Meeting of the Central Valley Flood Protection Board
August 30, 2019

Staff Report

Reclamation District 17
Phase 3-RD 17 Levee Seepage Repair Project, San Joaquin County

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1.0 – REQUESTED ITEM

Consider approval of Permit No. 18980-1. (Attachment A)

2.0 – APPLICANT

Reclamation District 17 (RD 17)

3.0 – PROJECT LOCATION

The proposed work is located within the RD 17 levee system that is bordered to the north by French Camp Slough and to the west by the San Joaquin River in San Joaquin County. The levee system is continuous, extending approximately 19 miles (see Attachment B, Project Maps).

4.0 – PROJECT DESCRIPTION

The overall purpose of the RD 17 Levee Seepage Repair Program (LSRP) is to implement levee improvements at various locations along the landside toe of levees to increase resistance to under-seepage and through-seepage, and ultimately bring the approximately 19-mile levee system into compliance with applicable Federal and State standards for the levees protecting urban areas. Implementation of the RD 17 LSRP consists of three phases. Phase I repairs were completed in 2009, and Phase II repairs were completed during the summer of 2010. Some emergency work related to Phase III was completed in 2017. The proposed repair work described in this staff report and the completed emergency work of Phase III are included in draft Permit 18980-1.

As part of the Phase 3-RD 17 Levee Seepage Repair Project, the proposed work will construct a new seepage berm with chimney drain (Element VIIg), construct ten additional chimney drains (Elements Ia, Ib, Ie, IIIa, IIIb, IVa, VIc, VId, VIe, and VIIb), and authorize ten previously constructed seepage berms (Elements Ia, Ib, Ie, IIIa, IIIb, IVa, VIc, VId, VIe, and VIIb) completed during the RD 17 2017 Emergency Flood Project. The levee is along the east (right) bank of the San Joaquin River and north

bank of Walthall Slough (see Attachment C, Project Plans). Table 1, listed below, presents the details of repair for each element of proposed work. The proposed work does not include any raises to the existing levee. Construction is proposed to begin in Fall 2019. Further details of proposed work to each element is presented in Attachment D (see Attachment D, Details of Proposed Work for Each Element).

5.0 – AUTHORITY OF THE BOARD

California Water Code § 8534, 8590 – 8610.5, 8700 – 8710, and 8730 – 8742

California Code of Regulations, Title 23, Division 1 (Title 23):

- § 6, Need for a Permit
- § 106, Existing Encroachments within an Adopted Plan of Flood Control
- § 112, Streams Regulated and Nonpermissible Work Periods
- § 116, Borrow and Excavation Activities – Land and Channel
- § 120, Levees
- § 121, Erosion Control
- § 123, Pipelines, Conduits and Utility Lines
- § 130, Patrol roads and Access Ramps
- § 131, Vegetation
- Rivers and Harbors Act of 1899, Title 33 United States Code, § 408, hereafter referred to as 33 USC 408

Table 1: Details of Repair for Each Element

Element No.	Latitude	Longitude	Length of the Berm	Action 2017 Emergency	Action 2019 Cat Perm
Ia	37°52'43.19"N	121°19'53.96"W	590’	Seepage Berm	Chimney Drain
Ib	37°52'38.70"N	121°19'51.99"W	125’	Seepage Berm	Chimney Drain
Ie	37°51'55.41"N	121°19'29.18"W	655’	Seepage Berm	Chimney Drain
IIIa	37°49'21.36"N	121°18'54.41"W	4,659’	None (Phase 1 Berm)	Chimney Drain
IIIb	37°49'14.42"N	121°19'11.65"W	741’	Seepage Berm	Chimney Drain
IVa	37°49'7.25"N	121°18'52.49"W	525’	Seepage Berm	Chimney Drain
VIc	37°47'17.80"N	121°18'25.28"W	300’	Seepage Berm	Chimney Drain
VId	37°47'15.05"N	121°18'24.94"W	200’	Seepage Berm	Chimney Drain
VIe	37°47'12.98"N	121°18'24.25"W	350’	Parking Lot Raising	Chimney Drain
VIIb	37°47'6.44"N	121°18'14.69"W	445’	Seepage Berm	Chimney Drain
VIIg	37°46'20.28"N	121°17'23.17"W	400’	None	Seepage Berm + Chimney Drain

6.0 – WORK ANALYSIS

Staff has reviewed the supporting technical documentation submitted by RD 17, which includes plans, drawings, hydraulic, and geotechnical reports. Below is a summary of hydraulic and geotechnical reviews:

6.1 – Hydraulic Review

Several hydraulic analyses have been performed for RD 17, as part of San Joaquin River system by USACE (1955, 1979, 2002), for or by FEMA (1988, 1990, 2009) and by DWR (2002 and 2013). Based on these studies, RD 17 is proposing to use the highest and most conservative water elevation as the design water surface elevation. In addition, further hydraulic analysis indicated that no changes to the water surface

elevation are expected with the addition of the setback levee (Reference: Deterministic Hydraulic Impact Analysis for the RD 17 Early Implementation Program Levee Setback Project, MBK, February 2014). The proposed work is entirely on the landside of the levee. Board staff reviewed the hydraulic studies that were submitted by the applicant and concurs with the applicant's conclusion that no adverse hydraulic impacts are expected.

6.2 – Geotechnical Review

The scope of geotechnical analyses for Phase III included a steady-state seepage analysis to evaluate under-seepage, a steady-state stability analyses to evaluate landside stability, and a rapid drawdown stability analyses to evaluate waterside stability conditions. Board staff reviewed the analyses and concurs with the applicant's conclusion that the analyses are consistent with the best professional practice in terms of stability and seepage analyses.

7.0 – Agency Comments and Endorsements

The comments and endorsements associated with the application, from all pertinent agencies, are shown below:

- The U.S. Army Corps of Engineers (USACE) 33 U.S.C. 408 Categorical Permission approval letter has not been received. The conditions in the USACE Sacramento District Engineer Categorical Permission, if any, will be incorporated into the permit as Exhibit A.

8.0 – CEQA ANALYSIS

Board staff has prepared the following California Environmental Quality Act (CEQA) determination:

The Board, as a responsible agency under CEQA, has reviewed the Draft and the Final Environmental Impact Reports (EIR) (SCH No. 2010042073, June 2016), and the Mitigation Monitoring and Reporting Program (MMRP) for the Phase 3-RD 17 Levee Seepage Repair Project, prepared by the lead agency, RD 17. The District's Phase 3-RD 17 Levee Seepage Repair Project is covered by the Draft and Final EIR. These documents, including project design, may be viewed or downloaded from the Board's website at http://cvfpb.ca.gov/event/august-2019-regular-business-meeting/, under a

link for this agenda item. The documents are also available for review in hard copy at the Board and RD 17 offices.

RD 17 determined that the Phase 3-RD 17 Levee Seepage Repair Project will have a significant effect on the environment, and filed a Notice of Determination with the State Clearinghouse on July 14, 2016. The District incorporated mandatory mitigation measures into the project plans to avoid impacts or to mitigate impacts. These mitigation measures, included in the District's Final EIR and MMRP, address impacts to agricultural resources, air quality, biological resources, cultural resources, geology, soils, minerals, and paleontological resources, hazards and hazardous materials, hydrology and water quality (non-flood related), noise, transportation and circulation, and utilities with mitigation measures. These mitigation measures are within the responsibility and jurisdiction of the RD17 and have been adopted by the RD17. The Draft and Final EIR found less than significant impacts under hydrology for flood related impacts associated with the construction of a new seepage berm with chimney drain and ten new chimney drains, as well as the authorization of ten previously constructed seepage berms during the District's 2017 Emergency Flood Project.

The Board, as a responsible agency, is responsible for mitigating and avoiding only the direct and/or indirect environmental effects of those parts of the project which it decides to carry out, finance, or approve (CEQA Guidelines § 15096(g); Public Resources Code § 21002.1(d)). Here, the Board's action is limited to approving an encroachment permit for work to construct a new seepage berm with chimney drain and ten new chimney drains, as well as authorizing ten previously constructed seepage berms completed during the RD17's 2017 Emergency Flood Project and the Board's jurisdiction is limited to imposing conditions or mitigation related to effects on the State Plan of Flood Control.

In accordance with CEQA Guidelines § 15096, Board staff independently reviewed the RD17's Draft and Final EIR, and finds these environmental documents prepared by the lead agency adequately address hydrology impacts, including potential flood risk, for the Board's approval of Permit No. 18980-1 to authorize work to construct a new seepage berm with chimney drain and ten new chimney drains, as well as authorizing ten previously constructed seepage berms completed during the RD17's 2017 Emergency Flood Project which is within the Board's jurisdiction as it relates to effects on the State's flood control system.

The Board, as a responsible agency, is required to make findings for each significant effect of the project (CEQA Guidelines § 15096(h) and § 15091). However, the Draft and Final EIR identified less than significant impacts to flood risk, which is the only resource area within the Board's jurisdiction. The project will not adversely impact the State Plan of Flood Control. Based on staff's review of the EIR and the hydraulic

analyses, there is no substantial evidence to support a fair argument that the project may result in significant impacts related to flood risk within the Board's jurisdiction.

According to the EIR, the proposed construction of a new seepage berm with chimney drain and ten additional chimney drains, as well as the authorization of ten previously constructed seepage berms completed during RD 17's 2017 Emergency Flood Project results in less than significant impacts related to flood risk, which is the only resource area within the Board's jurisdiction; therefore, the Board's approval of the encroachment permit does not require additional findings unrelated to flood risk under CEQA Guidelines § 15096(h), nor is the consideration of alternatives required. In accordance with CEQA Guidelines § 15096(f) and (g), staff recommends that the Board make responsible agency findings that approval of Permit No. 18980-1 will not result in any significant adverse impacts related to flood risk, and no additional mitigation measures within the Board's jurisdiction are required.

The documents and other materials which constitute the record of the Board's proceedings in this matter are in the custody of the Executive Officer, Central Valley Flood Protection Board, 3310 El Camino Ave., Suite 170, Sacramento, California 95821.

9.0 – CALIFORNIA WATER CODE SECTION 8610.5 CONSIDERATIONS

California Water Code, Section 8610.5 (c) provides that the Board shall consider all the following matters, if applicable.

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:

> Staff respectfully requests that the Board consider this report, any documents or studies to which the report refers, and any opinions rendered that have been made a part of the record.

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

> The hydraulic analysis used a HEC RAS model to evaluate the hydraulic impacts as it provided the best available hydraulic information. No adverse hydraulic impacts

are expected as a result of the proposed work because the generated water surface profiles are lower than the top of the levee with an appropriate margin of safety.

3. Effects of the decision on the entire State Plan of Flood Control (SPFC).

   The proposed work is not expected to result in adverse impacts to facilities of the SPFC because the work does not impact the water surface profiles. Furthermore, these levee repairs are consistent with the adopted 2012 and 2017 Updates of CVFPP as the proposed work coincides with the CVFPP's supporting goals to improve operations and maintenance. In addition, the proposed work complies with the Title 23 standards identified in Section 5.0.

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

   Based on the best available information, the repairs are not anticipated to be impacted by any reasonably projected future events, including, but not limited to, changes in hydrology, sea level rise, and climate change. The hydraulic analysis discussed in Section 6.1 took into consideration possible changes in hydrology, sea level rise and climate change.

10.0 – STAFF RECOMMENDATION

Staff recommends that the Board:

Adopt:

- The CEQA findings: The Board, acting as a responsible agency under CEQA, has independently reviewed and considered the environmental documents prepared for the project. Approving Permit No. 18980-1 will not result in any significant adverse impacts related to flood risk and no additional mitigation measures within the Board's jurisdiction are required.

Approve:

- Permit No. 18980-1 in substantially the form provided, and

Direct:

- The Executive Officer to take the necessary actions to execute the permit and file a Notice of Determination pursuant to CEQA with the State Clearinghouse.

11.0 – LIST OF ATTACHMENTS

Attachment A: Draft Permit 18980-1

Attachment B: Repair Work Maps

Attachment C: Repair Work Plans

Attachment D: Details of Proposed Work for Each Element

Prepared by:	Ali Porbaha, Plan Implementation and Compliance Branch
Reviewed by:	Itzia Rivera, Environmental Services and Land Management Branch; Greg Harvey, Plan Implementation and Compliance Branch Chief; Michael Wright, Chief Engineer; and Sarah Backus, Staff Counsel

Attachment A: Draft Permit 18980-1

DRAFT

STATE OF CALIFORNIA
THE RESOURCES AGENCY

THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18980-1 BD

This Permit is issued to:

Reclamation District 17
711 N Pershing Ave
Stockton, California 95203

The encroachments are portions of RD17 Phase III Levee Seepage Repair Project including construction of a new seepage berm w/chimney drain (Element VIIg), ten additional chimney drains (Elements Ia, Ib, Ie, IIIa, IIIb, IVa, VIc, VId, VIe, and VIIb), and the authorization of the ten previously constructed seepage berms (Elements Ia, Ib, Ie, IIIa, IIIb, IVa, VIc, VId, VIe, and VIIb) completed during the RD17 2017 Emergency Flood Project.

The project is located at the right bank of San Joaquin River, at 37.87902°N 121.33197°W, San Joaquin River, San Joaquin 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. 18980-1 BD

LIABILITY AND INDEMNIFICATION

THIRTEEN: The permittee shall defend, indemnify, and hold harmless the Central Valley Flood Protection Board (Board) and the State of California, including its agencies or departments thereof, including but not limited to, any and all boards, commissions, officers, agents, employees, and representatives (Indemnities), against any and all claims, liabilities, charges, losses, expenses, and costs including the State's attorneys' fees (Liabilities), that may arise from, or by reason of: (1) any action or inaction by the Indemnities in connection with the issuance or denial of any permit, lease, or other entitlement; (2) as a result of approvals or authorizations given by the Board to the permittee pursuant to, or as a result of, permittee's permit application; (3) provisions of the issued permit or lease, provisions of CEQA, an environmental document certified or adopted by the Board related to the permit application, or any other regulations, requirements, or programs by the State, except for any such Liabilities caused solely by the gross negligence or intentional acts or the State or its officers, agents, and employees.

FOURTEEN: Permittee shall reimburse the Board in full for all reasonable costs and attorneys' fees, including, but not limited to, those charged to it by the California Office of Attorney General, that the Board incurs in connection with the defense of any action brought against the Board challenging this permit or any other matter related to this permit or the work performed by the State in its issuance of this permit. In addition, the permittee shall reimburse the Board for any court costs and reasonable attorneys' fees that the Board/Indemnities may be required by a court to pay as a result of such action. The permittee may participate in the defense of the action, but its participation shall not relieve it of its obligations under the conditions of this permit.

FIFTEEN: The Board and Department of Water Resources shall not be held liable for any damages to the permitted encroachment(s) resulting from releases of water from reservoirs, flood fight, operation, maintenance, inspection, or emergency repair.

AGENCY CONDITIONS

SIXTEEN: All work approved by this permit shall be in accordance with the submitted drawings and specifications dated September 2018 except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Board.

SEVENTEEN: Permittee shall pay to the Board, an inspection fee(s) to cover inspection cost(s), including staff and/or consultant time and expenses, for any inspections before, during, post-construction, and regularly thereafter as deemed necessary by the Board.

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

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

TWENTY: The permittee shall comply with all conditions set forth in the letter from the Department of the Army (U.S. Army Corps of Engineers, Sacramento District, dated xxx, 2019, which is attached to this permit as Exhibit A and is incorporated by reference.

TWENTY-ONE: The permittee agrees to notify new property/encroachment owner(s) that they are required to submit a permit Name Change request form to the Board upon completion of the sale. The new owner(s) will be required to comply with all permit conditions. Name Change forms are available at http://cvfpb.ca.gov/

TWENTY-TWO: The Board reserves the right to add additional, or modify existing, conditions when there is a change in ownership and/or maintenance responsibility of the work authorized under this permit.

PRE-CONSTRUCTION

TWENTY-THREE: Upon receipt of a signed copy of the issued permit the permittee shall contact the Board by telephone at (916) 574-0609, and submit the enclosed postcard, to schedule a preconstruction conference with the inspector that is assigned to your project. Failure to do so at least 10 working days prior to start of work may result in a delay of the project.

CONSTRUCTION

TWENTY-FOUR: No construction work of any kind shall be done during the flood season from November 1 to July 15 without prior approval of the Board. Failure to submit a Time Variance Request to the Board at least 10 working days prior to November 1 may result in a delay of the project.

TWENTY-FIVE: Any excavations made in the levee section or within 10 feet of the levee toes shall be backfilled in 4- to 6-inch layers with impervious material with 20 percent or more passing the No. 200 sieve, a plasticity index of 8 or more, and a liquid limit of less than 50 and free of lumps or stones exceeding 3 inches in greatest dimension, vegetative matter, or other unsatisfactory material. Backfill material shall be compacted in 4- to 6-inch layers to a minimum of 90 percent relative compaction as measured by the current ASTM D1557 standard.

TWENTY-SIX: Compaction tests by a certified soils laboratory will be required to verify compaction of backfill within the levee section or within 10 feet of the levee toe.

POST-CONSTRUCTION

TWENTY-SEVEN: All debris generated by this project shall be properly disposed of outside the San Joaquin river Floodway and off all Project Works and project right-of-way.

TWENTY-EIGHT: The levee shall be restored to at least the condition that existed prior to commencement of work.

TWENTY-NINE: Upon completion of the project, the permittee shall submit as-constructed drawings to the Board and to: Department of Water Resources, Flood Project Inspection Section, 3310 El Camino Avenue, Suite 256, Sacramento, California 95821.

OPERATIONS AND MAINTENANCE

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

THIRTY-ONE: The permittee shall maintain the permitted encroachment(s) and the Project Works within the utilized area in the manner required and as requested by the authorized representative of the Board, Department of Water Resources, or any other agency responsible for maintenance and shall, at all times, allow officials from these agencies to access the levee, levee slope, and any adjacent areas as necessary for flood control.

THIRTY-TWO: The permitted encroachment(s) shall not interfere with the operation and maintenance of the flood control project. If the permitted encroachment(s) are determined by any agency responsible for operation or maintenance of the flood control project to interfere, the permittee shall be required, at permittee's cost and expense, to modify or remove the permitted encroachment(s) within 30-days of being notified in writing by the Board. In the event of an emergency a shorter timeframe may be required. If the permittee does not comply, the Board, or a designated agency or company authorized by the Board, may modify or remove the encroachment(s) at the permittee's

expense.

