wineman Railroad Bridge V-Drain Crossing affected by the proposed Project.

Additionally, Mr. Wineman would like to inform the Joint Powers Authority (JPA) that the existing Dixon Main Drain and the Reclamation Borrow Pit ditches are currently severely overgrown with tulles and other trash which greatly affects the flow capacity of the ditches. Please inform the JPA that these ditches should be cleaned and maintained to prevent flooding of adjacent land.

Very truly yours,

WAGNER & BONSIGNORE
CONSULTING CIVIL ENGINEERS

David P. Lounsbury, P.E.

Encls.
Via: US Mail

cc: Mitra Emami (email only)
Edward Wineman
Herman Fitzgerald, Esq.
Harriet Steiner, Esq.

2151 River Plaza Drive · Suite 100 · Sacramento, CA 95833-4133
Ph: 916-441-6850 or 916-448-2821 · Fax: 916-779-3120

Wagner & Bonsignore
Consulting Civil Engineers, A Corporation

Nicholas F. Bonsignore, P.E.
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Vincent Maples, P.E.
Emily MacDonald
Ryan E. Stolfus

James C. Hanson
Consulting Civil Engineer
A Corporation

MEMORANDUM

To: Mr. Edward Wineman

From: David Lounsbury, P.E.

Date: April 11, 2012

Re: **Wineman Railroad Car V-Drain Crossing**
Dixon Main Drain and V-Drain Enlargement Project

1.0 INTRODUCTION

The following report is to present the results of our evaluation of the Wineman Railroad Bridge V-Drain Crossing affected by the Dixon Main Drain and V-Drain Enlargement Project (Project) proposed by the Dixon Regional Watershed Joint Powers Authority. The Project includes the enlargement of the existing V-Drain from Swan Road to the Reclamation District Intake Canal and replacement of various culverts, weirs and agricultural supply infrastructure affected by the V-Drain enlargement.

Our evaluation was focused on determining the long-term performance of the existing Wineman bridge as affected by the proposed Project. Information reviewed in the preparation of this report included the following:

- Draft Environmental Impact Report for the Dixon Main Drain and V-Drain Enlargement Project dated October 2008
- Project Drawings dated 4/21/2011 obtained in hard copy and electronic format
- Portions of various hydraulic analysis report prepared by West Yost Associates
- Letter by Brad Friederichs, P.E., of VE Solution Inc. regarding the structural stability of the bridge
- Communications with Ms. Mary Young, West Yost and Associates
- Personal communications with Mr. Edward Wineman
- Personal inspection of the site
- Personal communications with railroad bar bridge supplier and design engineer.

2.0 PROJECT DESCRIPTION

The Project Drawings show the work to be performed at the Wineman bridge crossing to include localized excavation along the flow line of the V-Drain channel bottom with additional sub-excavation of the channel bottom and side slopes to accommodate rip rap placed in the reach extending between 200 feet upstream and 200 feet downstream of the bridge structure. Upstream of the bridge structure the project V-Drain design incorporates a "low flow" channel and "shelf" which would become inundated during high discharge events. Parallel to the channel and shelf is a roadway set at a higher elevation for project access and inspection activities. Downstream of the bridge structure the project V-Drain design is modified to only include a low-level channel across the entire width with no "mid-level" shelf. An access road is also incorporated into the design for the downstream design section. The lower reaches of the Project, including the reach downstream of the bridge structure is tidally influenced and will often be inundated with water.

3.0 HYDRAULIC ANALYSIS

The hydraulic analysis prepared by West Yost Associates indicates that the top of the Wineman bridge deck is at 14.5 foot elevation and the bottom of the bridge deck is at about 12.2 foot elevation. The hydraulic analysis also indicates that the water surface at the upstream side of the bridge at full design flow is estimated to be at about 12.2 feet elevation, or at the bottom of the bridge deck. The hydraulic analysis models evaluated the hydraulic roughness of the V-Drain with a coefficient of friction (Manning's "n" value) of 0.040, which is appropriate for the earthen vegetated channels as is proposed for the reaches upstream and downstream of the bridge section, however at the bridge section the proposed plan includes placement of rip rap 200 feet upstream and downstream of the bridge structure. The Manning's "n" value for a rough stone channel bottom would be higher and in the vicinity of 0.050. A higher "n" value will cause the water to increase in depth to maintain the discharge flow rate, which will increase the water level against the bridge deck. The hydraulic analysis completed does not incorporate this higher "n" value therefore it is not known how high the water will be against the bridge and therefore we cannot determine the force the water will apply to the bridge.

