RECLAMATION DISTRICT NO. 773
MEETING AGENDA FOR
BOARD OF TRUSTEES
9:00 A.M. APRIL 1, 2025

NEUMILLER & BEARDSLEE
3121 WEST MARCH LANE, SUITE 100
STOCKTON, CALIFORNIA

AGENDA

1. **Call to Order/Roll Call**.

2. **Public comment**: Under Government Code section 54954.3, members of the public may address the Board on any issue in the District's jurisdiction. The public may address any item on the agenda at the time it is taken up.

3. **Oath of Office**. Administer Oath of Office to Trustee Ryan Bacchetti.

4. **Minutes**. Consider for approval minutes of the February 4, 2025, Board meeting.

5. **District Financial Report**. Discussion and possible action to accept District Financial Report.

6. **Budget.** Discussion and direction to staff regarding Draft Budget for Fiscal Year 2025-2026.

7. **Resolution 2025-01.** Adopt Resolution 2025-01 Approving and Authorizing Execution of Delta Levee Maintenance Subventions Program Work Agreements for Fiscal Year 2025-2026.

8. **Resolution 2025-02.** Adopt Resolution 2025-02 Authorizing and Directing Filing of Notice of Exemption for Routine Maintenance for Fiscal Year 2025-2026.

9. **Accounting Services.** Discussion and possible action regarding authorizing signing engagement letter with DRJ CPAs, Inc. (previously BPM).

10. **Engineers' Report**. Discussion and Possible Action on the following items:

    I. DELTA LEVEE SUBVENTIONS PROGRAM

        A. Review Levee Maintenance Project for Fiscal Year 2024/25 awarded to Dino & Son Excavating.

            a. Original Contract Work and Change Order No. 1 has been completed.

This agenda shall be made available upon request in alternative formats to persons with a disability, as required by the Americans with Disabilities Act of 1990 (42 U.S.C. § 12132) and the Ralph M. Brown Act (California Government Code §54954.2). Persons requesting a disability related modification or accommodation in order to participate in the meeting should contact Andy Pinasco at 209/948-8200 during regular business hours, at least twenty-four hours prior to the time of the meeting.

Materials related to an item on this Agenda submitted to the Trustees after distribution of the agenda packet are available for public inspection in the office of the District Secretary at Neumiller & Beardslee, 3121 West March Lane, Suite 100, Stockton, California during normal business hours.

b. Potential Change Order 2: Gates

i. The Contractor will submit a quote for (2) gate repairs and (1) replacement for review and approval as change order.

ii. Contract work remains open until the repairs and replacements are completed.

c. Contractor Progress Pay Estimates

i. Payment Recommendation No. 1 sent March 19, 2025.

1. Dino & Son (Contractor) requesting expedited payment.

d. Contract Summary:

i. Original Contract Price: $143,260.00

ii. Approved Change Orders: $15,189.62

iii. Percent Change Orders: $10.6%

iv. Revised Contract Price: $158,449.62

v. Percent Complete: 100%

II. STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES SOUTH DELTA BARRIERS PROJECT

A. Review request for entry permit for Geotechnical Explorations for proposes future Permanent Tidal Barriers on Gantline and Old River. KSN recommends coordination with RD 2 in as much as terms and conditions for entry permit and reimbursement terms and technical terms on Drilling Plan. Review Gilbert Cosio with River Delta (formerly MBK) email correspondence and attachments.

11. **Right of Entry for Geotechnical Explorations.** Discussion and possible action regarding Approval of Permanent South Delta Tidal Gates Right of Entry for Geotechnical Explorations.

12. **Correspondence and meeting attendance reports**.

13. **District Calendar**.

a. Next Meeting Tuesday, June 3, 2025

14. **Bills**. Approval of bills to be paid.

15. **Adjournment**.

This agenda shall be made available upon request in alternative formats to persons with a disability, as required by the Americans with Disabilities Act of 1990 (42 U.S.C. § 12132) and the Ralph M. Brown Act (California Government Code §54954.2). Persons requesting a disability related modification or accommodation in order to participate in the meeting should contact Andy Pinasco at 209/948-8200 during regular business hours, at least twenty-four hours prior to the time of the meeting.

Materials related to an item on this Agenda submitted to the Trustees after distribution of the agenda packet are available for public inspection in the office of the District Secretary at Neumiller & Beardslee, 3121 West March Lane, Suite 100, Stockton, California during normal business hours.

AGENDA PACKET
RECLAMATION DISTRICT 773
APRIL 1, 2025

ITEM	COMMENTARY
1.	Self-explanatory.
2.	Self-explanatory.
3.	Self-explanatory.
4.	Please see attached.
5.	Please see attached.
6.	Please see attached.
7.	Please see attached.
8.	Please see attached.
9.	Please see attached.
10.	Please see attached.
11.	Self-explanatory.
12.	Self-explanatory.
13.	Please see attached.
14.	Please see attached.
15.	Self-explanatory.

ITEM 4

Minutes of Meeting of
Reclamation District 773
Held on February 4, 2025

The regular meeting of the Board of Trustees of Reclamation District 773 was held at 9:00 a.m. on February 4, 2025, at the District Offices located at 3121 West March Lane, Suite 100.

Item No. 1: The meeting was called to order at 9:07 a.m. Present were President Mark Bacchetti, and Trustee Ryan Bacchetti, Trustee Joe Enos was absent. Also present were Andy Pinasco, District Secretary, and Dave Carr, District Engineer.

Item No. 2: Public Comment. There was no public comment.

Item No. 3: Minutes. The minutes of the June 4, 2024, meeting were approved unanimously by the Trustees present on a motion by President Mark Bacchetti seconded by Trustee Ryan Bacchetti.

Item No. 4: Mr. Pinasco provided an oral written financial report and reviewed it with the Trustees. The February 2025 financial report was approved unanimously by the Trustees present on a motion by Trustee Ryan Bacchetti, seconded by President Mark Bacchetti.

Item No. 5: Mr. Pinasco reported that the District's insurance product expires on March 31, 2025, which is before the District meets again. Mr. Pinasco recommended that the Trustees delegate authority to the Trustee President for approval of the District's insurance product for the 2025-2026 insurance year. Authority was delegated to the Trustee President to approve the insurance proposal for the 2025-2026 insurance year by the Trustees present on a motion by Trustee Ryan Bacchetti, seconded by President Mark Bacchetti.

Item No. 6: Mr. Pinasco reviewed the Draft Audit for Fiscal Year ending June 30, 2024, and explained that the representation letter had been signed by the District Secretary in order to accommodate filing deadlines. Mr. Pinasco also reviewed the Engagement Letter for Auditing Services to the District for the Fiscal Year ending June 30, 2025. The Draft Audit for Fiscal Year ending June 30, 2024 was approved, the representation letter for the same Draft Audit was ratified, and the Engagement Letter for Auditing Services to the District for the Fiscal Year ending June 30, 2025 was approved unanimously by the Trustees present on a motion by Ryan Bacchetti, seconded by President Mark Bacchetti.

Item No. 7: Engineers' Report; request for direction. Mr. Carr presented a written and oral report consisting of the following items:

I. DELTA LEVEE SUBVENTIONS PROGRAM

A. Review Levee Maintenance Project for Fiscal Year 2024/25 awarded to Dino & Son Excavating.

B. Review California Department of Fish & Wildlife Streambed Alteration Agreement: EPIMS_SJN_44771-R3 Fabian Bell Canal and Old River. Expiration Date: 12/31/2028.

Item No. 8: No correspondence was presented at the February meeting.

Item No. 9: It was noted that the next regular meeting is April 1, 2025.

Item No. 10: Mr. Pinasco reported on the outstanding bills that had been received and the status of the District's accounts. On a motion by Trustee Ryan Bacchetti, seconded by President Mark Bacchetti, the Trustees present unanimously approved payment of the attached bills identified on the attached bills paid report

Item No. 11: The meeting was adjourned at 9:40 a.m. by unanimous vote of the Trustees present on a motion by President Mark Bacchetti, seconded by Trustee Ryan Bacchetti.

Respectfully submitted,

_____

Andy Pinasco, District Secretary

ITEM 5

RECLAMATION DISTRICT 773
FINANCIAL REPORT MARCH 2025 MEETING
75% OF 2024/2025 FISCAL YEAR

	INCOME	Annual Budget Amount	Received Period TD	Received YTD	% YTD
	INTEREST	$ 7,500.00	$0.00	$ 11,076.00	147.68%
	ASSESSMENTS (MAX. ALLOWANCE)	$ 235,793.00	$11,336.00	$ 105,017.24	44.54%
	5-Year Plan	$ -	$0.00	$ -	
	SUBVENTION REIMBURSEMENT	$ 425,000.00	$0.00	$ 423,557.00	99.66%
	FEMA Reimbursement	$ 200,000.00	$0.00	$ -	0.00%
	Total Income	**$ 868,293.00**	**$ 11,336.00**	**$ 539,650.24**	**62.15%**
	EXPENSES	**Annual Budget Amount**	**Expended Period TD**	**Expended YTD**	**% YTD**
	GENERAL				
G1	County Assessment Administration	$ 2,500.00	$161.25	$ 2,820.25	112.81%
G2	Miscellaneous Supplies	$ 300.00	$0.00	$ -	0.00%
G3	General Engineering	$ 35,000.00	$4,571.25	$ 36,686.90	104.82%
G4	Legal and Accounting	$ 25,000.00	$10,106.00	$ 23,944.90	95.78%
G5	Insurance	$ 30,000.00	$0.00	$ 100.00	0.33%
G6	Contingency	$ 4,000.00	$0.00	$ 3,043.00	76.08%
	Total General Expenses	**$ 96,800.00**	**$ 14,838.50**	**$ 66,595.05**	**68.80%**
	LEVEE WORK				
L1	Vegetation Control and Management	$ 30,000.00	$198.00	$ 20,847.99	69.49%
L2	Rodent Control	$ 30,000.00	$0.00	$ -	0.00%
L3	Construct All-Weather Road Surfacing	$ 15,000.00	$0.00	$ -	0.00%
L4	Waterside Erosion Repair	$ 25,000.00	$0.00	$ -	0.00%
L5	Back Slope Fill Flattening	$ 250,000.00	$0.00	$ 8,011.14	3.20%
L6	General Levee Maintenance	$ 50,000.00	$15,130.70	$ 26,953.90	53.91%
L7	DWR 5 Year Plan	$ -	$0.00	$ -	0.00%
	Total Levee Work	**$ 400,000.00**	**$ 15,328.70**	**$ 55,813.03**	**13.95%**
	Total Expenses	**$ 496,800.00**	**$ 30,167.20**	**$ 122,408.08**	**24.64%**

	ANNUAL BUDGET AMOUNT	PTD INCOME/LOSS	YTD INCOME/LOSS
NET INCOME (LOSS)	**$ 371,493.00**	**($18,831.20)**	**$ 417,242.16**

Fund Balance as of Beginning of Fiscal Year 2024-2025	$ 217,482.85
Revenues (YTD)	$ 539,650.24
Expenses (YTD)	$ 122,408.08
Total Cash in General Fund	**$ 634,725.01**
Total Restricted Cash in 5 Year Plan Account	**$ 1,318.14**
Bank of Stockton	**$ 1,238.30**
Total Available Cash	**$ 635,963.31**

ITEM 6

RECLAMATION DISTRICT 773
PROPOSED BUDGET FOR FISCAL YEAR 2025-2026

	EXPENSES	2024-2025 Budget	2024-2025 Actuals	2025-2026 Proposed Budget
	GENERAL			
G1	County Assessment Administration	$ 2,500.00	$ 2,820.25	
G2	Miscellaneous Supplies	$ 300.00	$ -	
G3	General Engineering	$ 35,000.00	$ 36,686.90	
G4	Legal and Accounting	$ 25,000.00	$ 23,944.90	
G5	Insurance	$ 30,000.00	$ 100.00	
G6	Contingency	$ 4,000.00	$ 3,043.00	
G7	Emergency Equipment & Supplies	$ -	$ -	
	Totals	**$ 96,800.00**	**$ 66,595.05**	**$ -**
	LEVEE WORK			
L1	Vegetation Control and Management	$ 30,000.00	$ 20,847.99	
L2	Rodent Control	$ 30,000.00	$ -	
L3	Construct All-Weather Road Surfacing	$ 15,000.00	$ -	
L4	Waterside Erosion Repair	$ 25,000.00	$ -	
L5	Back Slope Fill Flattening	$ 250,000.00	$ 8,011.14	
L6	General Levee Maintenance	$ 50,000.00	$ 26,953.90	
L7	DWR 5 Year Plan	$ -	$ -	
	Totals	**$ 400,000.00**	**$ 55,813.03**	**$ -**
	Total Expense Budget	**$ 496,800.00**	**$ 122,408.08**	**$ -**
	INCOME			
	Interest	$ 7,500.00	$ 11,076.00	
	Assessment (Max. Allowance)	$ 235,793.00	$ 105,017.24	
	Subventions Reimbursement	$ 425,000.00	$ 423,557.00	
	FEMA Reimbursement	$ 200,000.00	$ -	
	Total Income Budget	**$ 868,293.00**	**$ 539,650.24**	**$ -**
	NET INCOME (LOSS)	**$ 371,493.00**	$ 417,242.16	$ -

ITEM 7

RECLAMATION DISTRICT 773
RESOLUTION 2025-01

RESOLUTION APPROVING AND AUTHORIZING EXECUTION OF DELTA LEVEE MAINTENANCE SUBVENTIONS PROGRAM WORK AGREEMENTS FOR FISCAL YEAR 2025-2026

WHEREAS, the Board of Trustees ("Board") of Reclamation District 773 ("District") has reviewed, and desires to enter into, that certain Delta Levee Maintenance Subventions Program Work Agreements for Fiscal Year 2025-2026, ("Agreement") between the District and the Reclamation Board of the State of California ("Reclamation Board");

NOW, THEREFORE, BE IT RESOLVED AS FOLLOWS:

1. The Agreement is approved, and the President of the Board or District Secretary is authorized and directed to execute the Agreement, and cause it to be presented to the Reclamation Board with a certified copy of this Resolution.

PASSED AND ADOPTED by the Board of Trustees of Reclamation District 773 at a meeting thereof held on April 1, 2025, by the following vote:

AYES: ____
NOES: ____
ABSENT: ____
ABSTENTION: ____

_____
Trustee, Board of Trustees

ATTEST:

_____
Secretary, Board of Trustees

CERTIFICATION

I ANDY PINASCO, Secretary of Reclamation District 773, do hereby certify that the foregoing is a full, true and correct copy of a resolution of Reclamation District 773, duly passed and adopted at a meeting of the Board of Trustees thereof held on the 1st day of April, 2025.

Dated:_____, 20__

_____
ANDY PINASCO, Secretary
Reclamation District 773

ITEM 8

RECLAMATION DISTRICT 773

RESOLUTION 2025-02

RESOLUTION AUTHORIZING AND DIRECTING FILING OF NOTICE OF EXEMPTION FOR ROUTINE MAINTENANCE, FOR FISCAL YEAR 2025-2026

WHEREAS, the Board of Trustees ("Board") of Reclamation District 773 ("District"), in conjunction with, but not limited to, that certain anticipated Delta Levee Maintenance Subventions Program Work Agreement Fiscal Year 2025-2026 ("Agreement"), between the District and the Central Valley Flood Protection Board of the State of California ("Protection Board") has determined that the work described therein consists of routine maintenance to existing levee improvements;

NOW, THEREFORE, BE IT RESOLVED AS FOLLOWS:

1. All repair of wave wash and erosion protection, all levee crown restoration which is not in excess of the 100 year flood elevation plus (2) two feet and all levee section restoration including adding material to back slopes, construction of toe berms and construction of seepage berms, drains and other measures to control seepage exit gradients to less than 0.5 and including the work described in the Fiscal Years 2025-2026 Delta Levee Subventions Program Applications consists of routine maintenance to existing levee improvements and falls within the categorical exemptions to the California Environmental Quality Act pursuant to Section 15301 (Class I) of the Guidelines for the California Environmental Quality Act, California Administrative Code of Regulations, Title 14, Chapter 3, Article 19.

2. The District finds the proposed work will not have a material adverse effect upon the environment.

3. That said work does not constitute an exception to the exemptions of the California Environmental Quality Act.

4. That Christopher H. Neudeck is hereby directed to prepare and file with the County Clerk of San Joaquin County for posting, a "Notice of Exemption" pursuant to California Administrative Code, Title 14, Chapter 3, Section 15062 and 15261.

PASSED AND ADOPTED by the Board of Trustees of Reclamation District 773, at a meeting thereof, held on April 1, 2025, by the following vote:

AYES:

NOES:

ABSENT:

ABSTENTION:

RECLAMATION DISTRICT 773
A Political Subdivision of the
State of California

By:_____
TRUSTEE

ATTEST:

_____
SECRETARY

CERTIFICATION

I, _____, Secretary of Reclamation District 773, do hereby certify that the foregoing is a full, true and correct copy of a resolution of Reclamation District 773 duly passed and adopted at a meeting of the Board of Trustees thereof held on the 1st day of April, 2025.

Dated: _____, 20__

_____
SECRETARY, Reclamation District 773

ITEM 9

DRJ CPAs, INC.
3247 W March Ln Ste 200
Stockton, CA 95219
209-943-2222

January 28, 2025

Reclamation District 773
PO Box 20
Stockton 95201

Dear Reclamation District 773:

This letter is to confirm our understanding of the terms and objectives of our engagement with Reclamation District 773 as well as the nature and limitations of the services we will provide.

Services

We anticipate that our services will include annual preparation of forms 1099. You agree to provide us with all required client source documents in an agreed-upon format.

It is Management's responsibility to substantiate and authorize all records and information provided to us. We will not audit, review or otherwise verify the records or information provided to us, although we may ask you to clarify or furnish us with additional information. By your signature below, you acknowledge and agree that it is Reclamation District 773's responsibility to verify the accuracy of the records being provided to DRJ CPAs, Inc..

As our services our limited in nature, we will not verify the accuracy of the records being provided to DRJ CPAs, Inc. beyond the normal authorizations provided by your office. If we notice that an amount appears unusual or out of the ordinary, we will call it to your attention, but our engagement cannot be relied upon to disclose errors, fraudulent financial reporting, misappropriation of assets, or noncompliance with laws and regulations that may have occurred. However, we will inform the appropriate level of management of any material errors and of any evidence or information that comes to our attention during the performance of our engagement that fraud may have occurred. We will also report to the appropriate level of management any evidence or information that comes to our attention regarding noncompliance with laws and regulations that may have occurred, unless it is clearly inconsequential. In addition, we have no responsibility to identify and communicate significant deficiencies or material weaknesses in your system of internal control as part of this engagement. By your signature below, you understand and agree that you are responsible for preventing and detecting fraud. Should you wish us to expand our procedures to include additional work and investigations, we will arrange this with you in a separate engagement letter.

Other Matters

By your signature below, you acknowledge and understand that we will not be responsible for advising you with respect to independent contractor status as part of our services. If you have any questions regarding the classification of employees versus independent contractors, we strongly encourage you to consult with legal counsel experienced in employment practice matters.

DRJ CPAs, INC.
3247 W March Ln Ste 200
Stockton, CA 95219
209-943-2222

Starting in 2024, the Corporate Transparency Act ("CTA") mandates certain entities (primarily small and medium-size businesses) created in or registered to do business in the United States report information about their beneficial owners — the individuals who ultimately own or control a company — to the Financial Crimes Enforcement Network ("FinCEN"). Management is responsible for Reclamation District 773's compliance with the CTA, if applicable, and for ensuring that any required reporting of beneficial ownership information (including the initial filing and any required ongoing updates and/or corrected reports that may be necessary) is timely filed with FinCEN as required by the CTA. Our firm's services under the terms of this agreement do NOT include any advising, consulting, or submission of any required reporting related to your entity's compliance with the CTA.

<If you need assistance with any required CTA reporting and/or have any questions regarding Reclamation District 773's compliance with the CTA, including but not limited to whether an exemption may apply to your organization or to ascertain whether relationships constitute beneficial ownership under CTA rules, we strongly encourage you to consult with qualified legal counsel experienced in this area.>

Our fees will be based upon the amount of time required at our standard billing rates plus out-of-pocket expenses. All invoices are due and payable upon presentation. Billings become delinquent if not paid within 90 days of the invoice date. If billings are past due in excess of 90 days, at our election, we may stop all work until your account is brought current, or withdraw from this engagement. Reclamation District 773 acknowledges and agrees that we are not required to continue work in the event of Reclamation District 773's failure to pay on a timely basis for services rendered as required by this engagement letter. Reclamation District 773 further acknowledges and agrees that in the event we stop work or withdraw from this engagement as a result of Reclamation District 773's failure to pay on a timely basis for services rendered as required by this engagement letter, we shall not be liable for any damages that occur as a result of our ceasing to render services.

In addition, in the event our firm or any of its employees or agents is called as a witness or requested to provide any information whether oral, written, or electronic in any judicial, quasi-judicial, or administrative hearing or trial regarding information or communications that you have provided to this firm, or any documents and workpapers prepared by DRJ CPAs, Inc. in accordance with the terms of this agreement, you agree to pay any and all reasonable expenses, including fees and costs for our time at the rates then in effect, as well as any legal or other fees that we incur as a result of such appearance or production of documents.

Because of the importance of oral and written management representations to the effective performance of our services, Reclamation District 773 releases and indemnifies our firm and its personnel from any and all claims, liabilities, costs and expenses attributable to any misrepresentation by management and its representatives.

In connection with this engagement, we may communicate with you or others via email transmission. We take reasonable measures to secure your confidential information in our email transmissions. However, as emails can be intercepted and read, disclosed, or otherwise used or communicated by an unintended third party, or may not be delivered to each of the parties to whom they are directed and only to such parties, we cannot guarantee or warrant that emails from us will be properly delivered to and read only by the addressee. Therefore, we specifically disclaim and waive any liability or responsibility whatsoever for interception or

DRJ CPAs, INC.
3247 W March Ln Ste 200
Stockton, CA 95219
209-943-2222

unintentional disclosure or communication of email transmissions, or for the unauthorized use or failed delivery of emails transmitted by us in connection with the performance of this engagement. In that regard, you agree that we shall have no liability for any loss or damage to any person or entity resulting from the use of email transmissions, including any consequential, incidental, direct, indirect, or special damages, such as loss of sales or anticipated profits, or disclosure or communication of confidential or proprietary information.

We may from time to time and depending on the circumstances and nature of the services we are providing, share your confidential information with third-party service providers, some of whom may be cloud-based, but we remain committed to maintaining the confidentiality and security of your information. Accordingly, we maintain internal policies, procedures and safeguards to protect the confidentiality of your personal information. In addition, we will secure confidentiality terms with all service providers to maintain the confidentiality of your information and will take reasonable precautions to determine that they have appropriate procedures in place to prevent the unauthorized release of your confidential information to others. In the event that we are unable to secure appropriate confidentiality terms with a third-party service provider, you will be asked to provide your consent prior to the sharing of your confidential information with the third-party service provider. Although we will use our best efforts to make the sharing of your information with such third parties secure from unauthorized access, no completely secure system for electronic data transfer exists. As such, by your signature below, you understand that the firm makes no warranty, expressed or implied, on the security of electronic data transfers.

It is our policy to keep records related to this engagement for four years. However, DRJ CPAs, Inc. does not keep any original client records, so we will return those to you at the completion of the services rendered under this engagement. It is your responsibility to retain and protect your records (which includes any work product we provide to you as well as any records that we return) for possible future use, including potential examination by government or regulatory agencies. DRJ CPAs, Inc. does not accept responsibility for hosting client information; therefore, you have the sole responsibility for ensuring you retain and maintain in your possession all your financial and non-financial information, data and records.

By your signature below, you acknowledge and agree that upon the expiration of the four year period, DRJ CPAs, Inc. shall be free to destroy our records related to this engagement.

If a dispute arises among the parties hereto, the parties agree to first try in good faith to settle the dispute by mediation. The costs of any mediation proceeding shall be shared equally by all parties.

Client and accountant both agree that any dispute over fees charged by the accountant to the client will be submitted for resolution by arbitration. Such arbitration shall be binding and final. IN AGREEING TO ARBITRATION, WE BOTH ACKNOWLEDGE THAT, IN THE EVENT OF A DISPUTE OVER FEES CHARGED BY THE ACCOUNTANT, EACH OF US IS GIVING UP THE RIGHT TO HAVE THE DISPUTE DECIDED IN A COURT OF LAW BEFORE A JUDGE OR JURY AND INSTEAD WE ARE ACCEPTING THE USE OF ARBITRATION FOR RESOLUTION. The prevailing party shall be entitled to an award of reasonable attorneys' fees and costs incurred in connection with the arbitration of the dispute in an amount to be determined by the arbitrator.

DRJ CPAs, INC.
3247 W March Ln Ste 200
Stockton, CA 95219
209-943-2222

If the foregoing is in accordance with your understanding, please sign the copy of this letter in the space provided and return it to us. Also please provide names of your authorized representatives for purposes of this engagement in the space provided. Thank you for this opportunity to serve you.

Sincerely,

DRJ CPAs, INC.
DRJ CPAs, Inc.

APPROVED:

_____
Reclamation District 773

_____
Date

ITEM 10

RECLAMATION DISTRICT NO. 773
FABIAN TRACT
BOARD OF TRUSTEES MEETING
TUESDAY, APRIL 1, 2025
9:00 AM
ENGINEER'S REPORT

I. DELTA LEVEE SUBVENTIONS PROGRAM

A. Review Levee Maintenance Project for Fiscal Year 2024/25 awarded to Dino & Son Excavating.

a. Original Contract Work and Change Order No. 1 has been completed.

b. Potential Changer Order 2: Gates

i. The Contractor will submit a quote for (2) gate repairs and (1) replacement for review and approval as change order.

ii. Contract work remains open until the repairs and replacements are completed.

c. Contractor Progress Pay Estimates

i. Payment Recommendation No. 1 sent March 19, 2025.

1. Dino & Son (Contractor) requesting expedited payment.

d. Contract Summary:

i. Original Contract Price: $143,260.00

ii. Approved Change Orders: $15,189.62

iii. Percent Change Orders: 10.6%

iv. Revised Contract Price: 158,449.62

v. Percent Complete 100.00%

EXHIBIT A: Progress Pay Estimate No 1

II. STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES SOUTH DELTA BARRIERS PROJECT

A. Review request for entry permit for Geotechnical Explorations for proposes future Permanent Tadal Barriers on Gantline and Old River. KSN recommends coordination with RD 2 in as much as terms and conditions for entry permit and reimbursement terms and technical terms on Drilling Plan. Review Gilbert Cosio with River Delta (formerly MBK) email correspondence and attachments.

EXHIBIT B: Email correspondence from Gilbert Cosio with River Delta Consulting

EXHIBIT C: Draft DWR Permit Agreement.

EXHIBIT D: South Delta DWR Drilling Plan for Permanent tidal barriers

EXHIBIT A

KSN inc. KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

Stephen K. Sinnock, P.E.
Christopher H. Neudeck, P.E.
Neal T. Colwell, P.E.
Barry O'Regan, P.E.

2089-0400
25-002

March 19, 2025

Reclamation District No. 773
Mark Bacchetti, President
apinasco@neumiller.com

Re: FY24/25 Maintenance Project – Contractor Progress Payment Application No. 1

Dear Mr. Bacchetti,

Please find Payment Application No. 1 for work performed by Dino & Son Ditching Service Inc. for the Annual Levee Maintenance Project FY2024/2025. The payment application was submitted by the Contractor to KSN on March 6, 2025. Additional items were requested and supplied to us on March 17, 2025. The total work completed amounts to **$158,449.62**. KSN recommends withholding 5% retention at **($7,922.48)** and approval and payment by Reclamation District No. 773 in the amount of **$150,527.14**.

Pricing for gate repairs and replacements have been requested of the contractor. The contract will remain open until pricing is received and determination is made on whether to proceed with the repairs and replacements by contract change order.

Please call me at 209-946-0268 or email me at jprescott@ksninc.com if you have any questions.

Sincerely,
KJELDSEN, SINNOCK & NEUDECK, INC.

Joseph D. Prescott, P.E.
Civil Engineer

w/enclosures
- Engineer's Progress Pay Estimate
- Change Order No. 1
- ¾" Class II AB Weight Tags
- Contractor's Invoice

cc: Christopher Neudeck, District Engineer

KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

PROGRESS PAY ESTIMATE

Monthly Progress

NO. 1

OWNER:	**Reclamation District No. 773 Fabian Tract**	PROJECT:	**Levee Maintenance Project FY2024/2025**
CONTRACTOR:	**Dino and Son Ditching Service Inc.**	CONTRACT NO.:	**0773-12-13-24-01**
KSN JOB NO.:	**2089-0400**	DATE:	**3/7/2025**

Contract Time:

Original Time	45 working days
Notice to Proceed Date	1/15/2025
Original Completion Date	
Approved Time Extensions	- working days
Contract Completion Date	3/24/2025
Work Completed Through	3/6/2025
Elapsed Time	33 working days
Percent Time Elapsed	73.3%

Contract Cost:

Original Contract Price	$143,260.00
Approved Change Orders	$15,189.62
Percent Change Orders	10.6%
Revised Contract Price	$158,449.62
Amount Complete To Date	$158,449.62
Percent Complete	100.0%

Payment Summary:

	Previous	Current	To Date
Total Earnings	$ -	$ 158,449.62	$ 158,449.62
Less Contract Deductions	$ -	-	$ -
Subtotal	$ -	$ 158,449.62	$ 158,449.62
Less Retention (5%)	$ -	$ *(7,922.48)*	$ *(7,922.48)*
Net Earnings	$ -	$ 150,527.14	$ 150,527.14

Net Payment Due This Invoice **$ 150,527.14**

Supporting Documentation:
- > Change Order No. 1
- > Contractor's Invoice
- > AB Weight Tags

Recommended for Payment:

Joseph Prescott

Kjeldsen, Sinnock & Neudeck, Inc.
District Engineer
By: Joseph Prescott

PROGRESS PAY ESTIMATE
NO. 1
3/7/2025

Item No.	Item Description	Unit	Contract			Previous Estimate		Current Estimate		Total Estimate to Date		
			Quantity	Unit Price	Amount	Quantity	Amount	Quantity	Amount	Quantity	%	Amount
Original Contract												
1.	Mobilization	LS	1	$ 5,000.00	$5,000.00			1.00	$5,000.00	1.00	100%	$5,000.00
2.	Levee Work	Ton	1,580	$ 47.00	$74,260.00			1,580.00	$74,260.00	1,580.00	100%	$74,260.00
3.	Levee Clean-Up	LS	1	$ 50,000.00	$50,000.00			1.00	$50,000.00	1.00	100%	$50,000.00
4.	Levee Work	LS	1	$ 14,000.00	$14,000.00			1.00	$14,000.00	1.00	100%	$14,000.00
			Subtotals, Original Contract:		**$143,260.00**		**$0.00**		**$143,260.00**		**100%**	**$143,260.00**
Change Orders												
1.	Misc. Extra Work	LS	1	$ 15,189.62	$15,189.62			1.00	$15,189.62	1.00	100%	$15,189.62
			Subtotals, Change Orders:		**$15,189.62**		**$0.00**		**$15,189.62**		**100%**	**$15,189.62**
Totals:					$158,449.62		$0.00		$158,449.62		100%	$158,449.62

KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS

Change Order

PROJECT:	2089-0400-25 Levee Maintenance Project FY 2024/2025	DATE:	3/13/2025
CHANGE ORDER FOR:	Misc. Extra Work	CONTRACT ID:	0773-12-13-24-01
TO:	Dino & Son Ditching Service Inc.	CHANGE ORDER:	CO 01

The Contract is modified as follows upon execution of this Change Order:

SCHEDULE OF VALUES:

ITEM ID	DESCRIPTION	MODIFICATION AMOUNT
PCO 1	Remove fallen tree at Sta 170+00.	$980.00
PCO 2	Trim trees between Sta 172+00 and 221+25.	$1,890.00
PCO 3	Remova tree at Sta 244+18.	$865.00
PCO 4	Remove fallen trees at Sta 534+80.	$1,260.00
PCO 5	Trim tress between Sta 410+00 and 412+00.	$630.00
PCO 6	Remove fallen trees between Sta 712+00 and 726+00; Trim trees between Sta 733+00 and Sta 737+00.	$3,780.00
PCO 7	Trim trees between Sta 741+80 and 771+40	$2,520.00
PCO 8	Additional Aggregate Base (69.46 tons at $47.00 per ton)	$3,264.62
	TOTAL CHANGE ORDER AMOUNT:	**$15,189.62**

CLARIFICATIONS AND GENERAL NOTES:

This Change Order includes pricing from the following Potential Change Orders: PCO 1 through PCO 8.