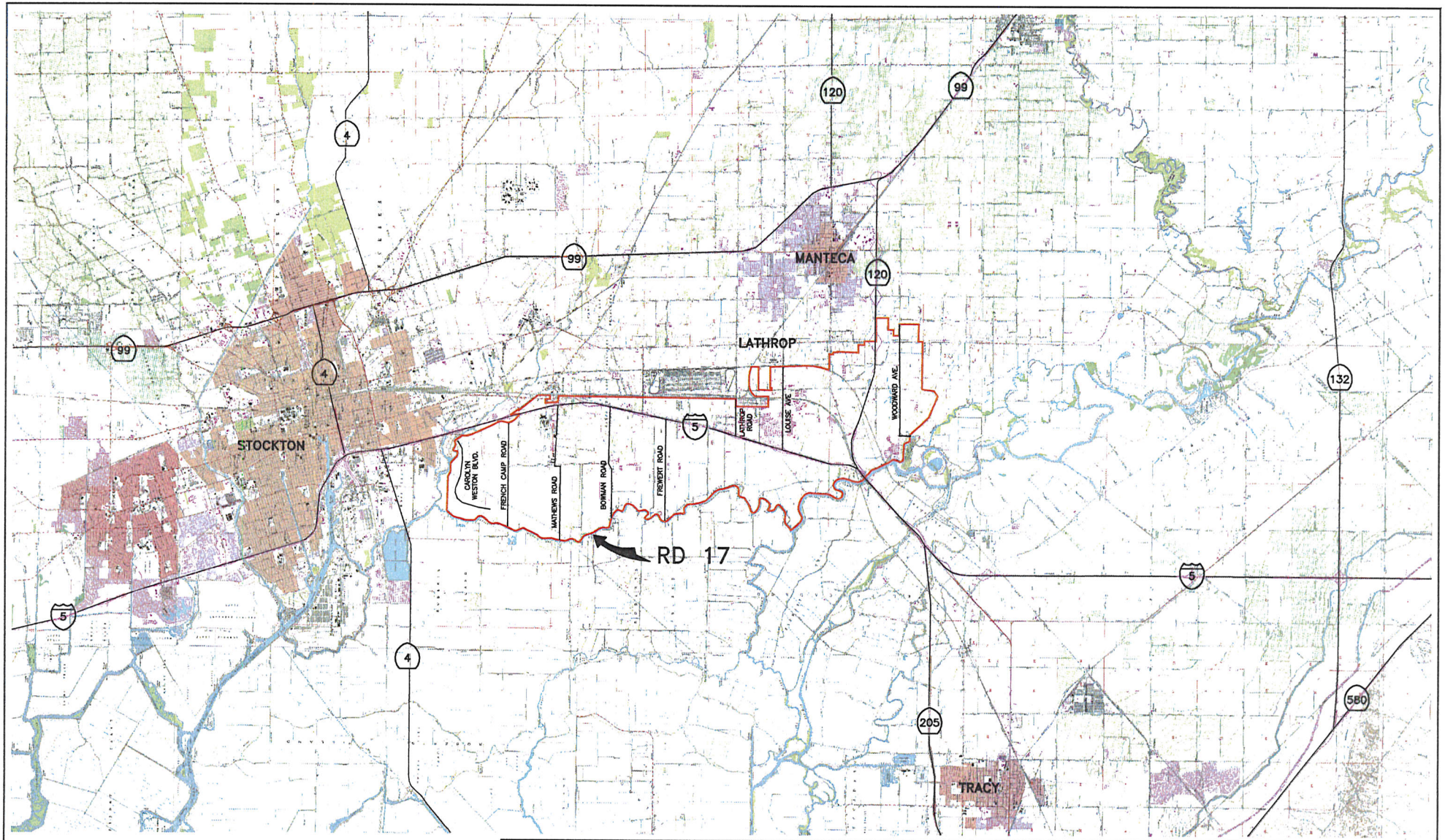
PROJECT ABANDONMENT / CHANGE IN PLAN OF FLOOD CONTROL

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

THIRTY-FOUR: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted encroachment(s) if in the discretion of the Board the 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 the project is not maintained or is damaged by any cause. The permittee shall remove the encroachment(s) within 30-days of being notified in writing by the Board. In the event of an emergency a shorter timeframe may be required. If the permittee does not comply the Board will remove the encroachment(s) at the permittee's expense.

END OF CONDITIONS

Attachment B: Repair Work Maps



KSN INC. KJELDSEN SINNOCK NEUDECK
Consulting Engineers and Land Surveyors
Post Office Box 844
711 N. Pershing Avenue
Stockton, CA 95201-0844
Office: (209) 946-0268
Faxes: (209) 946-0296
E-mail: KSN@ksninc.com

RECLAMATION DISTRICT NO. 17
MOSSDALE TRACT

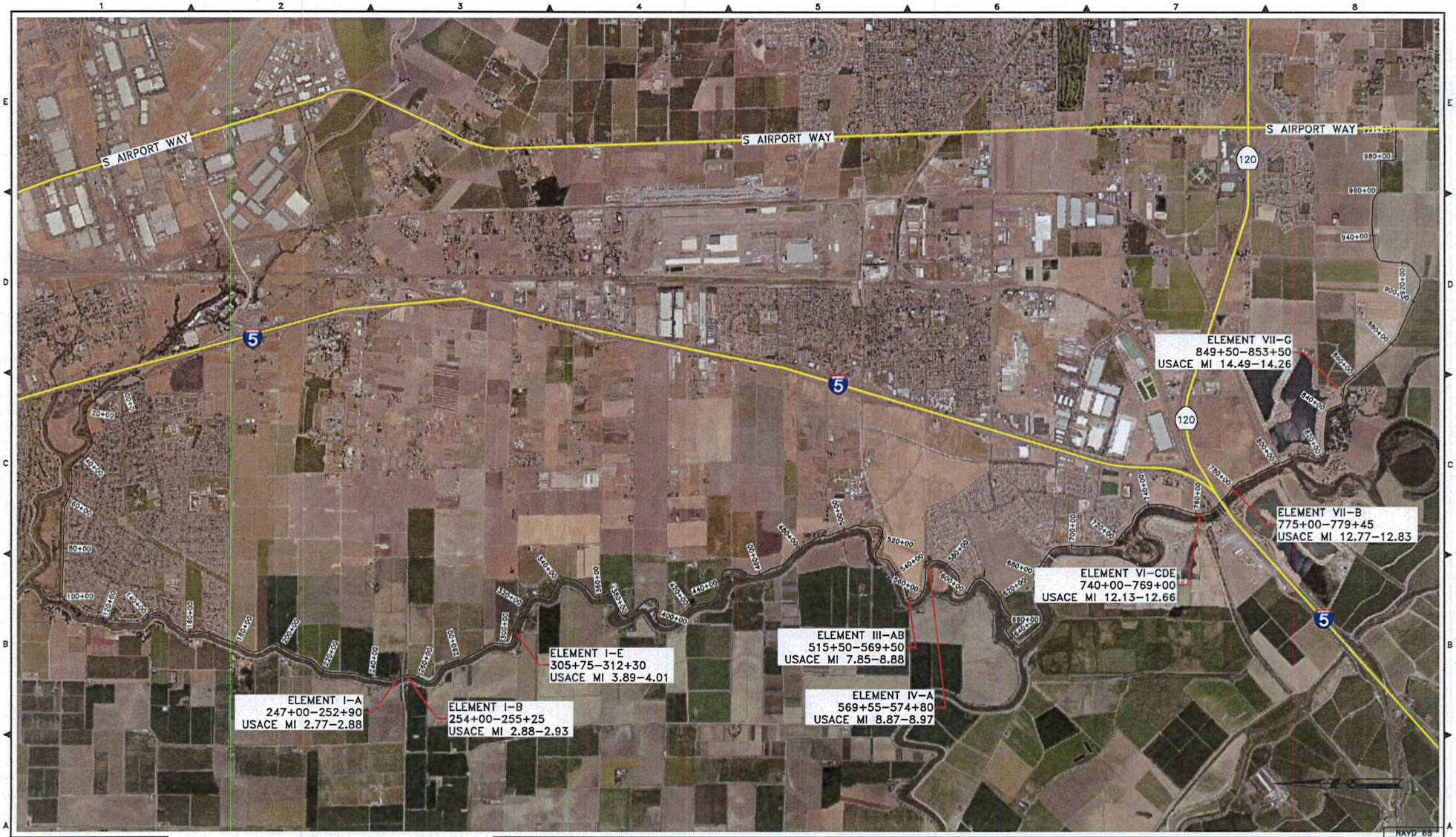
VICINITY MAP

Revisions				
No.	Description	Date	By	Aprvd. By

Design
Drawn JAM
Check CHN

Scale 1" = 5000'
Original Drawing Scale 0 ½" 1"

Date MAY 2008
Sheet Number 1 Of 1
Project File No. 0856-0020



Submittal	
%	Date

CALL BEFORE YOU DIG
1-800-227-2600
UNDERGROUND SERVICE ALERT

KSN INC. KJELDSEN SINNOCK NEUDECK
Civil Engineers and Land Surveyors
Post Office Box 844
711 N. Pershing Avenue
Stockton, CA 95201-0844
Office: (209) 946-0268
Faxes: (209) 946-0296
E-mail: KSN@ksninc.com

RECLAMATION DISTRICT 17
MOSSDALE TRACT
SAN JOAQUIN COUNTY, CALIFORNIA

LEVEE SEEPAGE REPAIR PROJECT - PH 3
CATEGORICAL PERMISSION SITES

Revisions				
No.	Description	Date	By	Aprvd. By

Design	JAM
Drawn	JOB
Check	JAM
Scale	NTS
Original Drawing Scale	0 ½" 1"
Date	JULY 2019
Sheet Number	1 Of 1
Project File No.	0856-0450

FILE SPEC: P:\0856-Mossdale\0450_Phase_III_Levee_Seepage_Repair_Project\08-001_Categorical_Permission_Construction\08_Civil\400_Plans\020_CAD\R017_Cat_Perm_Map.dwg
PLOT DATE: Aug 15, 2019 - 3:26pm

Attachment C: Repair Work Plans

CONTROL POINTS

P# 87975- N=2142549.562 E=6321677.582 ELEV=23.40 3/4" IP ON LEVEE
P#87976- N=2142995.032 E=6321742.157 ELEV=23.05 3/4" IP ON LEVEE
P#87977- N=2143545.552 E=6321542.916 ELEV=22.99 3/4" IP ON LEVEE
ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

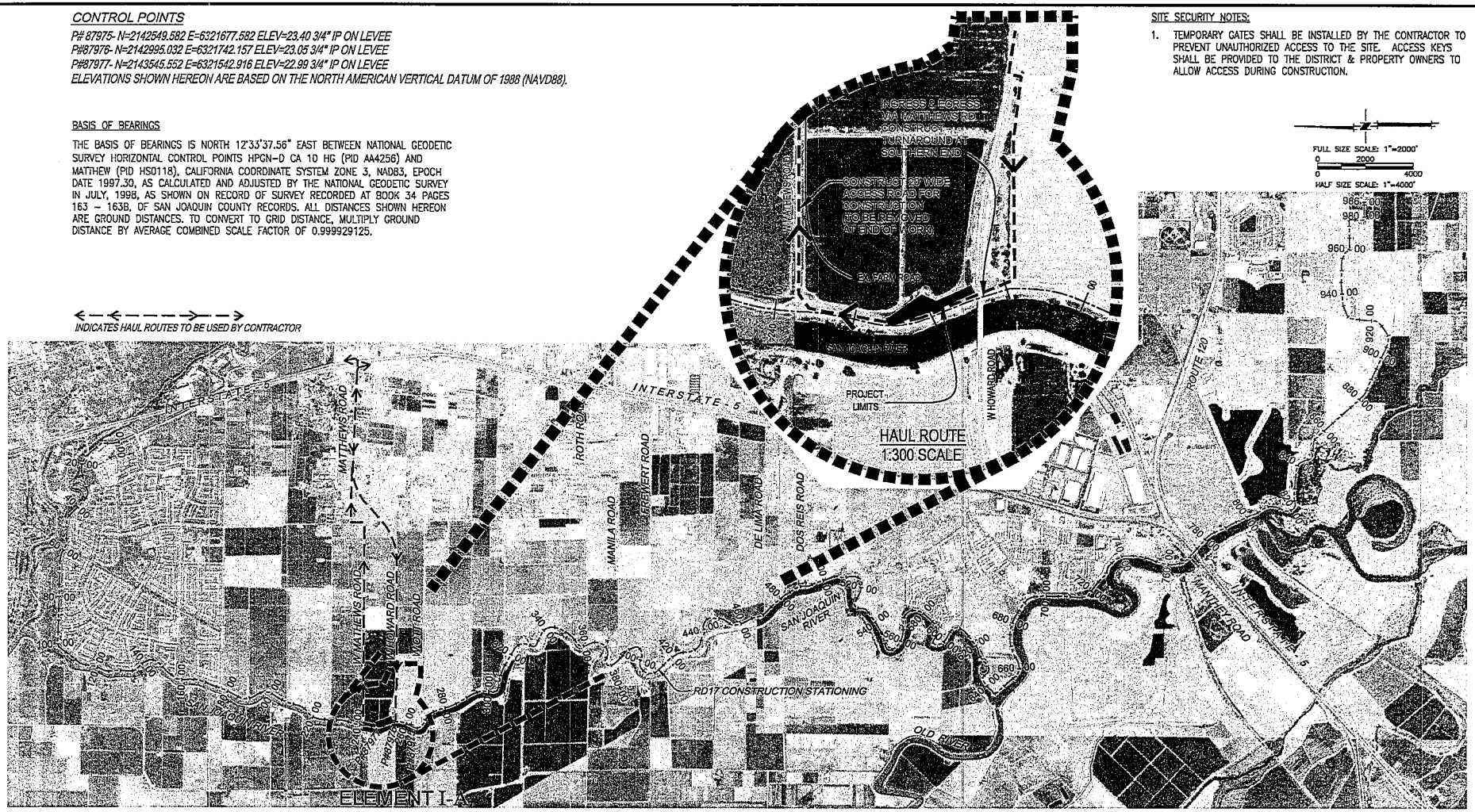
BASIS OF BEARINGS

THE BASIS OF BEARINGS IS NORTH 12°33'37.56" EAST BETWEEN NATIONAL GEODETIC SURVEY HORIZONTAL CONTROL POINTS HPGN-D CA 10 HG (PID AA4256) AND MATTHEW (PID HS0118), CALIFORNIA COORDINATE SYSTEM ZONE 3, NAD83, EPOCH DATE 1997.30, AS CALCULATED AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JULY, 1998, AS SHOWN ON RECORD OF SURVEY RECORDED AT BOOK 34 PAGES 163 – 163B, OF SAN JOAQUIN COUNTY RECORDS. ALL DISTANCES SHOWN HEREON ARE GROUND DISTANCES. TO CONVERT TO GRID DISTANCE, MULTIPLY GROUND DISTANCE BY AVERAGE COMBINED SCALE FACTOR OF 0.999929125.

SITE SECURITY NOTES:

1. TEMPORARY GATES SHALL BE INSTALLED BY THE CONTRACTOR TO PREVENT UNAUTHORIZED ACCESS TO THE SITE. ACCESS KEYS SHALL BE PROVIDED TO THE DISTRICT & PROPERTY OWNERS TO ALLOW ACCESS DURING CONSTRUCTION.