The modeled water surface elevation at the bridge of 12.2 feet, plus the undetermined increase in water surface elevation caused by the placement of rip rap yields a water surface elevation that is significantly above the bottom of the bridge deck. The water that inundates the bridge deck imparts a lateral force onto the bridge structure which should be evaluated. Additionally there is a buoyant force that may affect the stability and should be evaluated in connection with the foregoing.

In a letter by Mr. John Currey dated June 22, 2006 contained in the Draft Environmental Impact Report, Mr Currey states that the velocity through the unimproved/existing railroad car bridge V-Drain section ranges from 4.0 to 5.7 feet per

second based on analysis of flow of the unimproved/existing railroad car bridge V-Drain section. Mr. Currey correctly states that a maximum velocity of 4 to 5 feet per second is recommended for an earthen channel, and because the estimated velocities are above this rate, he recommended placement of rip rap in the channel bottom to prevent erosion. Mr. Currey's recommendation for placement of rip rap only in the channel bottom was predicated by an incorrect assumption that the channel walls under the bridge structure were concrete. That assumption is incorrect as the west side of the bridge is founded on a concrete abutment and there is no concrete on the east side. The east side abutment washed out many years ago and was replaced with a steel plate to retain the earth at the abutment. In either case, the channel under the bridge is not concrete and will be susceptible to erosion if adequate protection measures not placed.

The current Drawings do not detail the extent of rip rap to be placed under the bridge so it is unknown how or if the channel bottom and the steel plate abutment on the east side will be adequately protected. Without adequate erosion protection, the bridge foundation will become unstable and cause ultimate failure of the bridge. The Drawings also do not show how the rip rap will be placed under the bridge, whether it will be placed on the surface or if the surface will be sub-excavated. The placement methodology needs to be taken into account in the hydraulic analysis as rock placed on the surface will reduce the flow area under the bridge. If the channel surface is to be sub-excavated, special precautions should be made to avoid undermining the abutments supporting the bridge deck.

4.0 MAINTENANCE

The long-term hydraulic capacity of the V-Drain is highly dependent on the maintenance performed. The reach of V-Drain upstream of the Wineman bridge includes a mid-level shelf which would be routinely mowed and will significantly improve the long-term performance of the V-Drain. Maintenance of the reach downstream of the Wineman bridge will be more difficult due to the frequent tidal inundations and require more specialized equipment such as low ground pressure dozers and long-reach excavators, however this effort can also be accommodated under routine maintenance. The rip rap lined section of the V-Drain in the vicinity of the Wineman bridge will also require maintenance to control vegetation growth however this maintenance may prove difficult as it will likely need to be performed with hand operations. Completion of vegetation control maintenance operations, even those required by hand or specialized equipment are critical for maintaining the hydraulic capacity of the V-Drain.

5.0 EVALUATION OF EXISTING WINEMAN BRIDGE

The existing Wineman bridge has been in place for many years. Due to flooding events causing high discharge of water through the V-Drain channel over the years,

portions of the bridge structure have been modified to what we see today. The existing support structures are composed of the concrete abutment on the west site, a steel plate retaining wall on the east side and steel pipe piles on either end of the bridge interior to the abutments. The east abutment has an additional line of steel pipe piles which support the steel plate retaining wall. The depth and bearing capacity of the concrete abutment, steel wall, or the piles are unknown as no records are available for their design or installation. Conversations with Mr. Wineman indicated that the steel piles were driven by a 1-ton hammer to refusal, however the stroke distance or hammer efficiency values are not known which makes the pile bearing capacity indeterminable. The railroad car bridge deck is tied to the concrete abutment on the west site at the center beam by a bolted connection and is welded to the steel plate wall on the east side, however the capacity of these connections to resist laterally applied forces is unknown. There are no mechanical connections of the bridge deck to the steel piers.

As previous discussed, water encroaching on the bridge deck will impart lateral forces and potentially vertical buoyant forces on the bridge. The bridges ability to resist these forces relies on connections of unknown strength to abutments of unknown quality, and by friction developed by the weight of the bridge on the pile supports. The factors of safety of any or all of these components are unknown for the existing condition and any increase or differential of loads applied may cause failure.

6.0 SUMMARY

In summary, the hydraulic analyses of the V-Drain system during the design storm event have not been completed incorporating all elements of the proposed project as shown on the Drawings therefore determination of the water level acting against the bridge is not known. The capability of the existing bridge structure to resist laterally applied forces is unknown but is considered to be minimal from review of available information and site conditions. Due to the above, we recommend the existing railroad car bridge structure be replaced to maintain and ensure adequate accessibility and that safety is maintained at the completion of the proposed project.