INCLUSIONS:

The Scope of Work shall include, but is not limited to, the following: Additional tree trimming and removals. Additional aggregate base.

CONTRACT DOCUMENTS:

The following Contract Documents are included as part of this Change Order:

Not applicable.

Change Order

DATE: 3/13/2025
CONTRACT ID: 0773-12-13-24-01
CHANGE ORDER: 01

CONTRACT SUMMARY:

The original Contract was	$143,260.00
Net change by previously approved Change Orders was	$0
The amount prior to this Change Order was	$143,260.00
The amount will be changed by this Change Order in the amount of	$15,189.62
The new amount including this Change Order will be	$158,449.62
The Contract time will be changed by	0 days
The date of Substantial Completion as of the date of this Change Order is	3/7/2025

All terms and conditions of the previous Contract not modified herein shall remain in full force and effect.

IN WITNESS WHEREOF, the parties hereto have executed this Change Order as of the date first above written:

CONTRACTOR ACCEPTANCE
Dino & Son Ditching Service Inc.

BY:
Teofilo Macias, Jr.
Vice President

OWNER ACCEPTANCE
Reclamation District No. 773

BY:
Mark Bacchetti
President

Date	Load Number	Ticket Number	Tons Per Load	Daily Tons
2/11/2025	1	481423	22.00	
2/11/2025	2	481554	21.90	
2/11/2025	3	481686	21.95	65.85
3/4/2025	1	488793	25.19	
3/4/2025	2	488802	25.03	
3/4/2025	3	488805	25.42	
3/4/2025	4	488812	25.56	
3/4/2025	5	488816	24.12	
3/4/2025	6	488818	24.74	
3/4/2025	7	488830	24.61	
3/4/2025	8	488832	25.34	
3/4/2025	9	488835	24.17	
3/4/2025	10	488836	24.75	
3/4/2025	11	488842	24.49	
3/4/2025	12	488848	25.34	
3/4/2025	13	488850	25.12	
3/4/2025	14	488851	24.38	
3/4/2025	15	488857	24.51	
3/4/2025	16	488862	22.74	
3/4/2025	17	488916	25.32	
3/4/2025	18	488946	25.10	
3/4/2025	19	488953	24.18	
3/4/2025	20	488958	25.68	
3/4/2025	21	488962	23.95	
3/4/2025	22	488965	24.79	
3/4/2025	23	488967	25.34	
3/4/2025	24	488968	24.23	
3/4/2025	25	488972	24.78	
3/4/2025	26	488980	24.55	
3/4/2025	27	488984	24.33	
3/4/2025	28	488985	24.63	
3/4/2025	9	488989	24.66	
3/4/2025	10	488993	23.27	
3/4/2025	11	488995	24.89	
3/4/2025	12	489000	24.67	
3/4/2025	13	489078	25.53	
3/4/2025	14	489097	25.51	
3/4/2025	15	489101	25.03	
3/4/2025	16	489107	24.55	
3/4/2025	17	489110	24.81	
3/4/2025	18	489113	24.34	
3/4/2025	19	489116	25.28	
3/4/2025	20	489119	23.48	
3/4/2025	21	489120	24.88	
3/4/2025	22	489123	25.13	

Date	Load Number	Ticket Number	Tons Per Load	Daily Tons
3/4/2025	23	489124	24.59	
3/4/2025	24	489126	24.41	
3/4/2025	1	489127	24.09	
3/4/2025	2	489129	24.52	
3/4/2025	3	489132	24.27	
3/4/2025	4	489135	24.37	
3/4/2025	5	489215	25.59	
3/4/2025	6	489217	24.83	
3/4/2025	7	489222	25.43	
3/4/2025	8	489224	24.59	
3/4/2025	9	489226	25.46	
3/4/2025	10	489237	24.65	
3/4/2025	11	489240	24.31	
3/4/2025	12	489244	25.11	
3/4/2025	13	489245	25.39	
3/4/2025	14	489246	24.84	
3/4/2025	15	489248	25.30	
3/4/2025	16	489252	24.56	
3/4/2025	17	489256	24.20	
3/4/2025	18	489257	24.58	
3/4/2025	19	489260	25.43	
3/4/2025	20	489261	24.67	1583.61

Σ 1649.46 Tons

KSN inc. KJELDSEN SINNOCK NEUDECK CIVIL ENGINEERS & LAND SURVEYORS

INVOICE

Dino and Son Ditching Service Inc.
5250 Claremont Ave #122
Stockton, CA 95207

dinoandsonditching@yahoo.com
+1 (209) 471-0370

Reclamtion District 773 C/O K.S.N Inc.

Bill to
Reclamtion District 773 C/O K.S.N Inc.
711 N Pershing Ave.
Stockton, Ca. 95203

Ship to
Reclamtion District 773 C/O K.S.N Inc.
711 N Pershing Ave.
Stockton, Ca. 95203

Invoice details
Invoice no.: 25-01
Terms: Net 30
Invoice date: 03/06/2025
Due date: 04/05/2025

#	Date	Product or service	Description	Qty	Rate	Amount
1.		**Mobilization**	Mobilization 100% completed	1	$5,000.00	$5,000.00
2.		**Levee work**	Supplemental Aggregate Base 100% completed	1649.46	$47.00	$77,524.62
3.		**Levee clean-up**	Vegetation Management Selective Tree & Shrub Removal & Trimming 100% completed	1	$50,000.00	$50,000.00
4.		**Levee work**	Miscellaneous Grading 100% completed	1	$14,000.00	$14,000.00
5.		**Levee clean-up**	(Change order work) 02/03 Removed large fallen tree from levee crown near station 170+00 with two laborers (@$140.00 per hour/per laborer) BC 1000 chipper/chipper truck (@$160.00 per hour), chain saws, pole saws and hand tools (@$50.00 per hour)	2	$490.00	$980.00
6.		**Levee clean-up**	(Change order work) 02/05 Trimmed trees from levee crown near stations 172+00 - 176+00 - 183+00 - 190+00 - 221+25 with three laborers (@$140.00 per hour/per laborer) BC 1000 chipper/chipper truck (@$160.00 per hour), chain saws, pole saws and hand tools (@$50.00 per hour)	3	$630.00	$1,890.00

7.	**Levee clean-up**	(Change order work) 02/05 Removed large fallen tree from levee crown near station 244+18 with three laborers (@$140.00 per hour/per laborer) BC 1000 chipper/chipper truck (@$160.00 per hour), Bobcat E50 excavator (@$235.00 per hour), chain saws, pole saws and hand tools (@$50.00 per hour)	1	$865.00	$865.00
8.	**Levee clean-up**	(Change order work) 02/07 Removed fallen trees from levee crown near station 534+80 with three laborers (@$140.00 per hour/per laborer) BC 1000 chipper/chipper truck (@$160.00 per hour), chain saws, pole saws and hand tools (@$50.00 per hour)	2	$630.00	$1,260.00
9.	**Levee clean-up**	(Change order work) 02/10 Trimmed trees from levee crown between stations 410+00-412+00 with three laborers (@$140.00 per hour/per laborer) BC 1000 chipper/chipper truck (@$160.00 per hour), chain saws, pole saws and hand tools (@$50.00 per hour)	1	$630.00	$630.00
10.	**Levee clean-up**	(Change order work) 02/11 Removed fallen trees from levee crown near stations 712+40 - 726+00 trimmed trees between stations 733+00-737+00 with three laborers (@$140.00 per hour/per laborer) BC 1000 chipper/chipper truck (@$160.00 per hour), chain saws, pole saws and hand tools (@$50.00 per hour)	6	$630.00	$3,780.00
11.	**Levee clean-up**	(Change order work) 02/12 Trimmed trees from levee crown between stations 741+80-745+00, 745+00-747+50, 751+50-757+30 and 770+00-771+40 with three laborers (@$140.00 per hour/per laborer) BC 1000 chipper/chipper truck (@$160.00 per hour), chain saws, pole saws and hand tools (@$50.00 per hour)	4	$630.00	$2,520.00
		Total			**$158,449.62**

Note to customer

Contract Number 0773-12-13-24-01

EXHIBIT B

Christopher H. Neudeck

From: Gilbert Cosio <gcosio@river-deltaconsulting.com>
Sent: Wednesday, March 26, 2025 7:47 AM
To: Christopher H. Neudeck; Steve Sinnock
Cc: Dave C. Carr
Subject: Re: Permanent Barriers South Delta
Attachments: 20250303_LIC-2025021003_RD773.pdf; RD 773 Lic Agreement SDG- OGC Approved.docx; 20250303_LIC-2025021002_RD2.pdf; RD 2 Lic Agreement SDG- OGC.docx; South Delta Gates Drill Plan_March 2025.pdf

Chris & Steve:
Attached are the draft permit agreements with RD's 2 & 773. Also attached is the drilling plan. I had hoped that my conversations with DWR about the agreements would have resulted in another draft version, but DWR has not provided that yet, so the agreements are in a very rough state. Described, below, are initial comments that I have discussed with DWR, accept what you like, but certainly think about other comments you would add.

I have been working with John Herrick and Jeff Klein to perform initial reviews of the RD and landowner agreements. Here are some of my initial thoughts about the RD agreements that I have expressed to Herrick, Klein and DWR. In several conversations with DWR, they will be accepting these comments and modifying the agreements. I've added additional comments in parentheses:

- No Filing Fee described. DWR is willing to reimburse engineering costs, but they do not reimburse attorney fees. In past agreements, RD's have charged a "Filing Fee" of a magnitude that would cover attorney fees. (RD's 2 & 773 should decide the magnitude of their filing fee)
- In the Recitals, recital "E" describes that the project is intended to prevent intrusion of salt water into the Delta. DWR is going to work on this to cite all project benefits.
- Under reimbursements, a number of $140,000 is provided as a not to exceed number for the independent person to review the drilling. DWR should also reimburse for engineering review of the drilling plan, the work agreement, and any of reviews that the RD's District Engineers deem necessary. (I have told DWR the number for RD consultants to review should be in the neighborhood of $25,000. You can adjust if you feel differently)
- The agreement does not describe any conditions of approval the RD's may request. The most common is that the RD will receive a report describing the results of the geotechnical exploration so the RD can keep for it's records. (the RD's should decide how to include any conditions of approval)
- The inspector is generally described by someone having 10+ years of drilling inspection experience, or a CA registered Engineering Geologist. This should be made more clear that someone registered as a Geotechnical Engineer would also be qualified. KSN has some inspectors in mind, so they may have a better description for this section.
- Agreement condition 7 describes that DWR would repair and return the levee to the condition that existed prior to geotechnical exploration. The RD's should add conditions, such as pre-project photos, or videos, as a way to accurately document the pre-project conditions. (DWR has mentioned that their experience on the levees indicated the levees look "a little rough".)
- In Exhibit B, Section II.B. Drill Exploration, I told DWR they need to justify the maximum depth of 200-feet so that it does not appear that this exploration is intended for use with tunnel design. In the north Delta temporary barriers design, they drilled about 100-feet. (the drilling plan apparently describes a depth of 130-feet, so the permit agreement will be edited to reflect the same)

- Exhibit B includes a brief description of the Drilling Plan. However, DWR has developed a very detailed Drilling Plan which should be included as Exhibit C. (Exhibit C, the drilling plan will be added as Exhibit C)

If you want to get on a call before your district meetings, let me know. I am pretty available over the next few days and the next couple of weeks.

Let me know if you have any questions.
Thanks,

Gilbert Cosio, Jr.
President
(916) 761-1282
gcosio@river-deltaconsulting.com
P. O. Box 73386
Davis, CA 95617

From: Chris Neudeck <cneudeck@ksninc.com>
Date: Wednesday, March 26, 2025 at 5:20 AM
To: Gilbert Cosio <gcosio@river-deltaconsulting.com>
Cc: "Dave C. Carr" <dcarr@ksninc.com>
Subject: Permanent Barriers South Delta

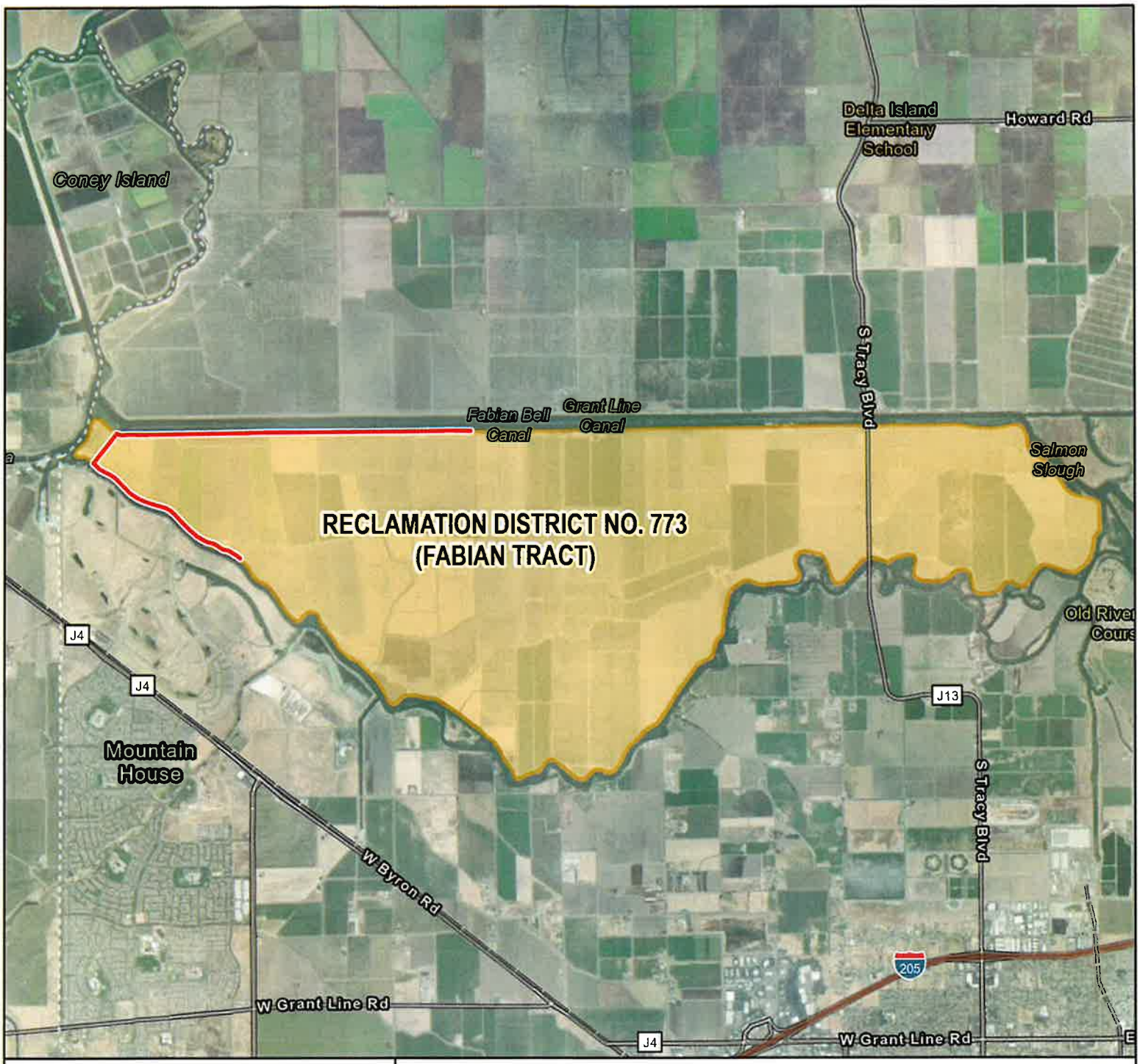
GC,

I am preparing my Engineers Report for next Tuesday's RD 773 meeting. Can you please send me details on the barriers today? At least send me site map etc. I have it on the agenda and I have Dave Carr covering this meeting for me since I have another conflict so I need to bring him up to speed as well

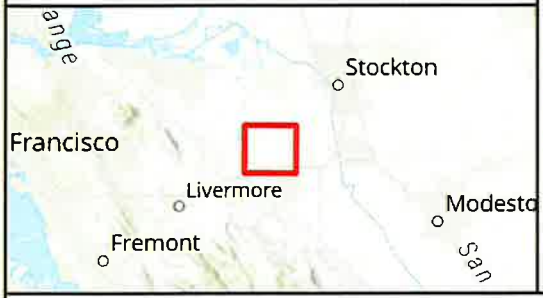
KJELDSEN SINNOCK NEUDECK
CIVIL ENGINEERS & LAND SURVEYORS
The trusted firm for delivering the right solution for our clients' needs.

Christopher H. Neudeck , P.E.
President

711 N. Pershing Ave. Stockton CA 95203
p: 209 946-0268 **f:** 209 946-0296 **m:** 209 481-0316 h 209 948-8479
cneudeck@ksninc.com
www.ksninc.com



VICINITY MAP



LEGEND

N

NO SCALE

PROPOSED ACCESS ROUTE

RECLAMATION DISTRICT NO. 773

Note: DWR makes no claims, representations, or warranties (express or implied) concerning the positional accuracy of the polygon data contained herein. Each user is responsible for determining its suitability for his or her intended use or purpose. Ownership information was provided by the County Assessor's Office and may not be complete or accurate.

This exhibit does not represent a survey and is for informational purposes only.

EXHIBIT A

LICENSE: LIC-2025021003

TO: CALIFORNIA DEPARTMENT OF WATER RESOURCES

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING - GEOMATICS BRANCH

3/3/2025

SHEET 1 OF 1

EXHIBIT C

☒ RD 773
☒ Geology, utility site walk, cultural surveys, environmental surveys, Phase 1 Environmental Site Assessment

Project: South Delta Gates

PERMIT

This Permit ("Permit") for geology, utility site walk, cultural surveys, environmental surveys, and Phase 1 Environmental Site Assessment is issued by Reclamation District _____ ("RD 773") to the California Department of Water Resources ("DWR"). RD 773 and DWR are hereinafter at times collectively referred to as the "Parties" and individually as a "Party." This Permit is effective upon

Recitals

A. RD 773 was formed pursuant to Water Code section _____.
B. RD 773's purpose is to protect the lands comprising the reclamation district from storm water and related issues.
C. To achieve RD 773's purpose, it developed ____ miles of levees to control the storm water within _____ County, California, shown on Exhibit A.
D. DWR seeks to conduct work, as further described in Exhibit B, in preparation for the South Delta Gates Project ("Project").
E. The Project seeks to install a permanent salinity barrier to prevent the intrusion of salt water into the Delta.
F. DWR needs to conduct various surveys to determine if the Project can proceed.

Now, therefore, in consideration of good and valuable consideration, the receipt and adequacy of which the Parties mutually acknowledge, the Parties agree as follows:

Agreement

1. Grant of Permit. RD 773 hereby grants to DWR a permit to conduct geotechnical exploration within RD 773's levees shown on Exhibit A.

2. Scope of Work. DWR is granted a permit for the purpose of geology, utility site walk, cultural surveys, environmental surveys, and a Phase 1 Environmental Site Assessment. Further description of the permit work is included in Exhibit B. RD 773 retains all of its rights to use its levees; however, RD 773 shall not unreasonably interfere with DWR's uses of the levees provided for within the scope of this Permit.

3. Reimbursement. DWR agrees to reimburse RD 773 for it to retain the services of an inspector with a minimum of ten years of experience as a drill inspector or a California Certified Engineering Geologist ("Inspector") to observe geotechnical exploration pursuant to this Permit subject to the limitations contained herein. The Inspector will ensure the geotechnical exploration complies with applicable safety and regulatory standards. If the Inspector discovers noncompliance, the Inspector shall immediately report such noncompliance to the onsite DWR staff. The Inspector shall not interfere with any of the geotechnical exploration work. RD 773 shall hire the Inspector and be responsible for payment of Inspector's services. DWR shall reimburse RD 773 for the Inspector's services observing geotechnical exploration pursuant to this Permit with a maximum reimbursement amount of $140,000 regardless of the total amount of the cost of Inspector's services to RD 773. In order for RD 773 to obtain reimbursement from DWR, RD 773 must provide DWR copies of the Inspector's invoices. The invoices will be

reviewed by DWR and all invoice amounts determined by DWR, in its sole and absolute judgment, to be reasonable and attributable to Inspector's services observing geotechnical exploration pursuant to this Permit shall be paid by DWR to RD 773.

4. Private Property Permission. RD 773 does not own the underlying fee of the levees. DWR must obtain permission from the fee owners to access and conduct geotechnical exploration.

5. Reasonable precautions. DWR shall exercise reasonable precautions to avoid damage and protect persons or property.

6. Indemnification. DWR agrees to indemnify and hold RD 773 harmless from and against any and all liabilities, claims, actions, or demands, costs or expenses, including reasonable attorney's fees (collectively, a "Loss"), arising out of or in any way connected to this Permit.

7. Repair or Reimbursement. DWR agrees to repair any damage it causes to RD 773's levee. Repairs required hereunder shall return the levee to the condition that such levee was in immediately preceding the occurrence of any such damage caused by DWR, normal wear and tear excepted.

8. Term. This permit expires when the geotechnical exploration work is completed by DWR.

9. Governing Law. This Agreement shall be governed by, interpreted under, construed, and enforced in accordance with, the laws of the State of California, without giving effect to its conflicts of laws principles.

10. Incorporation of Recitals and Exhibits. The recitals to this Agreement, and all exhibits referred to in this Agreement, are incorporated herein by such reference and made a part of this Agreement as though set forth in full herein.

11. Entire Agreement. This Agreement sets forth the entire understanding and agreement of the Parties and shall supersede any other agreements and understandings (written or oral) between the Parties on or prior to the date of this Agreement with respect to the subject matter of this Agreement.

12. Amendment, Modification, and Waiver. No amendment or modification to any term or provision of this Agreement or waiver of any covenant, obligation, breach or default under this Agreement shall be valid unless in writing and executed and delivered by each of the Parties. No waiver of any provision of this Agreement by a party shall be construed as a waiver of any subsequent breach or failure of the same term or condition, or as a waiver of any other provision of this Agreement.

13. Execution in Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original and all of which counterparts together shall constitute one agreement with the same effect as if the Parties had signed the same signature page. The Parties agree to the use of electronic signatures, such as digital signatures that meet the requirements of the California Uniform Electronic Transactions Act (CUETA) Cal. Civ. Code §§ 1633.1 to 1633.17), for executing this Agreement. The Parties further agree that the electronic signatures of the Parties included in this Agreement are intended to authenticate this writing and to have the same force and effect as manual signatures.

14. Authority to Sign. The Parties represent and warrant that the person executing this Agreement on behalf of each respective Party has full power and authority to enter into this Agreement.

RD 773, Address, and Phone No.:

RD 773_____

_____

_____

Phone No. _____

▶_____
Signature

Date: _____

DWR

ACCEPTANCE RECOMMENDED:

▶_____
_____, _____ Right of Way Agent Date

ACCEPTED:

▶_____
_____, _____ Right of Way Agent

Date: _____

Exhibit A

Map of RD 773 Levees

Exhibit B

TYPES OF STUDIES AND SCOPING ACTIVITIES

For purposes of the Permit, all permit activities will be led by qualified and trained DWR personnel and/or authorized representatives (contractors/consultants) under the direction of a DWR Project Manager and, when necessary, overseen or inspected by other governmental agencies and tribes. If requested by RD 773, DWR will provide RD 773 a copy of any requested report provided to a regulatory agency during the term of this Permit that is a result of information gathered pursuant to this Permit unless such report or portions of a report are confidential. DWR may conduct the following checked activities:

☒I. GEODETIC MAPPING

Geodetic mapping involves measuring the shape and area of the levee by using the exact position of geographical points as a reference. The geodetic mapping activities will require the installation of targets on the levee and then using a small aircraft to take photographs while flying over the levee.

In addition to the small aircraft, equipment used to complete the mapping activity will include standard survey trucks and, if the levee is muddy, levee access will be postponed until conditions are dry to avoid damage to the levee. A tripod, a handheld receiver, antenna and data collector unit will also be used. The targets will be set by using a sledgehammer to drive iron pipe flush with the ground surface. The iron pipes will be placed at the center of an aerial ground target. GPS surveying equipment will then be used to determine the exact location of the target. If livestock is present, chicken wire (or a similar type of fence fabric) will be installed around the target marker by using a hand-held staple gun and hammer. Staff will return with GPS equipment to resurvey, check, clean, and repair the target when necessary. After the second aerial flight has been completed, staff will return to remove target material from the ground surface. RD 773 may elect to retain the iron pipes installed on the levee for future use.

Field surveying will occur to study possible future project alignments. Surveying activities will require the use of two (2) by two (2) inch wood lath-stakes with flagging. Stakes will be placed in the ground following a linear progression that may traverse the levee.

☒II. ENGINEERING GEOLOGY

Geologic activities will include field surveying, mapping and geotechnical exploration. The geotechnical exploration will include auger and/or mud rotary drilling, soils sampling using a Standard Penetometer Test (SPT) barrel, Modified California spoon, Hydro-punch, and Shelby tubes, Cone Penetometer Testing (CPT). Prior to exploration activities, several site inspections will be needed to evaluate access, potential environmental restrictions, potential cultural and archaeological resources, the locations of underground utilities, etc.
Activities are described as follows:

A. Underground Service Alert ("USA"). Prior to drilling, USA (Underground Service Alert) will be contacted to mark all known utility lines.

B. Drill Exploration. Drill exploration will generally be performed using a six and a half to 8-inch diameter auger or 94mm (3.7 inch) to 134mm (5.3 inch) diameter mud rotary drill rig. The drill rig is usually truck-mounted and powered by an industrial engine with 200 to 300 cubic inches of displacement, equipped with a muffler and spark arrester. Soil samples will be obtained for

testing. Upon completion of drilling, holes will be sealed using cement-bentonite grout. The depth of test holes will vary from about five (5) feet to two-hundred (200) feet. An associated truck or small loader with a "Baker Tank" or drums may be on site to dispose of drilling mud and cuttings resulting from rotary drilling. Additional vehicles may be present at short time intervals to deliver supplies. The drilling time required for each drill hole is normally less than 2 (two) to five (5) workdays. Weather, site conditions and/or mechanical breakdown may lengthen the drilling time. Cone Penetrometer testing (CPT) will require a Rig (generally truck- mounted) to push a hole, a tender truck and/or a driller's pick-up truck and trailer with grouting equipment, a geologist's vehicle, and an environmental monitor's vehicle.

☒III. UTILITIES

Inventory of existing utilities will consist of a review of public records and a walking survey of the levee. Records review and walking surveys are completed in compliance with best practices as outlined by the California Public Utilities Commission. Site reconnaissance consists of ground surveys with minimal ground disturbance. Shallow scraping of surface soils, one (1) to three (3) inches deep, in small, localized areas may be required. Upon completion of site reconnaissance DWR will restore the levee, as near as possible, to its original condition.

Electrical items such as vaults, underground and exposed conduits, power generating equipment, pole mounted transformers and other equipment capable of generating, transmitting or consuming electrical power may be inspected or documented.

☒IV. CULTURAL RESOURCES

Studies of cultural resources include both archaeological surveys and architectural and historic resource evaluations. A site visit will be conducted in order to perform a Cultural Resources Inventory in compliance with the California Environmental Quality Act and the National Historic Preservation Act implementing regulations. Representatives from one or more Native American tribes affiliated with the project area may accompany DWR personnel or consultants during site visits and surveys of the levee.

Archaeological surveys involve walking across the levee and recording any archaeological resources that are observed on the ground surface. Architectural and historic resource evaluations will follow the Secretary of the Interior's Standard's for the Identification of Historic Properties. If the ground surface is not visible due to vegetation, surveyors may use a hand trowel or a small shovel to perform minimally invasive clearance of vegetation, scraping soils to a depth of one (1) to three (3) inches, in small, localized areas. Upon completion of vegetation scraping, DWR will restore the levee, as near as possible, to its original condition.

Different types of strategies are employed when conducting cultural surveys. An intensive strategy uses 15-meter transects, depending on the likelihood of encountering significant cultural resources. This approach will be modified only when unsafe situations or impassable terrain are encountered. In such areas, a moderate to cursory strategy will be employed using meandering and 20-meter or greater transects.

Site visits will include condition assessments which will involve ground-truthing of previously recorded or known cultural resources. Using cursory surveys, an archaeologist will verify the accuracy of site records and site locations, as well as the presence or absence of artifacts and/or human remains. Known cultural resources may include prehistoric archaeological sites that can include features such as burial mounds, habitation sites, lithic scatters, or baked clay deposits; or historic era resources such as architectural and engineering features.

A random sample survey will be conducted for these resources. These types of visits include, but are not limited to, single day field inspections.

Photographs and Global Positioning System (GPS) location readings will be taken for archaeological, architectural, and historic era resources. Architectural and historic era resource evaluations will involve noting the structures present on the levee (houses, barns, sheds, etc.) and historic era features within the study area.

Information concerning the nature and location of any archaeological resource or tribal cultural resource will be kept confidential in accordance with State and federal law.

☒V. ENVIRONMENTAL STUDIES

The environmental surveys involve a variety of specialties and primarily consist of observations made by environmental scientists. Minor ground disturbances with a shovel or hand trowel may be required. Any holes will be filled and compacted immediately. Regardless of the surveys to be conducted, DWR will restore the levees, as near as possible, to its original condition. Environmental survey data, including observations of special status plants and wildlife, results of wetland and aquatic resource delineations, and habitat evaluations, will be reported to state and federal agencies as required by regulatory permits or authorizations and may be used to support an analysis for a future proposed project under the California Environmental Quality Act (CEQA).