INDICATES HAUL ROUTES TO BE USED BY CONTRACTOR



REVIEWED AND APPROVED BY:
KSN KJELDSEN SINNOCK NEUDECK INC. Consulting Engineers and Land Surveyors
Post Office Box 844, 711 N. Pershing Avenue, Stockton, CA 95201-0844
Office: (209) 946-0268, Fax: (209) 946-0296, E-mail: KSN@ksninc.com

THIS PLAN CONFORMS TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

PREPARED UNDER THE DIRECTION OF:
MacKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
5142 Franklin Drive, Suite B, Pleasanton, CA 94588 (925) 225-0690
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RECLAMATION DISTRICT NO. 17
ELEMENT I-A
HAUL ROUTE & CONTROL POINTS

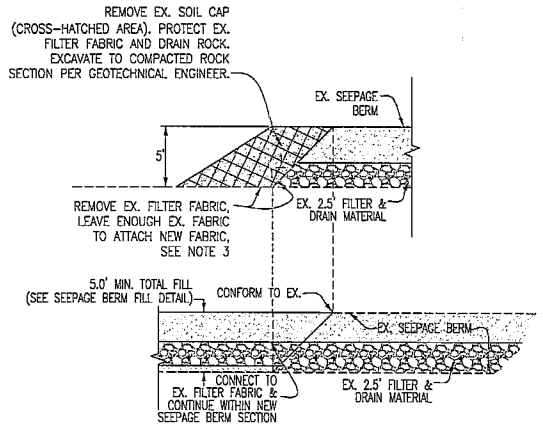
SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

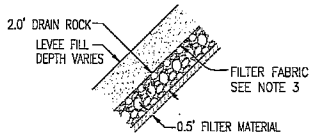
DATE: SEPT 2018
SCALE: AS NOTED
DRAWN BY: RTH
DESIGNED BY: JPG
CHECKED BY: CWG

PROJECT NO. 25182.010
SHT 4 OF 10

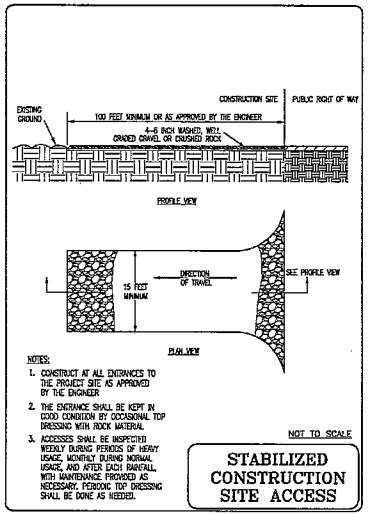
01-22-2018 1:51pm Rich Hoist P:\25182_IA - SEEPAGE BERM\F-01.DWG



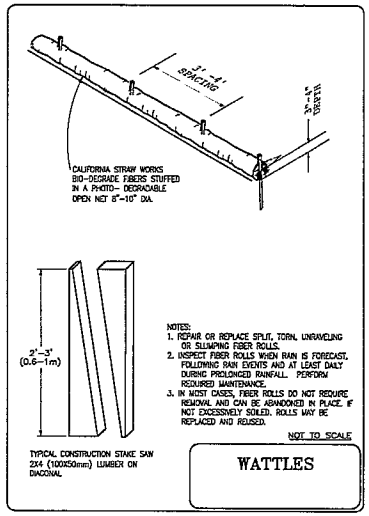
SECTION D-D: BERM CONFORM
NTS



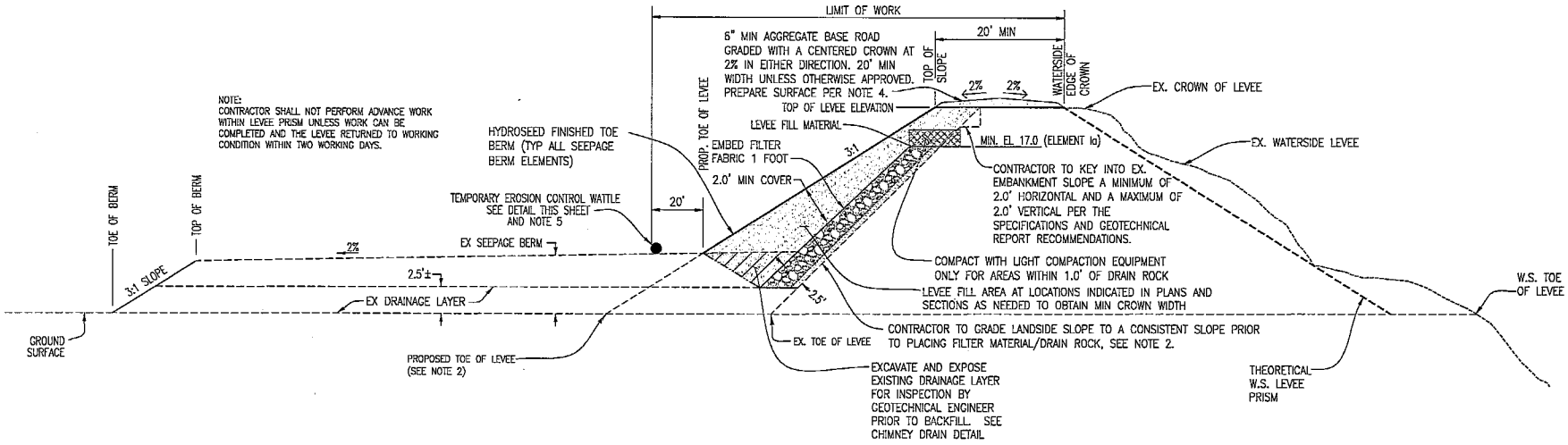
CHIMNEY DRAIN DETAIL
NTS



STABILIZED CONSTRUCTION SITE ACCESS



WATTLES



SECTION E-E: CHIMNEY DRAIN CONNECTION
NTS

REVIEWED AND APPROVED BY:
KJELDSEN SINNOCK NEUDECK INC.
Consulting Engineers and Land Surveyors
Post Office Box 844
711 N. Pershing Avenue
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Office: (209) 946-0268
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E-mail: KSN@ksninc.com

THIS PLAN CONFORMS TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

PREPARED UNDER THE DIRECTION OF:
MacKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
5142 Franklin Drive, Suite B, Pleasanton, CA 94588 (925) 225-0690
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RECLAMATION DISTRICT NO. 17
ELEMENT I-A
TYPICAL SECTIONS & DETAILS
SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

DATE: SEPT 2018
SCALE: NTS
DRAWN BY: RTH
DESIGNED BY: JPG
CHECKED BY: CWG
PROJECT NO. 25182.010
SHT 6 OF 10

01-22-2019 1:51pm Rita Hall P:\25182_1A - SEEPAGE BERM\P-25-06.DWG

CONTROL POINTS

P# 87975- N=2142549.582 E=6321677.582 ELEV=23.40 3/4" IP ON LEVEE
P# 87976- N=2142995.032 E=6321742.157 ELEV=23.05 3/4" IP ON LEVEE
P# 87977- N=2143545.552 E=6321542.916 ELEV=22.99 3/4" IP ON LEVEE
ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

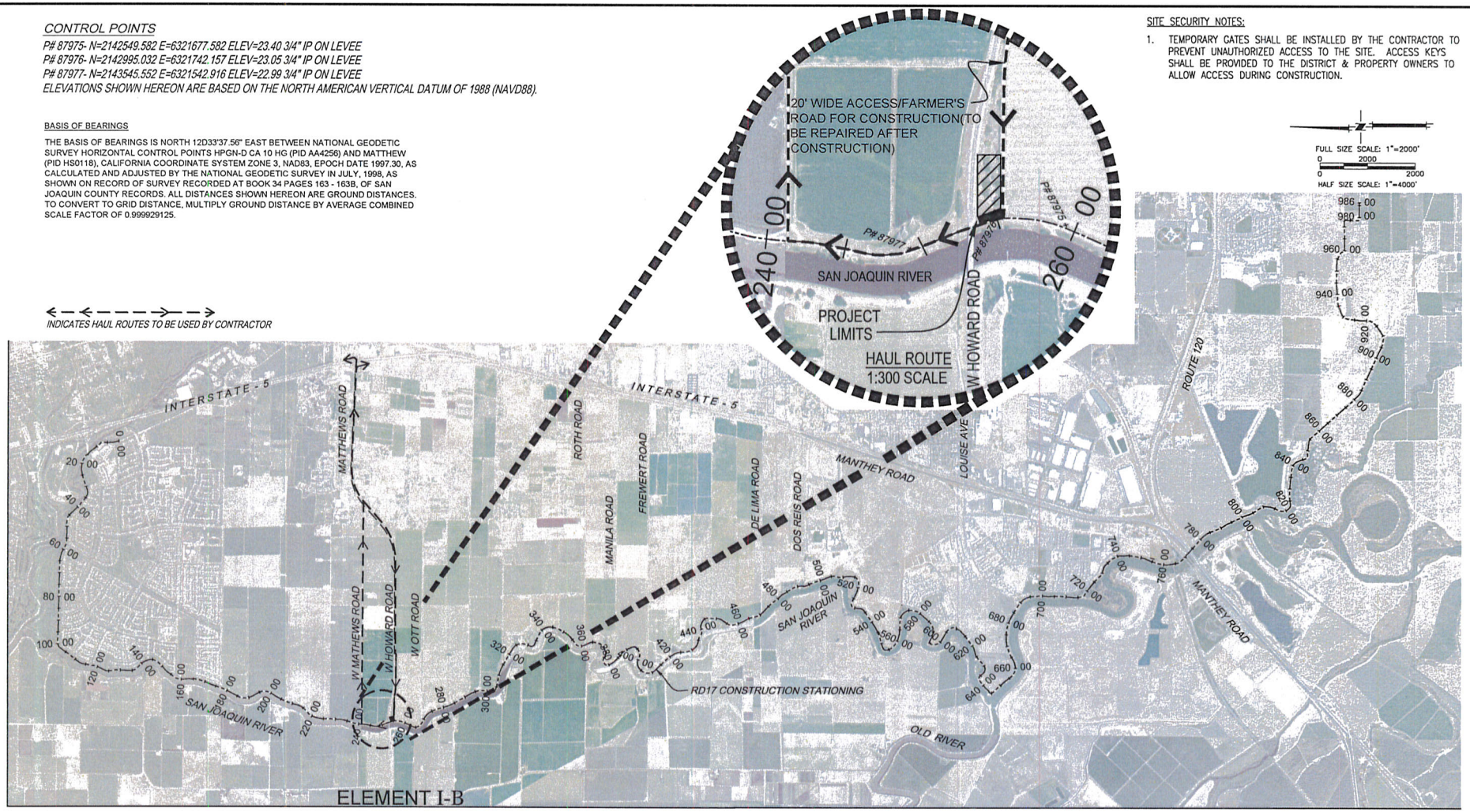
BASIS OF BEARINGS

THE BASIS OF BEARINGS IS NORTH 12D33'37.56" EAST BETWEEN NATIONAL GEODETIC SURVEY HORIZONTAL CONTROL POINTS HPGN-D CA 10 HG (PID AA4256) AND MATTHEW (PID HS0118), CALIFORNIA COORDINATE SYSTEM ZONE 3, NAD83, EPOCH DATE 1997.30, AS CALCULATED AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JULY, 1998, AS SHOWN ON RECORD OF SURVEY RECORDED AT BOOK 34 PAGES 163 - 163B, OF SAN JOAQUIN COUNTY RECORDS. ALL DISTANCES SHOWN HEREON ARE GROUND DISTANCES. TO CONVERT TO GRID DISTANCE, MULTIPLY GROUND DISTANCE BY AVERAGE COMBINED SCALE FACTOR OF 0.999929125.

SITE SECURITY NOTES:

1. TEMPORARY GATES SHALL BE INSTALLED BY THE CONTRACTOR TO PREVENT UNAUTHORIZED ACCESS TO THE SITE. ACCESS KEYS SHALL BE PROVIDED TO THE DISTRICT & PROPERTY OWNERS TO ALLOW ACCESS DURING CONSTRUCTION.

INDICATES HAUL ROUTES TO BE USED BY CONTRACTOR



REVIEWED AND APPROVED BY:
CHRISTOPHER N. NEUDECK, NO. 43473, CIVIL, STATE OF CALIFORNIA
KJELDSEN SINNOCK NEUDECK INC. — Consulting Engineers and Land Surveyors
Post Office Box 844, 711 N. Pershing Avenue, Stockton, CA 95201-0844
Office: (209) 946-0268, Faxes: (209) 946-0296, E-mail: KSN@ksninc.com

JOSEF E. TOOTLE, No. 2677, GEOTECHNICAL, STATE OF CALIFORNIA
THIS PLAN CONFORMS TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

JAMES F. TEMPLEMAN, No. 43061, CIVIL, STATE OF CALIFORNIA
PREPARED UNDER THE DIRECTION OF:
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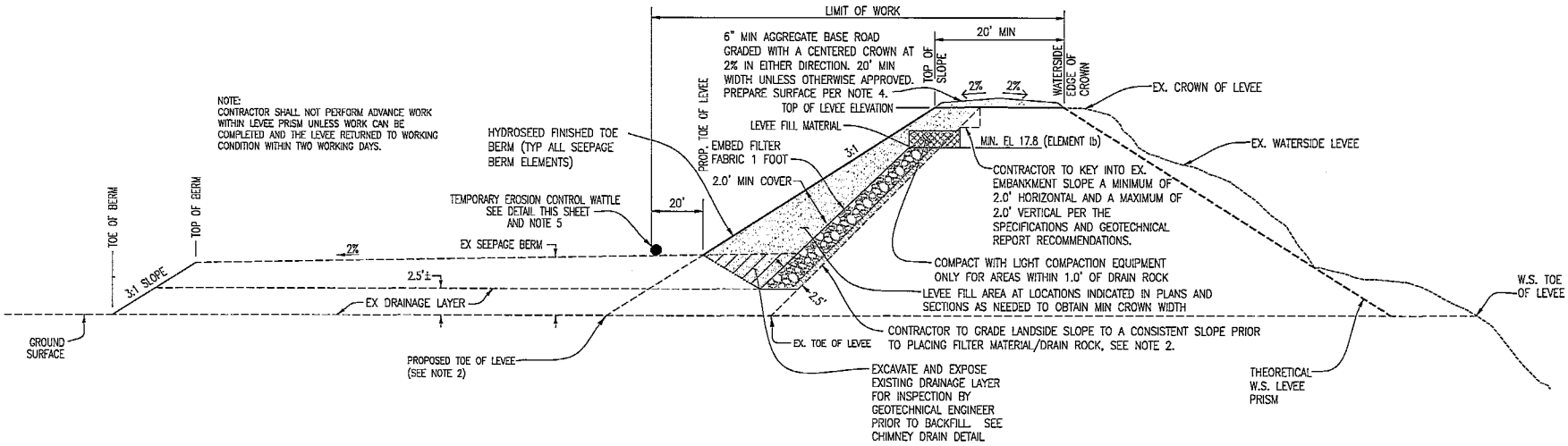
RECLAMATION DISTRICT NO. 17
ELEMENT I-B
STATIONING MAP / HAUL ROUTES
SAN JOAQUIN COUNTY — CALIFORNIA

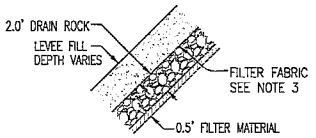
NO.	REVISION	DATE

DATE: SEPT 2018
SCALE: AS NOTED
DRAWN BY: JPG
DESIGNED BY: JBM
CHECKED BY: CWG
PROJECT NO. 25182.010
SHT 4 OF 8

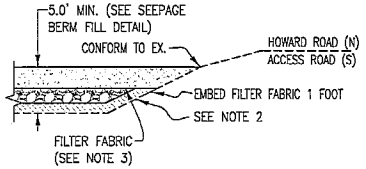
01-22-2019 1:56pm Rick Hall P:\25182_18 - SEEPAGE REMV\P-04HAUL.DWG



SECTION B–B: CHIMNEY DRAIN CONNECTION
NTS



CHIMNEY DRAIN DETAIL
NTS



SECTION A–A: END OF BERM TRANSITION
NTS

NOTES:

1. RD17 RIGHT OF WAY EXTENDS FROM THE SAN JOAQUIN RIVER WATER'S EDGE (AT ORDINARY HIGH WATER) TO THE PROPOSED RD17 RIGHT OF WAY SHOWN ABOVE AND ON THE DETAILED CROSS-SECTIONS WITHIN THIS PLAN SET. TEMPORARY CONSTRUCTION EASEMENTS WILL BE OBTAINED BY RD17 TO COVER THE LIMITS OF WORK AS SHOWN.
2. CONTRACTOR TO CLEAR AND GRUB WORKING AREAS. SCARIFY AND RECOMPACT EXISTING GROUND WORKING AREAS PER GEOTECHNICAL ENGINEER'S RECOMMENDATION. SUBGRADE SHALL BE GRADED FLAT OR WITH POSITIVE FALL AWAY FROM THE LEVEE SUCH THAT THE TOE OF THE SEEPAGE BERM IS SET AT THE EXISTING GROUND SURFACE.
3. ALL FILTER FABRIC SHALL BE MIRAFI FW700 OR APPROVED EQUAL. EDGES SHALL BE SEWN PER SPECIFICATIONS.
4. STRIP AND STOCKPILE EX. AB AS APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. EACH LAYER OF AB PLACED SHALL BE NO LESS THAN 95% COMPACTION.
5. PLACE WATTLES ALONG THE LIMIT OF THE TEMPORARY CONSTRUCTION EASEMENT PRIOR TO BEGINNING WORK, ALL SUBSEQUENT EROSION CONTROL MEASURES SHALL BE INSTALLED PER THE PROVISIONS OF THE SWPPP.
6. GRADE SUBGRADE TO UNIFORM SLOPE (0–2%) TO ENSURE CONSISTENT UNIFORM BERM LAYER THICKNESS.
7. CONTRACTOR TO COMPACT FILL ABOVE DRAINAGE SECTION IN A MANNER THAT MAINTAINS THE INTEGRITY OF THE FILTER AND DRAIN ROCK.

REVIEWED AND APPROVED BY:
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RECLAMATION DISTRICT NO. 17
ELEMENT I-B
TYPICAL SECTIONS & DETAILS

SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

DATE: SEPT 2018
SCALE: NTS
DRAWN BY: JPG
DESIGNED BY: JBM
CHECKED BY: CWG

PROJECT NO. 25182.010
SHT 5 OF 8

01-22-2019 1:56pm Ron Held P:\25182\1_18 - SEEPAGE BERM\P-25-04-DETAILS.DWG

CONTROL POINTS

P87978 - N=2138518.817 E=6323883.306 ELEV=24.85 IRON PIPE ON LEVEE
P87979 - N=2138711.925 E=6323078.145 ELEV=25.11 IRON PIPE ON LEVEE
P87980 - N=2139379.183 E=6323030.916 ELEV=24.08 IRON PIPE ON LEVEE