7.0 PROPOSED RAILROAD CAR BRIDGE ALTERNATIVES

We have prepared alternative bridge and channel designs for consideration and evaluation and are described as follows:

Alternative A:

Alternative A consists of a new bridge crossing at approximate station 85+60, or approximately 90 feet downstream of the existing bridge. A plan and profile of the approach road and bridge section is attached. The bridge consists of two flatbed rail cars placed side by side giving the bridge an overall dimension of approximately 17' wide by

89' long. The bridge will be anchored by concrete abutments on either side of the channel with retaining walls extending parallel to the channel as needed to facilitate access road grading. Note that the rail road car bridge dimensions and abutment designs are preliminary. Rail road cars vary in dimension depending on availability. Abutment design will require a soils report and/or geotechnical analysis to determine foundation bearing depth and capacity.

Alternative A extends the "low flow" channel section and associated bench, currently designed for the reach upstream of the bridge, downstream through the bridge section to a point downstream of the new bridge area. The transition is assumed to be far enough downstream that turbulence generated by the V-Drain transition will not affect the bridge section. The side slopes of the channel section through the bridge section area transition from 4:1 to 2:1 (h:v) slopes to reduce the overall length of the required bridge deck. The "low flow" channel with shelf design section is preferred because the predominance of vegetation growth will occur within the low flow channel area and the shelf area will remain clear with regular maintenance which will allow high flows to pass through the bridge section without vegetation-cause reduction of flow capacity.

As discussed previously, maintenance of the low flow channel and shelf design section reaches of the V-Drain is expected to be easier than the tidal channel section downstream of the Wineman bridge. Maintenance in the low flow channel areas will predominately performed by regular mowing whereas the tidal channel sections would require low-ground pressure dozers and excavators to maintain and control vegetation growth. Maintenance under and adjacent to the bridge will also be substantially easier utilizing the low flow channel design as regular maintenance equipment will be able to access the bridge area from each side. The preliminary bridge design is conceptual; however locating the bridge across the V-Drain with a deck bottom elevation of 14.0 feet creates a flow area of about 500 square-feet which is about 220 square-feet greater than the existing/unimproved bridge section design.

The cost for the new bridge structure is estimated to be about $156,000, estimated as shown below. Note that the cost for removal of the existing bridge, excavation of the enlarged V-Drain and cost for modifications, replacements or removal of existing facilities including irrigation distribution pipelines and power poles are not included in the estimated cost. The cost estimate will be revised upon completion of the geotechnical analysis and structure design.

Item	Amount
Rail Road Car Bridge Deck	$75,000
Abutment Construction	$15,000
Engineering	$25,000
Geotechnical Evaluation	$15,000
Contingency @ 20%	$26,000
Total	**$156,000**

The elevation of the bridge deck may be raised or lowered and placement of rip rap may still be required depending on the results of hydraulic analyses. We request a hydrologic analysis on the V-Drain channel utilizing the proposed Alternative A bridge and channel section be performed for further evaluation.

Alternative B:

Alternative B consists of the same bridge as described in Alternative A, with a difference in the channel bottom grading. A plan and profile of the approach road and bridge section is attached. The Alternative B bridge channel section extends the tidal channel section upstream through the bridge section where it then transitions to the low flow channel design section. The preliminary bridge design is conceptual; however locating the bridge across the V-Drain with a deck bottom elevation of 14.0 feet creates a flow area of about 660 square-feet which is about 380 square-feet greater than the existing/unimproved bridge section design. The modified channel grading section increases the flow area and theoretical flow capacity over the Alternative A concept; however maintenance of vegetation would be more difficult and a lack of maintenance would constrict the flow capacity of the channel significantly thereby potentially negating the benefit of the increase flow area.

The cost for bridge structure would be the same as shown for Alternative A as the difference is in the V-Drain channel grading beneath the bridge structure.