A. Botanical Surveys: Surveys will include walking the levee, surveying by vehicle using existing roads on the levee, or surveying the levee banks by boat; recording plant species identified; collecting samples of unknown plant species; and photographing plants and habitats. The levee will be accessed by small vehicle and/or a small boat. Hand-held GPS receivers, cameras, and notebooks will be used to complete the surveys. Botanical surveys will be conducted during daylight hours during the months of February through October.

B. Wetland Delineation: A wetland delineation may be conducted on portions of the levee to identify aquatic features that meet the federal or state definition of wetlands. The levee will be accessed by small vehicle and/or a small boat. Hand-held GPS receivers, cameras, and notebooks will be used to document the surveys. Hand-held shovels will be used to dig holes approximately two (2) feet wide by two (2) feet deep in order to study soils. Any disturbance of levee soils will be minor and will be returned to the original condition to the best extent possible. Wetland delineations will be conducted during daylight hours at any time of the year.

C. Wildlife Surveys: In general, wildlife surveys will consist of visual surveys and habitat assessments which will include walking the levee, surveying by vehicle using existing roads on the levee, or surveying the levee banks by boat, recording observations of wildlife species, and photographing habitats. Hand-held GPS receivers, binoculars/spotting scopes, cameras, and notebooks will be used to conduct and document the surveys. All wildlife encountered will be documented. Surveys for wildlife fall into four generalized categories and are described as follows:

Reptile and Amphibian Surveys: Surveys will follow the general wildlife survey description above and may also include specialized surveys intended to detect presence of California red-legged frog (CRLF, *Rana draytonii*) in or near aquatic habitat such as seasonal or perennial ponds, or wet ditches. CRLF surveys may require nighttime visual surveys using flashlights and binoculars or larval surveys to detect CRLF tadpoles. Larval surveys would be conducted by using hand dipnets or seines from the margins of the water feature or by entering the feature on foot. Reptile and amphibian surveys may be conducted during daylight or nighttime hours at any time of year.

Avian Surveys: Surveys will follow the general wildlife survey description above and are generally focused on identifying avian species present as well as identifying active nest sites. Protocol-level surveys to assess potential for impacts to Swainson's Hawk (SWHA, *Buteo swainsonii*) and Burrowing Owl (BUOW, *Athene cunicularia*) may be required. Protocol surveys would be conducted following the general wildlife survey methods described above, but due to specific timing requirements will necessitate multiple visits. Avian surveys may be conducted between the hours of dawn and twilight at any time of year.

Mammal Surveys: Surveys will follow the general wildlife survey description above. Visual and passive auditory surveys for special-status bat species may be required where appropriate habitat (including riparian trees and shrubs as well as human-made structures such as outbuildings, bridges, and water control structures) is identified. Bat surveys would utilize equipment such as binoculars, hand-held audio recorders, or solar panel-powered bat auditory recording equipment left on site for a two-week period.

Invertebrate/Insect Surveys: Surveys will follow the general wildlife survey description above. Invertebrate surveys would primarily be focused on identifying suitable habitat but may also involve capture of individuals using a hand-held insect net for the purposes of identification.

3

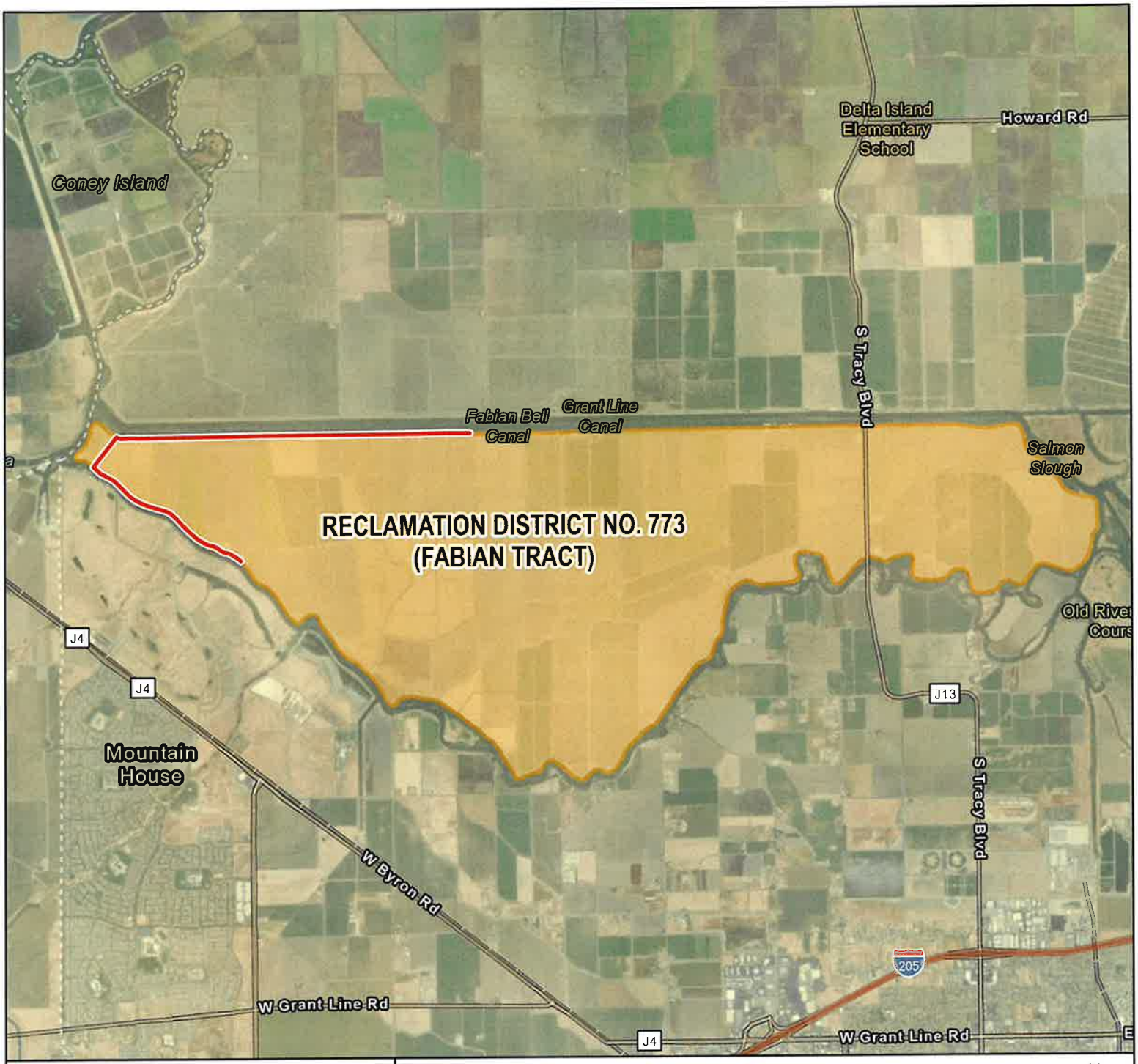
D. Pre-Activity Surveys – prior to the start of Engineering Geology activities described in item II above, pre-activity surveys may be required to comply with any regulatory permits that are obtained. Pre-activity surveys are visual surveys that are intended to assess current conditions immediately before the start of a project activity and to identify biological resources such as plants and wildlife that may be impacted by the activity.

☒VI. PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

The purpose of the Phase 1 Environmental Site Assessment is to evaluate the study area for potential environmental hazards or degradation caused by the release of hazardous materials. This investigation will include the review of historic land use and land title records, federal and state regulatory agency environmental databases, consultation with local environmental health officials, and communication with the current landowners or operators.

The Phase 1 Environmental Site Assessment will include access to the levee to perform site reconnaissance in accordance with the American Society of Testing Materials (ASTM), Standard Practice for Environmental Site Assessment; Phase 1 Environmental Site Assessment Process Designation E1527-21 and newly adopted federal regulations pursuant to 40 Code of Federal Regulation, Part 312 – Standards and Practices for all Appropriate Inquires. Site assessment will include the use of a vehicle, and will include walking the levee, making visual observations, and documenting visual observations and recording locations of "recognized environmental conditions" using GPS, UAV, digital photography, and tape measures.

Any disturbance of levee soils will be minor and will be returned to pre-survey conditions to the best extent possible.



VICINITY MAP

LEGEND

N

NO SCALE

PROPOSED ACCESS ROUTE

RECLAMATION DISTRICT NO. 773

Note: DWR makes no claims, representations, or warranties (express or implied) concerning the positional accuracy of the polygon data contained herein. Each user is responsible for determining its suitability for his or her intended use or purpose. Ownership information was provided by the County Assessor's Office and may not be complete or accurate.

This exhibit does not represent a survey and is for informational purposes only.

EXHIBIT A

LICENSE: LIC-2025021003

TO: CALIFORNIA DEPARTMENT OF WATER RESOURCES

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING - GEOMATICS BRANCH

3/3/2025

SHEET 1 OF 1

EXHIBIT D

DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING
PROJECT GEOLOGY
3500 INDUSTRIAL BOULEVARD
WEST SACRAMENTO, CA 95691

March 11, 2025

Mr. Gilbert Cosio
President, River Delta Consulting
P.O. Box 73386
Davis, CA 95617

South Delta Geotechnical Investigations Drill Plan

Dear Mr. Cosio,

The State of California, Department of Water Resources (DWR) is considering the construction of three permanent gated structures to control water level and circulation in the south Sacramento-San Joaquin Delta. The three proposed structures, currently called the South Delta Gates (SDG) project, would replace temporary rock barriers located in Grant Line Canal, Old River, and Middle River. The Old River and Middle River project areas each have a single location designated for exploration. Two potential sites have been proposed along the Grant Line Canal, identified as Grant Line Canal Alternative 2 (GLA2), and Grant Line Canal Alternative 3 (GLA3).

At this time, DWR proposes geotechnical explorations to gain an understanding of the geological and geotechnical conditions at potential permanent structure locations. Geotechnical explorations will include soil borings and cone penetration tests (CPTs), with the goal for the collected data to be utilized during the design process for the proposed gate structures. The proposed exploration points will primarily be located on or adjacent to existing levees with some overwater exploration planned from a barge.

Well established exploration and sampling methods were selected to protect levees and waterways and provide the best method for obtaining geotechnical and geologic data. These methods have been utilized for previous exploration work performed by DWR and others within the Delta including locations in the vicinity of the proposed gate structures. All work will be performed in conformance with applicable laws and regulations and DWR will acquire all necessary permits required prior to the start of onsite exploration work.

DWR Project Geology Section in tandem with their geologic consultant, Lettis Consultants International (LCI), prepared a geotechnical investigation drill plan (drill plan) summarizing the drilling and sampling methods that will be used during this project. As a standard practice in developing drilling plans on levees or other embankment structures, we include a risk evaluation as part of the drill plan. Levee embankment drilling will utilize hollow stem auger (HSA) drilling methods which is a primarily dry drilling method. We recognized a potential risk for hydraulic fracturing during drill hole abandonment when backfilling drillholes with cement-bentonite grout via

the tremie method. To understand and mitigate these risks a hydraulic fracturing analysis was performed. This analysis informed the proposed stage-up backfilling procedure which will reduce the pressure exerted by the grout against the foundation and levee embankment materials and mitigate the risk of hydraulic fracturing during drillhole abandonment. In the unlikely event of an emergency, an emergency action plan was also developed and included within the drill plan. The emergency action plan includes emergency action measures and a communication plan that will be implemented if problems are encountered during exploration activities. DWR and their partners have extensive experience conducting geologic and geotechnical investigations using risk-informed decision making and emergency preparedness as standard practices.

If you have any questions regarding the content of the proposed subsurface exploration and data collection activities, please do not hesitate to contact Kate Le at (916) 902-9895 or via email at Kate.Le@water.ca.gov and/or Rebekah Cesmat at (916) 820-7587 or via email at Rebekah.Cesmat@water.ca.gov.

Sincerely,

Andrew Tate

Andrew Tate, CEG
Supervising Engineering Geologist
Project Geology Section
Division of Engineering

State of California
California Natural Resources Agency
DEPARTMENT OF WATER RESOURCES
Division of Engineering

South Delta Geotechnical Investigations Drill Plan

March 2025

State of California
California Natural Resources Agency
DEPARTMENT OF WATER RESOURCES
Division of Engineering

Dale Brown ..... Division Chief
Joe Royer ..... Manager, Geotechnical Services Branch
Andrew Tate ..... Manager, Project Geology Section

This report was prepared
in the Project Geology Section
under the supervision of

Andrew Tate ..... Supervising Engineering Geologist
Rebekah Cesmat ..... Senior Engineering Geologist

By

Wes Johns ..... Senior Staff Geologist, Lettis Consultants International, Inc.

With Assistance from

Richard Ortiz ..... Principal Geologist, Lettis Consultants International, Inc.

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1.0 PURPOSE OF EXPLORATORY WORK

The State of California, Department of Water Resources (DWR) is considering the construction of three permanent gated structures to control water level and circulation in the south Sacramento-San Joaquin Delta. The three proposed structures, currently called the South Delta Gates (SDG) project, would replace temporary rock barriers located in the Grant Line Canal, Old River, and Middle River (Attachment 1; Figure 1). Two potential sites have been proposed along the Grant Line Canal, identified from west to east as Grant Line Canal Alternative 2 (GLA2), and Grant Line Canal Alternative 3 (GLA3). The Old River and Middle River project areas each have a single location designated for exploration.

This Geotechnical Investigation focuses on obtaining subsurface geotechnical information to support the future permanent gates design and construction. The primary objective of the proposed exploration program is to assess the subsurface soil characteristics for planning and design of the SDG project. Geotechnical investigations will include soil borings and cone penetration tests (CPTs) which will be used to gain an understanding of the geological and geotechnical conditions at potential construction locations in Old River, Middle River, and Grant Line Canal.

2.0 BACKGROUND

The project areas are located within San Joaquin County, California and include a portion of the San Joaquin River Basin. The land located within and near the project areas are generally used for agriculture. For more than 30 years, the Department of Water Resources (DWR) has annually built and removed temporary rock barriers in Old River, Middle River, and Grant Line Canal, to improve water levels in the southern Sacramento-San Joaquin River Delta (Delta).

A permanent operable barriers project has been identified for possible implementation by DWR, the California Natural Resources Agency, and the United States Bureau of Reclamation under the CALFED Bay-Delta Program (CALFED). At this time, DWR is proposing to conduct geotechnical explorations to gain an understanding of the geological and geotechnical conditions at potential construction locations in Old River, Middle River, and Grant Line Canal.

3.0 FIELD SUPERVISION PERSONNEL AND RESPONSIBILITIES

Personnel from DWR's Project Geology and/or their subconsultants will supervise all work. Specifically, all on-site activities described in the DPP will be conducted in the presence of one or more DWR engineering geologists or their consultants. Project Geology field personnel will be responsible for ensuring that all work conducted meets the conditions of DWR's Streambed Alteration Agreement (Attachment 2) and other regulatory permits. They will also log materials from the drill holes and produce daily exploration summary emails at the end of each shift. The daily summary emails will include photographs or scans of drill hole logs and/or CPT data, an activity

summary, and will note if any problems were encountered.

3.1 Tentative Drilling Schedule

Months	Drilling Activity
*April 2025 – July 2025 (~90 days)	Cone Penetration Tests (CPTs) at Grant Line Hollow Stem Auger (on land)
August 2025 – October 2025 (~63 days)	Rotary Wash Drilling (over water)

*All work will start after April 15, 2025 based on permit approval

4.0 EXISTING INFORMATION REVIEW

To understand subsurface conditions, justify drilling, and estimate drilling risks, relevant geologic information has been summarized in this section. Previous explorations in the area conducted by DWR were reviewed to identify gaps in the existing subsurface data. These previous explorations are summarized in Section 4.2.

4.1 Geologic Setting

The project areas are in the Sacramento-San Joaquin River Delta, composed mainly of Quaternary alluvial, deltaic, and estuarine sedimentary deposits. The surface materials are predominantly Holocene organic clay, silt, and peat overlying coarse-grained late Pleistocene alluvium (Atwater, 1982). Levees have been constructed to protect the islands from inundation and are likely primarily composed of fill derived from local materials. The levees are also constructed with minor amounts of import materials, such as aggregate base surfacing of the crown roads and sporadic rock slope protection that armors the waterside slopes.

All sites have been mapped by Atwater (1982) as Holocene alluvial-floodplain deposits (Qfp). These deposits include tidal-wetland peat coarsening down to sand (Atwater, 1982). The floodplain deposits commonly include small deposits of peaty mud thicker than 5 feet in abandoned channels and interdistributary basins (Atwater, 1982).

4.2 Geotechnical Investigations

Previous exploration along Grant Line Canal was conducted by DWR approximately 8,800 feet west of GLA2 (DWR, 1994; DWR,1995; DWR 2005a,c). Drilling in 1993 consisted of five drill holes reaching depths of 50 to 100 feet below ground surface (bgs; DWR, 1994). Drilling in 1994 consisted of three drill holes from a barge in Grant Line canal (DWR, 1995). Drilling in 2002 included six drill holes advanced to a depth of 120 to 135 feet bgs, and nine CPTs pushed to a depth of 79 to 110 feet bgs (DWR, 2005a). Laboratory testing performed on samples collected during this phase of drilling included Atterberg Limits, consolidation, direct shear, and triaxial shear tests. Drilling in 2005 consisted of two auger holes advanced to 24 and 26 feet bgs

(DWR, 2005c).

Exploration of the Middle River site was conducted by DWR in 1994, 1995, 2002, and 2005 totaling 19 drill holes and nine CPTs (DWR, 2001b; DWR, 2005b,c). Drilling in 1994 and 1995 consisted of seven drill holes ranging in depth from 8 to 94 feet bgs (DWR, 2001b). Exploration in 2002 included nine drill holes drilled to depths ranging from 24 to 135 feet bgs, and nine CPTs to depths of 20 to 120 feet bgs (DWR, 2005b). Additional exploration in 2005 consisted of three auger holes extending 20 to 30 feet bgs and two rotary wash drill holes reaching 100 feet bgs (DWR, 2005c). Laboratory testing was performed on samples collected in 2002 and 2005, and included density, consolidation, direct shear, and triaxial shear tests.

Exploration of the Old River site was conducted by DWR in 1994, 1995, 2002, and 2005 totaling 22 drill holes and nine CPTs (DWR, 2001a; DWR, 2004; DWR, 2005c). Exploration in 1994 and 1995 was conducted at the existing temporary barrier with nine drill holes to depths of 80 to 99 feet bgs (DWR, 2001a). Exploration in 2002 consisted of seven drill holes to depths of 126.5 to 134 feet bgs, and nine CPTs advanced to depths of 71 to 122 feet bgs (DWR, 2004). Additional drilling in 2005 included six drill holes to depths of 19 to 104 feet bgs (DWR, 2005c).

Laboratory data from the previous explorations at these sites is approximately twenty years old and is insufficient for the design of the proposed permanent gate structures. Additionally, there is no existing subsurface geotechnical data for the two sites located along Grant Line Canal (GLA2 and GLA3). Additional geotechnical explorations at these locations will be needed to properly characterize the site geological and geotechnical conditions.

5.0 EXPLORATION SCOPE AND METHODOLOGY

This subsurface exploration plan is intended to collect additional subsurface data that are required for design and construction. Exploration and sampling methods were selected to protect levees and waterways and provide the best method of obtaining geotechnical and geologic data. These methods are based on previous exploration work performed by DWR at all three locations and other DWR levee drilling projects. This plan proposes to explore the levee embankments and underlying foundation soils using a combination of CPTs and drill holes. Drill holes will be completed using a combination of Hollow Stem Auger (HSA) and rotary wash (RW) drilling with a target depth of 130 feet bgs. HSA drilling will be utilized for all land-based drill holes (e.g. levee locations). HSA drilling is a dry drilling method that does not utilize recirculated water or other fluids to advance the auger string. RW drilling will be utilized for all over-water, in channel drilling locations. CPTs will be pushed on the levees and advanced to a target depth of 100 feet bgs. A total of 12 CPTs and 30 drill holes are proposed for the GLA2 and GLA3 locations (Attachment 1; Figures 2 and 3). Ten drill holes are proposed at the Middle River site (Attachment 1; Figure 4). Sixteen drill holes are proposed at the Old River site (Attachment 1; Figure 5). Total footage proposed includes up to 1,200 feet of CPT and 7,160 feet of HSA/RW drilling. Approximately five months are anticipated to complete the subsurface

exploration.

Soil sampling from drill holes will include both geotechnical sampling and geochemical sampling. This will include Standard Penetration Tests (SPTs), dry core sampling, Shelby tube sampling, and grab sampling for composite geochemical samples. DWR anticipates encountering sands, silts, and clays in the embankment and foundation at these sites. All explorations will be backfilled with a cement-bentonite grout mixture placed via tremie pipe. Details of the grouting and mix design are provided in Section 5.5.

Underground Service Alert will be contacted by Project Geology to locate underground utilities before subsurface exploration work begins. Tickets will be kept open until the exploration at the site is completed. Tickets will be in the possession of field personnel.

A California-licensed engineering geologist from Project Geology and/or their subconsultant will direct and supervise all field exploration activities including site inspection, drilling activities, and soil logging using Unified Soil Classification System (USCS) methodology. An engineering geologist from Project Geology and/or their subconsultant will record drilling, sampling, and geologic information on drill hole logs. Soil recovered from drilling will be photographed prior to placing in bags, boxes, or sealing of tubes.

Drill rig operators will have a minimum of 5 years of experience drilling with the equipment and procedures described in the DPP. All drilling activities will be conducted under the supervision of a California licensed professional geologist who will be responsible for monitoring the levee during exploration.

5.1 Cone Penetration Test (CPT) – Equipment, Methods, and Dimension

Up to twelve vertical CPT soundings are proposed through the levee crest if exploration is completed at both potential Grant Line sites, six at GLA2 and six at GLA3. The CPTs will be performed by Gregg Drilling. The target depth for the twelve CPTs is approximately 100 feet bgs.

CPTs will be pushed prior to the start of HSA drilling at each location. The CPTs are proposed to depths of 100 feet unless refusal is encountered. Dissipation tests may be conducted during CPTs to identify groundwater depth if permeable strata are encountered. All CPTs will be backfilled with a cement-bentonite grout mixture placed via tremie pipe. Details of the grout backfill ratios are presented in Section 5.5.

5.2 Exploratory Borings – Equipment, Methods, and Dimensions

A total of 56 drill holes are proposed in this DPP. The two sites along Grant Line Canal (GLA2 and GLA3) will each have 15 drill holes; six located on the levee crest, two at the levee toe (landside) on the centerline of proposed structure, and seven

over the water. The Middle River site includes 10 drill holes; five located on the levee crest, two at the levee toe (landside) on the centerline of the proposed structure, and three over the water. The Old River site includes sixteen drill holes; seven located on the levee crest, two at the levee toe (landside) on the centerline of the proposed structure, and seven over the water. Drill holes located on land will be drilled with HSA methods using a rubber tire, truck-mounted drill rig (CME-85 or equivalent). Drill holes located over water will be drilled with RW methods using a barge or jack-up rig. Drill hole details are provided in Attachment 3, and details of the grout backfill ratios are presented in Section 5.5.

Hollow Stem Auger (HSA) Drilling

The HSA drill holes will be drilled using a nominal 8.25-inch or 10-inch outside diameter (O.D.) HSA tooling utilizing the CME dry-core sampling system. At all sites, HSA will be used to drill through the levee prism to a maximum depth of 130 feet (about 130 feet below the levee crests), and to a maximum depth of 115 feet at the levee toe (about 130 feet below the levee crests). Sampling will proceed through the HSA string in advance of the drill bit.

The methods used to drill through the levees will be in accordance with USACE Procedures for Drilling in Earth Embankments (USACE, ER 1110-1-1807). Auger drill cuttings and waste will be contained in 55-gallon drums. Soil will be tested for hazardous components by the drilling contractor before removal from the site and disposal at an appropriate landfill or waste disposal facility.

If high groundwater leads to heaving-sand conditions, the drillers will raise the inner sample barrel slowly to reduce disturbance in the drill hole. Drillers may also add a small volume of water (~10 gallons) though the augers to temporarily increase the head pressure to facilitate the removal of the inner barrel in order to mitigate conditions that may lead to stuck tooling below the ground surface. For the 8.25-inch HSA, 10 gallons of water is equal to about 13.6 feet of head (5.9 psi). For the 10-inch HSA, 10 gallons of water is equal to about 6.3 feet of head (2.7 psi). While adding water to counteract heave, water readings inside the auger will be monitored with a water meter to confirm the addition of water is adding a sufficient amount of head. Alternatively, if heaving conditions are encountered within drill holes on the levee crest, the drill crew can switch to rotary drilling if below a depth of 60 feet (about 45 feet below mean sea level) at Grant Line, or if below a depth of 60 feet (about 45 feet below mean sea level) at Middle River, or if below a depth of 65 feet (about 50 feet below mean sea level) at Old River. Additional discussion of risks associated with HSA drilling is provided in Section 6.

Rotary Wash Drilling

Rotary wash (RW) drilling will be used in overwater drill holes and may be used during the land-based drill holes if heaving sands are encountered. The rotary wash drilling method will be a direct circulation rotary wash with a surface conductor casing and a wireline sample retrieval system. The drilling set-up consists of a 5.5-inch diameter coring bit, which produces a nominal 6-inch-diamter borehole.
Drilling fluid will not include bentonite in RW drill holes due to potential brackish

conditions. Guar Gum or equivalent biodegradable additive will be used as an additive in place of bentonite.

Drill fluid will be pumped down the drill string to the base of the hole and will carry cuttings back up the drill hole to the surface. The drilling fluid will also cool the drill bit. The drill fluid pressure, and the fluid return will be monitored for plugging by both the driller and geologist. The drilling fluid return will be recirculated down the drill hole. Rotary wash drill cuttings and waste will be contained in 55-gallon drums for disposal. Soil will be removed from the site and tested for hazardous components by the drilling contractor before disposal. Additional discussion of risks associated with rotary wash drilling is provided in Section 6.

5.3 In-Situ Testing and Sampling

In-situ testing from CPTs will consist of pore pressure dissipation testing. The pore pressure dissipation test is conducted by stopping the CPT cone during testing and allowing the water pressure in the ground to equilibrate after pushing the cone. In-situ testing conducted during drilling will consist of SPTs. In addition to testing, soil samples will be recovered using the standard 2-inch-diameter split-tube SPT sampler, Modified California (Mod Cal) sampler, dry-core split barrels, and thin-walled Shelby tubes. The dry core system will allow for continuous soil sampling for identifying and selecting laboratory samples. SPT or Mod Cal samples will be taken at approximately five-foot intervals regardless of anticipated soil types, Shelby tube samples will be utilized as needed to target specific intervals of soft, fine-grained material identified within CPT soundings prior to the start of drilling. Bulk samples may be collected from the cuttings or dry core for laboratory testing.

The sample numbering system will include a letter designation for the type of sampler and the sampling depth interval. Sample numbers will be noted in the field boring logs as well as on each sample container. The sample number will be linked to the boring number for cross-reference in the database.

Standard Penetration Test (SPT)

SPTs will be performed using an unlined 24-inch long, 2-inch outside-diameter (OD), 1 3/8-inch constant inside diameter (ID) split-tube sampler. SPTs are performed in general accordance with ASTM D1586. An SPT sampler is attached to NWJ (2-5/8-inch-diameter) drill rods and advanced using a 140-pound automatic hammer with a 30-inch drop. The sampler will be driven 18 inches and blow counts for each 6-inch increment will be noted on the boring logs. Hammer energy efficiency will have been measured within one year of performing SPT tests.

SPTs are anticipated to be performed at five-foot intervals. The recovered sample from each drive will be logged and placed in a resealable one-gallon sip-lock bag or one-quart Mason jar, labeled with permanent ink, and stored for transport to DWR's Bryte Laboratory in West Sacramento, California or to a designated outside laboratory.

Modified California (Mod Cal) Sampler

Relatively undisturbed in-situ samples will be obtained by utilizing a 2.4-inch-ID Mod Cal sampler in general conformance with ASTM D3550. The sampler will be driven using the same hammer as for the SPT testing. Mod Cal sampling will be used to sample both fine-grained and granular materials within the subsurface and generally collected at vertical intervals of five feet to a depth of about 40 feet, and at intervals of 10 feet at deeper depths.

Mod Cal samples will be recovered in 6-inch-long tubes. The recovered samples from each drive will be logged and labeled with permanent ink and sealed before transport to Bryte Laboratory or to a designated outside laboratory.

Shelby Tube Samplers

Shelby tube (thin-walled) samplers will be used to obtain undisturbed samples of cohesive soils for laboratory strength and consolidation testing. Shelby tubes samples will target soft, fine-grained materials that were identified in the CPT logs. Thin-walled sample tube collection will be in accordance with ASTM D1587 and use different types of samplers depending on the soil conditions encountered. A fixed-piston sampler will be used primarily in soft soil deposits to minimize sample disturbance. An open-end Shelby tube sampler will be used in primarily stiff soil deposits, where sample recovery can be limited using the piston sampler. When primarily hard soil deposits are encountered, the rotary Pitcher barrel sampler will be used.

Samples will be collected using 3-inch OD Shelby tubes. Samples will be labeled and handled in accordance with ASTM D4220 (Standard Practices for Preserving and Transporting Soil Samples) and ASTM D1587 (Standard Practices for Thin-Walled Tube Sampling of Soil for Geotechnical Purposes). Samples will be kept out of direct sunlight and placed in a custom Shelby tube carrier. The entire sample carrier will be secured with rope or cable to the body of the transporting vehicle for delivery to a temperature-controlled area at Bryte Laboratory or to a designated outside laboratory.

Dry-Core Sampling

Dry-core sampling will consist of a CME dry-core barrel during auger drilling. Most core-barrel sampling will include re-drilling through the SPT or Shelby tube sample interval, followed by recovery of the remaining 3 to 3.5 of a 5-foot drilling run.

Cored soil samples will be retrieved and extruded onto a logging tray. After geologic logging according to ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Method), core samples will be retained in core boxes for transport to Brye Laboratory or to a designated outside laboratory. If additional samples are needed for gradation, moisture, or associated testing portions of the core sample will be sealed in re-sealable one-gallon zip-lock bags or one-quart sample jars, labeled with permanent marker, and stored for transport to the designated laboratory.

Geochemical Sampling

For the top 5 feet of hand auger drilling, soil from the hand auger will be placed on new-clean plastic sheeting in a linear fashion and a representative composite sample of the 0-to-5-foot interval will be collected. Once HSA drilling has commenced (below 5 feet bgs), a representative composite sample of the 5-to-10-foot interval will be collected from the drive samples, as available.

All samples will be collected by hand with new nitrile gloves or with a decontaminated trowel. Soil will be placed in new 2-gallon Ziplock bags and kneaded/mixed for a minimum of 1 minute to create a representative composite. Composite soil will then be placed directly in new, labeled, clean laboratory supplied containers, and immediately placed on ice in an ice chest.