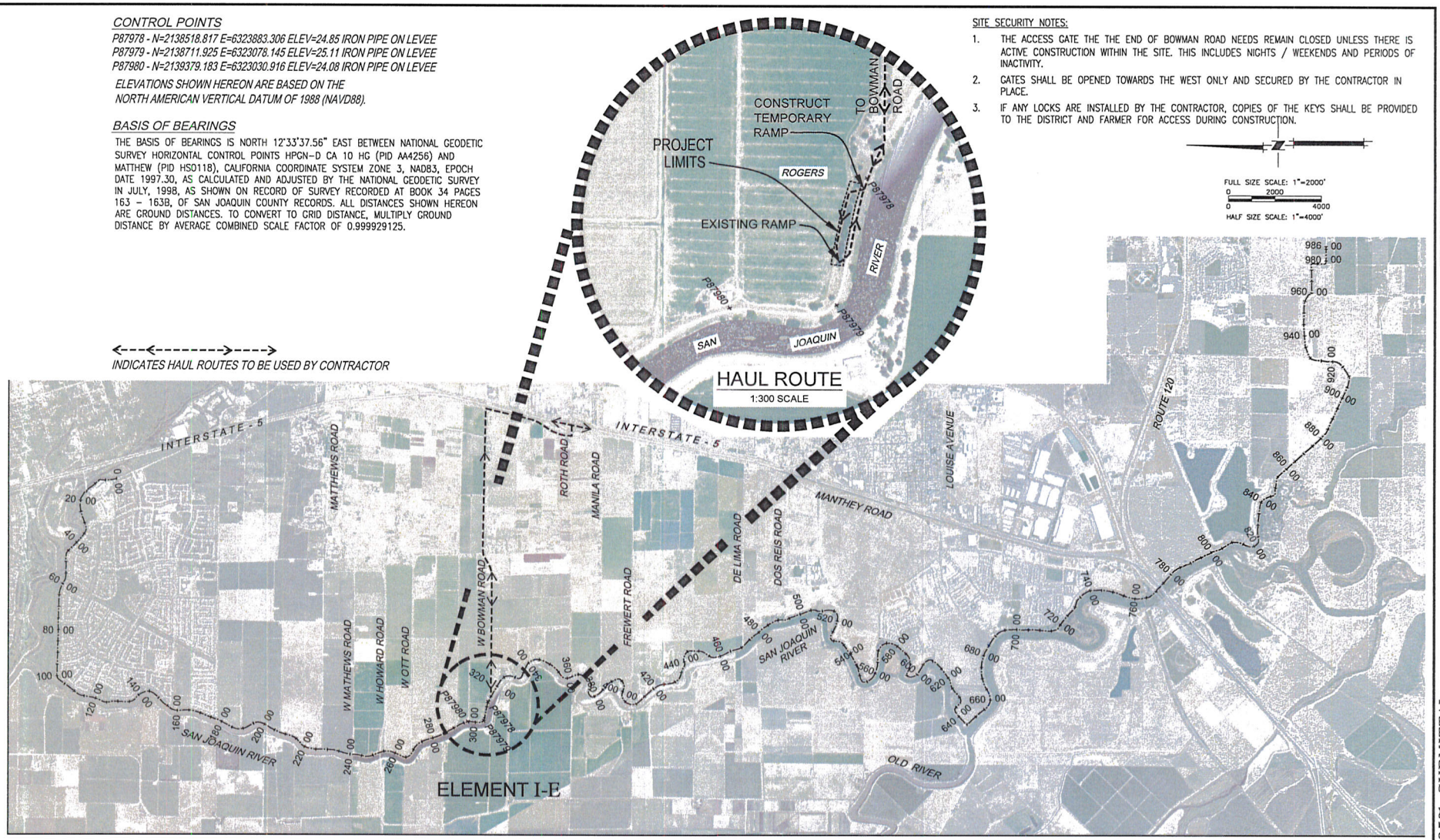
ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

BASIS OF BEARINGS

THE BASIS OF BEARINGS IS NORTH 12°33'37.56" EAST BETWEEN NATIONAL GEODETIC SURVEY HORIZONTAL CONTROL POINTS HPGN-D CA 10 HG (PID AA4256) AND MATTHEW (PID HS0118), CALIFORNIA COORDINATE SYSTEM ZONE 3, NAD83, EPOCH DATE 1997.30, AS CALCULATED AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JULY, 1998, AS SHOWN ON RECORD OF SURVEY RECORDED AT BOOK 34 PAGES 163 – 163B, OF SAN JOAQUIN COUNTY RECORDS. ALL DISTANCES SHOWN HEREON ARE GROUND DISTANCES. TO CONVERT TO GRID DISTANCE, MULTIPLY GROUND DISTANCE BY AVERAGE COMBINED SCALE FACTOR OF 0.999929125.

SITE SECURITY NOTES:

1. THE ACCESS GATE THE THE END OF BOWMAN ROAD NEEDS REMAIN CLOSED UNLESS THERE IS ACTIVE CONSTRUCTION WITHIN THE SITE. THIS INCLUDES NIGHTS / WEEKENDS AND PERIODS OF INACTIVITY.
2. GATES SHALL BE OPENED TOWARDS THE WEST ONLY AND SECURED BY THE CONTRACTOR IN PLACE.
3. IF ANY LOCKS ARE INSTALLED BY THE CONTRACTOR, COPIES OF THE KEYS SHALL BE PROVIDED TO THE DISTRICT AND FARMER FOR ACCESS DURING CONSTRUCTION.



FULL SIZE SCALE: 1"=2000'
0 2000
0 4000
HALF SIZE SCALE: 1"=4000'

REVIEWED AND APPROVED BY:
CHRISTOPHER M. NEUDECK, No. 43473, CIVIL, STATE OF CALIFORNIA
KSN INC. KJELDSEN SINNOCK NEUDECK
Consulting Engineers and Land Surveyors
Post Office Box 844
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JOSEF TOOTE, No. 2677, GEOTECHNICAL, REGISTERED PROFESSIONAL ENGINEER, STATE OF CALIFORNIA

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ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

JAMES J. TEMPLETON JR., No. 43061, CIVIL, REGISTERED PROFESSIONAL ENGINEER, STATE OF CALIFORNIA

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RECLAMATION DISTRICT NO. 17
ELEMENT I-E
STATIONING MAP / HAUL ROUTES

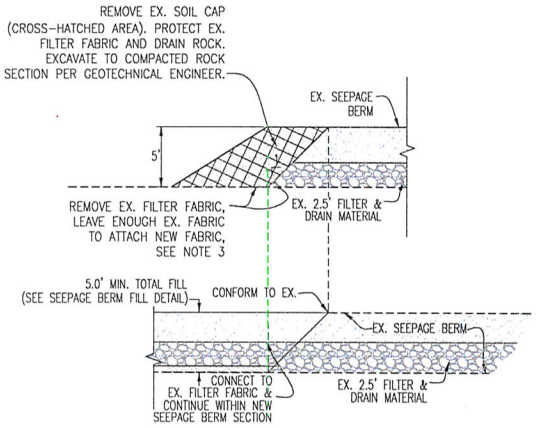
SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

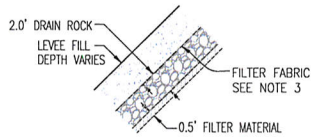
DATE: SEPT 2018
SCALE: 1"=4000'
DRAWN BY: RTH
DESIGNED BY: JBM
CHECKED BY: CWG

PROJECT NO. 25182.010
SHT 4 OF 8

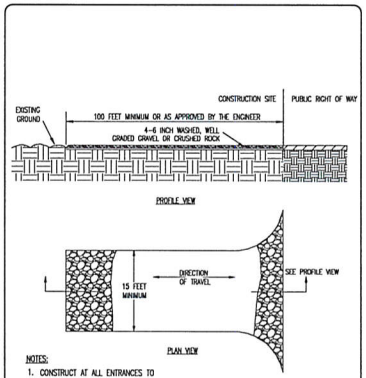
01-22-2019 2:00pm Rick Hall P:\25182_IE - SEEPAGE BERM\P-04.DWG



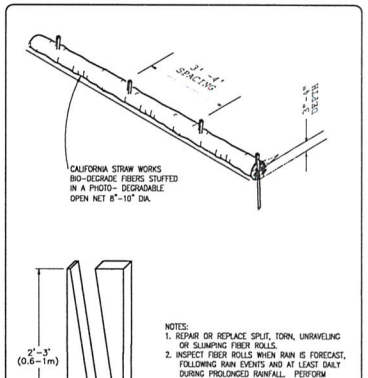
SECTION D-D: BERM CONFORM
NTS



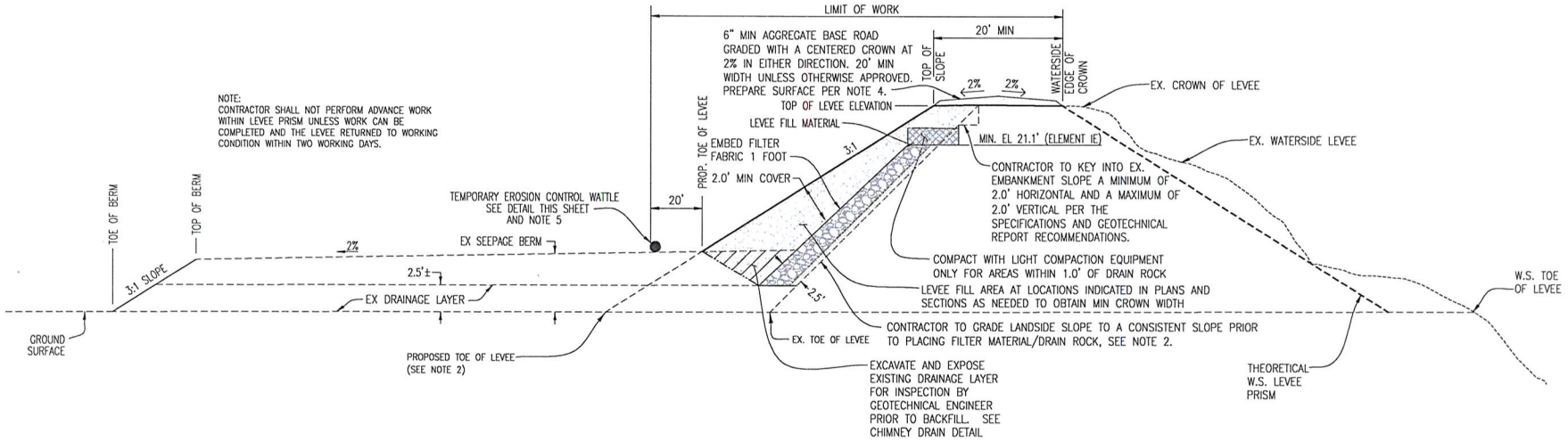
CHIMNEY DRAIN DETAIL
NTS



STABILIZED CONSTRUCTION SITE ACCESS



WATTLES



SECTION E-E: CHIMNEY DRAIN CONNECTION
NTS

REVIEWED AND APPROVED BY:
REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER N. NEUDECK No. 43473 CIVIL STATE OF CALIFORNIA
KSN KJELDSEN SINNOCK NEUDECK INC. Consulting Engineers and Land Surveyors
Post Office Box 844, 711 N. Pershing Avenue, Stockton, CA 95201-0844
Office: (209) 946-0268, Faxes: (209) 946-0296, E-mail: KSN@ksninc.com

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REGISTERED PROFESSIONAL ENGINEER JOSEF TOOTLE No. 2677 GEOTECHNICAL STATE OF CALIFORNIA
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

PREPARED UNDER THE DIRECTION OF:
REGISTERED PROFESSIONAL ENGINEER JAMES F. TEMPLETON No.43061 CIVIL STATE OF CALIFORNIA
MacKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
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RECLAMATION DISTRICT NO. 17
ELEMENT I-E
TYPICAL SECTIONS & DETAILS

SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

DATE: SEPT 2018
SCALE: NTS
DRAWN BY: RTH
DESIGNED BY: JBM
CHECKED BY: CWG

PROJECT NO. 25182.010
SHT 6 OF 8

01-22-2019 2:00pm Rick Hall P:\25182_IE - SEEPAGE BERM\P-02-08 DET.DWG

CONTROL POINTS

P1- N=2122543.04 E= 6325219.83 START SEEPAGE BERM (CL STATION 548+50)
P2- N=2122122.44 E=6324847.61 END SEEPAGE BERM (CL STATION 555+70)
P3- N=2121651.90 E=6326694.72 FND REBAR L.S. 4876 PER TRACT MAP 3533
P4- N=2121650.91 E=6328675.89 FND IP L.S. 4876 PER TRACT MAP 3533

VERTICAL CONTROL POINTS

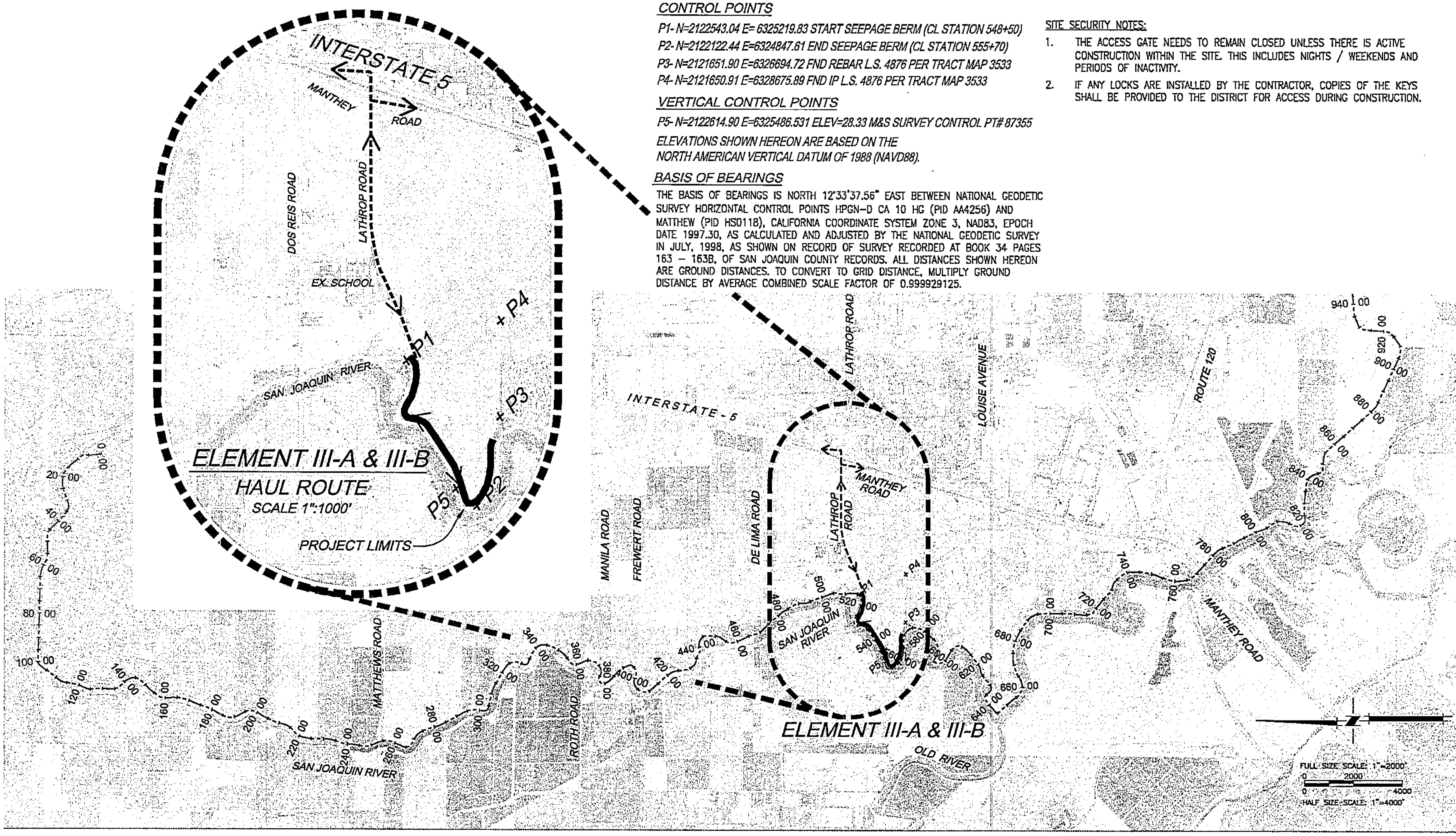
P5- N=2122614.90 E=6325486.531 ELEV=28.33 M&S SURVEY CONTROL PT# 87355
ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

BASIS OF BEARINGS

THE BASIS OF BEARINGS IS NORTH 12°33'37.56" EAST BETWEEN NATIONAL GEODETIC SURVEY HORIZONTAL CONTROL POINTS HPGN-D CA 10 HG (PID AA4256) AND MATTHEW (PID HS0118), CALIFORNIA COORDINATE SYSTEM ZONE 3, NAD83, EPOCH DATE 1997.30, AS CALCULATED AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JULY, 1998, AS SHOWN ON RECORD OF SURVEY RECORDED AT BOOK 34 PAGES 163 – 163B, OF SAN JOAQUIN COUNTY RECORDS. ALL DISTANCES SHOWN HEREON ARE GROUND DISTANCES. TO CONVERT TO GRID DISTANCE, MULTIPLY GROUND DISTANCE BY AVERAGE COMBINED SCALE FACTOR OF 0.999929125.

SITE SECURITY NOTES:

1. THE ACCESS GATE NEEDS TO REMAIN CLOSED UNLESS THERE IS ACTIVE CONSTRUCTION WITHIN THE SITE. THIS INCLUDES NIGHTS / WEEKENDS AND PERIODS OF INACTIVITY.
2. IF ANY LOCKS ARE INSTALLED BY THE CONTRACTOR, COPIES OF THE KEYS SHALL BE PROVIDED TO THE DISTRICT FOR ACCESS DURING CONSTRUCTION.