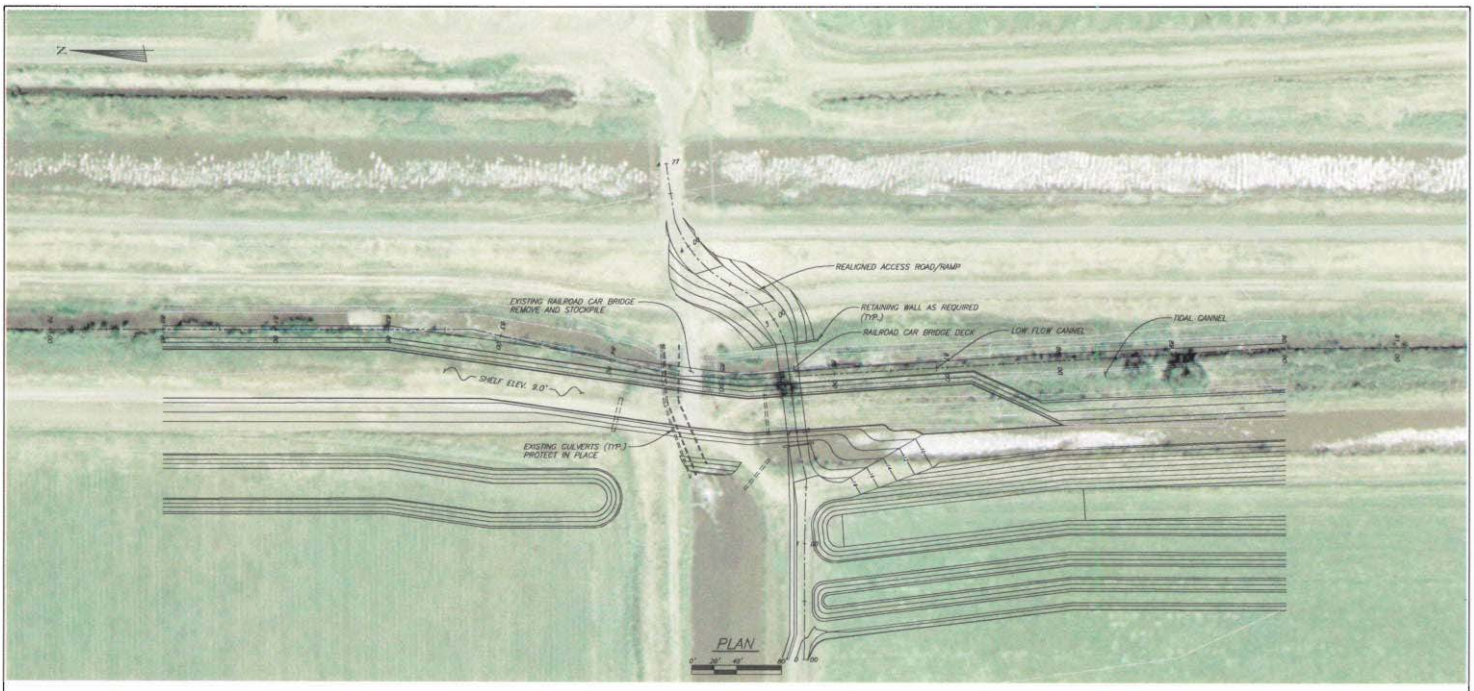
The elevation of the bridge deck may be raised or lowered and placement of rip rap may still be required depending on the results of hydraulic analyses. We request a hydrologic analysis on the V-Drain channel utilizing the proposed Alternative B bridge and channel section be performed for further evaluation.

Additional Conceptual Alternatives

Additional alternatives may be evaluated and considered for replacement of the bridge structure. Such additional include, but are not limited to precast "BridgeTech Conspan" bridge segments or appropriately sized culvert pipes.

cc: Herman Fitzgerald

Atachment G



REVISIONS			
REF.	DESCRIPTION	APVD.	DATE

PRELIMINARY
NOT FOR CONSTRUCTION

D.P. LOUNSBURY
S.R. HERINGER
R.C. BAGNER
MARCH 2012

Wagner Bonsignore
Consulting Civil Engineers, A Corporation

EDWARD WINEMAN
DIXON MAIN DRAIN AND V-DRAIN ENLARGEMENT PROJECT
PLAN & SECTION AT WINEMAN BRIDGE ALTERNATIVE A

SHEET 1 OF 1 SHEETS

Atachment G

REVISIONS			
REF.	DESCRIPTION	APVD.	DATE

PRELIMINARY
NOT FOR CONSTRUCTION

D.P. LOUNSBURY
S.R. HERINGER
R.C. WAGNER
MARCH 2012

Wagner Bonsignore
Consulting Civil Engineers, A Corporation
2151 River Plaza Drive
Suite 300
Sacramento, California 95833
Ph: 916.442.4636
Fx: 916.779.1870