Each sample container will be labeled with the project name, sample ID with depth range (ex. DH-GLA2-2025-03_0.0-5.0), time, date, sampler name, preservation method, and analyses required (constituents of interest; COIs). No head space shall be left in any sample container, and the lids shall be securely fastened/sealed. Once filled, sample containers shall be placed in new bubble wrap bags before being placed on ice in an ice chest and delivered or overnight shipped to California Laboratory Services in Rancho Cordova, California. Time between soil exposure to the atmosphere (removal from drillhole) and sample container being placed on ice should be minimal due to degradation of select constituents of interest.

All reusable sampling equipment (hand augers, trowels, SPT split spoons, core barrels, etc.) shall be decontaminated with either a heated pressure washer or a triple bucket rinse before the first sample collection, and between each sample collected where the equipment is in use. The triple bucket decontamination procedure will include one initial rinse with potable water and a non-phosphatic lab-grade detergent such as Alconox or Liquinox, followed by one rinse with potable water, and completed with a final rinse with de-ionized water. New, nitrile gloves will be used for each sample collected.

Sample depths, identifications, dates, and times shall be indicated on the Project Geology daily field summary and drill logs.

5.4 Proposed Laboratory Testing

The design engineer will assist Project Geology in selecting samples to submit for geotechnical testing at Bryte Laboratory or a designated outside laboratory. The following laboratory tests will be performed on selected soil samples with applicable ASTM standards.

Lab testing is anticipated to include:

Atterberg limits (ASTM D4318)
Gradation test (ASTM D6913)

One-Dimension consolidation test (ASTM D2435)
Direct Shear Test Under Consolidated Drained (D3080-04)
Triaxial Shear Test – Consolidated Undrained with Pore Pressure (ASTM D4767)
Moisture Content test (ASTM D2216-05)
Particle Size Distribution Analysis test (ASTM D422-07)
Permeability test (ASTM D2434)
Density testing (ASTM D7263)
Unconfined Compressive Strength (D2166)
Compaction testing (ASTM D1557)
Organic contents (ASTM D2974-14)
Chemical Resistivity (ASTM G187-18)

Constituents of interest for geochemical sampling include:

Title 22 Metals by EPA Method 6010D and 7471B
pH by EPA Method 9045
Total Petroleum Hydrocarbons in the gasoline, diesel, and motor oil ranges (TPH-g/d/mo) by EPA Method 8015D
Polynuclear Aromatic Hydrocarbons (PAHs) by EPA 2270E
Polychlorinated Biphenyls (PCBs) by EPA Method 8082A
Organochlorine Pesticides by EPA Method 8081B
Chlorinated Herbicides by EPA Method 8151A
Volatile Organic Compounds (VOCs) by EPA Method 8260D
Naturally Occurring Asbestos by EPA Method 600/R-93/116

5.5 Borehole and CPT Completion

Upon completion, the on land drill holes and CPTs will be tremie grouted with cement-bentonite grout. Over water drill holes will be grouted using a neat cement mixture. The grout used to close the drill holes and CPT holes is designed to be stronger than the surrounding soil. Borehole/CPT backfill will be performed in compliance with the California Water Well Standards: State of California Bulletin 74-81. The DWR approved grout mix that will be utilized consists of cement-bentonite grout mixed at the following ratio:

Portland Cement	1 sack (94 lbs.)	1 ratio by weight
Bentonite	5 lbs.	0.05 ratio by weight
Water	6 to 8 gallons	0.5 – 0.7 ratio by weight

The cement and water will be mixed first, followed by bentonite. The amount of bentonite will be adjusted to produce a grout with the consistency of heavy cream. If the grout is too thin, the solids and water will separate. If the grout is too thick, it will be difficult to pump. Up to 5 percent powdered bentonite by dry mass of cement will be added to the mix for pumping ease and to reduce shrinkage and cracking after curing.

A stage-up tremie grouting method will be used to backfill all explorations.

Specifically, HSA and CPT holes will be grouted through a tremie pipe set at the bottom of the hole. For the first stage of grouting, all drill holes and CPTs will be grouted from the bottom of the hole to 10 feet below ground surface and left overnight to set. For drill holes, the casing will be left in the hole from a depth of 10 feet to the ground surface. The following day, the casing will be flushed with water, and the height of the grout column will be measured. See Section 6.4 and Attachment 4 for additional discussion on the grout staging depths.

For the second stage of grouting, the hole will be grouted up from the settled depth of the grout column about 10 feet below the ground surface as the casing is pulled. See Section 6.4 and Attachment 4 for additional discussion on the grout staging depths. A licensed professional geologist will calculate the anticipated grout volume and will closely monitor for unusually high volumes of grout take. Grouting pressure will also be closely monitored for pressure spikes indicating a hole blockage.

Drill hole and CPT completion documentation will include the calculated theoretical volume necessary to fill each hole and actual volume of material required to fill each hole. If significant difference exists between the calculated and actual volume of the backfill material, the cause of the difference will be identified and remediated as necessary. If significant grout losses are observed, the grout backfilling will be done in smaller stages allowing the grout to set between stages. The grout mix may also be modified by adding more bentonite or cement to produce a thicker grout if significant grout losses are observed.

For over water drill holes, grout will be placed from the bottom of the hole upward to a depth of approximately 10 feet below the bottom of the slough or river based on a calculated grout take volume to prevent grout migration into the river water. At the completion of the grouting, the conductor casing will then be pulled out of the channel bottom to complete the overwater drilling operation. The remaining 10 feet of drill hole will collapse with native material and serve as an adequate seal.

Excess material and water from the drill holes will be placed in barrels, tested for hazardous materials, and removed from the site for disposal.

5.6 Reporting

A geologic report will be produced within six to eight weeks of the completion of all lab work and will include a site geology map, cross-sections, final CPT and boring logs, geologic summaries, and a discussion of the findings. If necessary, a draft report, boring logs, and recommendations can be provided sooner to facilitate the design schedule.

6.0 RISK EVALUATION

The on-site geologist and the drillers will have a list of emergency phone numbers to call in case of an emergency. Project Geology trucks are equipped with two-way radios in case of poor mobile phone service.

Drilling activities have potential risks associated with physical hazards, environmental hazards, and health and safety hazards. Project Geology will observe the following guidelines to ensure exploration and sampling will preserve the integrity of levees while mitigating hazards at each drilling location.

6.1 Underground Utilities and Other Levee Penetrations

Project Geology will notify Underground Service Alert of the exploration work prior to exploration. Each utility operator in the area will be contacted to ensure exploration work will not damage utilities. As an added precaution, each exploration point will utilize a hand-auger to ensure there are no unmarked/unknown utilities within the upper five feet of the subsurface. Proximity to overhead utilities will be evaluated at each exploration location. In general, a clearance of at least 15 feet will be maintained between the drill rig mast and lower-voltage overhead utilities (power lines). Greater clearance (up to 20 feet) will be maintained for high-voltage overhead transmission lines.

Overhead powerlines were identified on the landside of the northern levee along Grant Line canal, and on the landside of the southern levee along Middle River. The drill holes in these areas are located approximately 40 feet away. Drilling activities will not be conducted near or under the overhead powerlines. No subsurface structures were identified during the site visits, and any utilities identified by the utility companies will be avoided by at least five feet.

If an unknown obstruction is encountered during drilling, drilling activities will be stopped, and the levee owner will be contacted. If it is determined that drilling cannot proceed the hole will be abandoned and grouted based on the requirements in Section 5.5.

6.2 Nearby Instrument Monitoring

No instruments were identified near the four sites which could be monitored for ground movement or water levels. Slopes and waterways will be visually monitored for signs of seepage or drilling fluid during drilling. In the event that seepage of drilling fluid is identified, our response methodology is described below, in Sections 6.4, 6.5, 6.7, and 10.1.

6.3 Heave and Sample Disturbance

If heaving is experienced because of pressures within the embankment or the underlying foundation materials, water will be introduced at the top of the borehole to the drill stem. If heaving cannot be controlled, the drill hole will be abandoned as described in Section 5.5.

6.4 Hydraulic Fracturing

Project Geology performed an analysis of the potential for hydraulic fracturing in the soils expected to be encountered at the site and their estimated engineering properties, which are provided in Attachment 4.

As a precaution, drilling through the levee embankment (about 15 feet thick at all sites), will be performed using HSA drilling methods which is considered a dry drilling technique that does not utilize recirculated fluids. Groundwater is anticipated approximately 20 feet below the levee crest, and hydraulic fracturing is a potential hazard if rotary wash drilling methods are used. Therefore, rotary wash methods will only be used if heaving sands are encountered after the hole has been advanced through the embankment prism to a depth of about 60 feet at Grant Line, about 60 feet at Middle River, or about 65 feet at Old River). The auger will be removed, and casing will be installed to the auger depth and pushed to the bottom to create a seal to allow for fluid recirculation. The casing will prevent drilling fluids from coming in contact with the levee embankment.

If drilling below depths of 60 feet at Grant Line, 60 feet at Middle River, or 65 feet at Old River, and conditions warrant, the drilling contractor will be directed to switch to rotary wash. During rotary wash drilling, the drill operator will minimize the fluid circulation pressure. Drill fluid circulation will be increased gradually to reduce the possibility of hydraulic fracturing. Raising and lowering of drill bits, rods, and sampling tools will be done slowly to avoid increasing fluid pressure or inducing negative fluid pressure. The driller and DWR geologist will monitor the pressure of drilling fluids within the drill hole by watching the pressure gauges on the drill rig. Likewise, drilling will be halted and investigated if a loss of drill fluid circulation or drill fluid seepage along the embankment face are observed. If fluid loss or seepage is observed, the drill hole casing will be extended deeper until the fluid circulation is returned. This step will be repeated as necessary. The driller will bring additional bentonite, cement, pumps, and hoses to provide for the sealing of zones where fluid loss or artesian conditions are encountered, and to provide for immediate abandonment of a drill hole (up to and including termination of drilling and placement of grout to the ground surface) should there be an indication of significant fluid losses or gains or piping of materials from the foundation.

Backfilling an exploration hole with grout in a single stage could pose a risk of hydraulic fracturing. The results from the hydraulic fracturing analysis indicate that each hole can be grouted to 10 feet bgs at all sites during the first grouting stage (Attachment 4). Project Geology will direct the driller to backfill the holes in stages as discussed in Section 5.5.

The drill bit will be removed from each drill hole upon reaching target depth or encountering refusal. On land drill holes will be plugged with a Type II Portland cement-bentonite grout mix, with approximately 5 pounds of bentonite for every 94-pound bag of Portland cement mixed with 6 to 8 gallons of water. Over water drill holes will be backfilled using neat cement. The casing or drill pipe will be removed as

the cement-bentonite grout mix is pumped into the drill hole using the tremie method. The tremie pipe will be placed at the bottom of the drill hole and pulled up as the hole is filled. When grout mix reaches 20 to 30 feet above the bottom of the boring, the grout will be allowed to set to prevent undue fluid pressure. The backfilling will continue in stages until it is grouted to within two feet of the ground surface. The remaining two feet will be backfilled with the appropriate material to match the surrounding surface material.

6.5 Erosion

Major ground disturbance is not anticipated for the CPTs or drilling. Drilling fluids will be contained and recirculated, best management practices will reduce the chance of runoff. In the unlikely event, any drill fluid runoff will be contained behind straw wattles, berms etc. and collected for removal. The slopes and vegetation of the levee will also mitigate the potential for erosion.
It is possible that there may be a risk of initiating internal erosion by drilling in or around the levee embankment. Section 10.1 discusses measures that will be taken if erosion due to drilling is discovered.

6.6 Contamination of Filter / Drainage Feature

There are no internal levee filters or drainage features documented in the project areas.

6.7 Emergency Plugging Materials

For this project, drilling-related fluids (water and cement-bentonite grout) are not considered hazardous. For ongoing, continued loss of drilling or abandonment fluids within a subsurface void, personnel will consider introduction of higher viscosity, fast-setting cementitious fluids. For artesian conditions, drilling personnel will extend the casing above the ground surface as needed to control the artesian condition. A sand bag ring may be used around the drill hole to impound the water and apply head; alternately, drilling personnel may introduce fluids with high specific gravity to the hole or ring.

For emergencies, materials required to plug and abandon boreholes will be staged at the drill site before drilling operations begin. A borehole with a diameter of 10 inches will require 5.5 cubic feet of bentonite pellets or grout mix. For grout, that is approximately three 94-pound bags of Type II Portland cement for every 10 feet drilled. For every 10 feet drilled though the saturated foundation, six 5-gallon buckets of bentonite pellets will be at the drilling site. At each drilling site, there will be one 50-pound bag of bentonite gel to mix with the Portland cement. For example, a borehole drilled 60 feet, 40 feet of which is in the saturated zone, will have 24 buckets of bentonite pellets, 6 bags of Portland cement, one bag of bentonite gel, and at least 50 gallons of water available for emergency borehole abandonment.

6.8 Lost or Stuck Drill Rods

There is a risk of the drilling rods being lost or stuck if adverse drilling conditions are encountered. Section 9.1 discussed measures that will be taken if the drill rods become lost or stuck.

7.0 SITE ACCESS AND TRAFFIC CONTROL

On-land exploration locations are along existing dirt roads. Traffic control is not anticipated to be needed for this project.

8.0 STAGING PLAN

CPT/drill rigs will remain on site during drilling activities and may temporarily impede vehicle access to short segments of the levee road. When not in use, the equipment will be stored offsite or at a staging area located nearby on private land.

Drilling spoils will be temporarily placed in 55-gallon drums, sampled for hazardous constituents, and stored at the staging area. Once the drum-soil characterization results are received and drilling activities are completed, the drums will be removed from the site and disposed of at an appropriate waste facility.

9.0 ACCESS TO FACILITY, NOTIFICATION, AND SAFETY

Access to each levee will be along crest roads and levee toe roads. No modification to the ground surface will be required to allow for site access. Temporary traffic control with cones, signs, and caution tape may be established as necessary.

DWR staff will be present during mobilization for this work and will be on-site during project-related activities.

A Pre-Work Safety Plan (PWSP) will be prepared prior to the start of work and will be implemented for all field activities at the site. A daily tailgate safety meeting will be held prior to the start of the field work each day, where the Job Hazard Analysis will be reviewed and signed.

10.0 EMERGENCY ACTION PLAN

The on-site geologist and the drillers will have a list of emergency numbers to call in case of an accidental fluid spill. Additionally, aberrant conditions encountered will be reported as soon as is feasible following the incident.

For all significant releases or potential releases of hazardous materials, the geologist or another member of the drill crew will first call the local emergency response agency and notify the onsite biologist. That person will then call the Governor's Office of Emergency Services (OES) Warning Center at (800) 852-7550 or call the public number (916) 262-1621. Following that, notification will be made to the contacts

listed in the communication guide that will be provided to the on-site geologist prior to the start of drilling. Any flood-related emergencies will be relayed to the State-Federal Flood Operation Center at (916) 574-2619.

Information required at the time of reporting will include:

- Identity of caller
- Location, date and time of spill, release, or threatened release
- Substance and quantity involved
- Chemical name (if known, it should be reported if the chemical is extremely hazardous)
- Description of what happened

Federal notification requires additional information for spills (CERCLA chemicals) that exceed federal reporting requirements, which include:

- Medium or media impacted by the release
- Time and duration of the release
- Proper precautions to take
- Known or anticipated health risks
- Name and phone number for more information

Permitting agencies will be notified following the procedures outlined in each of the respective permits.

If an incidental spill of cement-bentonite grout occurs during backfilling of drill holes, the DWR geologists and drillers will immediately collect contaminated soil and store it in a labeled storage drum. Soil with different contaminants will not be mixed together. If a major spill to water or artesian (flowing) groundwater conditions are encountered during drilling, the drilling crew will attempt to contain the leak and prevent the water from reaching the waterway. This may include terminating drilling and placing sandbag rings or grouting the hole with cement slurry.

10.1 Emergency Action Measures

If drilling operations lead to piping, loss of integrity and control of the drill hole, or another safety incident, the following emergency actions will be considered.

- Drilling will stop, and the situation will be assessed. Specific details will be developed on a case-by-case basis dependent upon specific site conditions.

- For ongoing, continued loss of drilling/abandonment fluids within a subsurface void, drilling will be halted, and the loss of fluids will be assessed. The introduction of higher viscosity, fast-setting cementitious fluids (possibly with well graded sand and gravel) to plug voids will be considered to halt the loss of fluid. Bags of fast setting cement and the equipment to move them will be stored onsite during drilling activities.

- For flowing artesian conditions, a sandbag ring will be built around the drill hole to impound the water and apply head on the hole. High specific gravity fluids will be introduced to the hole / ring. Drillers will continue to add bags/elevate the top of the ring until sufficient head is provided to control the flow to an acceptable level. Sandbags and the equipment to move them will be stored in the staging areas during drilling activities.

- For drilling fluid seepage observed on any descending slopes or terrain, drillers will place well graded sand and gravel over the area of seepage to reduce exit velocities and erosion. The supervising engineering geologist will monitor the rate and clarity of the seepage flow and will collect and measure at a single location if possible. Super sacks of sand and gravel and the equipment to move them will be stored in the staging areas during drilling activities.

- For collapse of soils around the drill hole, the casing will be extended deeper to cut off drill fluid from bypassing the casing. The sinkhole will be grouted and backfilled once drilling has been completed. If the collapse continues, the drill hole may be terminated and grouted.

- Drillers and geologists will continuously monitor drilling fluid pressures to reduce the chances of material bridging or plugging the drill hole during drilling. Grouting will be conducted by a tremie pipe placed from the surface to the bottom of the drill hole. Grout will be pumped down the tremie pipe and fill the drill hole from the bottom up, displacing any remaining drilling fluid and groundwater in the drill hole.

- Grouting activities may consist of mobilization of a grouting rig and targeting the zone of seepage at depth around the drill hole. These services will be commissioned through the Project Geology Northern California Drilling Contract. Grouting may be required until the observed seepage or adverse conditions have been mitigated.

Should the drill rods become stuck or lost down hole, a reasonable attempt to retrieve them will be made. If retrieval of the lost/stuck rods is unsuccessful, the hole will be tremie grouted and a replacement hole will be drilled near the original drill hole location.

10.2 Notifications for Levee Safety Incidents / Unsuccessful Hole Abandonment

Should the drilling result in an incident such as piping of backfill or significant loss of integrity and control of the drill hole such that its abandonment is unsuccessful, the on-site geologist will notify relevant personnel listed in the communication guide prior to the start of drilling.

Regulatory notifications will be made as required by permit conditions. Prior to the start of drilling activities, a full list of emergency contacts will be provided to the on-site geologist and the drillers. In the event of an emergency spill, the on-site geologist and drillers will notify the relevant emergency contacts.

REFERENCES

Atwater, Brian F., 1982, Geologic Maps of the Sacramento-San Joaquin Delta, California, United States Geological Survey, Map MF-140, Sheets 16 and 18.

Department of Water Resources (DWR), 1994, Grant Line Canal Barrier, Site 1; Results of the Geologic Foundation Investigation. Project Geology Report No. 80-10-04.

DWR, 1995, South Delta Facilities, Grant Line Canal Barrier Site No. 2; Results of the Exploration Drilling Program. Project Geology Report No. 80-10-11

DWR, 2001a, Engineering Geology Report for Advanced Planning, South Delta Facilities, Permanent Old River Barrier Site. Project Geology Report No. 80-10-12.

DWR, 2001b, Engineering Geology Report for Advanced Planning, South Delta Facilities, Permanent Middle River Barrier Site. Project Geology Report No. 80-10-13.

DWR, 2004, Engineering Geology Report, South Delta Facilities, Permanent Barrier, Old River. Project Geology Report No. 80-10-24.