INDICATES HAUL ROUTES TO BE USED BY CONTRACTOR

REVIEWED AND APPROVED BY: KJELDSEN SINNOCK NEUDECK INC. Consulting Engineers and Land Surveyors, Post Office Box 844, 711 N. Pershing Avenue, Stockton, CA 95201-0844, Office: (209) 946-0268, Faxes: (209) 946-0296, E-mail: KSN@ksninc.com

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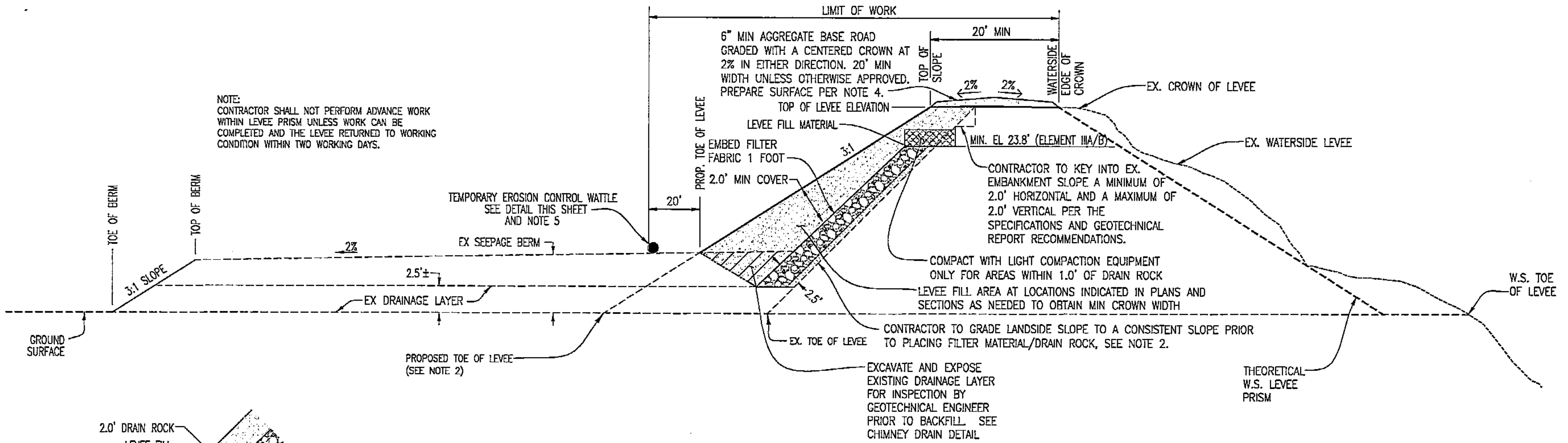
ENGEO INCORPORATED — EXCELLENT SERVICE SINCE 1971

PREPARED UNDER THE DIRECTION OF: MACKAY & SOMPS ENGINEERS PLANNERS SURVEYORS, 5142 Franklin Drive, Suite B, Pleasanton, CA 94588 (925) 225-0690

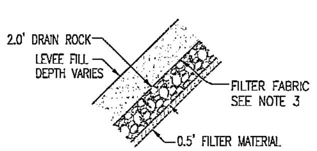
RECLAMATION DISTRICT NO. 17
ELEMENT III-A & III-B
HAUL ROUTE & CONTROL POINTS
SAN JOAQUIN COUNTY — CALIFORNIA

DATE:	SEPT 2018
SCALE:	AS NOTED
DRAWN BY:	RTH
DESIGNED BY:	JBM
CHECKED BY:	CWG
PROJECT NO.	25182.010
SHT	4 OF 19


LIMIT OF WORK
20' MIN
6" MIN AGGREGATE BASE ROAD GRADED WITH A CENTERED CROWN AT 2% IN EITHER DIRECTION. 20' MIN WIDTH UNLESS OTHERWISE APPROVED. PREPARE SURFACE PER NOTE 4.
TOP OF SLOPE
WATERSIDE EDGE OF CROWN
2%
2%
EX. CROWN OF LEVEE
TOP OF LEVEE ELEVATION
LEVEE FILL MATERIAL
MIN. EL 23.8' (ELEMENT IIIA/B)
EX. WATERSIDE LEVEE
PROP. TOE OF LEVEE
EMBED FILTER FABRIC 1 FOOT
2.0' MIN COVER
3:1
CONTRACTOR TO KEY INTO EX. EMBANKMENT SLOPE A MINIMUM OF 2.0' HORIZONTAL AND A MAXIMUM OF 2.0' VERTICAL PER THE SPECIFICATIONS AND GEOTECHNICAL REPORT RECOMMENDATIONS.
NOTE:
CONTRACTOR SHALL NOT PERFORM ADVANCE WORK WITHIN LEVEE PRISM UNLESS WORK CAN BE COMPLETED AND THE LEVEE RETURNED TO WORKING CONDITION WITHIN TWO WORKING DAYS.
TOE OF BERM
TOP OF BERM
TEMPORARY EROSION CONTROL WATTLE SEE DETAIL THIS SHEET AND NOTE 5
20'
EX SEEPAGE BERM
2%
3:1 SLOPE
2.5'±
EX DRAINAGE LAYER
COMPACT WITH LIGHT COMPACTION EQUIPMENT ONLY FOR AREAS WITHIN 1.0' OF DRAIN ROCK
LEVEE FILL AREA AT LOCATIONS INDICATED IN PLANS AND SECTIONS AS NEEDED TO OBTAIN MIN CROWN WIDTH
2.5'
W.S. TOE OF LEVEE
GROUND SURFACE
CONTRACTOR TO GRADE LANDSIDE SLOPE TO A CONSISTENT SLOPE PRIOR TO PLACING FILTER MATERIAL/DRAIN ROCK, SEE NOTE 2.
EX. TOE OF LEVEE
PROPOSED TOE OF LEVEE (SEE NOTE 2)
EXCAVATE AND EXPOSE EXISTING DRAINAGE LAYER FOR INSPECTION BY GEOTECHNICAL ENGINEER PRIOR TO BACKFILL. SEE CHIMNEY DRAIN DETAIL
THEORETICAL W.S. LEVEE PRISM

SECTION A-A: STATION 515+50 THRU 569+50

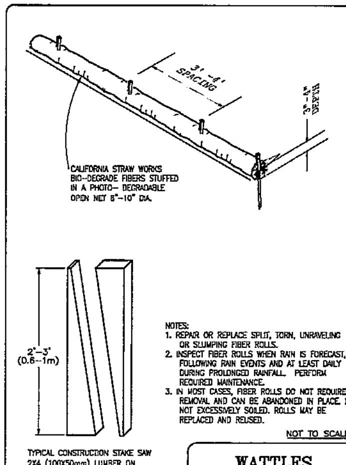
NTS



CHIMNEY DRAIN DETAIL

NTS

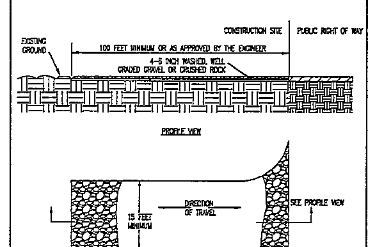
NOTES:
1. RD17 RIGHT OF WAY EXTENDS FROM THE SAN JOAQUIN RIVER WATER'S EDGE (AT ORDINARY HIGH WATER) TO THE PROPOSED RD17 RIGHT OF WAY SHOWN ABOVE AND ON THE DETAILED CROSS-SECTIONS WITHIN THIS PLAN SET. TEMPORARY CONSTRUCTION EASEMENTS WILL BE OBTAINED BY RD17 TO COVER THE LIMITS OF WORK AS SHOWN.
2. CONTRACTOR TO CLEAR AND GRUB WORKING AREAS. SCARIFY AND RECOMPACT EXISTING GROUND WORKING AREAS PER GEOTECHNICAL ENGINEER'S RECOMMENDATION. SUBGRADE SHALL BE GRADED FLAT OR WITH POSITIVE FALL AWAY FROM THE LEVEE SUCH THAT THE TOE OF THE LEVEE IS SET AT THE EXISTING GROUND SURFACE.
3. ALL FILTER FABRIC SHALL BE MIRAFI FW700 OR APPROVED EQUAL. EDGES SHALL BE SEWN PER SPECIFICATIONS.
4. STRIP AND STOCKPILE EX. AB AS APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. EACH LAYER OF AB PLACED SHALL BE NO LESS THAN 95% COMPACTION.
5. PLACE WATTLES ALONG THE LIMIT OF THE TEMPORARY CONSTRUCTION EASEMENT PRIOR TO BEGINNING WORK, ALL SUBSEQUENT EROSION CONTROL MEASURES SHALL BE INSTALLED PER THE PROVISIONS OF THE SWPPP.
6. CONTRACTOR TO COMPACT FILL ABOVE DRAINAGE SECTION IN A MANNER THAT MAINTAINS THE INTEGRITY OF THE FILTER AND DRAIN ROCK.



NOTES:
1. REPAIR OR REPLACE SPLIT, TORN, UNRAVELING OR SLUMPING FIBER ROLLS.
2. INSPECT FIBER ROLLS WHEN RAIN IS FORECAST, FOLLOWING RAIN EVENTS AND AT LEAST DAILY DURING PROLONGED RAINFALL. PERFORM REQUIRED MAINTENANCE.
3. IN MOST CASES, FIBER ROLLS DO NOT REQUIRE REMOVAL AND CAN BE ABANDONED IN PLACE. IF NOT EXCESSIVELY SOILED, ROLLS MAY BE REPLACED AND REUSED.

NOT TO SCALE

WATTLES



NOTES:
1. CONSTRUCT AT ALL ENTRANCES TO THE PROJECT SITE AS APPROVED BY THE ENGINEER
2. THE ENTRANCE SHALL BE KEPT IN GOOD CONDITION BY OCCASIONAL TOP DRESSING WITH ROCK MATERIAL
3. ACCESSES SHALL BE INSPECTED WEEKLY DURING PERIODS OF HEAVY USAGE, MONTHLY DURING NORMAL USAGE, AND AFTER EACH RAINFALL, WITH MAINTENANCE PROVIDED AS NECESSARY. PERIODIC TOP DRESSING SHALL BE DONE AS NEEDED.

NOT TO SCALE

STABILIZED CONSTRUCTION SITE ACCESS

REVIEWED AND APPROVED BY:

KSN KJELDSEN SINNOCK NEUDECK INC. Consulting Engineers and Land Surveyors
Post Office Box 844, 711 N. Pershing Avenue, Stockton, CA 95201-0844, Office: (209) 946-0268, Faxes: (209) 946-0296, E-mail: KSN@ksninc.com

THIS PLAN CONFORMS TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000

ENGEO INCORPORATED — EXCELLENT SERVICE SINCE 1971

PREPARED UNDER THE DIRECTION OF:

MacKAY & SOMPS ENGINEERS PLANNERS SURVEYORS
5142 Franklin Drive, Suite B, Pleasanton, CA 94588 (925) 225-0690

RECLAMATION DISTRICT NO. 17
ELEMENT III-A & III-B
TYPICAL SECTIONS AND DETAILS
SAN JOAQUIN COUNTY, CALIFORNIA

NO.	REVISION	DATE

DATE:	SEPT 2018
SCALE:	NOT TO SCALE
DRAWN BY:	RTH
DESIGNED BY:	JBM
CHECKED BY:	CWG
PROJECT NO.	25182.010
SHT	5 OF 19

CONTROL POINTS

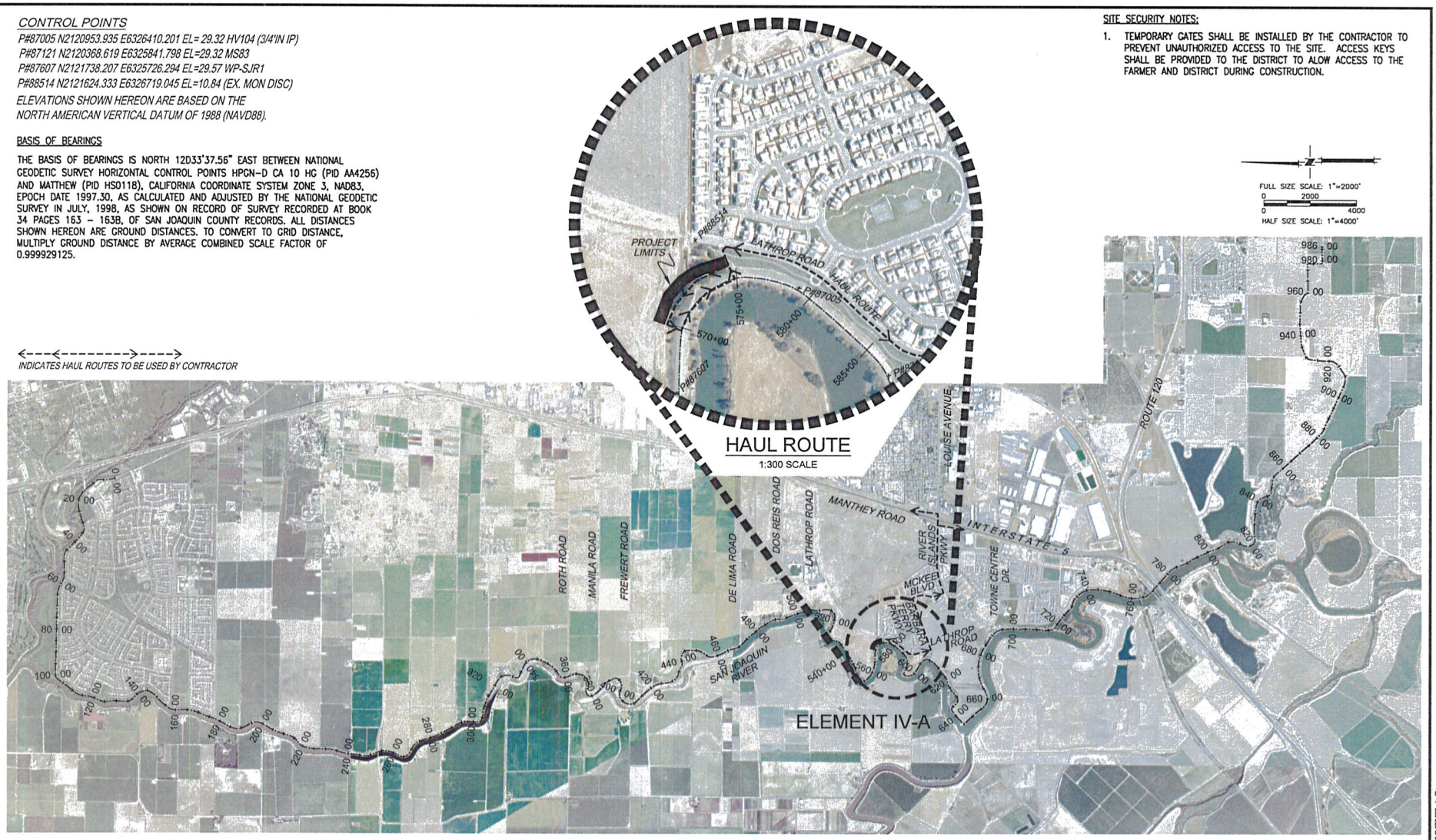
P#87005 N2120953.935 E6326410.201 EL= 29.32 HV104 (3/4"IN IP)
P#87121 N2120368.619 E6325841.798 EL=29.32 MS83
P#87607 N2121738.207 E6325726.294 EL=29.57 WP-SJR1
P#88514 N2121624.333 E6326719.045 EL=10.84 (EX. MON DISC)
ELEVATIONS SHOWN HEREON ARE BASED ON THE
NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

BASIS OF BEARINGS

THE BASIS OF BEARINGS IS NORTH 12D33'37.56" EAST BETWEEN NATIONAL GEODETIC SURVEY HORIZONTAL CONTROL POINTS HPGN-D CA 10 HG (PID AA4256) AND MATTHEW (PID HS0118), CALIFORNIA COORDINATE SYSTEM ZONE 3, NAD83, EPOCH DATE 1997.30, AS CALCULATED AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JULY, 1998, AS SHOWN ON RECORD OF SURVEY RECORDED AT BOOK 34 PAGES 163 – 163B, OF SAN JOAQUIN COUNTY RECORDS. ALL DISTANCES SHOWN HEREON ARE GROUND DISTANCES. TO CONVERT TO GRID DISTANCE, MULTIPLY GROUND DISTANCE BY AVERAGE COMBINED SCALE FACTOR OF 0.999929125.

SITE SECURITY NOTES:

1. TEMPORARY GATES SHALL BE INSTALLED BY THE CONTRACTOR TO PREVENT UNAUTHORIZED ACCESS TO THE SITE. ACCESS KEYS SHALL BE PROVIDED TO THE DISTRICT TO ALOW ACCESS TO THE FARMER AND DISTRICT DURING CONSTRUCTION.



REVIEWED AND APPROVED BY:
KSN | KJELDSEN SINNOCK NEUDECK INC. Consulting Engineers and Land Surveyors
Post Office Box 844, 711 N. Pershing Avenue, Stockton, CA 95201-0844
Office: (209) 946-0268 Faxes: (209) 946-0296 E-mail: KSN@ksninc.com

THIS PLAN CONFORM TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

PLAN PREPARED UNDER THE DIRECTION OF:
MacKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
5142 Franklin Drive, Suite B, Pleasanton, CA 94588 (925) 225-0690
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RECLAMATION DISTRICT NO. 17
ELEMENT IV-A

STATIONING MAP / HAUL ROUTE,

SAN JOAQUIN COUNTY CALIFORNIA

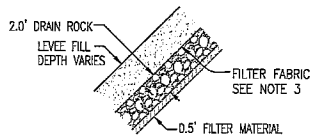
NO.	REVISION	DATE

DATE: JAN 2018
SCALE: AS NOTED
DRAWN BY: RTH
DESIGNED BY: JBM
CHECKED BY: CWG

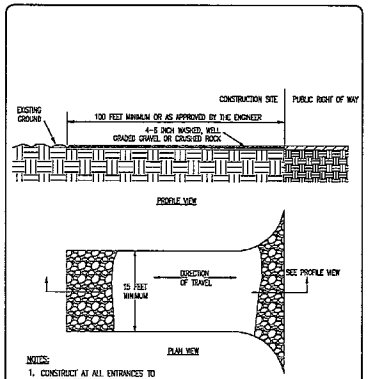
PROJECT NO. 25182.010
SHT 4 OF 11

01-22-2019 2:12pm Rick Hall P:\25182_44 - SEEPAGE BERM\P-04-HAULING

ELEMENT IV-A (SEEPAGE BERM)
95% SUBMITTAL



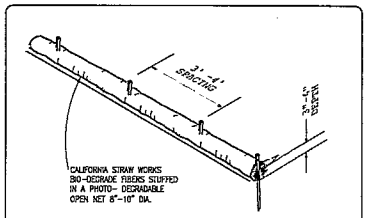
CHIMNEY DRAIN DETAIL
NTS



NOTES:
1. CONSTRUCT AT ALL ENTRANCES TO THE PROJECT SITE AS APPROVED BY THE ENGINEER
2. THE ENTRANCE SHALL BE KEPT IN GOOD CONDITION BY OCCASIONAL TOP DRESSING WITH ROCK MATERIAL
3. ACCESSES SHALL BE INSPECTED WEEKLY DURING PERIODS OF HEAVY USAGE, MONTHLY DURING NORMAL USAGE, AND AFTER EACH RAINFALL. WITH MAINTENANCE PROVIDED AS NECESSARY. PERIODIC TOP DRESSING SHALL BE DONE AS NEEDED.