EDWARD WINEMAN
DIXON MAIN DRAIN AND V-DRAIN ENLARGEMENT PROJECT
PLAN & SECTION AT WINEMAN BRIDGE ALTERNATIVE B

SHEET 1 OF 1 SHEETS

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Atachment H

Dixon Regional Watershed Joint Powers Authority
1170 N. Lincoln, Suite 110, Dixon, CA 95620 – Phone (707) 678-1655

May 19, 2010

Edward S. Wineman
PO Box 109
Santa Maria, CA 93456

Re: Dixon Main Drain / V- drain Wineman Bridge Evaluation

Dear Mr. Wineman,

In response to your letter to the Authority and the Central Valley Flood Protection Board, we have again reviewed how the proposed project interacts with your bridge. The JPA project engineer engaged a structural engineer to review the bridge, and its abutments as well as the hydraulic impacts that might be expected in a design level event.

Enclosed is the opinion of *Brad Friedericks, PE,* that any effects during flood conditions can be mitigated by rip rap armoring, up and downstream of the bridge, and as proposed in the channel design. Furthermore, after such an event and if needed, the approaches should be repaired with compacted backfill. The Authority is prepared to provide an assurance that damage to the bridge and its approaches, as a result of flood water conveyance, acting on the bridge or its abutments will be repaired by the Authority.

You should have been recently contacted by the appraiser who will be performing a reappraisal in advance of a new offer to secure an easement from you. Once the reappraisal is complete, you will be contacted by Kathy Phillips of Overland, Pacific & Cutler to extend the new offer.

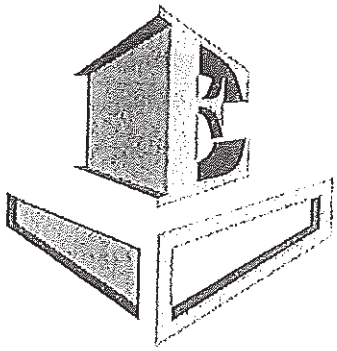
The Authority is committed to minimizing conflicts during the construction phase of the project.

Please call me if you a have any question at (707) 678-1655, extension 105.

Sincerely,

John S. Currey
Secretary

Enc. VE Solutions, Inc. *April 7, 2010 Letter*



VE SOLUTIONS, INC.
Where Value and Engineering Come Together

April 7, 2010

Ms Mary Young
West Yost & Associates
2020 Research Park Dr., Ste 100
Davis, CA 95618

Subject: Mr. Wineman's Bridge
VES No. 9109

Dear Mary:

This letter summarizes my findings on the above bridge.

PURPOSE OF EVALUATION

The purpose of the bridge evaluation is to determine if it is likely to remain stable under flood conditions. The evaluation is not meant to be conclusive but an estimate of what is likely to happen. There are obviously unknown loads that occur during flood conditions that would negate the results of this evaluation.

BRIDGE CONSTRUCTION

I performed a site visit on March 1, 2010 to observe the structure and support conditions for the bridge.

The bridge is constructed from two 8.5' wide railroad flat cars that are butted together down their length.

There are two 23" deep center beams approximately 14" apart for each car.

The bridge deck consists of steel plate covered with crushed rock more or less.

The west abutment is constructed from cast-in-place concrete. The center beams are anchored to the concrete abutment. In addition, there is a steel plate behind the end of the bridge that is anchored to the bridge. There is also an additional row of support consisting of an HSS8x8 square tube. The HSS is supported on 4-8" dia. steel pipes. The pipes are embedded into the side/bottom of the channel.

The east abutment is constructed from a W8 wide flange beam supported on five-8" dia. pipes with a steel plate backwall. The backwall plate is notched for the RR center beams and is welded to the 8" dia. steel pipes. In addition, there is another line of support four feet in from this one that consists of a W8 beam and four-8" dia. steel pipes.

5845 Windmill Way, Suite D • Carmichael, CA 95608

(916) 505.0519 • Fax (916) 482 1173 • electronic mail: bradf@vesolutions.net

According to West Yost & Associates, it is likely that the flood water will go over the top of the bridge. This flooding is caused by a high backwater condition due to flooding in the Yolo bypass. During these high water events the velocity of the floodwater will be low.

EVALUATION

During the above flood conditions it is possible that the soil behind the abutments will be washed away.

I recommend that the soil behind the abutment be protected with rip-rap on both sides. After the flood, compacted backfill would be placed behind the backwall to rebuild the approach to the bridge.

The depth of the 8" steel pipes is unknown but it appears that the concrete abutment on the west end and the steel backwall on the east end will remain in place and provide support and lateral stability for the bridge during and after flood conditions.

Sincerely yours,

Brad Friederichs
President

CA License S2780