ATTACHMENTS

Attachment 1

Overview and Site Maps

Attachment 1

Overview and Site Maps

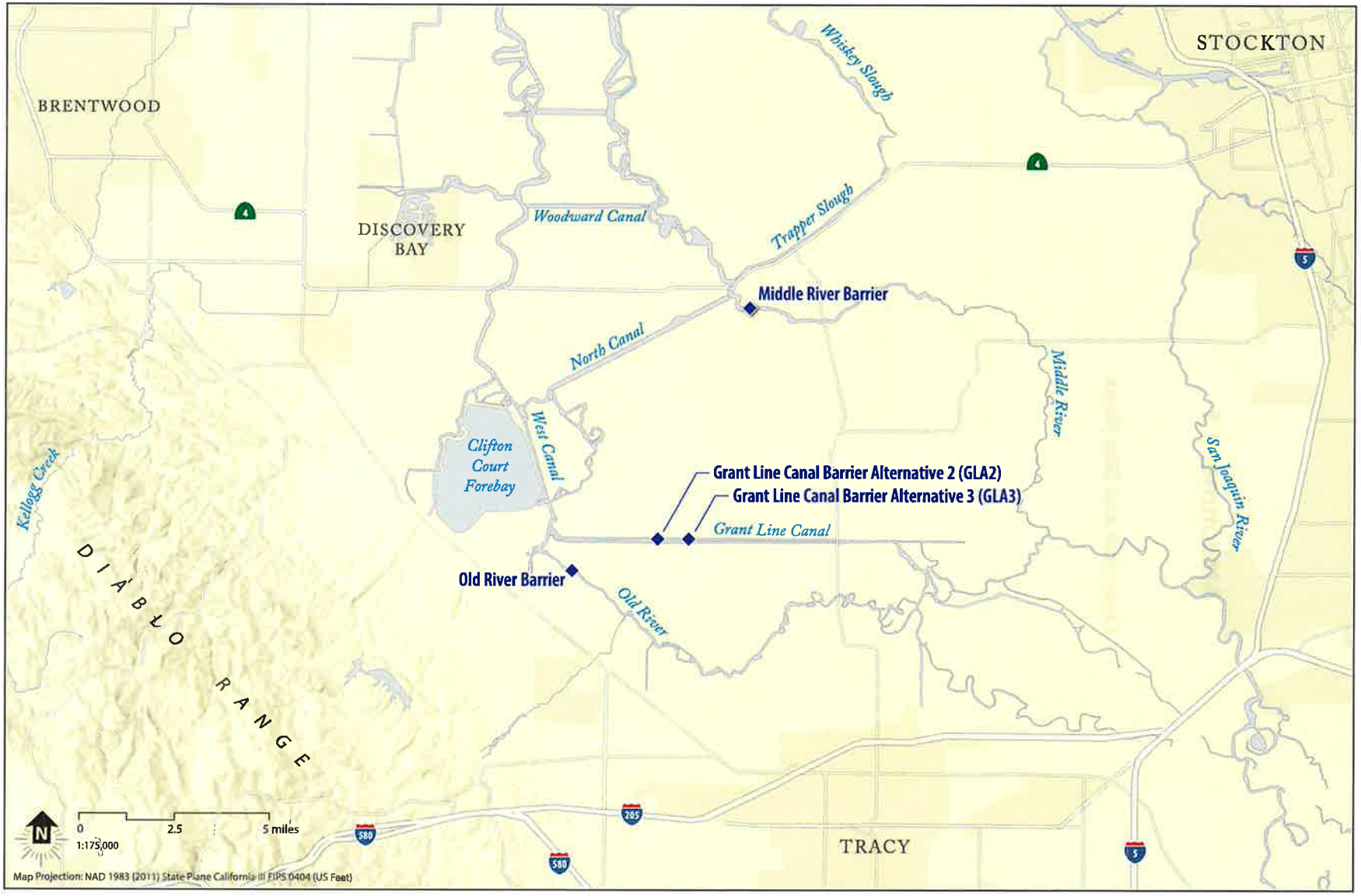


Figure 1. South Delta Gates Project Area

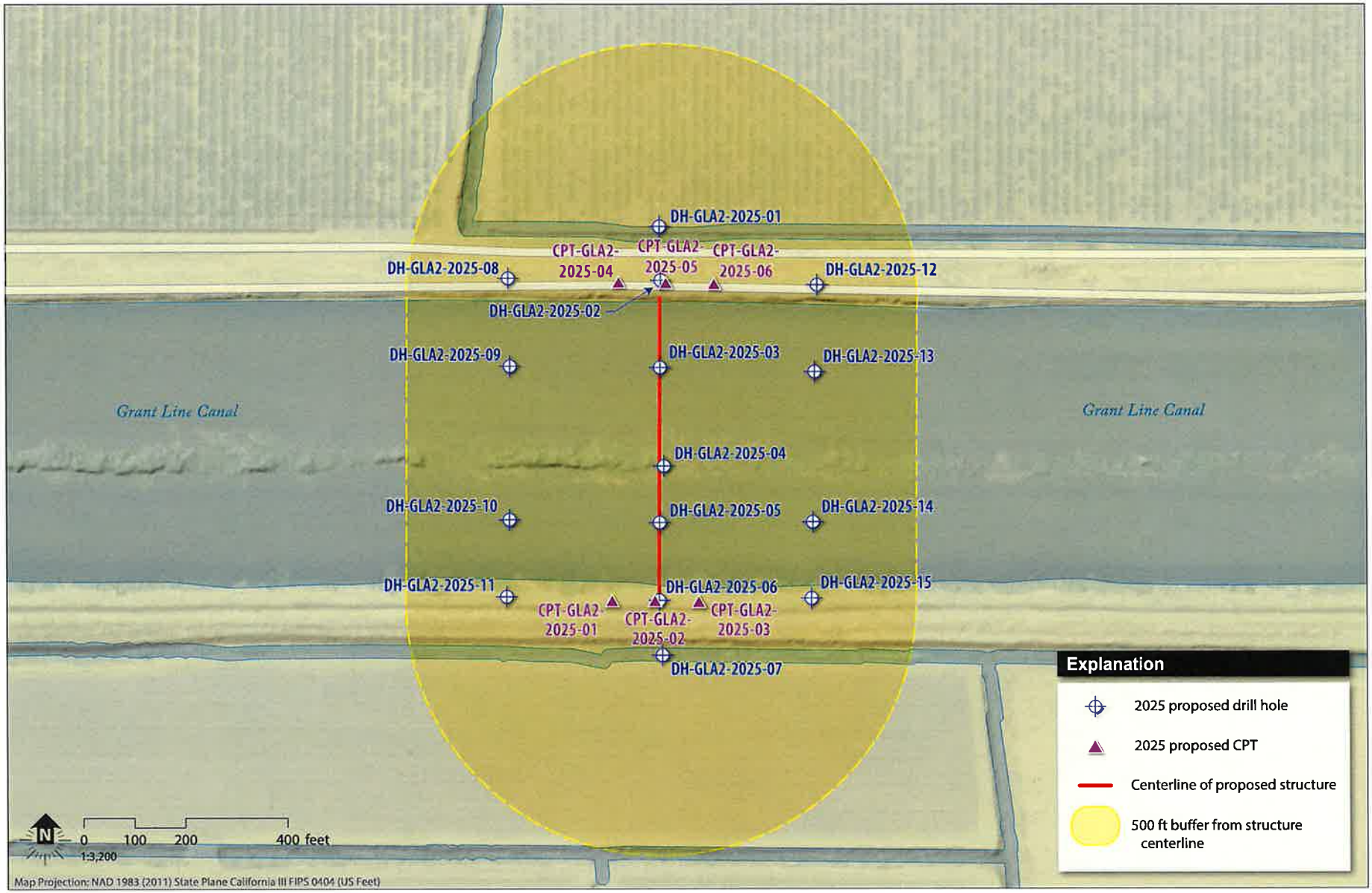


Figure 2. Grant Line Canal Alternative 2 Site Map

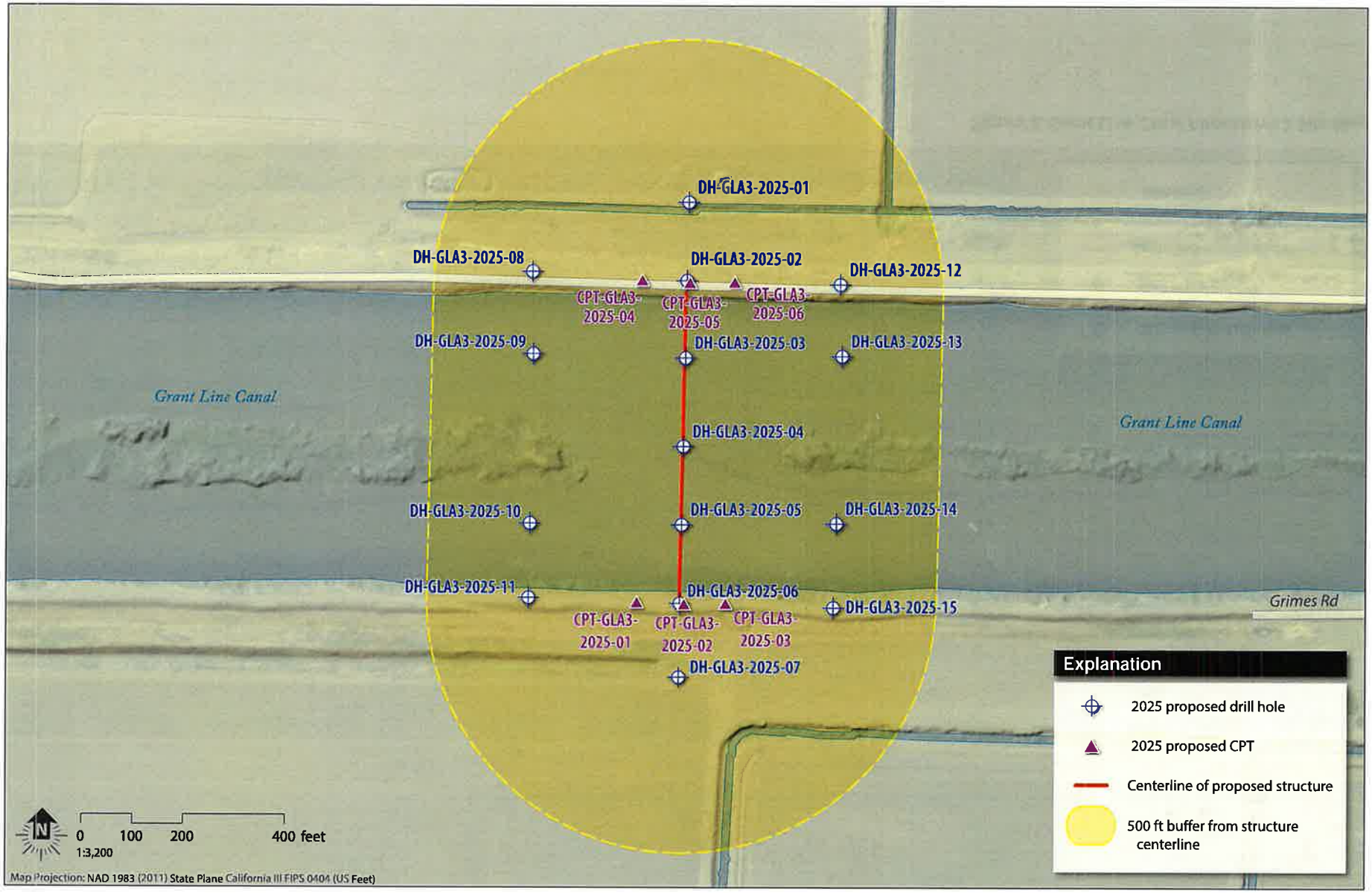


Figure 3. Grant Line Canal Alternative 3 Site Map

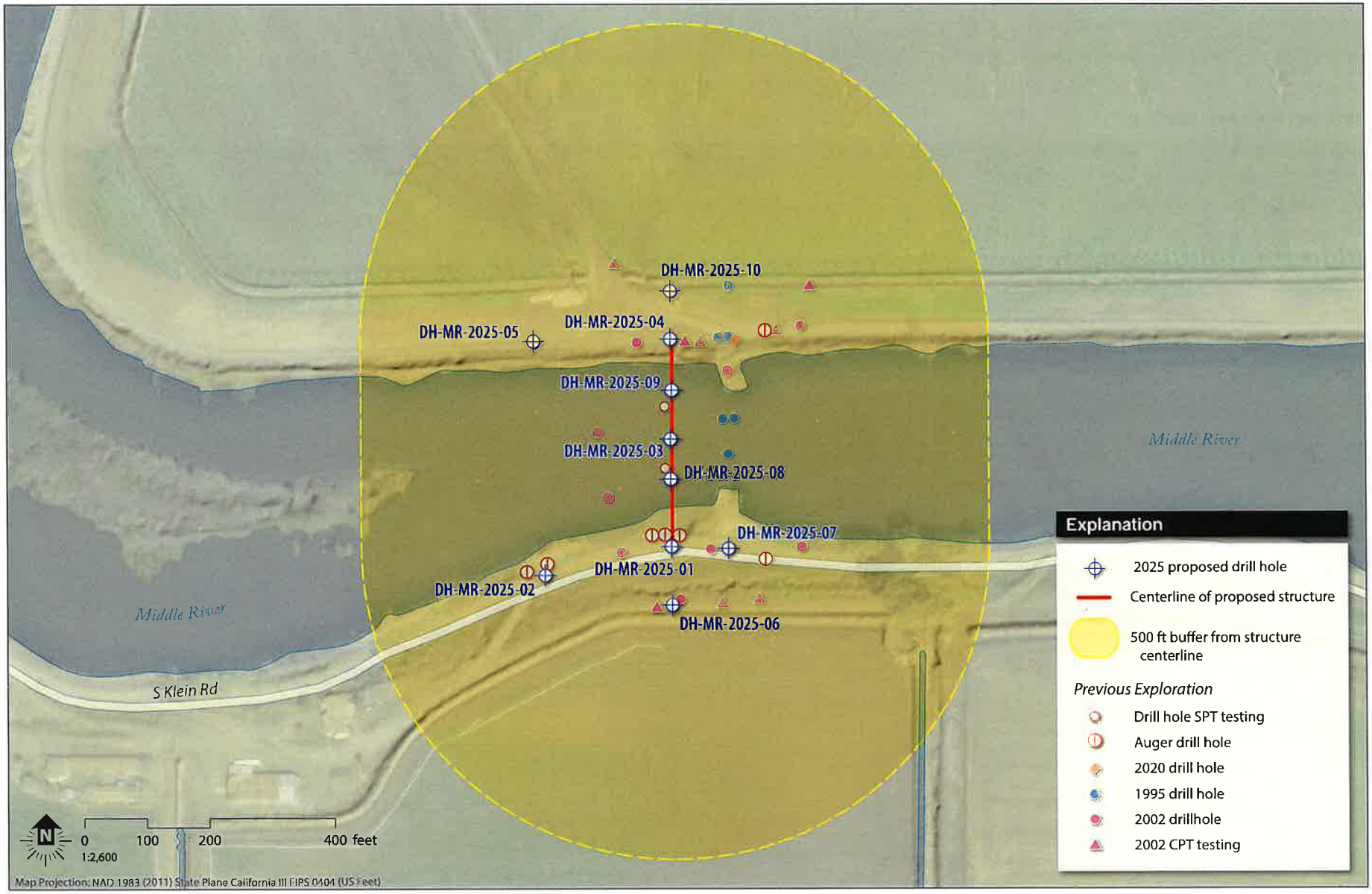


Figure 4. Middle River Site Map

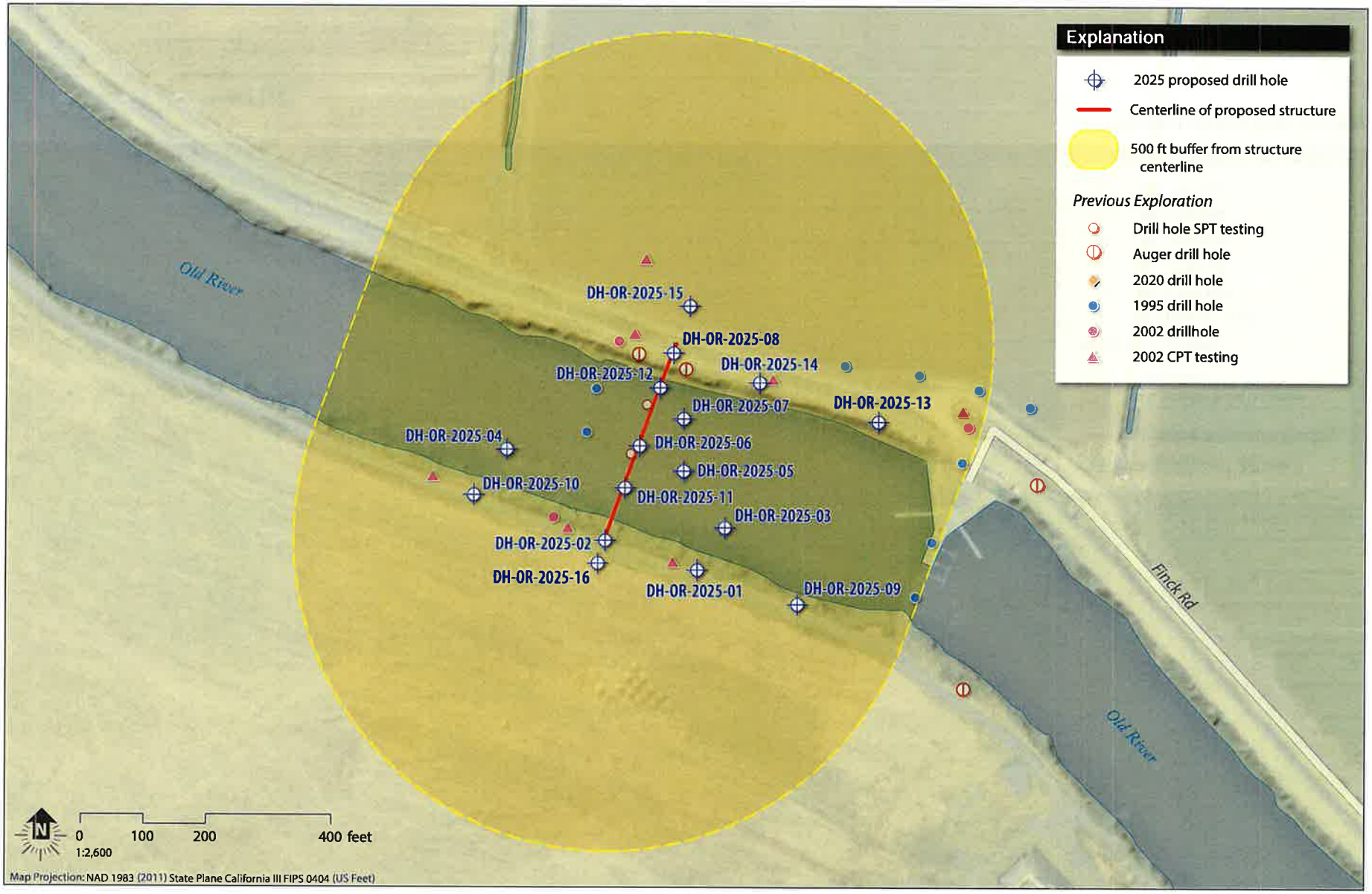


Figure 5. Old River Site Map

Attachment 2

Streambed Alteration Agreement

Attachment 2

Streambed Alteration Agreement

Condition	Description	Overwater Drilling	Land-Based Drilling
Working Conditions			
2.1 Work Period	In-water activities covered under this Agreement shall be confined to the period between August 1 through October 31 during the term of this Agreement. All other activities covered under this Agreement shall be confined to the period between April 15 and October 31, unless approved by CDFW per measure 2.2 of this Agreement.	X	X
2.3 Work Period in Dry Weather Only-Check Forecast	Project construction work conducted shall be restricted to limited flow and dry weather as allowed during the work period specified in Measure 2.1. Work within the stream zone shall be timed with awareness of precipitation forecasts and potential increases in stream flow and flood stages. Construction activities shall cease when the National Weather Service (NWS) 72-hour weather forecast indicates a 60 percent or higher chance of precipitation. In-water work may be conducted during light (less than 0.25 inch) precipitation events with prior consultation with CDFW. All necessary erosion control measures shall be implemented 12 hours prior to the onset of precipitation. Construction equipment and materials shall be removed if inundation is likely. Construction activities halted due to precipitation may resume when precipitation ceases and the NWS 72-hour weather forecast indicates a 30 percent or less chance of precipitation. If work is conducted within 24 hours after a precipitation event that produces less than 0.2 inches of rain, additional erosion control materials may be needed to prevent saturated soil from entering the channel. Weather forecasts shall be documented upon request by CDFW.	X	X
2.4 Construction Work Hours	No project activity will be initiated until thirty (30) minutes after sunrise and all project activity will cease thirty (30) minutes prior to sunset.	X	X
2.7 Work Area Delineation	Permittee shall place flagging around the construction corridor within the stream, riparian, and wetland areas. Flagging shall be removed and appropriately disposed of within 5 calendar days of the completion of construction work. Access paths and staging areas shall be adequately temporarily fenced or flagged to prevent damage to adjacent stream, riparian or wetland habitat.	X	X
2.9 Qualified Biologist or Biological Monitor On Site	A Qualified Biologist or Biological Monitor shall be on site daily to monitor compliance with all conditions of this Agreement unless otherwise approved in writing by CDFW. The Qualified Biologist or Biological Monitor shall have the authority to halt project activities, through communication with the Project Manager or their on-site designee, to comply with the terms of this Agreement and otherwise avoid impacts to species and or habitats. If the on-site biologist has requested a work stop due to failure to implement any of the conditions, CDFW shall be contacted within 24 hours.	X	X
2.12 Open Pipes Restriction	All pipes, culverts, or similar structures that are staged or stored at the site for one or more overnight periods shall be either: (1) immediately capped, screened, or filled with material by Permittee upon delivery to the project site; or (2) thoroughly inspected for wildlife by the Qualified Biologist or Biological Monitor prior to use in project activities. All hollow pipes or posts installed as part of the project and exposed to the environment at a positive angle shall be capped, screened, or filled with material by Permittee prior to the end of the workday in which the installation occurs.	X	X
2.13 Fence and Signpost Restriction	Any fencing, signposts, or poles installed temporarily or permanently throughout the course of the project at a positive angle shall have the top capped and/or the top three post holes covered or filled with screws or bolts to prevent the entrapment of wildlife. No barbed wire shall be allowed where it may result in harm to birds and other wildlife.	X	X
2.14 Open Trenches	Any open trenches, pits, or holes with a depth of larger than one foot shall be covered at the conclusion of each workday with a hard, non-heat conductive material (e.g., plywood). Netting, canvas, or material capable of trapping or ensnaring wildlife shall not be used to cover open trenches. If use of a hard cover is not feasible, multiple wildlife escape ramps shall be installed, constructed of wood, or installed as an earthen slope in each open trench, hole, or pit that is capable of allowing large (e.g., coyote and deer) and small (e.g., frogs and snakes) wildlife to escape on their own volition. Prior to the initiation of construction each day and prior to the covering of the trench at the conclusion of each workday, the Qualified Biologist or Biological Monitor shall inspect the open trench, pit, or hole for wildlife. If wildlife is discovered, it shall be allowed to leave on its own volition.		X
2.15 Temporary and Permanent Lighting	No permanent or unattended temporary lighting is authorized under this Agreement.	X	X

Invasive Species			
2.29 Invasive Species	Permittee shall conduct project activities in a manner that prevents the introduction, transfer, and spread of aquatic, riparian, and terrestrial invasive species from one work site and/or water body to another. Prior to entering the project area, Permittee shall inspect equipment for invasive species and, if any signs of invasive species are found, the equipment shall be cleaned to remove those species. All visible soil/mud, plant materials, and animal remnants on equipment will be removed prior to entering and exiting the work site and/or between each use in different water bodies. Permittee shall notify CDFW immediately if an invasive species not previously known to occur within the work site is discovered during work activities by contacting CDFW's Invasive Species Program by email at Invasives@wildlife.ca.gov. Additionally, the Permittee shall not plant, seed or otherwise introduce invasive non-native plant species. Prohibited invasive non-native plant species include those identified in the California Invasive Plant Council's database, which is accessible at: http://www.cal-ipc.org.	X	
Equipment Maintenance and Storage			
2.35 Heavy Equipment and Storage	No heavy equipment, except that already described in the project description, shall operate, or any excavation take place, in waters of the state (Fish & G. Code § 89.1), the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located where it may not pass into the waters of the state, the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat. Project building material and/or project equipment shall not be placed where materials could pass into waters of the state (Fish & G. Code § 89.1), the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat, or where they may cover aquatic or riparian vegetation.	X	
2.36 Heavy Equipment Maintenance	Any equipment or vehicles driven and/or operated shall be checked and maintained daily to prevent leaks of materials that could be deleterious to aquatic and terrestrial life or riparian habitat. If maintenance or refueling of vehicles or equipment must occur on-site, Permittee shall use a designated area and/or a secondary containment, located away from drainage courses to prevent the runoff of storm water and the runoff of spills. Permittee shall place drip pans or absorbent materials under vehicles and equipment when not in use. Equipment shall be stored in areas that any possible contamination from the equipment would not pass into waters of the state (Fish & G. Code § 89.1), the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat.	X	X
2.37 Equipment Maintenance and Fueling	Permittee shall provide CDFW with an equipment maintenance and fueling plan that shall describe measures to prevent petroleum products or other pollutants from passing into waters of the state (Fish & G. Code § 89.1), the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat during maintenance and fueling activities while operating in the wetted portion of the channel.	X	X
2.38 Minimize Vehicle Parking	Vehicles may enter and exit the work area as necessary for project activities, but shall not be parked overnight within ten (10) feet of the drip line of any trees; nor shall vehicles be parked where mechanical fluid leaks may potentially pass into waters of the state (Fish & G. Code § 89.1), the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat.	X	X
2.39 Staging and Storage Areas	Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located where it may not pass into the waters of the state, the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat. Project building material and/or project equipment shall not be placed where materials could pass into waters of the state (Fish & G. Code § 89.1), the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat, or where they may cover aquatic or riparian vegetation.	X	X

Decontamination			
2.40 Decontamination of Project Equipment	Permittee shall decontaminate all tools, waders and boots, and other equipment that will enter the water prior to entering and exiting the project site to avoid the introduction and transfer of organisms. Permittee shall decontaminate project gear and equipment that will enter the water by utilizing one of three methods: drying, using a hot water soak, or freezing, as appropriate to the type of gear or equipment. For all methods, Permittee shall begin the decontamination process by thoroughly scrubbing personal equipment, paying close attention to small crevices such as boot laces, seams, net corners, etc., with a stiff-bristled brush to remove all organisms. To decontaminate by drying, Permittee shall allow larger equipment to dry thoroughly (i.e., until there is a complete absence of water), preferably in the sun, for a minimum of 48 hours. To decontaminate using a hot water soak, Permittee shall immerse equipment in 140 degrees Fahrenheit or hotter water and soak for a minimum of 5 minutes. To decontaminate by freezing, Permittee shall place equipment in a freezer 32 degrees Fahrenheit or colder for a minimum of eight (8) hours. Repeat decontamination is required only if the equipment/clothing is removed from the site, used within a different waterbody, and returned to the project site.	X	
2.41 Decontamination Sites	Permittee shall perform decontamination of vehicles, watercraft, and other project gear and equipment in a designated location where runoff can be contained and not allowed to pass into waters of the state (Fish & G. Code § 89.1), the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat.	X	
Leak Prevention and Disposal of Waste			
2.42 Stationary Equipment Leaks	Stationary equipment such as motors, pumps, generators, and welders shall be positioned over drip pans and secondary containment, as necessary. Stationary equipment shall have suitable containment to handle any spill/leak. Equipment shall be stored in areas that any possible contamination from the equipment would not pass into waters of the state (Fish & G. Code § 89.1), the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat.	X	X
2.44 No Dumping	Permittee and all contractors, subcontractors, and employees shall not dump any litter or project debris at the project sites.	X	X
2.45 Remove Temporary Flagging, Fencing, and Barriers	Permittee shall remove all temporary flagging, fencing, and/or barriers from the project area and vicinity immediately upon completion of project activities.	X	X
2.46 Wash Water	Water containing mud, silt, or other pollutants from equipment washing or other activities, shall not be allowed to enter sensitive areas, or placed in locations where it may pass into waters of the state (Fish & G. Code § 89.1), the stream bed, bank, channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, or other sensitive habitat.	X	X
2.47 Hazardous Materials	Debris, soil, silt, sand, rubbish, project waste, cement or concrete or washings thereof, asphalt, paint, oil or other petroleum products or any other substances which could be hazardous to aquatic life, or other organic or earthen material from project activities shall not be stored where it may pass into waters of the state (Fish & G. Code § 89.1), the stream bed, bank, or channel (including but not limited to dry, ponded, flowing, or wetland areas), drainages, lakes, other sensitive habitat. Permittee shall ensure that all project areas have proper spill clean-up materials (absorbent pads, sealed containers, booms, etc.) to contain the movement of any spilled substances. All debris shall be disposed of properly. BMPs shall be employed to accomplish these requirements. CDFW shall be notified immediately by the Permittee of any spills and shall be consulted regarding cleanup procedures.	X	X
2.48 Removal of Debris, Materials, and Rubbish	Permittee shall remove all project generated debris, building materials and rubbish from the project area following completion of project activities.	X	X

Spill Prevention and Mitigation			
3.1 Spill Prevention and Containment	Permittee shall retain a spotter to supervise activities during the operation to ensure that all drilling fluid and cuttings are kept and confined within the recirculation tanks and storage drums. The spotter will pay special attention to the water of the watercourse for the presence of colored or increasingly opaque plumes when drilling, grouting, and pulling casing. All personnel will report any observations of colored plumes in the water or leaking of the drilling fluids to the drilling foreman. Colored plumes are an indication that material may be leaking into the water. If an unauthorized discharge is discovered by any of the personnel, the drilling foreman will cease drilling activities until appropriate corrective measures have been implemented. Construction personnel shall ensure drilling fluids are not exposed to open water and excess drilling fluid will be contained in drums or bins, periodically off-loaded to a land-based staging area, and disposed of at an appropriate off-site waste facility.	X	X
3.2 Drilling Mud	At no time shall drill cuttings, drilling mud, and/or materials or water contaminated with bentonite or any other substance deleterious to fish or wildlife be allowed to enter the watercourse. Any contaminated water/materials from the drilling and/or project activities shall be pumped or placed into a holding facility and removed for proper disposal.	X	X
3.3 Application of Bentonie and Polymers	In brackish conditions where use of bentonite is not feasible, Permittee shall use environmentally-friendly polymers to fill and stabilize bore holes as to why these alternative environmentally friendly materials are infeasible specific to each location, such as brackish conditions. Grout shall be poured and contained so that grout, dust, and leachate shall be excluded from stream flows and/or the stream channels for 30 days after it is poured. If run off from exposed grout cannot be excluded from the stream flows and/or stream channels for 30 days, then a sealant may be applied. Any sealants applied to the grout shall be non-toxic and designed for use in aquatic environments. Sealants shall not contact stream flows for a minimum of 72 hours. Additionally, wash down water from grout pumping equipment and other tools and equipment shall not be allowed to enter the stream. The grout-exposed water shall be contained and properly disposed of off-site. Pumping equipment, and other tools and equipment shall be stored off-site in areas that do not drain into stream channels or other sensitive areas.	X	X
3.4 Emergency Spill Response Plan	An emergency response plan shall be prepared and submitted to CDFW prior to the start of project work. The plan shall be limited to three pages in length and may be presented in prose, table, or bulleted list format. The plan shall identify the actions which would be taken in the event of a spill of concrete, petroleum products, sediment, or other material harmful to aquatic or plant life. The plan shall also identify the emergency response materials which shall be kept at the site to allow the rapid containment and clean-up of any spilled material. The emergency response plan shall also be submitted in the final construction report.	X	X
3.5 Spill of Material Deleterious to Fish and Wildlife	Permittee and all contractors shall be subject to the water pollution regulations found in FGC Sections 5650 and 12015. In the event of a hazardous materials spill into the stream (e.g., grout, epoxy, etc.), Permittee shall immediately notify the California Office of Emergency Services State Warning Center by calling 1-800-852-7550 and immediately provide written notification to CDFW by email to the contact indicated in this Agreement (see "Contact Information"). Permittee shall take all reasonable measures to document the extent of the impacts and affected areas including photographic documentation of affected areas, injured fish and wildlife. If dead fish or wildlife are found in the affected area, Permittee shall collect carcasses and immediately deliver them to CDFW. The Permittee shall meet with CDFW within ten days of the reported spill in order to develop a resolution including: site clean-up, site remediation, and compensatory mitigation for the harm caused to fish, wildlife, and the habitats on which they depend as a result of the spill. Permittee shall be responsible for all spill cleanup, site remediation, and compensatory mitigation costs. Spill of materials to waters of the State that are deleterious to fish and wildlife are in violation of Fish and Game Code Section 5650 et. seq.	X	X
3.6 Frac-out Plan	Prior to initiating drilling activities in the watercourses listed in Table 1, Permittee shall submit a Frac-Out Contingency Plan for CDFW review and approval. The Permittee shall adhere to the conditions and plans set forth in the Frac-Out Contingency Plan, or as amended if approved by CDFW in writing.	X	

Attachment 3

Proposed Explorations and Methods

Attachment 3

Proposed Explorations and Methods

Table 1: Grant Line Alternative 2 (GLA2) - Proposed Explorations and Methods

ID	Location	Target Depth (ft bgs)	Drilling Method	Drill Rig Type	Sample Method	Downhole testing*	Longitude	Latitude
DH-GLA2-2025-01	North Levee Landside Toe Centerline	115	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5141243	37.82082921
DH-GLA2-2025-02	North Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed	PS Suspension Logging Geochemical Testing	-121.5141296	37.8204066
DH-GLA2-2025-03	North Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5141317	37.81998863
DH-GLA2-2025-04	Middle of Canal Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers	PS Suspension Logging	-121.5141382	37.81950931
DH-GLA2-2025-05	South Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5141431	37.81908556
DH-GLA2-2025-06	South Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed	PS Suspension Logging Geochemical Testing	-121.5141485	37.81866276
DH-GLA2-2025-07	South Levee Landside Toe Centerline	115	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.51415	37.81826301
DH-GLA2-2025-08	North Levee Downstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5151792	37.82044555
DH-GLA2-2025-09	North Channel Downstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5151663	37.82000161
DH-GLA2-2025-10	South Channel Downstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5151747	37.81908516
DH-GLA2-2025-11	South Levee Downstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5151774	37.81868456
DH-GLA2-2025-12	North Levee Upstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5130884	37.8203945
DH-GLA2-2025-13	North Channel Upstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5130697	37.82000665
DH-GLA2-2025-14	South Channel Upstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5130928	37.81910051

ID	Location	Target Depth (ft bgs)	Drilling Method	Drill Rig Type	Sample Method	Downhole testing*	Longitude	Latitude
DH-GLA2-2025-15	South Levee Upstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5131059	37.81864834
CPT-GLA2-2025-01	South Levee Downstream	100	Cone Penetrometer Test	Truck Mounted			-121.5144391	37.81867352
CPT-GLA2-2025-02	South Levee Centerline	100	Cone Penetrometer Test	Truck Mounted			-121.5141184	37.81866594
CPT-GLA2-2025-03	South Levee Upstream	100	Cone Penetrometer Test	Truck Mounted			-121.5138362	37.81867102
CPT-GLA2-2025-04	North Levee Downstream	100	Cone Penetrometer Test	Truck Mounted			-121.5144315	37.82041387
CPT-GLA2-2025-05	North Levee Centerline	100	Cone Penetrometer Test	Truck Mounted			-121.5141088	37.82040297
CPT-GLA2-2025-06	North Levee Upstream	100	Cone Penetrometer Test	Truck Mounted			-121.513805	37.820408

*Additional downhole geophysical testing can be added as needed (Caliper, Deviation, E-Log, etc.)

Table 2: Grant Line Alternative 3 (GLA3) - Proposed Explorations and Methods

ID	Location	Target Depth (ft bgs)	Drilling Method	Drill Rig Type	Sample Method	Downhole testing*	Longitude	Latitude
DH-GLA3-2025-01	North Levee Landside Toe Centerline	115	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.503416	37.820874
DH-GLA3-2025-02	North Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed	PS Suspension Logging Geochemical Testing	-121.503435	37.820417
DH-GLA3-2025-03	North Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.503436	37.819983
DH-GLA3-2025-04	Middle of Canal Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers	PS Suspension Logging	-121.503434	37.819581
DH-GLA3-2025-05	South Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.503435	37.819164
DH-GLA3-2025-06	South Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed	PS Suspension Logging Geochemical Testing	-121.503443	37.81866
DH-GLA3-2025-07	South Levee Landside Toe Centerline	115	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.503426	37.817932
DH-GLA3-2025-08	North Levee Downstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.504442	37.820405
DH-GLA3-2025-09	North Channel Downstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.50444	37.820007
DH-GLA3-2025-10	South Channel Downstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.504444	37.819185
DH-GLA3-2025-11	South Levee Downstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.504468	37.818697
DH-GLA3-2025-12	North Levee Upstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.502399	37.82039
DH-GLA32025-13	North Channel Upstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.502415	37.819977
DH-GLA3-2025-14	South Channel Upstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.502398	37.819165

ID	Location	Target Depth (ft bgs)	Drilling Method	Drill Rig Type	Sample Method	Downhole Testing*	Longitude	Latitude
DH-GLA3-2025-15	South Levee Upstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.502398	37.818665
CPT-GLA3-2025-01	South Levee Downstream	100	Cone Penetrometer Test	Truck Mounted			-121.503763	37.818664
CPT-GLA3-2025-02	South Levee Centerline	100	Cone Penetrometer Test	Truck Mounted			-121.503426	37.818664
CPT-GLA3-2025-03	South Levee Upstream	100	Cone Penetrometer Test	Truck Mounted			-121.503088	37.818666
CPT-GLA3-2025-04	North Levee Downstream	100	Cone Penetrometer Test	Truck Mounted			-121.503776	37.820408
CPT-GLA3-2025-05	North Levee Centerline	100	Cone Penetrometer Test	Truck Mounted			-121.503435	37.8204
CPT-GLA3-2025-06	North Levee Upstream	100	Cone Penetrometer Test	Truck Mounted			-121.503081	37.820406

*Additional downhole geophysical testing can be added as needed (Caliper, Deviation, E-Log, etc.)

Table 3: Middle River - Proposed Explorations and Methods

ID	Location	Target Depth (ft bgs)	Drilling Method	Drill Rig Type	Sample Method	Downhole Testing*	Longitude	Latitude
DH-MR-2025-01	South Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed	PS Suspension Logging Geochemical Testing	-121.4825529	37.88506082
DH-MR-2025-02	South Levee Downstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.4832491	37.88492929
DH-MR-2025-03	Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers	PS Suspension Logging	-121.4825626	37.88553295
DH-MR-2025-04	North Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed	PS Suspension Logging Geochemical Testing	-121.4825684	37.88596878
DH-MR-2025-05	North Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.4833226	37.88595132
DH-MR-2025-06	South Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.4825459	37.88480382
DH-MR-2025-07	South Levee Upstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.482239	37.88505505
DH-MR-2025-08	Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.4825603	37.88535694
DH-MR-2025-09	Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.4825584	37.88574533
DH-MR-2025-10	North Levee Downstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.4825676	37.88617555

*Additional downhole geophysical testing can be added as needed (Caliper, Deviation, E-Log, etc.)

Table 4: Old River - Proposed Explorations and Methods

ID	Location	Target Depth (ft bgs)	Drilling Method	Drill Rig Type	Sample Method	Downhole Testing*	Longitude	Latitude
DH-OR-2025-01	South Levee Upstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5440845	37.81013118
DH-OR-2025-02	South Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed	PS Suspension Logging Geochemical Testing	-121.5445952	37.81025561
DH-OR-2025-03	Channel Upstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5439363	37.81031791
DH-OR-2025-04	Channel Downstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5451457	37.81064909
DH-OR-2025-05	Channel Upstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5441678	37.81056366
DH-OR-2025-06	Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers	PS Suspension Logging	-121.5444128	37.81067191
DH-OR-2025-07	Channel Upstream	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5441716	37.81079297
DH-OR-2025-08	North Levee Centerline	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed	PS Suspension Logging Geochemical Testing	-121.5442327	37.81108282
DH-OR-2025-09	South Levee Upstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5435298	37.80998585
DH-OR-2025-10	South Levee Downstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5453247	37.81044813
DH-OR-2025-11	Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5444902	37.81048707
DH-OR-2025-12	Channel Centerline	130	Mud Rotary	Barge/Jack-Up Rig	Continuous SPT/ModCal/Shelby at direction of engineers		-121.5443042	37.81092942
DH-OR-2025-13	North Levee Upstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5430977	37.81078978
DH-OR-2025-14	North Levee Upstream	130	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5437549	37.81095676
DH-OR-2025-15	North Levee Landside Toe Centerline	115	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.5441463	37.81129039

ID	Location	Target Depth (ft bgs)	Drilling Method	Drill Rig Type	Sample Method	Downhole Testing*	Longitude	Latitude
DH-OR-2025-16	South Levee Landside Toe Centerline	115	Hollow Stem Augur	Truck Mounted	Continuous core with SPT and Shelby tubes as needed		-121.544634	37.8101555

*Additional downhole geophysical testing can be added as needed (Caliper, Deviation, E-Log, etc.)

Attachment 4

Hydraulic Fracturing Analysis

Attachment 4

Hydraulic Fracturing Analysis

GROUTING AND DRILLING FLUID PRESSURES

Four scenarios were used to produce the charts in this Attachment:

The first scenario, which includes Charts 1a, 1b, and 1c represents a hollow stem auger (HSA) boring advanced through the levee embankment to 130 feet total depth. Grout is backfilled up to 10 feet bgs.

The second scenario, which includes Charts 2a, 2b, and 2c, represents a HSA boring advanced through the levee embankment to 60 to 65 feet bgs, followed by rotary wash (RW) drilling to 130 feet total depth. Grout is backfilled up to 10 feet bgs.

The third scenario, which includes Charts 3a, 3b, and 3c, represents a CPT pushed through the levee embankment to 100 feet total depth. Grout is backfilled up to 10 feet bgs.

The fourth scenario, which includes Chart 4a, and 4b, represents a HSA boring advanced from the levee landside toe to a depth of 115 feet total depth. Grout is backfilled to 10 feet bgs.

Results in these charts compare horizontal stress of the soil, to pressures induced by drilling fluid, and grout backfill, respectively. Hydraulic fracturing may occur when the pressure of either drilling fluid, or grout, exceeds the horizontal stress of the surrounding soil. This analysis establishes drilling parameters necessary to avoid hydraulic fracturing based on expected soil conditions.