NOT TO SCALE

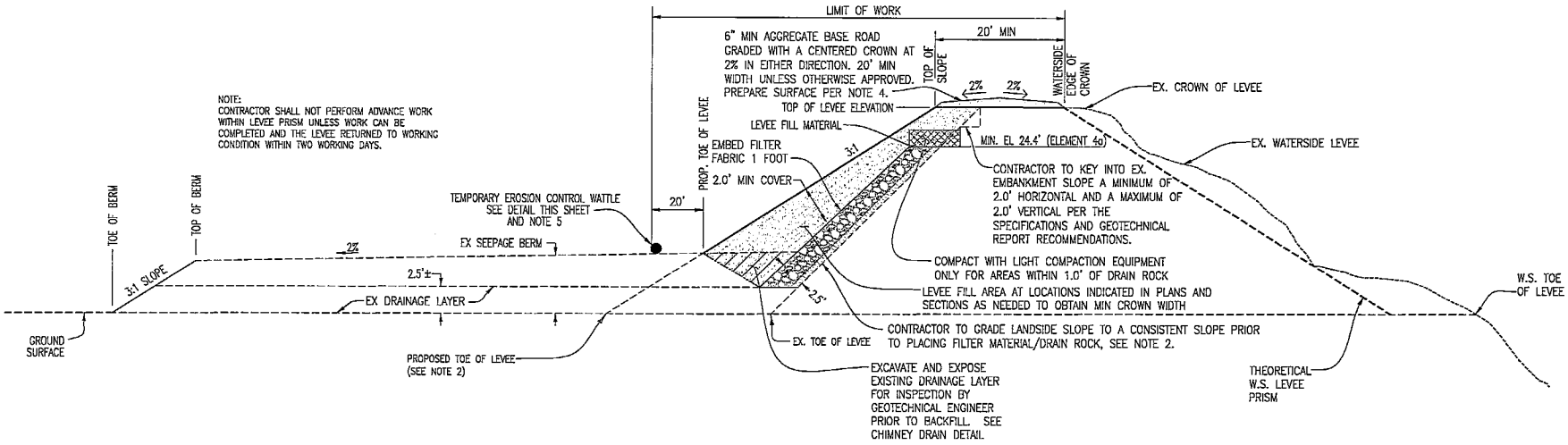
STABILIZED CONSTRUCTION SITE ACCESS



NOTES:
1. REPAIR OR REPLACE SPLIT, TORN, UNRAVELING OR SLUMPING FIBER ROLLS.
2. INSPECT FIBER ROLLS WHEN RAIN IS FORECAST, FOLLOWING RAIN EVENTS AND AT LEAST DAILY DURING PROLONGED RAINFALL. PERFORM REQUIRED MAINTENANCE.
3. IN MOST CASES, FIBER ROLLS DO NOT REQUIRE REMOVAL AND CAN BE ABANDONED IN PLACE. IF NOT EXCESSIVELY SOILED, ROLLS MAY BE REPLACED AND REUSED.

NOT TO SCALE

WATTLES



SECTION E-E: CHIMNEY DRAIN CONNECTION
NTS

REVIEWED AND APPROVED BY:
CHRISTOPHER N. NEUDECK No. 43473 C/V/L STATE OF CALIFORNIA
KSN INC. KJELDSEN SINNOCK NEUDECK
Consulting Engineers and Land Surveyors
Post Office Box 844
711 N. Pershing Avenue
Stockton, CA 95201-0844
Office: (209) 946-0268
Faxes: (209) 946-0296
E-mail: KSN@ksninc.com

JOSEF TOOTLE No. 2977 REGISTERED PROFESSIONAL ENGINEER GEOTECHNICAL STATE OF CALIFORNIA

THIS PLAN CONFORM TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

JAMES F. TEMPLETON No.43061 REGISTERED PROFESSIONAL ENGINEER CIVIL STATE OF CALIFORNIA

PLAN PREPARED UNDER THE DIRECTION OF:
MacKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
5142 Franklin Drive, Suite B, Pleasanton, CA 94588 (925) 225-0690
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RECLAMATION DISTRICT NO. 17
ELEMENT IV-A
TYPICAL SECTIONS AND DETAILS
SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

DATE: JAN 2018
SCALE:
DRAWN BY: RTH
DESIGNED BY: JBM
CHECKED BY: CWG

PROJECT NO. 25182.010
SHT 6 OF 11

01-22-2018 2:15pm Rick Hicks P:\25182_IA - SEEPAGE BERM\P-IS-SB-DETAILS.DWG

ELEMENT IV-A (SEEPAGE BERM)
95% SUBMITTAL

LEGEND

- 102B — APPROXIMATE LOCATION OF BORING/PIEZOMETER (DWR/ULE, FUGRO, 2006–2007)
- 001C — APPROXIMATE LOCATION OF CONE PENETRATION TEST (DWR/ULE, FUGRO, 2006–2007)
- K-B- — APPROXIMATE LOCATION OF BORING (RD–17, KLEINFELDER, 1986–1989)
- 4-B- — APPROXIMATE LOCATION OF SOIL BORING (RD–17, ENGEO, 2009)
- 4-CPT- — APPROXIMATE LOCATION OF CONE PENETRATION TEST (RD–17, ENGEO, 2009)

CONTROL POINTS

P#87115	N2111213.685 E6328577.283	EL=32.42	MS72
P#87400	N2110069.305 E6328467.912	EL=32.62	MS108
P#87401	N2109852.900 E6328702.568	EL=36.44	MS109
P#88421	N2107542.060 E6330358.510	EL=33.02	
P#88422	N2109325.507 E6329251.766	EL=33.64	MS110

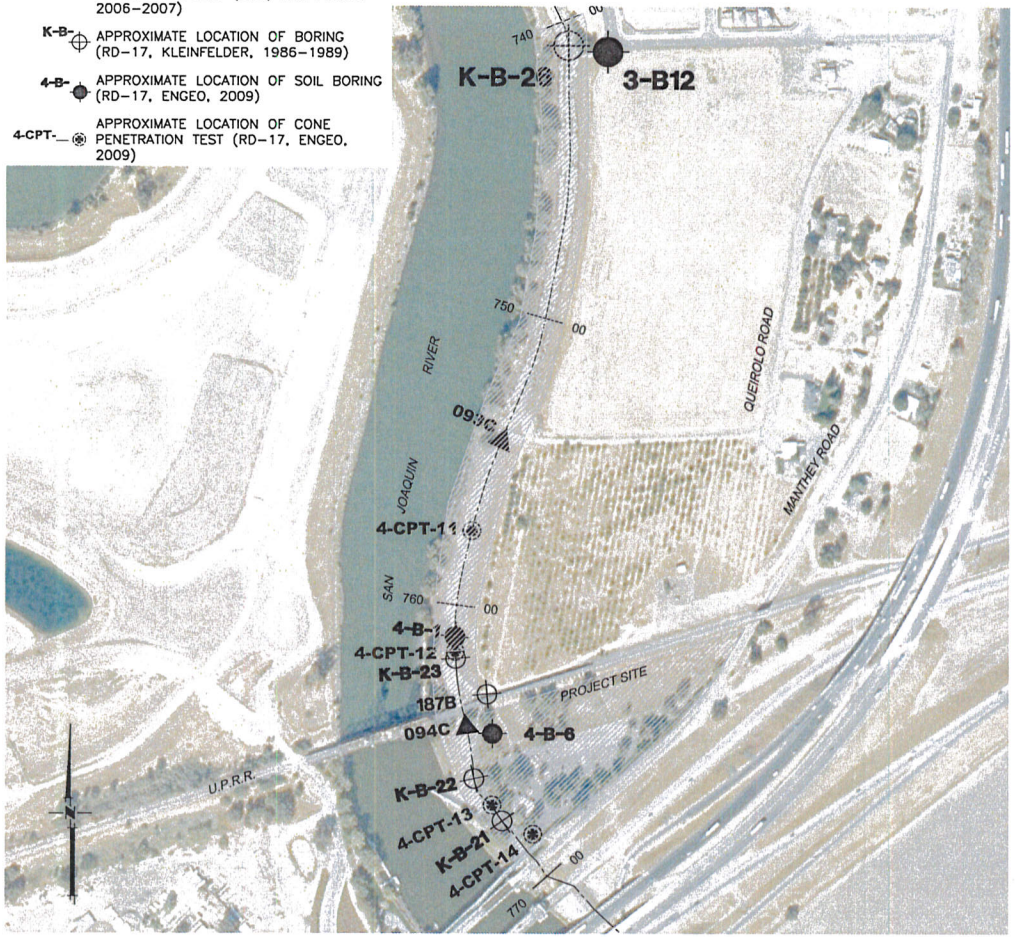
ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SITE SECURITY NOTES:

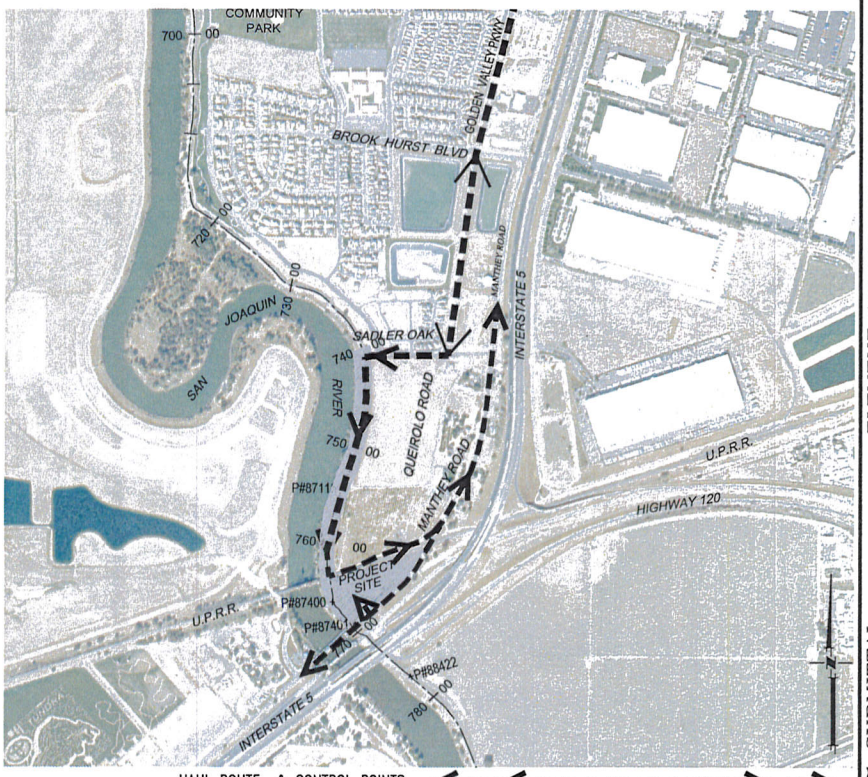
1. TEMPORARY GATES SHALL BE INSTALLED BY THE CONTRACTOR TO PREVENT UNAUTHORIZED ACCESS TO THE SITE. ACCESS KEYS SHALL BE PROVIDED TO THE DISTRICT TO ALOW ACCESS TO THE FARMER AND DISTRICT DURING CONSTRUCTION.

BASIS OF BEARING

THE BASIS OF BEARINGS IS NORTH 12D33'37.56" EAST BETWEEN NATIONAL GEODETIC SURVEY HORIZONTAL CONTROL POINTS HPGN–D CA 10 HG (PID AA4256) AND MATTHEW (PID HS0118), CALIFORNIA COORDINATE SYSTEM ZONE 3, NAD83, EPOCH DATE 1997.30, AS CALCULATED AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JULY, 1998, AS SHOWN ON RECORD OF SURVEY RECORDED AT BOOK 34 PAGES 163 – 163B, OF SAN JOAQUIN COUNTY RECORDS. ALL DISTANCES SHOWN HEREON ARE GROUND DISTANCES. TO CONVERT TO GRID DISTANCE, MULTIPLY GROUND DISTANCE BY AVERAGE COMBINED SCALE FACTOR OF 0.999929125.



BORING LOCATIONS
1"=200'



HAUL ROUTE & CONTROL POINTS
1"=600'

INDICATES HAUL ROUTES TO BE USED BY CONTRACTOR

95% SUBMITTAL

ELEMENT VI-B, VI-C, VI-D & VI-E (CUTOFF WALL/SEEPAGE BERM)

REVIEWED AND APPROVED BY:
KJELDSEN SINNOCK NEUDECK INC. — Consulting Engineers and Land Surveyors
Post Office Box 844, 711 N. Pershing Avenue, Stockton, CA 95201-0844
Office: (209) 946-0268 Faxes: (209) 946-0296 E-mail: KSN@ksninc.com

THIS PLAN CONFORMS TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000
ENGEO INCORPORATED — EXCELLENT SERVICE SINCE 1971

PREPARED UNDER THE DIRECTION OF:
MacKAY & SOMPS — ENGINEERS PLANNERS SURVEYORS
5142 Franklin Drive, Suite B, Pleasanton, CA 94588 (925) 225-0690
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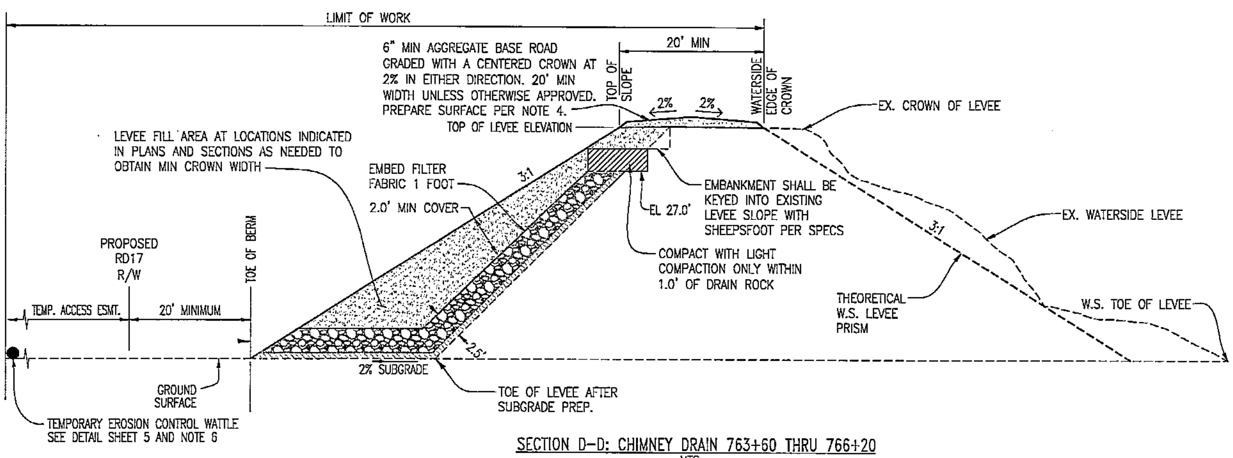
RECLAMATION DISTRICT NO. 17
ELEMENT VI–B, VI–C, VI–D, VI–E
BORING LOCATIONS, HAUL ROUTES & CONTROL POINTS
SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

DATE: JAN 2018
SCALE: AS NOTED
DRAWN BY: RTH
DESIGNED BY: GJ
CHECKED BY: CWG

PROJECT NO. 25182.010
SHT 2 OF 21

01-22-2019 2:30pm Rick Hatt P:\25182_RDC8 - SEEPAGE BERM\P-02 BORING HAUL CONTROL.DWG


LIMIT OF WORK
20' MIN
6" MIN AGGREGATE BASE ROAD GRADED WITH A CENTERED CROWN AT 2% IN EITHER DIRECTION. 20' MIN WIDTH UNLESS OTHERWISE APPROVED. PREPARE SURFACE PER NOTE 4.
TOP OF SLOPE
WATERSIDE EDGE OF CROWN
2%
2%
TOP OF LEVEE ELEVATION
EX. CROWN OF LEVEE
LEVEE FILL AREA AT LOCATIONS INDICATED IN PLANS AND SECTIONS AS NEEDED TO OBTAIN MIN CROWN WIDTH
EMBED FILTER FABRIC 1 FOOT
2.0' MIN COVER
3:1
EMBANKMENT SHALL BE KEYED INTO EXISTING LEVEE SLOPE WITH SHEEPSFOOT PER SPECS
EL 27.0'
COMPACT WITH LIGHT COMPACTION ONLY WITHIN 1.0' OF DRAIN ROCK
EX. WATERSIDE LEVEE
3:1
THEORETICAL W.S. LEVEE PRISM
W.S. TOE OF LEVEE
PROPOSED RD17 R/W
TOE OF BERM
TEMP. ACCESS ESMT.
20' MINIMUM
2.5'
2% SUBGRADE
GROUND SURFACE
TOE OF LEVEE AFTER SUBGRADE PREP.
TEMPORARY EROSION CONTROL WATTLE SEE DETAIL SHEET 5 AND NOTE 6

SECTION D–D: CHIMNEY DRAIN 763+60 THRU 766+20

NTS

REVIEWED AND APPROVED BY:

KSN KJELDSEN SINNOCK NEUDECK INC. Consulting Engineers and Land Surveyors
Post Office Box 844
711 N. Pershing Avenue
Stockton, CA 95201-0844
Office: (209) 946-0268
Faxes: (209) 946-0296
E-mail: KSN@ksninc.com

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER H. NEUDECK NO. 43473 CIVIL STATE OF CALIFORNIA

THIS PLAN CONFORMS TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000

REGISTERED PROFESSIONAL ENGINEER JOSEF TOOTLE No. 2677 GEOTECHNICAL STATE OF CALIFORNIA

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGISTERED PROFESSIONAL ENGINEER JAMES F. TEMPLETON JR. No. 43051 CIVIL STATE OF CALIFORNIA

PREPARED UNDER THE DIRECTION OF:

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
5142 Franklin Drive, Suite B, Pleasanton, CA 94588 (925) 225-0690

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RECLAMATION DISTRICT NO. 17
ELEMENT VI-B, VI-C, VI-D, VI-E
TYPICAL SECTIONS & DETAILS

SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

DATE: JAN 2018	PROJECT NO. 25182.010
SCALE: NTS	
DRAWN BY: RTH	SHT 8
DESIGNED BY: GJ	
CHECKED BY: CWG	OF 21

01-22-2019 2:31pm P:\25182_ENGDE - SEEPAGE BERM\P-07-10 DETAILS.DWG

CONTROL POINTS

P#9402 - N=2109338.552 E=6329241.118 ELEV=33.60 MS110
P#9403 - N=2108690.538 E=6329801.435 ELEV=32.91 MS111
P#9916 - N=2109375.771 E=6329161.796 ELEV=32.99 FM#4
P#9917 - N=2109981.365 E=6329963.705 ELEV=17.24 FM#5
P#10422 - N=2109325.507 E=6329251.766 ELEV=33.64 9422 MS110

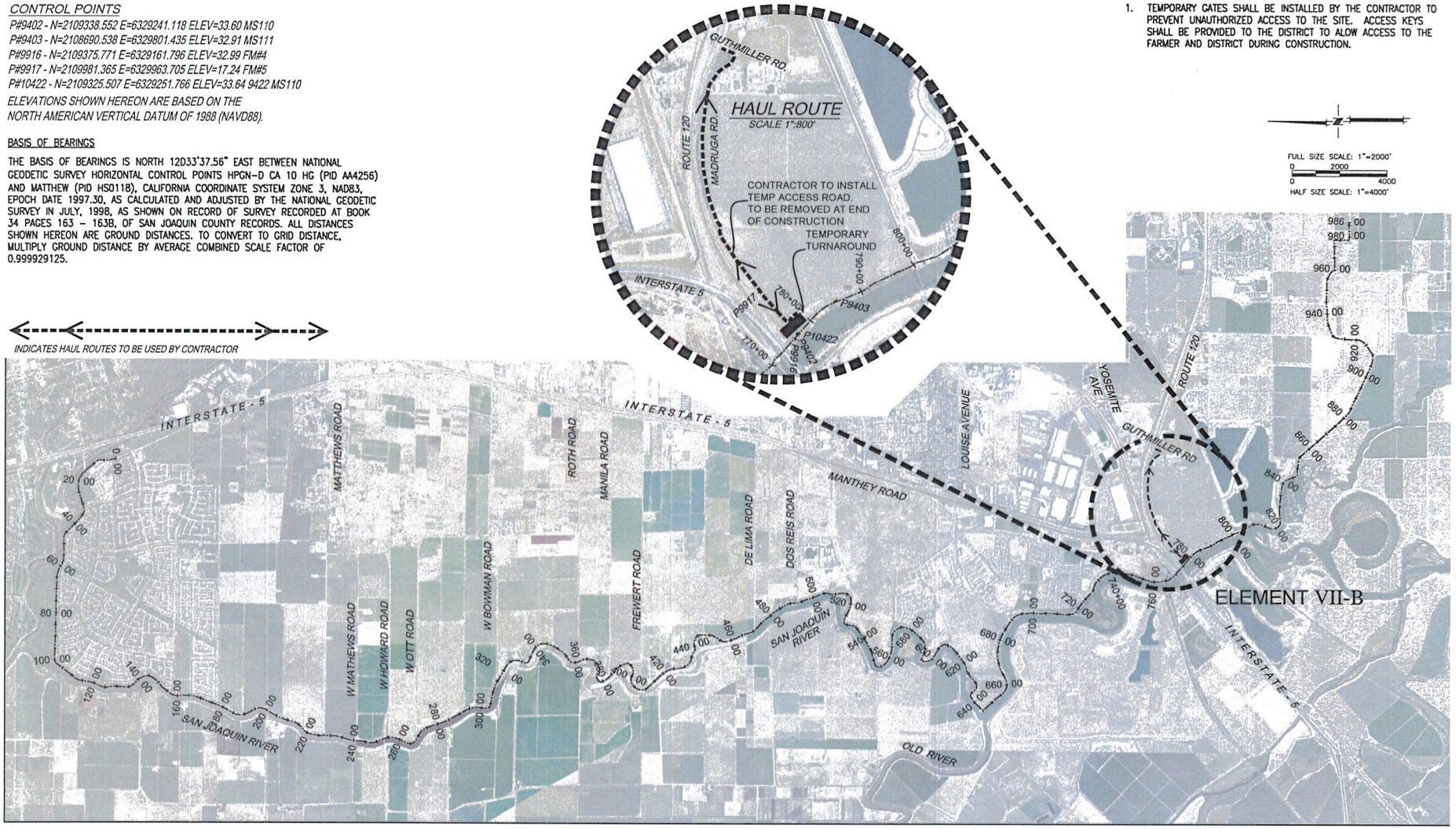
ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

BASIS OF BEARINGS

THE BASIS OF BEARINGS IS NORTH 12D33'37.56" EAST BETWEEN NATIONAL GEODETIC SURVEY HORIZONTAL CONTROL POINTS HPGN-D CA 10 HG (PID AA4256) AND MATTHEW (PID HS0118), CALIFORNIA COORDINATE SYSTEM ZONE 3, NAD83, EPOCH DATE 1997.30, AS CALCULATED AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JULY, 1998, AS SHOWN ON RECORD OF SURVEY RECORDED AT BOOK 34 PAGES 163 – 163B, OF SAN JOAQUIN COUNTY RECORDS. ALL DISTANCES SHOWN HEREON ARE GROUND DISTANCES. TO CONVERT TO GRID DISTANCE, MULTIPLY GROUND DISTANCE BY AVERAGE COMBINED SCALE FACTOR OF 0.999929125.

SITE SECURITY NOTES:

1. TEMPORARY GATES SHALL BE INSTALLED BY THE CONTRACTOR TO PREVENT UNAUTHORIZED ACCESS TO THE SITE. ACCESS KEYS SHALL BE PROVIDED TO THE DISTRICT TO ALOW ACCESS TO THE FARMER AND DISTRICT DURING CONSTRUCTION.



ELEMENT VII-B (SEEPAGE BERM)

95% SUBMITTAL

REVIEWED AND APPROVED BY:
CHRISTOPHER R. NEUDECK, No. 43473, CIVIL, STATE OF CALIFORNIA
KSN | KJELDSEN SINNOCK NEUDECK INC. Consulting Engineers and Land Surveyors
Post Office Box 844, 711 N. Pershing Avenue, Stockton, CA 95201-0844
Office: (209) 946-0268, Faxes: (209) 946-0296, E-mail: KSN@ksninc.com

THIS PLAN CONFORMS TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000
JOSEF TOOTLE, No. 2877, GEOTECHNICAL, STATE OF CALIFORNIA
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

PREPARED UNDER THE DIRECTION OF:
JAMES T. TEMPLETON, No.43061, CIVIL, STATE OF CALIFORNIA
MacKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
5142 Franklin Drive, Suite B, Pleasanton, CA 94588 (925) 225-0690
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RECLAMATION DISTRICT NO. 17
ELEMENT VII-B
HAUL ROUTE & CONTROL POINTS
SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

DATE: SEPT 2018
SCALE: NOT TO SCALE
DRAWN BY: RTH
DESIGNED BY: CWG
CHECKED BY: CWG
PROJECT NO. 25182.010
SHT 4 OF 8

01-22-2019 2:37pm Rick Hall P:\25182_70 - SEEPAGE BERM\P-0444.DWG

RECLAMATION DISTRICT NO. 17
ELEMENT VII-B
TYPICAL SECTIONS & DETAILS
SAN JOAQUIN COUNTY
CALIFORNIA
PREPARED UNDER THE DIRECTION OF:
MacKAY & SOMPS
CIVIL ENGINEERS
PLANNERS
SURVEYORS
DATE: SEPT 2018
SCALE: NTS
DRAWN BY: RTH
DESIGNED BY: CWG
CHECKED BY: CWG
PROJECT NO. 25182.010
SHT 6 OF 8
REVIEWED AND APPROVED BY:
KJELDSEN SINNOCK NEUDECK INC.
Consulting Engineers and Land Surveyors
THIS PLAN CONFORMS TO THE GEOTECHNICAL REPORT ENTITLED SEEPAGE EVALUATION PROJECT #5747.000.000
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971
STABILIZED CONSTRUCTION SITE ACCESS
NOT TO SCALE
WATTLES
NOT TO SCALE
CHIMNEY DRAIN DETAIL
NTS
SECTION E-E: CHIMNEY DRAIN CONNECTION
NTS
LIMIT OF WORK
20' MIN
WATERSIDE EDGE OF CROWN
TOP OF SLOPE
2%
EX. CROWN OF LEVEE
EX. WATERSIDE LEVEE
MIN. EL 28.1' (ELEMENT VII-D)
6" MIN AGGREGATE BASE ROAD GRADED WITH A CENTERED CROWN AT 2% IN EITHER DIRECTION, 20' MIN WIDTH UNLESS OTHERWISE APPROVED. PREPARE SURFACE PER NOTE 4.
TOP OF LEVEE ELEVATION
LEVEE FILL MATERIAL
EMBED FILTER FABRIC 1 FOOT
2.0' MIN COVER
PROP. TOE OF LEVEE
20'
CONTRACTOR TO KEY INTO EX. EMBANKMENT SLOPE A MINIMUM OF 2.0' HORIZONTAL AND A MAXIMUM OF 2.0' VERTICAL PER THE SPECIFICATIONS AND GEOTECHNICAL REPORT RECOMMENDATIONS.
COMPACT WITH LIGHT COMPACTION EQUIPMENT ONLY FOR AREAS WITHIN 1.0' OF DRAIN ROCK
LEVEE FILL AREA AT LOCATIONS INDICATED IN PLANS AND SECTIONS AS NEEDED TO OBTAIN MIN CROWN WIDTH.
CONTRACTOR TO GRADE LANDSIDE SLOPE TO A CONSISTENT SLOPE PRIOR TO PLACING FILTER MATERIAL/DRAIN ROCK, SEE NOTE 2.
EXCAVATE AND EXPOSE EXISTING DRAINAGE LAYER FOR INSPECTION BY GEOTECHNICAL ENGINEER PRIOR TO BACKFILL. SEE CHIMNEY DRAIN DETAIL
THEORETICAL W.S. LEVEE PRISM
W.S. TOE OF LEVEE
EX. TOE OF LEVEE
2.5'
NOTE:
CONTRACTOR SHALL NOT PERFORM ADVANCE WORK WITHIN LEVEE PRISM UNLESS WORK CAN BE COMPLETED AND THE LEVEE RETURNED TO WORKING CONDITION WITHIN TWO WORKING DAYS.
TEMPORARY EROSION CONTROL WATTLE SEE DETAIL THIS SHEET AND NOTE 5
EX SEEPAGE BERM
2%
2.5±
EX DRAINAGE LAYER
PROPOSED TOE OF LEVEE (SEE NOTE 2)
TOP OF BERM
3:1
3.0'
TOE OF BERM
GROUND SURFACE
2.0' DRAIN ROCK
LEVEE FILL DEPTH VARIES
FILTER FABRIC SEE NOTE 3
0.5' FILTER MATERIAL

CONTROL POINTS

P#87900 - N=2104553.066 E=6333596.037 ELEV=34.15 IP/CAP
P#87901 - N=2104636.095 E=6332966.263 ELEV=33.81 IP/CAP
P#87902 - N=2105295.978 E=6332471.387 ELEV=34.03 IP/CAP
P#87903 - N=2105392.795 E=6331321.478 ELEV=34.13 IP/CAP
P#87906 - N=2105377.344 E=6331724.812 ELEV=34.40 SPINDLE WP1

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

BASIS OF BEARING

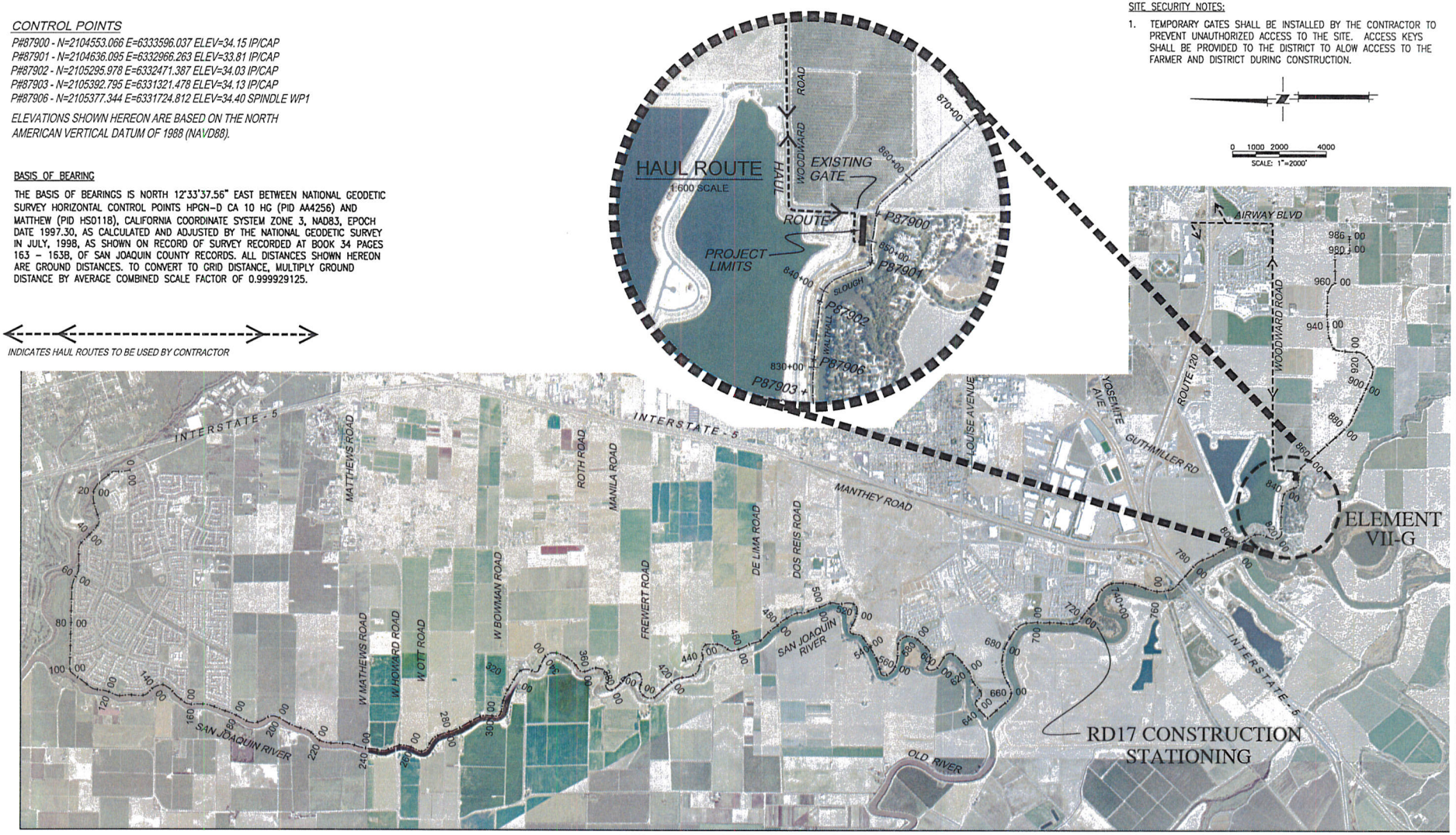
THE BASIS OF BEARINGS IS NORTH 12°33'37.56" EAST BETWEEN NATIONAL GEODETIC SURVEY HORIZONTAL CONTROL POINTS HPGN-D CA 10 HG (PID AA4256) AND MATTHEW (PID HS0118), CALIFORNIA COORDINATE SYSTEM ZONE 3, NAD83, EPOCH DATE 1997.30, AS CALCULATED AND ADJUSTED BY THE NATIONAL GEODETIC SURVEY IN JULY, 1998, AS SHOWN ON RECORD OF SURVEY RECORDED AT BOOK 34 PAGES 163 – 163B, OF SAN JOAQUIN COUNTY RECORDS. ALL DISTANCES SHOWN HEREON ARE GROUND DISTANCES. TO CONVERT TO GRID DISTANCE, MULTIPLY GROUND DISTANCE BY AVERAGE COMBINED SCALE FACTOR OF 0.999929125.

INDICATES HAUL ROUTES TO BE USED BY CONTRACTOR

SITE SECURITY NOTES:

1. TEMPORARY GATES SHALL BE INSTALLED BY THE CONTRACTOR TO PREVENT UNAUTHORIZED ACCESS TO THE SITE. ACCESS KEYS SHALL BE PROVIDED TO THE DISTRICT TO ALOW ACCESS TO THE FARMER AND DISTRICT DURING CONSTRUCTION.