The calculations to produce all Charts are based on Schaefer et al. (2011). The soil unit weights used are presented below and assume an at-rest lateral earth pressure coefficient of 0.55. Calculation spreadsheets showing factors of safety are provided at the end of this Attachment.

Sand (SP) and/or Silty Sand (SM) - above WT	95-100 pcf
Sand (SP) and/or Silty Sand (SM) - below WT	105-120 pcf
Clayey Sand (SC) - above WT	95-120 pcf
Clayey Sand (SC) - below WT	105-125 pcf
Lean Clay (CL) and/or Silt (ML) - above WT	95-120 pcf
Lean Clay (CL) and/or Silt (ML) - below WT	110-125 pcf
Fat Clay (CH) - above WT	90-100 pcf
Fat Clay (CH) - below WT	95-105 pcf

Typical cohesion values and friction (phi) angles (in degrees) for the soils listed above are included in the chart below:

USCS Soil Class	Cohesion (kPa)	Friction Angle (degrees)
SP	0 [1]	37 [2]
SM	22 [1]	34 [2]
SC	5 [1]	31 [2]
CH	25 [1]	19 [2]
CL	4 [1]	27-35 [1]
ML	7 [1]	27-41 [1]

1. Swiss Standard SN 670 010b, Characteristic Coefficients of soils, Association of Swiss Road and Traffic Engineers, Swiss Standard SN 670 010b, Characteristic Coefficients of soils, Association of Swiss Road and Traffic Engineers
2. Carter, M. and Bentley, S. (1991). Correlations of soil properties. Penetech Press Publishers, London.

Calculations used to determine the horizontal stress at each foot of depth for the drill holes follow.

The overburden (vertical pressure) (s_a) was calculated by multiplying the moist soil unit weight (g_x) with the depth to top of groundwater (d_{gw}) and adding that to the saturated unit weight of soil (g_y) multiplied by the depth of the hole (d) minus the depth to top of groundwater (d_{gw}).

$$s_a=(g_x*d_{gw})+(g_y*(d-d_{gw}))$$

The porewater pressure (s_{gw}) was calculated by multiplying the unit weight of water (gw) by the (d) depth of the hole minus the depth to top of groundwater (d_{gw}).

$$s_{gw}=(g_w*(d-d_{gw}))$$

The vertical effective stress (s'_{ev}) was calculated by subtracting the porewater pressure (s_{gw}) from the overburden pressure (s_a).

$$s'_{ev}=(s_a-s_{gw})$$

The horizontal effective stress (s'_{eh}) was calculated by multiplying the vertical effective stress (s'_{ev}) by the at-rest lateral earth pressure coefficient (Ko).

$$s'_{eh}=(K_o*s'_{ev})$$

The horizontal stress (s_{hs}) needed to resist fluid pressure was calculated by adding the horizontal effective stress (s'_{eh})to the porewater pressure (s_{gw}).

$$s_{hs}=s'_{eh}+s_{gw}$$

Calculations used to determine drilling fluid and grout pressure are as follows.

The drilling fluid pressure (s_{df}) was calculated by multiplying the unit weight of the drilling fluid (g_{df}) with the depth (h_{df}).

$$s_{df}=g_{df}*h_{df}$$

The grout pressure (s_{gt}) was calculated by multiplying the unit weight of the grout (g_g) with the height of grout (h_g).

$$s_{gt}=g_g*h_g$$

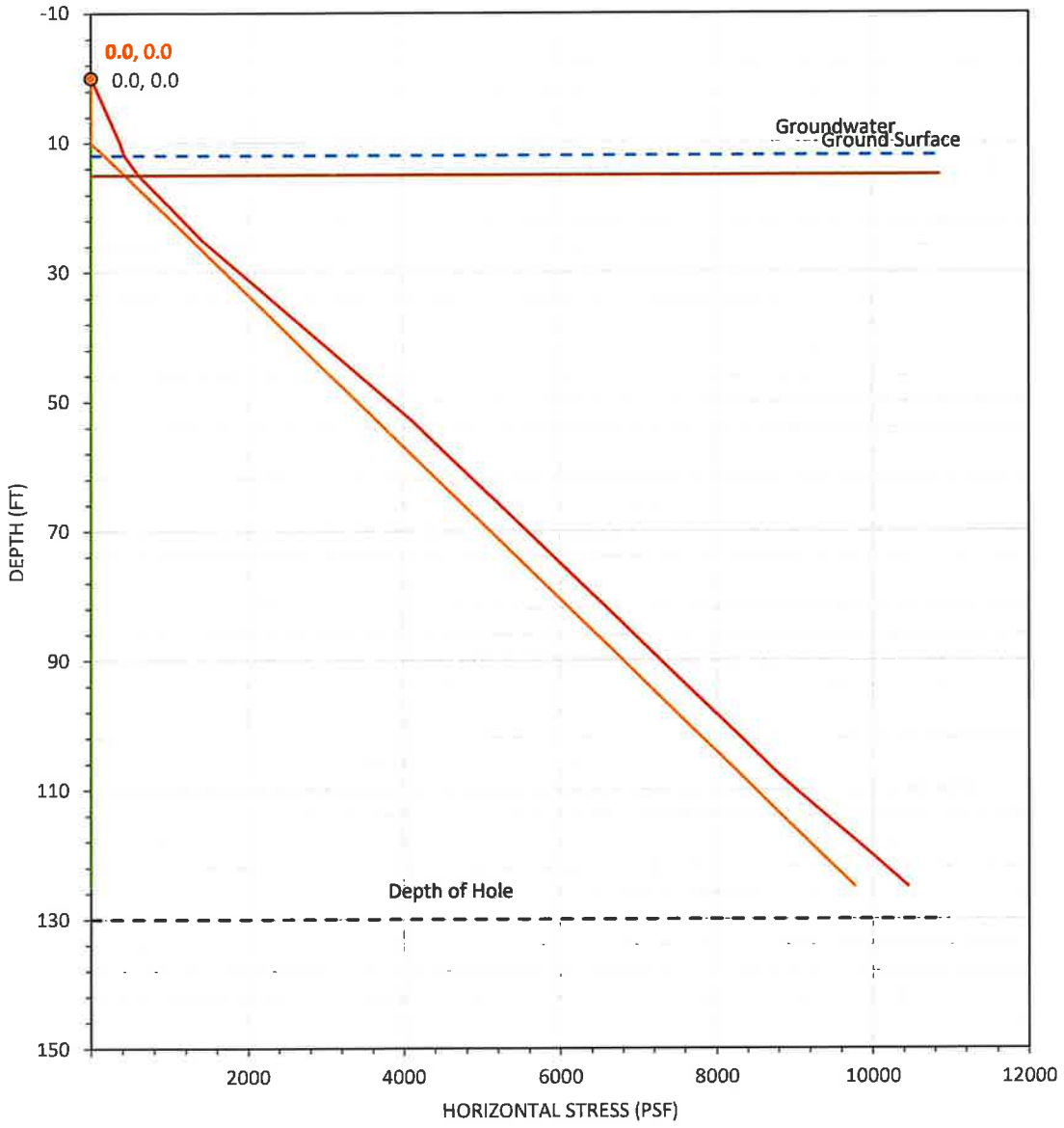
Scenario 1

The method of exploration will be hollow stem auger (HSA), which does not require the use of drilling fluids, and does not have the potential for hydraulic fracturing. This scenario represents a HSA boring advanced through the levee embankment to 130 feet total depth, followed by backfilling with grout up to 10 feet bgs. Backfilling these explorations with grout, however, may present the potential for hydraulic fracturing. Care will be taken to minimize this risk by staging the grout.

The stratigraphy for each site is based on the best available drill hole logs from previous DWR explorations.

Charts 1a, 1b, and 1c, respectively, present the results of the hydraulic fracture analysis for Grant Line, Old River, and Middle River. The charts show no potential for hydraulic fracturing if an 85 pcf grout were used to backfill the drill hole in a single stage to 10 feet bgs. Calculations were performed using the Schaefer et al. (2011) approach. The calculations assume a correction of 0.60 for the embankment.

Chart 1a


-10
10
30
50
70
90
110
130
150
DEPTH (FT)
0.0, 0.0
0.0, 0.0
Groundwater
Ground Surface
Depth of Hole
2000
4000
6000
8000
10000
12000
HORIZONTAL STRESS (PSF)
Horizontal Stress
Drilling Fluid Pressure
Grout Pressure
Ground Surface
Embankment Foundation
Groundwater
Depth of Hole
Drill Fluid=Effective Horizontal
Grout=Effective Horizontal

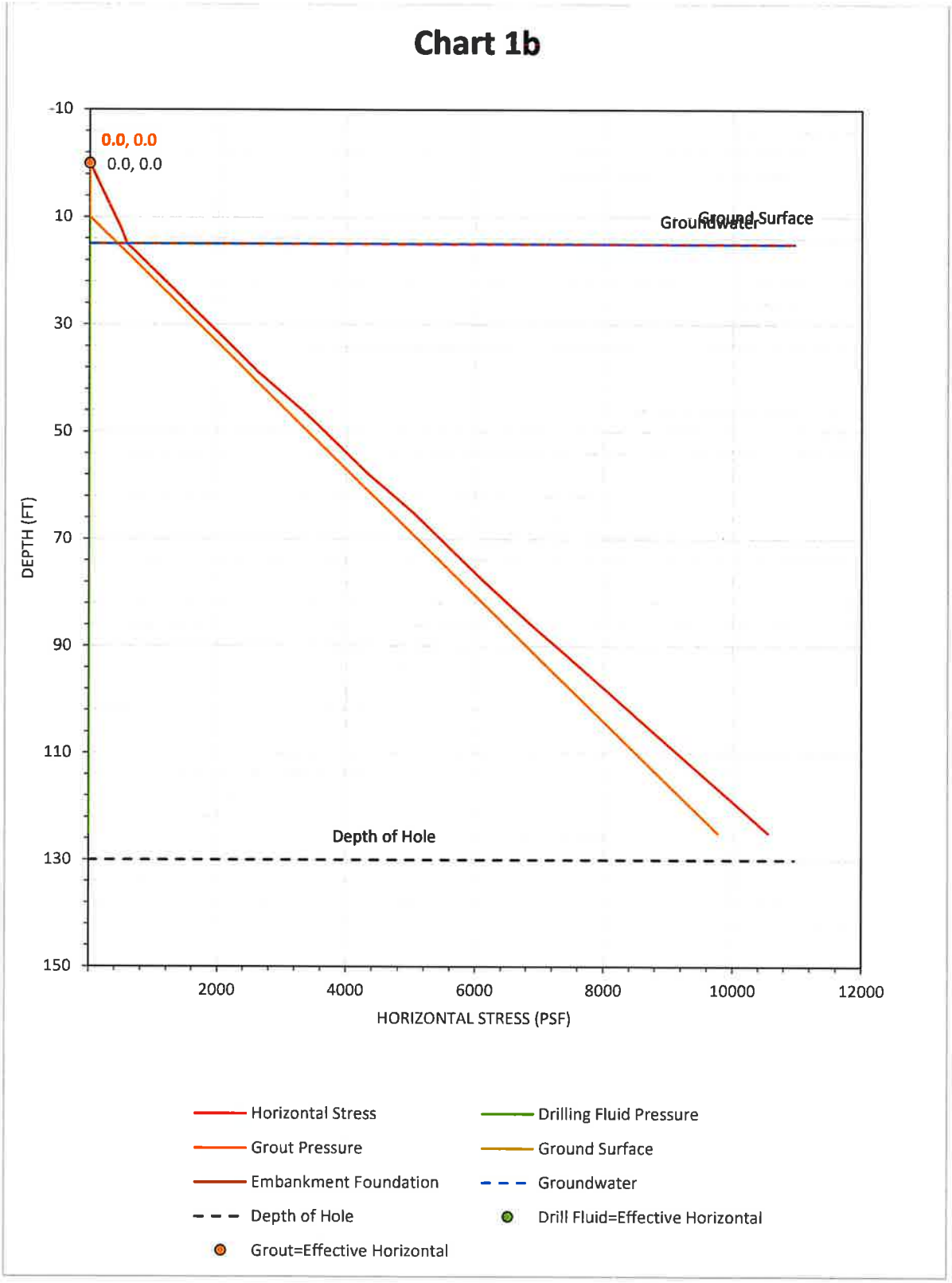


Chart 1b
-10
10
30
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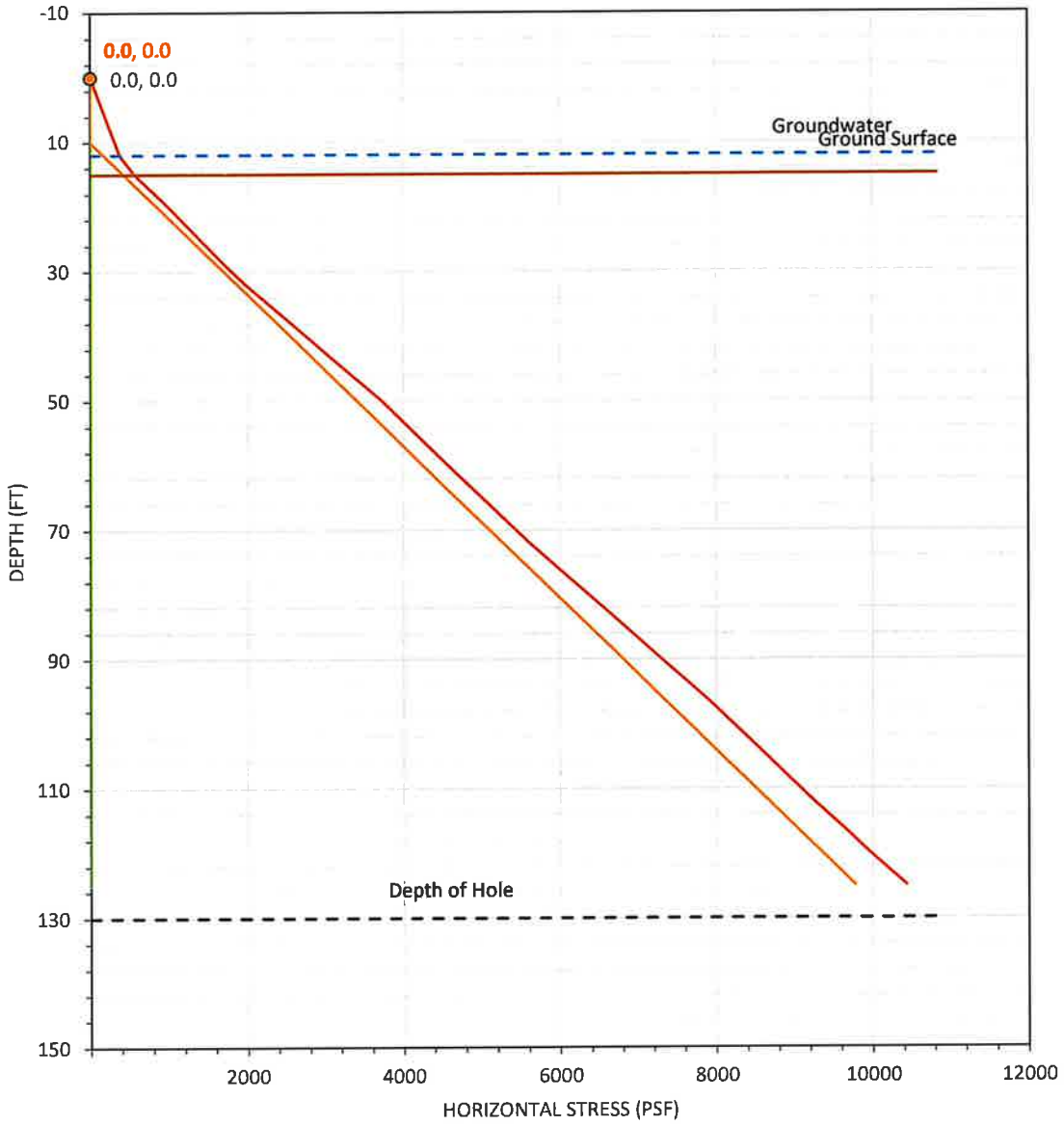
70
90
110
130
150
DEPTH (FT)
0.0, 0.0
0.0, 0.0
Groundwater
Ground Surface
Depth of Hole
2000
4000
6000
8000
10000
12000
HORIZONTAL STRESS (PSF)
Horizontal Stress
Drilling Fluid Pressure
Grout Pressure
Ground Surface
Embankment Foundation
Groundwater
Depth of Hole
Drill Fluid=Effective Horizontal
Grout=Effective Horizontal

Chart 1c


-10
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90
110
130
150
DEPTH (FT)
0.0, 0.0
0.0, 0.0
Groundwater
Ground Surface
Depth of Hole
2000
4000
6000
8000
10000
12000
HORIZONTAL STRESS (PSF)
Horizontal Stress
Drilling Fluid Pressure
Grout Pressure
Ground Surface
Embankment Foundation
Groundwater
Depth of Hole
Drill Fluid=Effective Horizontal
Grout=Effective Horizontal

Scenario 2

In this scenario, the exploration method will be HSA followed by RW and backfilled with grout upon reaching total depth. HSA does not require the use of drilling fluids and does not have the potential for hydraulic fracturing. Once the HSA reaches below the hydraulic fracturing depth (60 to 65 feet bgs), the HSA will be removed and casing will be placed to the depth reached with the HSA. RW method will continue through the casing to total depth (130 feet).

The stratigraphy for each site is based on the best available drill hole logs from previous DWR explorations.

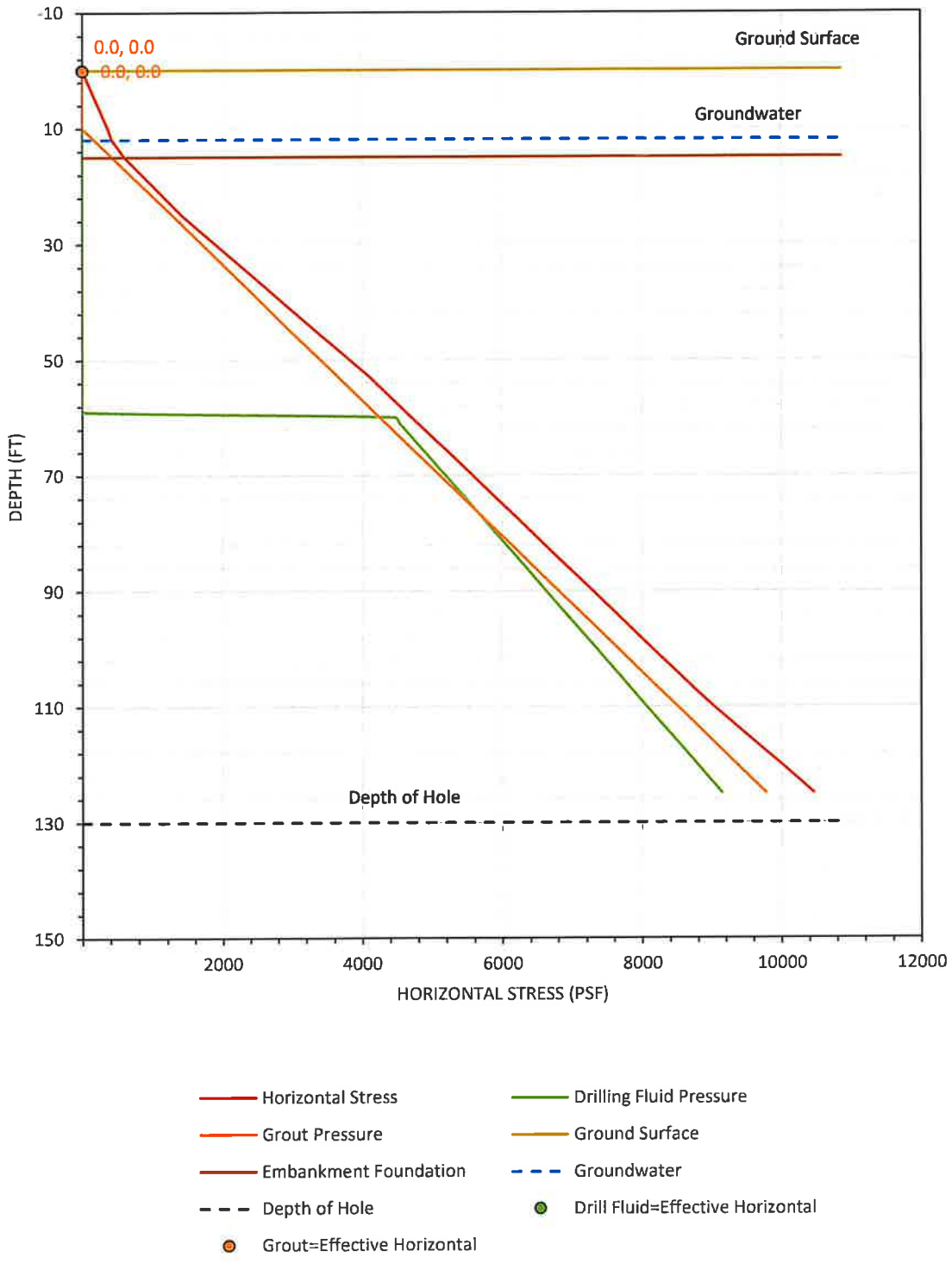
Chart 2a presents the results of hydraulic fracture analysis at Grant Line for moderate depth borings if HSA or casing is employed to 60 feet bgs, and if grout backfill is staged to 10 ft bgs. Results show that the risk for hydraulic fracturing is eliminated, due to grout and drilling fluid pressures never exceeding horizontal stress.

Chart 2b presents the results of hydraulic fracture analysis at Old River for moderate depth borings if HSA or casing is employed to 65 feet bgs, and if grout backfill is staged to 10 ft bgs. Results show that the risk for hydraulic fracturing is eliminated, due to grout and drilling fluid pressures never exceeding horizontal stress.

Chart 2c presents the results of hydraulic fracture analysis at Middle River for moderate depth borings if HSA or casing is employed to 60 feet bgs, and if grout backfill is staged to 10 ft bgs. Results show that the risk for hydraulic fracturing is eliminated, due to grout and drilling fluid pressures never exceeding horizontal stress.

These charts shows 85 pcf cement grout staged to 10 feet below ground surface. Analysis shows there is no risk for hydraulic fracturing if the grout is backfilled using this method.

Chart 2a


-10
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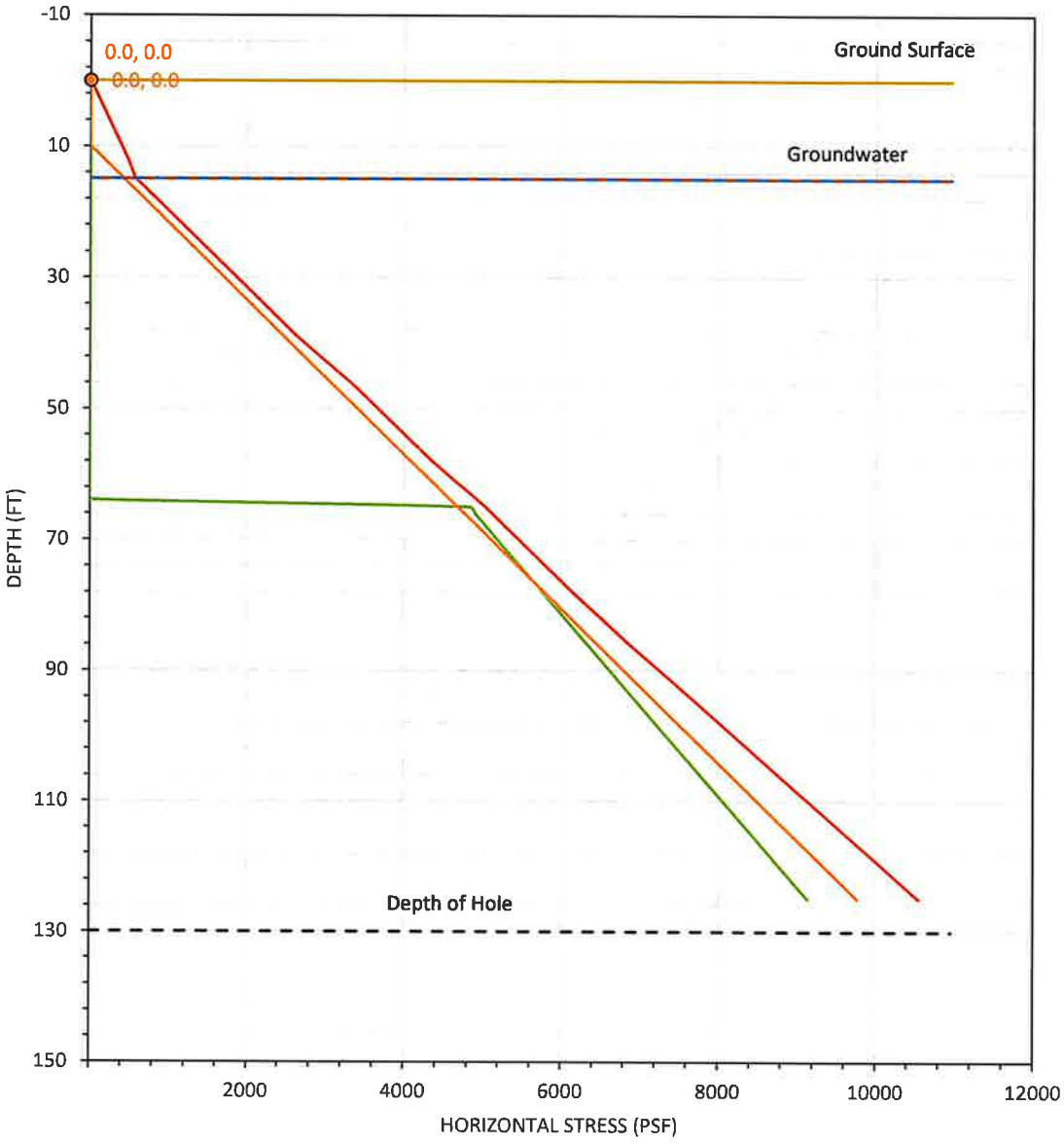
70
90
110
130
150
DEPTH (FT)
0.0, 0.0
0.0, 0.0
Ground Surface
Groundwater
Depth of Hole
2000
4000
6000
8000
10000
12000
HORIZONTAL STRESS (PSF)
Horizontal Stress
Drilling Fluid Pressure
Grout Pressure
Ground Surface
Embankment Foundation
Groundwater
Depth of Hole
Drill Fluid=Effective Horizontal
Grout=Effective Horizontal

Chart 2b


-10
10
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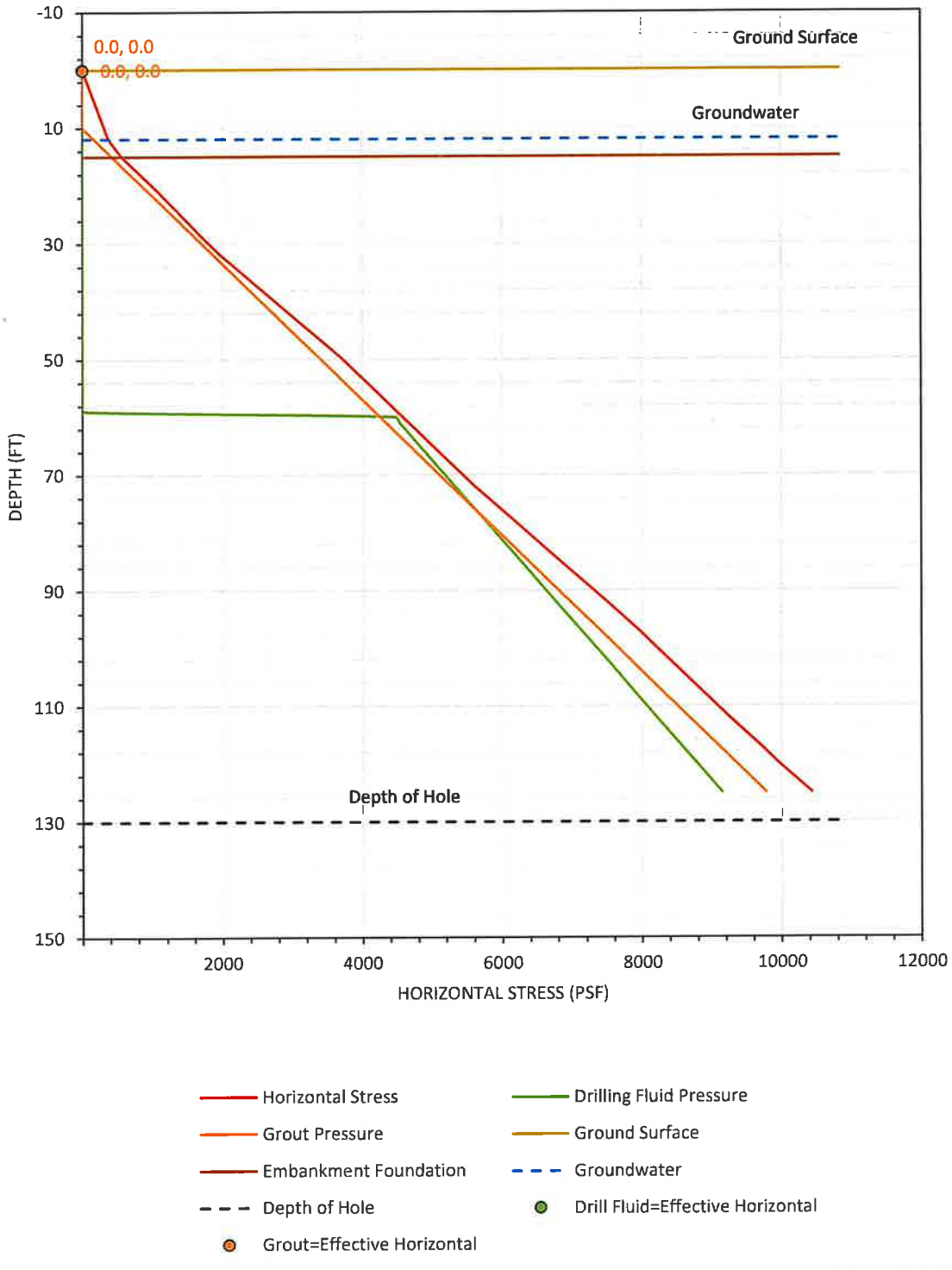
90
110
130
150
DEPTH (FT)
0.0, 0.0
0.0, 0.0
Ground Surface
Groundwater
Depth of Hole
2000
4000
6000
8000
10000
12000
HORIZONTAL STRESS (PSF)
Horizontal Stress
Drilling Fluid Pressure
Grout Pressure
Ground Surface
Embankment Foundation
Groundwater
Depth of Hole
Drill Fluid=Effective Horizontal
Grout=Effective Horizontal

Chart 2c


-10
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130
150
DEPTH (FT)
0.0, 0.0
0.0, 0.0
Ground Surface
Groundwater
Depth of Hole
2000
4000
6000
8000
10000
12000
HORIZONTAL STRESS (PSF)
Horizontal Stress
Drilling Fluid Pressure
Grout Pressure
Ground Surface
Embankment Foundation
Groundwater
Depth of Hole
Drill Fluid=Effective Horizontal
Grout=Effective Horizontal

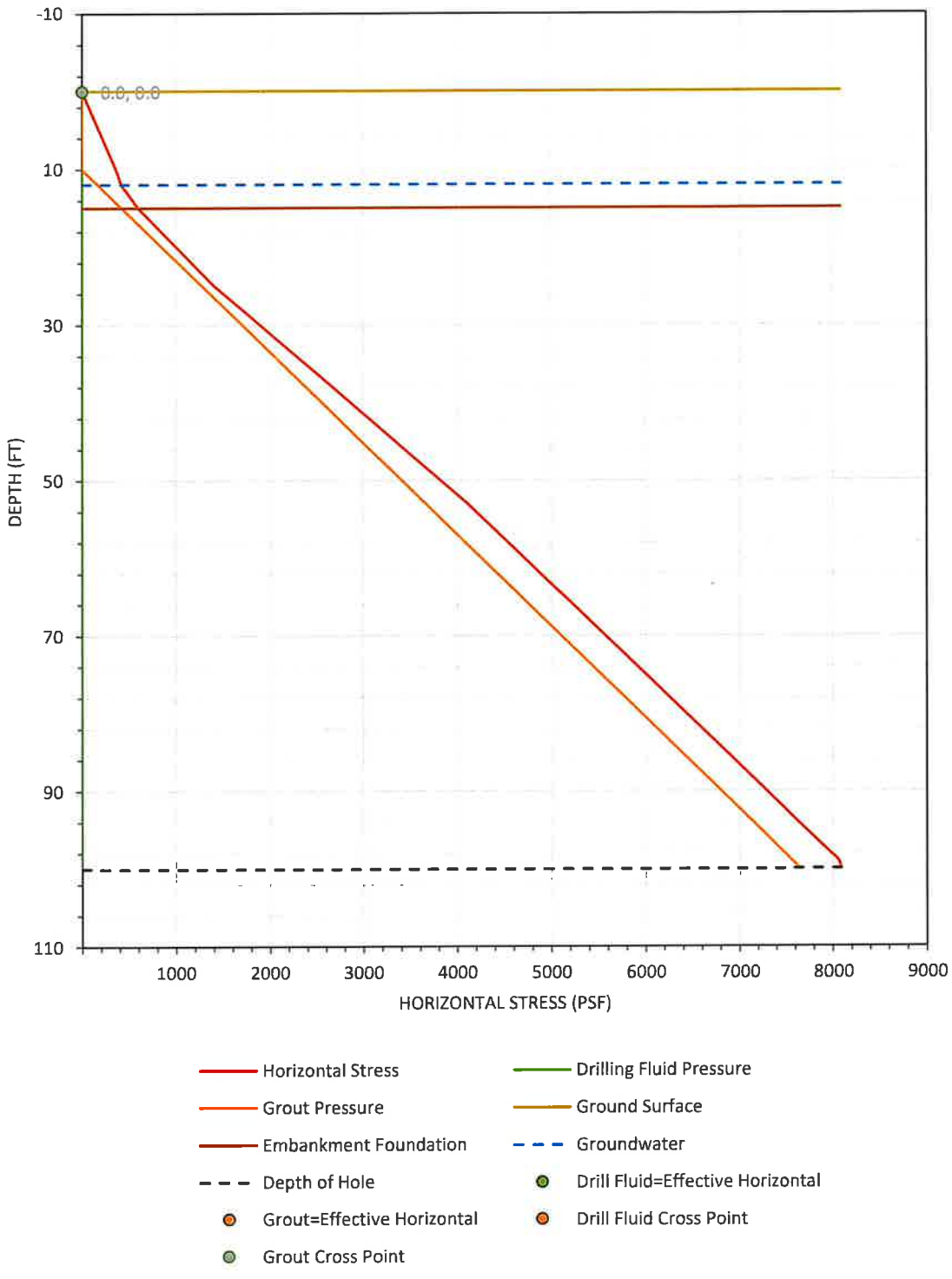
Scenario 3

This scenario represents a CPT pushed through the levee embankment to 100 feet bgs. The CPT method of exploration is direct push, does not require the use of drilling fluids, and does not have the potential for hydraulic fracturing. Backfilling these explorations with grout, however, does present the potential for hydraulic fracturing. Care will be taken to minimize this risk by staging the grout.