0 1000 2000 4000
SCALE: 1"=2000'



95% SUBMITTAL

ELEMENT VII-G (SEEPAGE BERM)

REVIEWED AND APPROVED BY:
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ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

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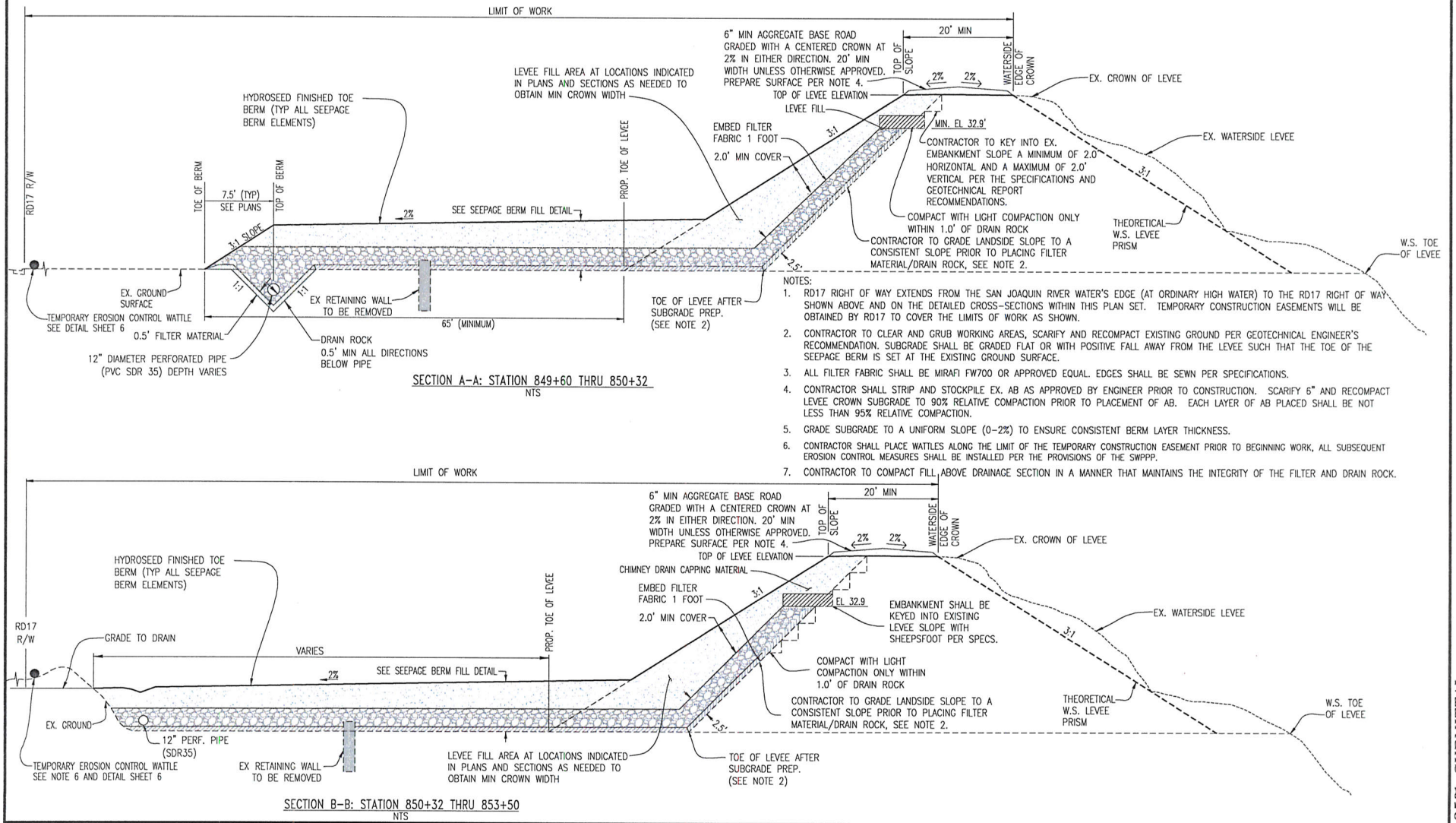
RECLAMATION DISTRICT NO. 17
ELEMENT VII-G
HAUL ROUTE & CONTROL POINTS
SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

DATE: SEPT 2018
SCALE: TO SCALE
DRAWN BY: RTH
DESIGNED BY: JBM
CHECKED BY: CWG
PROJECT NO. 25182.010
SHT 4 OF 10

01-22-2019 2:42pm Rick Hall P:\25182_7G - SEEPAGE BERM\P-04WAL.DWG



SECTION A-A: STATION 849+60 THRU 850+32
NTS

NOTES:

1. RD17 RIGHT OF WAY EXTENDS FROM THE SAN JOAQUIN RIVER WATER'S EDGE (AT ORDINARY HIGH WATER) TO THE RD17 RIGHT OF WAY SHOWN ABOVE AND ON THE DETAILED CROSS-SECTIONS WITHIN THIS PLAN SET. TEMPORARY CONSTRUCTION EASEMENTS WILL BE OBTAINED BY RD17 TO COVER THE LIMITS OF WORK AS SHOWN.
2. CONTRACTOR TO CLEAR AND GRUB WORKING AREAS, SCARIFY AND RECOMPACT EXISTING GROUND PER GEOTECHNICAL ENGINEER'S RECOMMENDATION. SUBGRADE SHALL BE GRADED FLAT OR WITH POSITIVE FALL AWAY FROM THE LEVEE SUCH THAT THE TOE OF THE SEEPAGE BERM IS SET AT THE EXISTING GROUND SURFACE.
3. ALL FILTER FABRIC SHALL BE MIRAFI FW700 OR APPROVED EQUAL. EDGES SHALL BE SEWN PER SPECIFICATIONS.
4. CONTRACTOR SHALL STRIP AND STOCKPILE EX. AB AS APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. SCARIFY 6" AND RECOMPACT LEVEE CROWN SUBGRADE TO 90% RELATIVE COMPACTION PRIOR TO PLACEMENT OF AB. EACH LAYER OF AB PLACED SHALL BE NOT LESS THAN 95% RELATIVE COMPACTION.
5. GRADE SUBGRADE TO A UNIFORM SLOPE (0-2%) TO ENSURE CONSISTENT BERM LAYER THICKNESS.
6. CONTRACTOR SHALL PLACE WATTLES ALONG THE LIMIT OF THE TEMPORARY CONSTRUCTION EASEMENT PRIOR TO BEGINNING WORK, ALL SUBSEQUENT EROSION CONTROL MEASURES SHALL BE INSTALLED PER THE PROVISIONS OF THE SWPPP.
7. CONTRACTOR TO COMPACT FILL ABOVE DRAINAGE SECTION IN A MANNER THAT MAINTAINS THE INTEGRITY OF THE FILTER AND DRAIN ROCK.

SECTION B-B: STATION 850+32 THRU 853+50
NTS

REVIEWED AND APPROVED BY:
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REGISTERED PROFESSIONAL ENGINEER JOSEF TOOTLE No. 2877 GEOTECHNICAL STATE OF CALIFORNIA
THIS PLAN CONFORM TO THE GEOTECHNICAL REPORT ENTITLED: SEEPAGE EVALUATION PROJECT #5747.000.000
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGISTERED PROFESSIONAL ENGINEER JAMES F. TEMPLETON JR. No. 43061 CIVIL STATE OF CALIFORNIA
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RECLAMATION DISTRICT NO. 17
ELEMENT VII-G
TYPICAL SECTIONS & DETAILS

SAN JOAQUIN COUNTY CALIFORNIA

NO.	REVISION	DATE

DATE: SEPT 2018
SCALE: NTS
DRAWN BY: RTH
DESIGNED BY: JBM
CHECKED BY: CWG

PROJECT NO. 25182.010
SHT 5 OF 10

01-22-2019 2:43pm Rick Hall P:\25182_70 - SEEPAGE BERM\SP-05-06 DETAILS.DWG

ELEMENT VII-G (SEEPAGE BERM)

95% SUBMITTAL

Attachment D: Details of Proposed Work for Each Element

Details of Project Description

Prepared by RD 17

The Reclamation District 17 (RD17) Levee Seepage Repair Project (LSRP) is a three-phase construction project intended to mitigate levee seepage at several sites along the San Joaquin River. The LSRP includes three different levee design features: drained seepage berms, levee cutoff walls, and a setback levee. The drained seepage berms are comprised of two components, a five-foot tall drained toe berm located on the landside toe of the levee, and a drained chimney drain located just inside the landside levee slope. No waterside work or impacts are associated with any of the seepage berm construction.

Phase 1 of the LSRP was completed in 2009 and included two drained toe berms that were constructed without chimney drains. Phase 2 of the LSRP was completed in 2013 and included seven drained seepage berms constructed with the toe berm and chimney drain components. The Phase 3 LSRP includes eleven drained seepage berms, four cutoff walls, and the single setback levee. RD17 submitted a Section 408 Permission Request to the United States Army Corps of Engineers (USACE) through the Central Valley Flood Protection Board (CVFPB) for the Phase 3 LSRP work on September 26, 2014. Nearly five years later RD17 is still working to obtain the Section 408 Permission to facilitate construction of these critical levee improvements.

In February 2017, in response to extreme weather, river, and reservoir conditions, RD17 issued a declaration of emergency and authorized the 2017 Emergency Flood Response Project (EFRP). The EFRP included construction of drained toe-berms at nine of the Phase 3 LSRP Seepage Berm Elements; chimney drains were not constructed as part of the project. There were two Phase 3 seepage berms not included in the EFRP, these were the berms at Elements IIIa and VIIg. Element IIIa was a Phase 1 seepage berm that had the lower toe berm portion constructed in 2009 and thus now needs only the chimney drain portion constructed in Phase 3. Element VIIg is located behind an operable canal gate on Weatherbee Lake, which can be isolated from the San Joaquin River during a high water event, and thus this berm wasn't constructed in the EFRP.

In January 2019, USACE introduced guidelines for the new Categorical Permission for Section 408 Requests. The Categorical Permission process was created to streamline the review and decision process for USACE 408 requests for a preapproved list of levee alterations. With seepage berm alterations qualifying for the new Categorical Permission process, RD17 is now requesting USACE Section 408 Categorical Permission for the eleven seepage berms in the Phase 3 LSRP through CVFPB Permit No. 18980-1. The expedited Categorical Permission process will enable the Phase 3 seepage berm construction to be completed in 2019, a full year ahead of the anticipated acquisition of the full project 408 permission.

Table 1 below provides a complete listing of the LSRP Phase 3 seepage berm elements included in Permit No. 18980-1. The table also includes the previous and remaining construction summaries, as well as the project impact status. Following the table is a detailed Element by Element description of the proposed work.

Table 1 – Phase 3 Project Summary Table

Element No.	Element Length	Previous Levee Alteration	Remaining Levee Alteration	Waterside Impacts	Impact Area	Changes in Project Description from 2015 Consultations
Ia	590'	Toe Berm in 2017 EFRP	Chimney Drain + PG&E Relocation	None	0.86 Acres	None
Ib	125'	Toe Berm in 2017 EFRP	Chimney Drain	None	0.05 Acres	None
Ie	655'	Toe Berm in 2017 EFRP	Chimney Drain	None	0.36 Acres	None
IIIa	4,659'	Toe Berm in Phase 1 LSRP	Chimney Drain	None	3.02 Acres	None
IIIb	741'	Toe Berm in 2017 EFRP	Chimney Drain	None	Acres	None
IVa	525'	Toe Berm in 2017 EFRP	Chimney Drain	None	0.42 Acres	None
VIc	300'	Toe Berm in 2017 EFRP	Chimney Drain	None	2.57 Acres	None
VId	200'	Toe Berm in 2017 EFRP	Chimney Drain	None	0.09 Acres	None
VIe	350'	Parking Lot Raising in 2017 EFRP	Chimney Drain	None	0.06 Acres	None
VIIb	445'	Toe Berm in 2017 EFRP	Chimney Drain	None	0.19 Acres	None
VIIg	400'	None	Seepage Berm + Chimney Drain	None	1.06 Acres	None
TOTAL: 8.68 Acres						

Project Element Ia:

Project Element Ia is located directly north of the Howard Road Bridge at the San Joaquin River in unincorporated San Joaquin County. Lands to the east are primarily utilized for agricultural and rural residential purposes. To mitigate under seepage, RD17 proposes to construct a drained seepage berm of varying width, at a minimum width of 65 feet constructed at the toe of the levee. To mitigate through seepage, RD17 proposes to construct a chimney drain hydraulically connected to the drained seepage berm drainage layer. The US Army Corps of Engineers constructed drained seepage berms along portions of this project element in response to the January 1997 event under PL84-99, however, those drained seepage berms have not been considered functional by USACE's own standards and now as part of the Phase III LSRP the berms will be removed and re-constructed. Three high voltage towers that are owned and operated by PG&E will need to have their concrete supports extended to the surface of the proposed drained seepage berm. An irrigation line is also located within the proposed seepage berm and will need to be relocated with the project.

As part of the 2017 Emergency Flood Response Project, RD17 constructed the toe berm portion of the Element Ia Seepage Berm outside of the high voltage tower area while also completing the irrigation line relocation. Remaining construction includes completing the PG&E tower footing raisings, the drained toe berm under the PG&E towers, and the chimney drain along the levee slope.

Project Element Ib:
Project Element Ib is located directly south of the Howard Road Bridge at the San Joaquin River in unincorporated San Joaquin County. Lands to the east are primarily utilized for agricultural and rural residential purposes. To mitigate under seepage, RD17 proposes to fill in a significant portion of a depression that is approximately 5 feet deep adjacent to the levee. The fill will return the ground to natural grade. The depression was a borrow site to facilitate the construction of the Howard Road Bridge. In addition RD17 proposes to construct a drained seepage berm 65 feet wide. To mitigate through seepage, RD17 proposes to construct a chimney drain hydraulically connected to the drained seepage berm drainage layer.
As part of the 2017 Emergency Flood Response Project, RD17 filled the existing borrow depression and constructed the toe berm portion of the Element Ib Seepage Berm. Remaining construction includes completing the chimney drain along the levee slope.

Project Element Ie:
Project Element Ie is located approximately 500 feet downstream of Bowman Road in unincorporated San Joaquin County. Lands to the east are primarily utilized for agricultural and rural residential purposes. To mitigate under seepage RD17 proposes to construct a drained seepage berm 65 foot wide. To mitigate through seepage, RD17 proposes to construct a chimney drain hydraulically connected to the drained seepage berm drainage layer. The US Army Corps of Engineers constructed drained seepage berms along portions of this project element in response to the January 1997 event under PL84-99, however, those drained seepage berms have not been considered functional as part of the Phase III LSRP and will be removed and re-constructed. PG&E facilities (power poles and power lines) will require relocation as part of the construction project.
As part of the 2017 Emergency Flood Response Project, RD17 constructed the toe berm portion of the Element Ie Seepage Berm. Remaining construction includes relocating the PG&E power poles and completing the chimney drain along the levee slope.

Project Elements IIIab:
Project Element IIIab is located north of the Mossdale Subdivision, adjacent to the San Joaquin River in the City of Lathrop. During the Phase 1 LSRP, a drained toe berm was installed at Element IIIa to mitigate under seepage and has functioned well during the previous seasons, however no through seepage improvements were completed at that time, thus the chimney drain will be constructed in Phase 3.
Element IIIb is included in the Phase 3 LSRP and is located in the middle of Element IIIa. Element IIIb is proposed to receive a 65 foot wide drained seepage berm with a hydraulically connected chimney drain to mitigate through seepage.
As part of the 2017 Emergency Flood Response Project, RD17 constructed the toe berm portion of the Element IIIb Seepage Berm. Remaining construction includes completing the chimney drain along the levee slope for Elements IIIab.

Project Element IVa:
Project Element IVa is located to the north of the northerly termination of Lathrop Road in the City of Lathrop. Lands to the east consist of an improved residential subdivision, a proposed residential subdivision and an improved high school facility. To mitigate under seepage, RD17 proposes to construct a drained seepage berm 65 feet wide. To mitigate through seepage, RD17 proposes to construct a chimney drain hydraulically connected to the drained seepage berm drainage layer. To facilitate the drained seepage berm improvements, it will be necessary to remove several trees adjacent to the levee. In addition, an existing agricultural pump station will need to be replaced with a "package" style pump.
As part of the 2017 Emergency Flood Response Project, RD17 constructed the toe berm portion of the Element IVa Seepage Berm. Remaining construction includes completing the chimney drain along the levee slope, relocating a power pole, and installing the new pump station for Element IVa.

Project Element VIc:
Project Element VIc is located immediately north of the Union Pacific Railroad in unincorporated San Joaquin County. Lands to the east are utilized primarily for agricultural and rural residential purposes. To mitigate under seepage, RD17 proposes to raise the grade of a 2.4 acre low-lying agricultural field adjacent to the levee to return the ground to natural grade and then construct a drained seepage berm 65 feet wide. To mitigate through seepage, RD17 proposes to construct a chimney drain hydraulically connected to the drained seepage berm drainage layer. As part of the 2017 Emergency Flood Response Project, RD17 constructed the toe berm portion of the Element VIc Seepage Berm. Remaining construction includes completing the grade raising in the adjacent field and the chimney drain along the levee slope for Element VIc.

Project Element VId:
Project Element VId is located immediately south of the Union Pacific Railroad in unincorporated San Joaquin County. Lands to the east are utilized primarily for agricultural and rural residential purposes. To mitigate under seepage, RD17 proposes to fill in a significant portion of a depression that is approximately 5 feet deep adjacent to the levee. The fill will return the ground to natural grade. The depression was a borrow site to facilitate construction of the Union Pacific Railroad Embankment. In addition RD17 proposes to construct a drained seepage berm 65 feet wide. To mitigate through seepage, RD17 proposes to construct a chimney drain hydraulically connected to the drained seepage berm drainage layer.
As part of the 2017 Emergency Flood Response Project, RD17 completed the depression fill construction and the toe berm portion of the Element VId Seepage Berm. Remaining construction includes completing the chimney drain along the levee slope for Element VId.

Project Element VIe:
Project Element VIe is located adjacent to the Mossdale Landing County Park where Manthey Road crosses the San Joaquin River in unincorporated San Joaquin County. Lands to the east are an existing County Park utilized in conjunction with a boat launch ramp on the levee, agricultural lands and rural residential. To mitigate under seepage RD17 proposes to raise the grade of the existing County Park parking lot and install a drained 30-inch tall subbase layer with perforated seepage conveyance pipes that tie into the existing storm drainage pump station. The parking lot is proposed to be reconstructed by RD17 to San Joaquin County standards. To mitigate through seepage, RD17 proposes to construct a chimney drain hydraulically connected to the drained seepage berm drainage layer.
As part of the 2017 Emergency Flood Response Project, RD17 constructed the parking lot subdrain system and completed the reinstallation of the asphalt parking lot in coordination with San Joaquin County. Remaining construction includes completing the chimney drain along the levee slope for Element VIe.

Project Element VIIb:
Project Element VIIb is located to the south of Interstate 5 in unincorporated San Joaquin County. Lands to the east are currently under development for future industrial use. To mitigate under seepage, RD17 proposes to construct a drained seepage berm 150 feet wide. To mitigate through seepage, RD17 proposes to construct a chimney drain hydraulically connected to the drained seepage berm drainage layer. The US Army Corps of Engineers constructed drained seepage berms along portions of this project element in response to the January 1997 event under PL84-99, however, those drained seepage berms have not been considered functional as part of the Phase III LSRP and will be removed and re-constructed.
There is an existing storm drainage outfall to the north of the project site that conveys storm drainage from the existing freeway above the levee. The outfall pipe runs parallel to the landside levee slope and does cross through the levee crown. In the Phase III LSRP, RD17 intends to extend that outfall to the face of the proposed drained seepage berm.

As part of the 2017 Emergency Flood Response Project, RD17 constructed the toe berm portion of the Element VIIb Seepage Berm and completed the outfall extension. Remaining construction includes completing the chimney drain along the levee slope for Element VIIb.

Project Element VIIg:

Project Element VIIg is located directly adjacent to Woodward Avenue on the Wathall Slough in unincorporated San Joaquin County. To the north of this element is the Oakwood Lake subdivision, residential lots back the levee, which were purchased by RD17 during the Phase II LSRP. To mitigate under seepage, RD17 proposes to construct a 65 foot wide drained seepage berm with a seepage collection trench. This seepage collection trench is not intended for pressure relief to meet project gradient criteria but because the adjoining area is developed, the seepage collection trench will collect and convey seepage discharge into an underground system to minimize nuisance in the urban environment. The seepage collection trench includes perforated pipe which collects and conveys under seepage flows to the subdivision's storm drainage system. To mitigate through seepage, RD17 proposes to construct a chimney drain hydraulically connected to the drained seepage berm.
No previous construction has been completed at Element VIIg.