The stratigraphy for each site is based on the best available drill hole logs from previous DWR explorations.

Charts 3a, 3b, and 3c, respectively, present the results of the hydraulic fracturing analysis for Grant Line, Old River, and Middle River. The charts show no potential for hydraulic fracturing if an 85 pcf grout were used to backfill the CPT in a single stage to 10 feet bgs. Results show that the risk for hydraulic fracturing is eliminated, due to grout and drilling fluid pressures never exceeding horizontal stress. Calculations were performed using the Schaefer et al. (2011) approach. The calculations assume a correction of 0.60 for the embankment.

Chart 3a


-10
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70
90
110
0.0, 0.0
DEPTH (FT)
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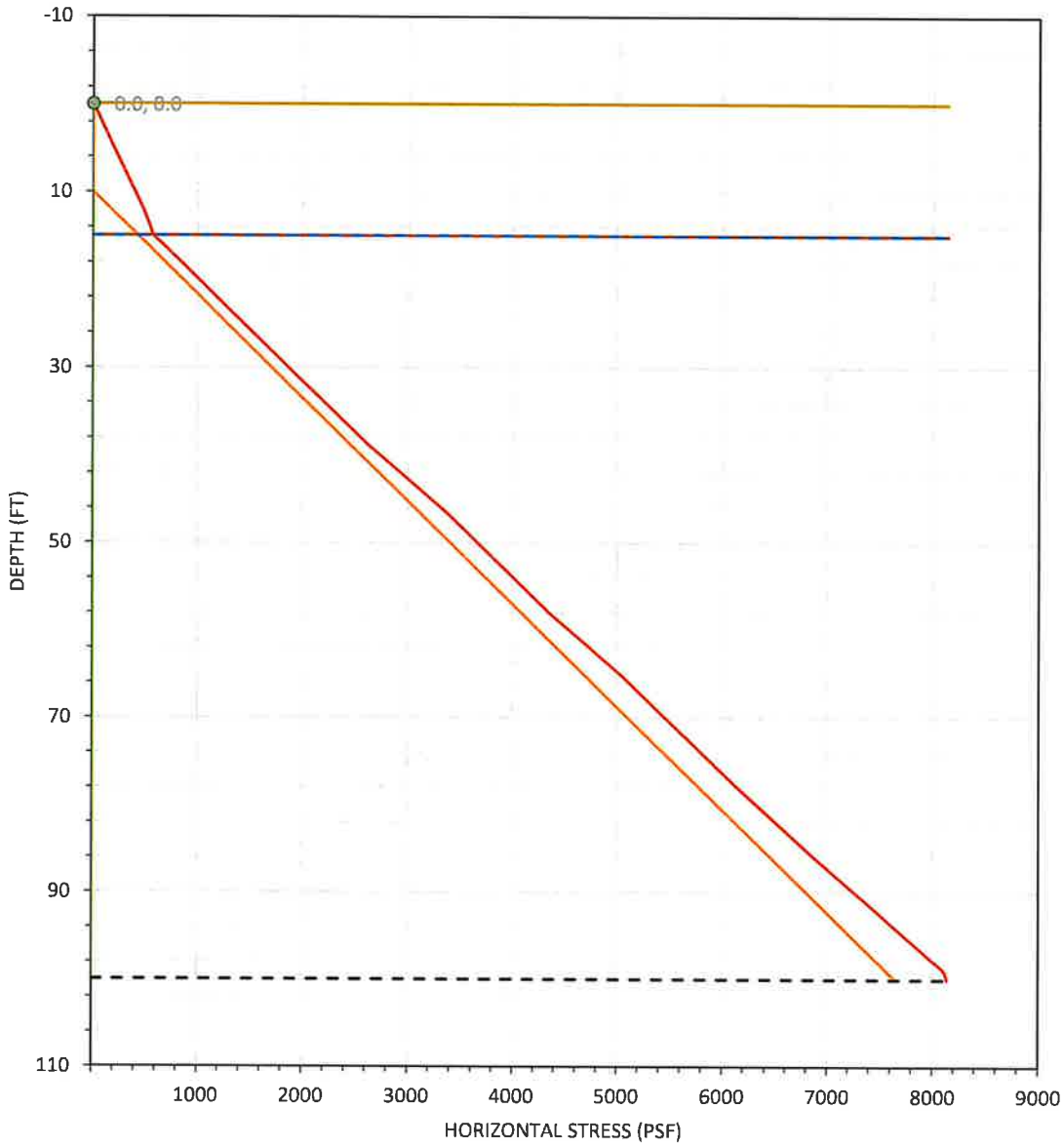
2000
3000
4000
5000
6000
7000
8000
9000
HORIZONTAL STRESS (PSF)
Horizontal Stress
Drilling Fluid Pressure
Grout Pressure
Ground Surface
Embankment Foundation
Groundwater
Depth of Hole
Drill Fluid=Effective Horizontal
Grout=Effective Horizontal
Drill Fluid Cross Point
Grout Cross Point

Chart 3b


-10
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110
0.0, 0.0
DEPTH (FT)
1000
2000
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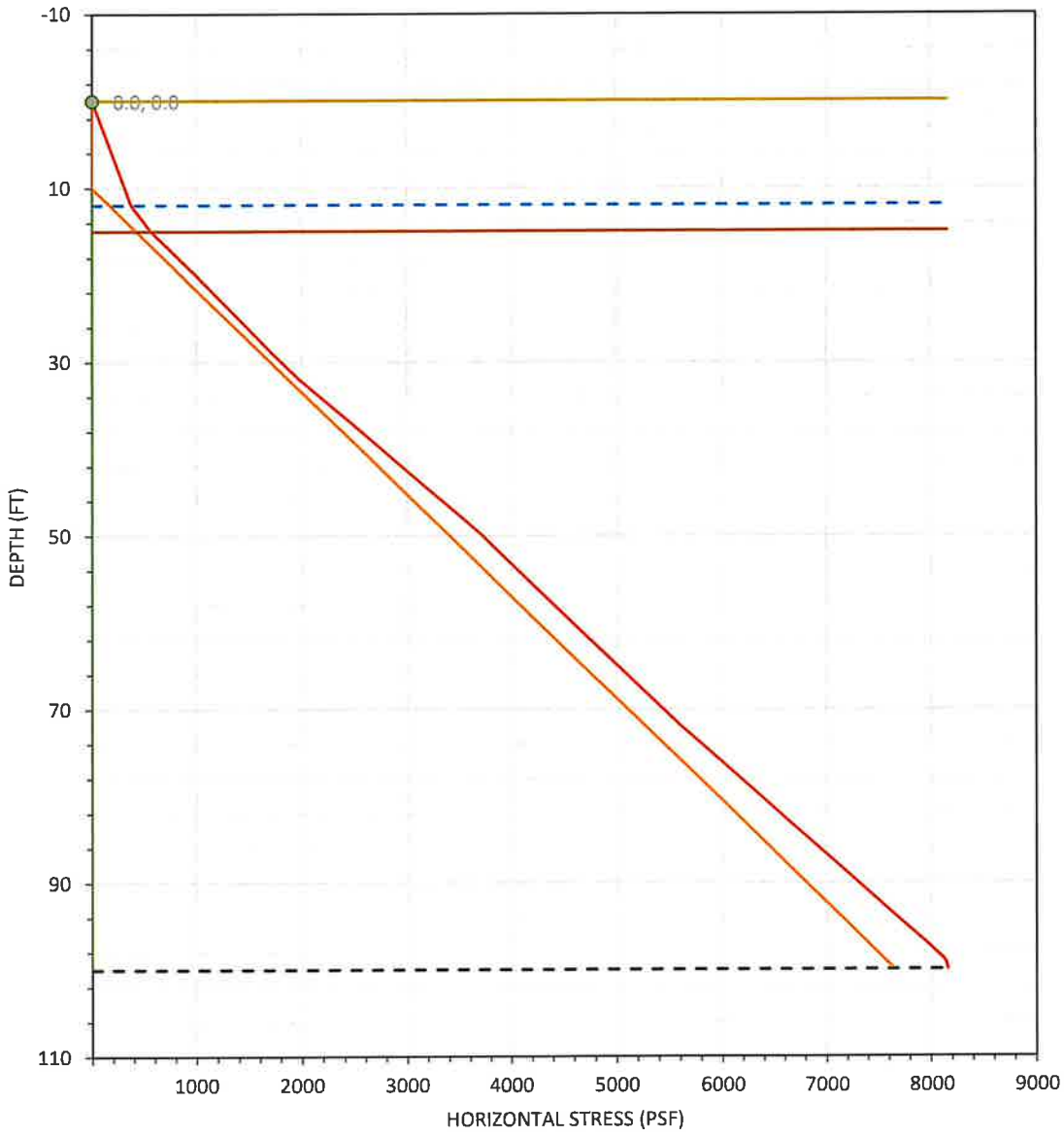
5000
6000
7000
8000
9000
HORIZONTAL STRESS (PSF)
Horizontal Stress
Drilling Fluid Pressure
Grout Pressure
Ground Surface
Embankment Foundation
Groundwater
Depth of Hole
Drill Fluid=Effective Horizontal
Grout=Effective Horizontal
Drill Fluid Cross Point
Grout Cross Point

Chart 3c


-10
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DEPTH (FT)
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6000
7000
8000
9000
HORIZONTAL STRESS (PSF)
Horizontal Stress
Drilling Fluid Pressure
Grout Pressure
Ground Surface
Embankment Foundation
Groundwater
Depth of Hole
Drill Fluid=Effective Horizontal
Grout=Effective Horizontal
Drill Fluid Cross Point
Grout Cross Point

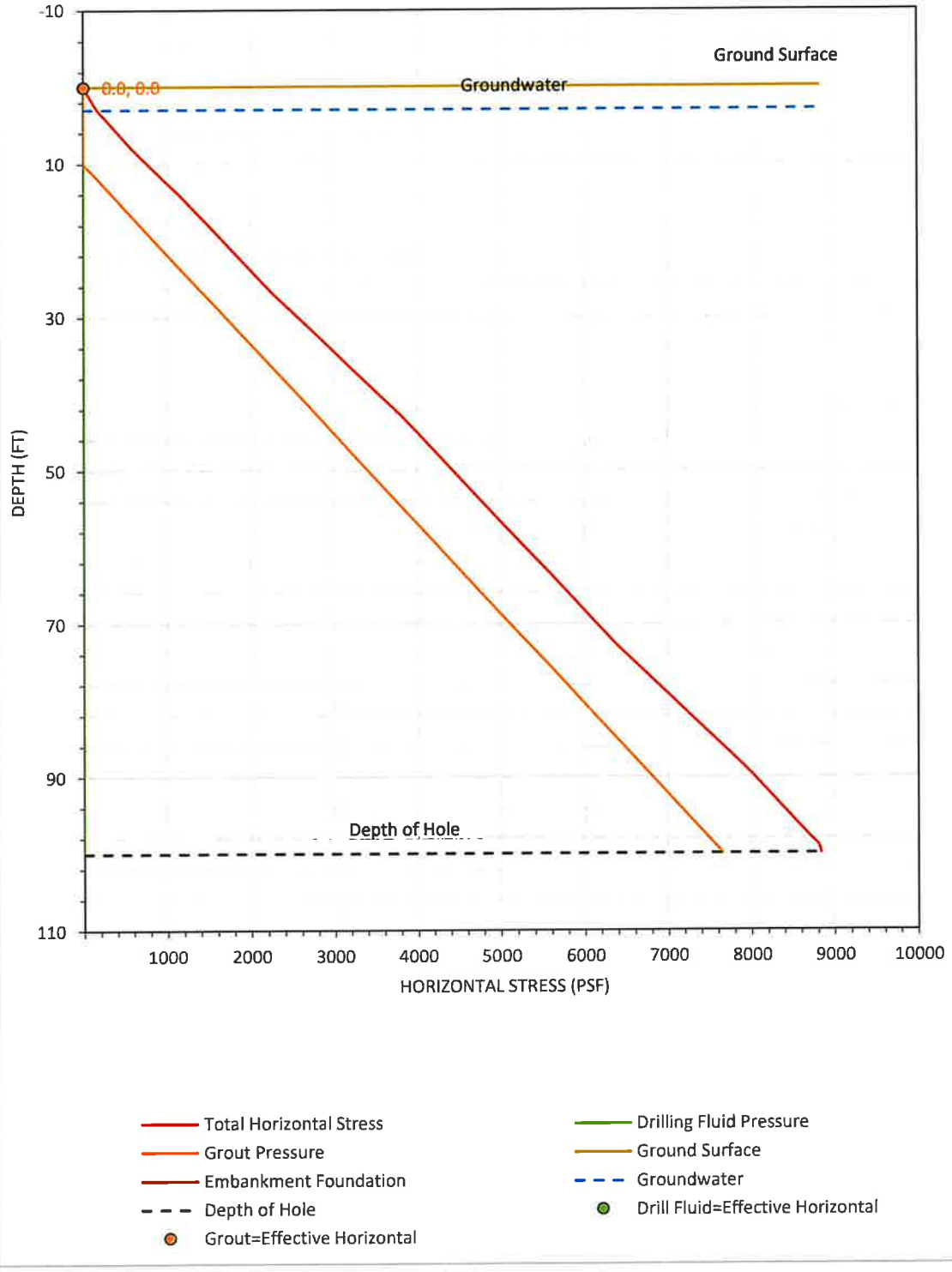
Scenario 4

The method of exploration will be hollow stem auger (HSA), which does not require the use of drilling fluids, and does not have the potential for hydraulic fracturing. This scenario represents a HSA boring advanced through from the landside levee toe to a depth of 115 feet bgs, followed by backfilling with grout up to 10 feet bgs. Backfilling these explorations with grout, however, may present the potential for hydraulic fracturing. Care will be taken to minimize this risk by staging the grout.

The stratigraphy for each site is based on the best available drill hole logs from previous DWR explorations.

Charts 4a and 4b, respectively, present the results of the hydraulic fracture analysis for Grant Line and Old River. The charts show no potential for hydraulic fracturing if an 85 pcf grout were used to backfill the drill hole in a single stage to 10 feet bgs. Calculations were performed using the Schaefer et al. (2011) approach.

Chart 4a


-10
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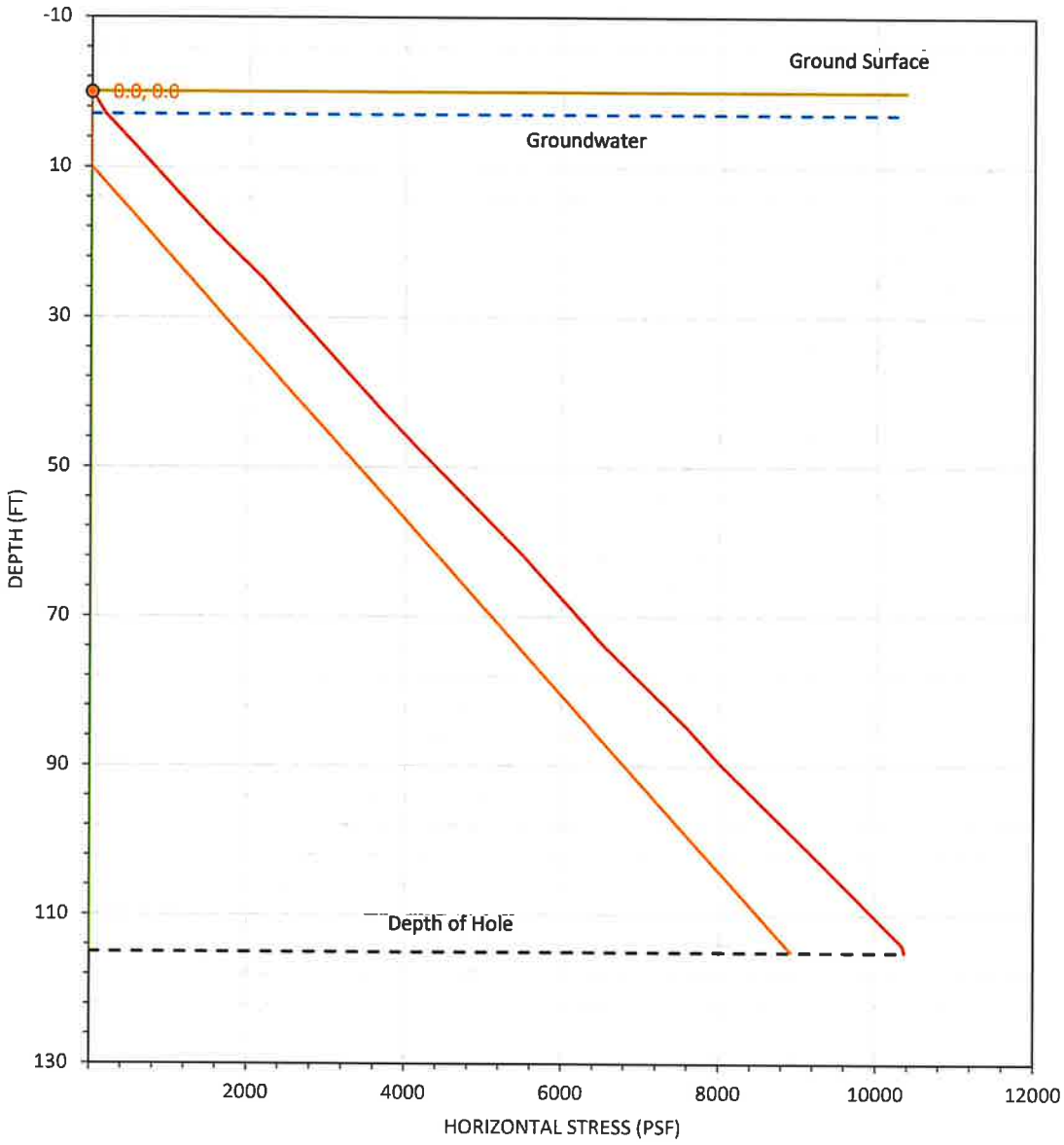
110
DEPTH (FT)
Ground Surface
Groundwater
0.0, 0.0
Depth of Hole
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
HORIZONTAL STRESS (PSF)
Total Horizontal Stress
Grout Pressure
Embankment Foundation
Depth of Hole
Grout=Effective Horizontal
Drilling Fluid Pressure
Ground Surface
Groundwater
Drill Fluid=Effective Horizontal

Chart 4b


-10
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30
50
70
90
110
130
DEPTH (FT)
0.0, 0.0
Ground Surface
Groundwater
Depth of Hole
2000
4000
6000
8000
10000
12000
HORIZONTAL STRESS (PSF)
Total Horizontal Stress
Grout Pressure
Embankment Foundation
Depth of Hole
Grout=Effective Horizontal
Drilling Fluid Pressure
Ground Surface
Groundwater
Drill Fluid=Effective Horizontal

Calculation Sheets

Table1a - Grant LIne; HSA through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
12	0	ML	110	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
11	1	ML	110	66.0	0.0	66.0	0.6	36.3	36.3	72.0	0.0	85.0	0.0	NA	NA
10	2	ML	110	132.0	0.0	132.0	0.6	72.6	72.6	72.0	0.0	85.0	0.0	NA	NA
9	3	ML	110	198.0	0.0	198.0	0.6	108.9	108.9	72.0	0.0	85.0	0.0	NA	NA
8	4	ML	110	264.0	0.0	264.0	0.6	145.2	145.2	72.0	0.0	85.0	0.0	NA	NA
7	5	ML	110	330.0	0.0	330.0	0.6	181.5	181.5	72.0	0.0	85.0	0.0	NA	NA
6	6	ML	110	396.0	0.0	396.0	0.6	217.8	217.8	72.0	0.0	85.0	0.0	NA	NA
5	7	ML	110	462.0	0.0	462.0	0.6	254.1	254.1	72.0	0.0	85.0	0.0	NA	NA
4	8	ML	110	528.0	0.0	528.0	0.6	290.4	290.4	72.0	0.0	85.0	0.0	NA	NA
3	9	ML	110	594.0	0.0	594.0	0.6	326.7	326.7	72.0	0.0	85.0	0.0	NA	NA
2	10	CH	90	660.0	0.0	660.0	0.6	363.0	363.0	72.0	0.0	85.0	0.0	NA	NA
1	11	CH	90	714.0	0.0	714.0	0.6	392.7	392.7	72.0	0.0	85.0	85.0	NA	4.6
0	12	CH	95	768.0	0.0	768.0	0.6	422.4	422.4	72.0	0.0	85.0	170.0	NA	2.5
-1	13	CH	95	825.0	62.4	762.6	0.6	419.4	481.8	72.0	0.0	85.0	255.0	NA	1.9
-2	14	CH	95	882.0	124.8	757.2	0.6	416.5	541.3	72.0	0.0	85.0	340.0	NA	1.6
-3	15	CH	95	939.0	187.2	751.8	0.6	413.5	600.7	72.0	0.0	85.0	425.0	NA	1.4
-4	16	CH	95	1034.0	249.6	784.4	0.6	431.4	681.0	72.0	0.0	85.0	510.0	NA	1.3
-5	17	CH	95	1129.0	312.0	817.0	0.6	449.4	761.4	72.0	0.0	85.0	595.0	NA	1.3
-6	18	CH	95	1224.0	374.4	849.6	0.6	467.3	841.7	72.0	0.0	85.0	680.0	NA	1.2
-7	19	CH	95	1319.0	436.8	882.2	0.6	485.2	922.0	72.0	0.0	85.0	765.0	NA	1.2
-8	20	CH	95	1414.0	499.2	914.8	0.6	503.1	1002.3	72.0	0.0	85.0	850.0	NA	1.2
-9	21	CH	95	1509.0	561.6	947.4	0.6	521.1	1082.7	72.0	0.0	85.0	935.0	NA	1.2
-10	22	CH	95	1604.0	624.0	980.0	0.6	539.0	1163.0	72.0	0.0	85.0	1020.0	NA	1.1
-11	23	CH	95	1699.0	686.4	1012.6	0.6	556.9	1243.3	72.0	0.0	85.0	1105.0	NA	1.1
-12	24	CH	95	1794.0	748.8	1045.2	0.6	574.9	1323.7	72.0	0.0	85.0	1190.0	NA	1.1
-13	25	CL	125	1889.0	811.2	1077.8	0.6	592.8	1404.0	72.0	0.0	85.0	1275.0	NA	1.1
-14	26	CL	125	2014.0	873.6	1140.4	0.6	627.2	1500.8	72.0	0.0	85.0	1360.0	NA	1.1
-15	27	CL	125	2139.0	936.0	1203.0	0.6	661.7	1597.7	72.0	0.0	85.0	1445.0	NA	1.1
-16	28	CL	125	2264.0	998.4	1265.6	0.6	696.1	1694.5	72.0	0.0	85.0	1530.0	NA	1.1
-17	29	CL	125	2389.0	1060.8	1328.2	0.6	730.5	1791.3	72.0	0.0	85.0	1615.0	NA	1.1
-18	30	CL	125	2514.0	1123.2	1390.8	0.6	764.9	1888.1	72.0	0.0	85.0	1700.0	NA	1.1
-19	31	CL	125	2639.0	1185.6	1453.4	0.6	799.4	1985.0	72.0	0.0	85.0	1785.0	NA	1.1
-20	32	CL	125	2764.0	1248.0	1516.0	0.6	833.8	2081.8	72.0	0.0	85.0	1870.0	NA	1.1
-21	33	CL	125	2889.0	1310.4	1578.6	0.6	868.2	2178.6	72.0	0.0	85.0	1955.0	NA	1.1
-22	34	CL	125	3014.0	1372.8	1641.2	0.6	902.7	2275.5	72.0	0.0	85.0	2040.0	NA	1.1
-23	35	CL	125	3139.0	1435.2	1703.8	0.6	937.1	2372.3	72.0	0.0	85.0	2125.0	NA	1.1
-24	36	CL	125	3264.0	1497.6	1766.4	0.6	971.5	2469.1	72.0	0.0	85.0	2210.0	NA	1.1
-25	37	CL	125	3389.0	1560.0	1829.0	0.6	1006.0	2566.0	72.0	0.0	85.0	2295.0	NA	1.1
-26	38	CL	125	3514.0	1622.4	1891.6	0.6	1040.4	2662.8	72.0	0.0	85.0	2380.0	NA	1.1
-27	39	CL	125	3639.0	1684.8	1954.2	0.6	1074.8	2759.6	72.0	0.0	85.0	2465.0	NA	1.1
-28	40	CL	125	3764.0	1747.2	2016.8	0.6	1109.2	2856.4	72.0	0.0	85.0	2550.0	NA	1.1
-29	41	CL	125	3889.0	1809.6	2079.4	0.6	1143.7	2953.3	72.0	0.0	85.0	2635.0	NA	1.1
-30	42	SP	120	4014.0	1872.0	2142.0	0.6	1178.1	3050.1	72.0	0.0	85.0	2720.0	NA	1.1
-31	43	SP	120	4134.0	1934.4	2199.6	0.6	1209.8	3144.2	72.0	0.0	85.0	2805.0	NA	1.1
-32	44	SP	120	4254.0	1996.8	2257.2	0.6	1241.5	3238.3	72.0	0.0	85.0	2890.0	NA	1.1
-33	45	SP	120	4374.0	2059.2	2314.8	0.6	1273.1	3332.3	72.0	0.0	85.0	2975.0	NA	1.1
-34	46	CL	125	4494.0	2121.6	2372.4	0.6	1304.8	3426.4	72.0	0.0	85.0	3060.0	NA	1.1
-35	47	CL	125	4619.0	2184.0	2435.0	0.6	1339.3	3523.3	72.0	0.0	85.0	3145.0	NA	1.1
-36	48	CL	125	4744.0	2246.4	2497.6	0.6	1373.7	3620.1	72.0	0.0	85.0	3230.0	NA	1.1
-37	49	CL	125	4869.0	2308.8	2560.2	0.6	1408.1	3716.9	72.0	0.0	85.0	3315.0	NA	1.1
-38	50	CL	125	4994.0	2371.2	2622.8	0.6	1442.5	3813.7	72.0	0.0	85.0	3400.0	NA	1.1
-39	51	CL	125	5119.0	2433.6	2685.4	0.6	1477.0	3910.6	72.0	0.0	85.0	3485.0	NA	1.1
-40	52	CL	125	5244.0	2496.0	2748.0	0.6	1511.4	4007.4	72.0	0.0	85.0	3570.0	NA	1.1
-41	53	CH	105	5369.0	2558.4	2810.6	0.6	1545.8	4104.2	72.0	0.0	85.0	3655.0	NA	1.1

Table1a - Grant Line; HSA through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-42	54	CH	105	5474.0	2620.8	2853.2	0.6	1569.3	4190.1	72.0	0.0	85.0	3740.0	NA	1.1
-43	55	CH	105	5579.0	2683.2	2895.8	0.6	1592.7	4275.9	72.0	0.0	85.0	3825.0	NA	1.1
-44	56	CH	105	5684.0	2745.6	2938.4	0.6	1616.1	4361.7	72.0	0.0	85.0	3910.0	NA	1.1
-45	57	CH	105	5789.0	2808.0	2981.0	0.6	1639.6	4447.6	72.0	0.0	85.0	3995.0	NA	1.1
-46	58	CH	105	5894.0	2870.4	3023.6	0.6	1663.0	4533.4	72.0	0.0	85.0	4080.0	NA	1.1
-47	59	CH	105	5999.0	2932.8	3066.2	0.6	1686.4	4619.2	72.0	0.0	85.0	4165.0	NA	1.1
-48	60	CH	105	6104.0	2995.2	3108.8	0.6	1709.8	4705.0	72.0	0.0	85.0	4250.0	NA	1.1
-49	61	CH	105	6209.0	3057.6	3151.4	0.6	1733.3	4790.9	72.0	0.0	85.0	4335.0	NA	1.1
-50	62	CH	105	6314.0	3120.0	3194.0	0.6	1756.7	4876.7	72.0	0.0	85.0	4420.0	NA	1.1
-51	63	CH	105	6419.0	3182.4	3236.6	0.6	1780.1	4962.5	72.0	0.0	85.0	4505.0	NA	1.1
-52	64	ML	115	6524.0	3244.8	3279.2	0.6	1803.6	5048.4	72.0	0.0	85.0	4590.0	NA	1.1
-53	65	CH	105	6639.0	3307.2	3331.8	0.6	1832.5	5139.7	72.0	0.0	85.0	4675.0	NA	1.1
-54	66	CH	105	6744.0	3369.6	3374.4	0.6	1855.9	5225.5	72.0	0.0	85.0	4760.0	NA	1.1
-55	67	CH	105	6849.0	3432.0	3417.0	0.6	1879.4	5311.4	72.0	0.0	85.0	4845.0	NA	1.1
-56	68	CH	105	6954.0	3494.4	3459.6	0.6	1902.8	5397.2	72.0	0.0	85.0	4930.0	NA	1.1
-57	69	CH	105	7059.0	3556.8	3502.2	0.6	1926.2	5483.0	72.0	0.0	85.0	5015.0	NA	1.1
-58	70	CH	105	7164.0	3619.2	3544.8	0.6	1949.6	5568.8	72.0	0.0	85.0	5100.0	NA	1.1
-59	71	CH	105	7269.0	3681.6	3587.4	0.6	1973.1	5654.7	72.0	0.0	85.0	5185.0	NA	1.1
-60	72	CH	105	7374.0	3744.0	3630.0	0.6	1996.5	5740.5	72.0	0.0	85.0	5270.0	NA	1.1
-61	73	CH	105	7479.0	3806.4	3672.6	0.6	2019.9	5826.3	72.0	0.0	85.0	5355.0	NA	1.1
-62	74	CH	105	7584.0	3868.8	3715.2	0.6	2043.4	5912.2	72.0	0.0	85.0	5440.0	NA	1.1
-63	75	CH	105	7689.0	3931.2	3757.8	0.6	2066.8	5998.0	72.0	0.0	85.0	5525.0	NA	1.1
-64	76	CH	105	7794.0	3993.6	3800.4	0.6	2090.2	6083.8	72.0	0.0	85.0	5610.0	NA	1.1
-65	77	CH	105	7899.0	4056.0	3843.0	0.6	2113.7	6169.7	72.0	0.0	85.0	5695.0	NA	1.1
-66	78	CH	105	8004.0	4118.4	3885.6	0.6	2137.1	6255.5	72.0	0.0	85.0	5780.0	NA	1.1
-67	79	CH	105	8109.0	4180.8	3928.2	0.6	2160.5	6341.3	72.0	0.0	85.0	5865.0	NA	1.1
-68	80	CH	105	8214.0	4243.2	3970.8	0.6	2183.9	6427.1	72.0	0.0	85.0	5950.0	NA	1.1
-69	81	CH	105	8319.0	4305.6	4013.4	0.6	2207.4	6513.0	72.0	0.0	85.0	6035.0	NA	1.1
-70	82	CH	105	8424.0	4368.0	4056.0	0.6	2230.8	6598.8	72.0	0.0	85.0	6120.0	NA	1.1
-71	83	CH	105	8529.0	4430.4	4098.6	0.6	2254.2	6684.6	72.0	0.0	85.0	6205.0	NA	1.1
-72	84	CH	105	8634.0	4492.8	4141.2	0.6	2277.7	6770.5	72.0	0.0	85.0	6290.0	NA	1.1
-73	85	CH	105	8739.0	4555.2	4183.8	0.6	2301.1	6856.3	72.0	0.0	85.0	6375.0	NA	1.1
-74	86	CH	105	8844.0	4617.6	4226.4	0.6	2324.5	6942.1	72.0	0.0	85.0	6460.0	NA	1.1
-75	87	SM	105	8949.0	4680.0	4269.0	0.6	2348.0	7028.0	72.0	0.0	85.0	6545.0	NA	1.1
-76	88	SM	105	9054.0	4742.4	4311.6	0.6	2371.4	7113.8	72.0	0.0	85.0	6630.0	NA	1.1
-77	89	SM	105	9159.0	4804.8	4354.2	0.6	2394.8	7199.6	72.0	0.0	85.0	6715.0	NA	1.1
-78	90	SM	105	9264.0	4867.2	4396.8	0.6	2418.2	7285.4	72.0	0.0	85.0	6800.0	NA	1.1
-79	91	SM	105	9369.0	4929.6	4439.4	0.6	2441.7	7371.3	72.0	0.0	85.0	6885.0	NA	1.1
-80	92	SM	105	9474.0	4992.0	4482.0	0.6	2465.1	7457.1	72.0	0.0	85.0	6970.0	NA	1.1
-81	93	SM	105	9579.0	5054.4	4524.6	0.6	2488.5	7542.9	72.0	0.0	85.0	7055.0	NA	1.1
-82	94	SM	105	9684.0	5116.8	4567.2	0.6	2512.0	7628.8	72.0	0.0	85.0	7140.0	NA	1.1
-83	95	SM	105	9789.0	5179.2	4609.8	0.6	2535.4	7714.6	72.0	0.0	85.0	7225.0	NA	1.1
-84	96	SM	105	9894.0	5241.6	4652.4	0.6	2558.8	7800.4	72.0	0.0	85.0	7310.0	NA	1.1
-85	97	SM	105	9999.0	5304.0	4695.0	0.6	2582.3	7886.3	72.0	0.0	85.0	7395.0	NA	1.1
-86	98	SM	105	10104.0	5366.4	4737.6	0.6	2605.7	7972.1	72.0	0.0	85.0	7480.0	NA	1.1
-87	99	SM	105	10209.0	5428.8	4780.2	0.6	2629.1	8057.9	72.0	0.0	85.0	7565.0	NA	1.1
-88	100	CH	105	10314.0	5491.2	4822.8	0.6	2652.5	8143.7	72.0	0.0	85.0	7650.0	NA	1.1
-89	101	CH	105	10419.0	5553.6	4865.4	0.6	2676.0	8229.6	72.0	0.0	85.0	7735.0	NA	1.1
-90	102	CH	105	10524.0	5616.0	4908.0	0.6	2699.4	8315.4	72.0	0.0	85.0	7820.0	NA	1.1
-91	103	CH	105	10629.0	5678.4	4950.6	0.6	2722.8	8401.2	72.0	0.0	85.0	7905.0	NA	1.1
-92	104	CH	105	10734.0	5740.8	4993.2	0.6	2746.3	8487.1	72.0	0.0	85.0	7990.0	NA	1.1
-93	105	CH	105	10839.0	5803.2	5035.8	0.6	2769.7	8572.9	72.0	0.0	85.0	8075.0	NA	1.1
-94	106	CH	105	10944.0	5865.6	5078.4	0.6	2793.1	8658.7	72.0	0.0	85.0	8160.0	NA	1.1
-95	107	ML	115	11049.0	5928.0	5121.0	0.6	2816.6	8744.6	72.0	0.0	85.0	8245.0	NA	1.1

Table1a - Grant Line; HSA through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-96	108	ML	115	11164.0	5990.4	5173.6	0.6	2845.5	8835.9	72.0	0.0	85.0	8330.0	NA	1.1
-97	109	ML	115	11279.0	6052.8	5226.2	0.6	2874.4	8927.2	72.0	0.0	85.0	8415.0	NA	1.1
-98	110	SM	125	11394.0	6115.2	5278.8	0.6	2903.3	9018.5	72.0	0.0	85.0	8500.0	NA	1.1
-99	111	SM	125	11519.0	6177.6	5341.4	0.6	2937.8	9115.4	72.0	0.0	85.0	8585.0	NA	1.1
-100	112	SM	125	11644.0	6240.0	5404.0	0.6	2972.2	9212.2	72.0	0.0	85.0	8670.0	NA	1.1
-101	113	SM	125	11769.0	6302.4	5466.6	0.6	3006.6	9309.0	72.0	0.0	85.0	8755.0	NA	1.1
-102	114	SM	125	11894.0	6364.8	5529.2	0.6	3041.1	9405.9	72.0	0.0	85.0	8840.0	NA	1.1
-103	115	SM	125	12019.0	6427.2	5591.8	0.6	3075.5	9502.7	72.0	0.0	85.0	8925.0	NA	1.1
-104	116	SM	125	12144.0	6489.6	5654.4	0.6	3109.9	9599.5	72.0	0.0	85.0	9010.0	NA	1.1
-105	117	SM	125	12269.0	6552.0	5717.0	0.6	3144.4	9696.4	72.0	0.0	85.0	9095.0	NA	1.1
-106	118	SM	125	12394.0	6614.4	5779.6	0.6	3178.8	9793.2	72.0	0.0	85.0	9180.0	NA	1.1
-107	119	SM	125	12519.0	6676.8	5842.2	0.6	3213.2	9890.0	72.0	0.0	85.0	9265.0	NA	1.1
-108	120	SP	120	12644.0	6739.2	5904.8	0.6	3247.6	9986.8	72.0	0.0	85.0	9350.0	NA	1.1
-109	121	SP	120	12764.0	6801.6	5962.4	0.6	3279.3	10080.9	72.0	0.0	85.0	9435.0	NA	1.1
-110	122	SP	120	12884.0	6864.0	6020.0	0.6	3311.0	10175.0	72.0	0.0	85.0	9520.0	NA	1.1
-111	123	SP	120	13004.0	6926.4	6077.6	0.6	3342.7	10269.1	72.0	0.0	85.0	9605.0	NA	1.1
-112	124	SP	120	13124.0	6988.8	6135.2	0.6	3374.4	10363.2	72.0	0.0	85.0	9690.0	NA	1.1
-113	125	SP	120	13244.0	7051.2	6192.8	0.6	3406.0	10457.2	72.0	0.0	85.0	9775.0	NA	1.1
-114	126	SP	120	13364.0	7113.6	6250.4	0.6	3437.7	10551.3	72.0	0.0	85.0	9860.0	NA	1.1
-115	127	SP	120	13484.0	7176.0	6308.0	0.6	3469.4	10645.4	72.0	0.0	85.0	9945.0	NA	1.1
-116	128	SP	120	13604.0	7238.4	6365.6	0.6	3501.1	10739.5	72.0	0.0	85.0	10030.0	NA	1.1
-117	129	SP	120	13724.0	7300.8	6423.2	0.6	3532.8	10833.6	72.0	0.0	85.0	10115.0	NA	1.1
-118	130	SP	120	13724.0	7363.2	6360.8	0.6	3498.4	10861.6	72.0	0.0	85.0	10200.0	NA	1.1

Table1b - Old River; HSA through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
15	0	CL	120	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
14	1	CL	120	72.0	0.0	72.0	0.6	39.6	39.6	72.0	0.0	85.0	0.0	NA	NA
13	2	CL	120	144.0	0.0	144.0	0.6	79.2	79.2	72.0	0.0	85.0	0.0	NA	NA
12	3	CL	120	216.0	0.0	216.0	0.6	118.8	118.8	72.0	0.0	85.0	0.0	NA	NA
11	4	CL	120	288.0	0.0	288.0	0.6	158.4	158.4	72.0	0.0	85.0	0.0	NA	NA
10	5	CL	120	360.0	0.0	360.0	0.6	198.0	198.0	72.0	0.0	85.0	0.0	NA	NA
9	6	CL	120	432.0	0.0	432.0	0.6	237.6	237.6	72.0	0.0	85.0	0.0	NA	NA
8	7	CL	120	504.0	0.0	504.0	0.6	277.2	277.2	72.0	0.0	85.0	0.0	NA	NA
7	8	CL	120	576.0	0.0	576.0	0.6	316.8	316.8	72.0	0.0	85.0	0.0	NA	NA
6	9	CL	120	648.0	0.0	648.0	0.6	356.4	356.4	72.0	0.0	85.0	0.0	NA	NA
5	10	CL	120	720.0	0.0	720.0	0.6	396.0	396.0	72.0	0.0	85.0	0.0	NA	NA
4	11	CL	120	792.0	0.0	792.0	0.6	435.6	435.6	72.0	0.0	85.0	85.0	NA	5.1
3	12	CH	100	864.0	0.0	864.0	0.6	475.2	475.2	72.0	0.0	85.0	170.0	NA	2.8
2	13	CH	100	924.0	0.0	924.0	0.6	508.2	508.2	72.0	0.0	85.0	255.0	NA	2.0
1	14	CH	100	984.0	0.0	984.0	0.6	541.2	541.2	72.0	0.0	85.0	340.0	NA	1.6
0	15	CH	105	1044.0	0.0	1044.0	0.6	574.2	574.2	72.0	0.0	85.0	425.0	NA	1.4
-1	16	CH	105	1149.0	62.4	1086.6	0.6	597.6	660.0	72.0	0.0	85.0	510.0	NA	1.3
-2	17	CH	105	1254.0	124.8	1129.2	0.6	621.1	745.9	72.0	0.0	85.0	595.0	NA	1.3
-3	18	CH	105	1359.0	187.2	1171.8	0.6	644.5	831.7	72.0	0.0	85.0	680.0	NA	1.2
-4	19	CH	105	1464.0	249.6	1214.4	0.6	667.9	917.5	72.0	0.0	85.0	765.0	NA	1.2
-5	20	CH	105	1569.0	312.0	1257.0	0.6	691.4	1003.4	72.0	0.0	85.0	850.0	NA	1.2
-6	21	CH	105	1674.0	374.4	1299.6	0.6	714.8	1089.2	72.0	0.0	85.0	935.0	NA	1.2
-7	22	CH	105	1779.0	436.8	1342.2	0.6	738.2	1175.0	72.0	0.0	85.0	1020.0	NA	1.2
-8	23	SP	105	1884.0	499.2	1384.8	0.6	761.6	1260.8	72.0	0.0	85.0	1105.0	NA	1.1
-9	24	SP	105	1989.0	561.6	1427.4	0.6	785.1	1346.7	72.0	0.0	85.0	1190.0	NA	1.1
-10	25	SP	105	2094.0	624.0	1470.0	0.6	808.5	1432.5	72.0	0.0	85.0	1275.0	NA	1.1
-11	26	SP	105	2199.0	686.4	1512.6	0.6	831.9	1518.3	72.0	0.0	85.0	1360.0	NA	1.1
-12	27	SP	105	2304.0	748.8	1555.2	0.6	855.4	1604.2	72.0	0.0	85.0	1445.0	NA	1.1
-13	28	CH	105	2409.0	811.2	1597.8	0.6	878.8	1690.0	72.0	0.0	85.0	1530.0	NA	1.1
-14	29	CH	105	2514.0	873.6	1640.4	0.6	902.2	1775.8	72.0	0.0	85.0	1615.0	NA	1.1
-15	30	CH	105	2619.0	936.0	1683.0	0.6	925.7	1861.7	72.0	0.0	85.0	1700.0	NA	1.1
-16	31	CH	105	2724.0	998.4	1725.6	0.6	949.1	1947.5	72.0	0.0	85.0	1785.0	NA	1.1
-17	32	CH	105	2829.0	1060.8	1768.2	0.6	972.5	2033.3	72.0	0.0	85.0	1870.0	NA	1.1
-18	33	CH	105	2934.0	1123.2	1810.8	0.6	995.9	2119.1	72.0	0.0	85.0	1955.0	NA	1.1
-19	34	CH	105	3039.0	1185.6	1853.4	0.6	1019.4	2205.0	72.0	0.0	85.0	2040.0	NA	1.1
-20	35	CH	105	3144.0	1248.0	1896.0	0.6	1042.8	2290.8	72.0	0.0	85.0	2125.0	NA	1.1
-21	36	CH	105	3249.0	1310.4	1938.6	0.6	1066.2	2376.6	72.0	0.0	85.0	2210.0	NA	1.1
-22	37	CH	105	3354.0	1372.8	1981.2	0.6	1089.7	2462.5	72.0	0.0	85.0	2295.0	NA	1.1
-23	38	CH	105	3459.0	1435.2	2023.8	0.6	1113.1	2548.3	72.0	0.0	85.0	2380.0	NA	1.1
-24	39	SM	125	3564.0	1497.6	2066.4	0.6	1136.5	2634.1	72.0	0.0	85.0	2465.0	NA	1.1
-25	40	SM	125	3689.0	1560.0	2129.0	0.6	1171.0	2731.0	72.0	0.0	85.0	2550.0	NA	1.1
-26	41	SM	125	3814.0	1622.4	2191.6	0.6	1205.4	2827.8	72.0	0.0	85.0	2635.0	NA	1.1
-27	42	SM	125	3939.0	1684.8	2254.2	0.6	1239.8	2924.6	72.0	0.0	85.0	2720.0	NA	1.1
-28	43	SM	125	4064.0	1747.2	2316.8	0.6	1274.2	3021.4	72.0	0.0	85.0	2805.0	NA	1.1
-29	44	SM	125	4189.0	1809.6	2379.4	0.6	1308.7	3118.3	72.0	0.0	85.0	2890.0	NA	1.1
-30	45	SM	125	4314.0	1872.0	2442.0	0.6	1343.1	3215.1	72.0	0.0	85.0	2975.0	NA	1.1
-31	46	ML	115	4439.0	1934.4	2504.6	0.6	1377.5	3311.9	72.0	0.0	85.0	3060.0	NA	1.1
-32	47	CH	105	4554.0	1996.8	2557.2	0.6	1406.5	3403.3	72.0	0.0	85.0	3145.0	NA	1.1
-33	48	CH	105	4659.0	2059.2	2599.8	0.6	1429.9	3489.1	72.0	0.0	85.0	3230.0	NA	1.1
-34	49	CH	105	4764.0	2121.6	2642.4	0.6	1453.3	3574.9	72.0	0.0	85.0	3315.0	NA	1.1
-35	50	CH	105	4869.0	2184.0	2685.0	0.6	1476.8	3660.8	72.0	0.0	85.0	3400.0	NA	1.1
-36	51	CH	105	4974.0	2246.4	2727.6	0.6	1500.2	3746.6	72.0	0.0	85.0	3485.0	NA	1.1
-37	52	CH	105	5079.0	2308.8	2770.2	0.6	1523.6	3832.4	72.0	0.0	85.0	3570.0	NA	1.1
-38	53	CH	105	5184.0	2371.2	2812.8	0.6	1547.0	3918.2	72.0	0.0	85.0	3655.0	NA	1.1

Table1b - Old River; HSA through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-39	54	CH	105	5289.0	2433.6	2855.4	0.6	1570.5	4004.1	72.0	0.0	85.0	3740.0	NA	1.1
-40	55	CH	105	5394.0	2496.0	2898.0	0.6	1593.9	4089.9	72.0	0.0	85.0	3825.0	NA	1.1
-41	56	CH	105	5499.0	2558.4	2940.6	0.6	1617.3	4175.7	72.0	0.0	85.0	3910.0	NA	1.1
-42	57	CH	105	5604.0	2620.8	2983.2	0.6	1640.8	4261.6	72.0	0.0	85.0	3995.0	NA	1.1
-43	58	SM	125	5709.0	2683.2	3025.8	0.6	1664.2	4347.4	72.0	0.0	85.0	4080.0	NA	1.1
-44	59	SM	125	5834.0	2745.6	3088.4	0.6	1698.6	4444.2	72.0	0.0	85.0	4165.0	NA	1.1
-45	60	SM	125	5959.0	2808.0	3151.0	0.6	1733.1	4541.1	72.0	0.0	85.0	4250.0	NA	1.1
-46	61	SM	125	6084.0	2870.4	3213.6	0.6	1767.5	4637.9	72.0	0.0	85.0	4335.0	NA	1.1
-47	62	SM	125	6209.0	2932.8	3276.2	0.6	1801.9	4734.7	72.0	0.0	85.0	4420.0	NA	1.1
-48	63	SC	125	6334.0	2995.2	3338.8	0.6	1836.3	4831.5	72.0	0.0	85.0	4505.0	NA	1.1
-49	64	SC	125	6459.0	3057.6	3401.4	0.6	1870.8	4928.4	72.0	0.0	85.0	4590.0	NA	1.1
-50	65	CH	105	6584.0	3120.0	3464.0	0.6	1905.2	5025.2	72.0	0.0	85.0	4675.0	NA	1.1
-51	66	CH	105	6689.0	3182.4	3506.6	0.6	1928.6	5111.0	72.0	0.0	85.0	4760.0	NA	1.1
-52	67	CH	105	6794.0	3244.8	3549.2	0.6	1952.1	5196.9	72.0	0.0	85.0	4845.0	NA	1.1
-53	68	CH	105	6899.0	3307.2	3591.8	0.6	1975.5	5282.7	72.0	0.0	85.0	4930.0	NA	1.1
-54	69	CH	105	7004.0	3369.6	3634.4	0.6	1998.9	5368.5	72.0	0.0	85.0	5015.0	NA	1.1
-55	70	CH	105	7109.0	3432.0	3677.0	0.6	2022.4	5454.4	72.0	0.0	85.0	5100.0	NA	1.1
-56	71	CH	105	7214.0	3494.4	3719.6	0.6	2045.8	5540.2	72.0	0.0	85.0	5185.0	NA	1.1
-57	72	CH	105	7319.0	3556.8	3762.2	0.6	2069.2	5626.0	72.0	0.0	85.0	5270.0	NA	1.1
-58	73	CH	105	7424.0	3619.2	3804.8	0.6	2092.6	5711.8	72.0	0.0	85.0	5355.0	NA	1.1
-59	74	CH	105	7529.0	3681.6	3847.4	0.6	2116.1	5797.7	72.0	0.0	85.0	5440.0	NA	1.1
-60	75	CH	105	7634.0	3744.0	3890.0	0.6	2139.5	5883.5	72.0	0.0	85.0	5525.0	NA	1.1
-61	76	CH	105	7739.0	3806.4	3932.6	0.6	2162.9	5969.3	72.0	0.0	85.0	5610.0	NA	1.1
-62	77	CH	105	7844.0	3868.8	3975.2	0.6	2186.4	6055.2	72.0	0.0	85.0	5695.0	NA	1.1
-63	78	ML	115	7949.0	3931.2	4017.8	0.6	2209.8	6141.0	72.0	0.0	85.0	5780.0	NA	1.1
-64	79	ML	115	8064.0	3993.6	4070.4	0.6	2238.7	6232.3	72.0	0.0	85.0	5865.0	NA	1.1
-65	80	ML	115	8179.0	4056.0	4123.0	0.6	2267.7	6323.7	72.0	0.0	85.0	5950.0	NA	1.1
-66	81	ML	115	8294.0	4118.4	4175.6	0.6	2296.6	6415.0	72.0	0.0	85.0	6035.0	NA	1.1
-67	82	ML	115	8409.0	4180.8	4228.2	0.6	2325.5	6506.3	72.0	0.0	85.0	6120.0	NA	1.1
-68	83	ML	115	8524.0	4243.2	4280.8	0.6	2354.4	6597.6	72.0	0.0	85.0	6205.0	NA	1.1
-69	84	ML	115	8639.0	4305.6	4333.4	0.6	2383.4	6689.0	72.0	0.0	85.0	6290.0	NA	1.1
-70	85	ML	115	8754.0	4368.0	4386.0	0.6	2412.3	6780.3	72.0	0.0	85.0	6375.0	NA	1.1
-71	86	SM	125	8869.0	4430.4	4438.6	0.6	2441.2	6871.6	72.0	0.0	85.0	6460.0	NA	1.1
-72	87	SM	125	8994.0	4492.8	4501.2	0.6	2475.7	6968.5	72.0	0.0	85.0	6545.0	NA	1.1
-73	88	SM	125	9119.0	4555.2	4563.8	0.6	2510.1	7065.3	72.0	0.0	85.0	6630.0	NA	1.1
-74	89	SM	125	9244.0	4617.6	4626.4	0.6	2544.5	7162.1	72.0	0.0	85.0	6715.0	NA	1.1
-75	90	SM	125	9369.0	4680.0	4689.0	0.6	2579.0	7259.0	72.0	0.0	85.0	6800.0	NA	1.1
-76	91	SP	120	9494.0	4742.4	4751.6	0.6	2613.4	7355.8	72.0	0.0	85.0	6885.0	NA	1.1
-77	92	SP	120	9614.0	4804.8	4809.2	0.6	2645.1	7449.9	72.0	0.0	85.0	6970.0	NA	1.1
-78	93	SP	120	9734.0	4867.2	4866.8	0.6	2676.7	7543.9	72.0	0.0	85.0	7055.0	NA	1.1
-79	94	SP	120	9854.0	4929.6	4924.4	0.6	2708.4	7638.0	72.0	0.0	85.0	7140.0	NA	1.1
-80	95	SP	120	9974.0	4992.0	4982.0	0.6	2740.1	7732.1	72.0	0.0	85.0	7225.0	NA	1.1
-81	96	SP	120	10094.0	5054.4	5039.6	0.6	2771.8	7826.2	72.0	0.0	85.0	7310.0	NA	1.1
-82	97	SP	120	10214.0	5116.8	5097.2	0.6	2803.5	7920.3	72.0	0.0	85.0	7395.0	NA	1.1
-83	98	SP	120	10334.0	5179.2	5154.8	0.6	2835.1	8014.3	72.0	0.0	85.0	7480.0	NA	1.1
-84	99	SP	120	10454.0	5241.6	5212.4	0.6	2866.8	8108.4	72.0	0.0	85.0	7565.0	NA	1.1
-85	100	SP	120	10574.0	5304.0	5270.0	0.6	2898.5	8202.5	72.0	0.0	85.0	7650.0	NA	1.1
-86	101	SP	120	10694.0	5366.4	5327.6	0.6	2930.2	8296.6	72.0	0.0	85.0	7735.0	NA	1.1
-87	102	SP	120	10814.0	5428.8	5385.2	0.6	2961.9	8390.7	72.0	0.0	85.0	7820.0	NA	1.1
-88	103	SP	120	10934.0	5491.2	5442.8	0.6	2993.5	8484.7	72.0	0.0	85.0	7905.0	NA	1.1
-89	104	SP	120	11054.0	5553.6	5500.4	0.6	3025.2	8578.8	72.0	0.0	85.0	7990.0	NA	1.1
-90	105	SP	120	11174.0	5616.0	5558.0	0.6	3056.9	8672.9	72.0	0.0	85.0	8075.0	NA	1.1
-91	106	SP	120	11294.0	5678.4	5615.6	0.6	3088.6	8767.0	72.0	0.0	85.0	8160.0	NA	1.1
-92	107	SP	120	11414.0	5740.8	5673.2	0.6	3120.3	8861.1	72.0	0.0	85.0	8245.0	NA	1.1

Table1b - Old River; HSA through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-93	108	SP	120	11534.0	5803.2	5730.8	0.6	3151.9	8955.1	72.0	0.0	85.0	8330.0	NA	1.1
-94	109	SP	120	11654.0	5865.6	5788.4	0.6	3183.6	9049.2	72.0	0.0	85.0	8415.0	NA	1.1
-95	110	SP	120	11774.0	5928.0	5846.0	0.6	3215.3	9143.3	72.0	0.0	85.0	8500.0	NA	1.1
-96	111	SP	120	11894.0	5990.4	5903.6	0.6	3247.0	9237.4	72.0	0.0	85.0	8585.0	NA	1.1
-97	112	SP	120	12014.0	6052.8	5961.2	0.6	3278.7	9331.5	72.0	0.0	85.0	8670.0	NA	1.1
-98	113	SP	120	12134.0	6115.2	6018.8	0.6	3310.3	9425.5	72.0	0.0	85.0	8755.0	NA	1.1
-99	114	SP	120	12254.0	6177.6	6076.4	0.6	3342.0	9519.6	72.0	0.0	85.0	8840.0	NA	1.1
-100	115	SP	120	12374.0	6240.0	6134.0	0.6	3373.7	9613.7	72.0	0.0	85.0	8925.0	NA	1.1
-101	116	SP	120	12494.0	6302.4	6191.6	0.6	3405.4	9707.8	72.0	0.0	85.0	9010.0	NA	1.1
-102	117	SP	120	12614.0	6364.8	6249.2	0.6	3437.1	9801.9	72.0	0.0	85.0	9095.0	NA	1.1
-103	118	SP	120	12734.0	6427.2	6306.8	0.6	3468.7	9895.9	72.0	0.0	85.0	9180.0	NA	1.1
-104	119	SP	120	12854.0	6489.6	6364.4	0.6	3500.4	9990.0	72.0	0.0	85.0	9265.0	NA	1.1
-105	120	SP	120	12974.0	6552.0	6422.0	0.6	3532.1	10084.1	72.0	0.0	85.0	9350.0	NA	1.1
-106	121	SP	120	13094.0	6614.4	6479.6	0.6	3563.8	10178.2	72.0	0.0	85.0	9435.0	NA	1.1
-107	122	SP	120	13214.0	6676.8	6537.2	0.6	3595.5	10272.3	72.0	0.0	85.0	9520.0	NA	1.1
-108	123	SP	120	13334.0	6739.2	6594.8	0.6	3627.1	10366.3	72.0	0.0	85.0	9605.0	NA	1.1
-109	124	SP	120	13454.0	6801.6	6652.4	0.6	3658.8	10460.4	72.0	0.0	85.0	9690.0	NA	1.1
-110	125	SP	120	13574.0	6864.0	6710.0	0.6	3690.5	10554.5	72.0	0.0	85.0	9775.0	NA	1.1
-111	126	SP	120	13694.0	6926.4	6767.6	0.6	3722.2	10648.6	72.0	0.0	85.0	9860.0	NA	1.1
-112	127	SP	120	13814.0	6988.8	6825.2	0.6	3753.9	10742.7	72.0	0.0	85.0	9945.0	NA	1.1
-113	128	SP	120	13934.0	7051.2	6882.8	0.6	3785.5	10836.7	72.0	0.0	85.0	10030.0	NA	1.1
-114	129	SP	120	14054.0	7113.6	6940.4	0.6	3817.2	10930.8	72.0	0.0	85.0	10115.0	NA	1.1
-115	130	SP	120	14054.0	7176.0	6878.0	0.6	3782.9	10958.9	72.0	0.0	85.0	10200.0	NA	1.1

Table1c - Middle River; HSA through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
15	0	SP	95	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
14	1	SP	95	57.0	0.0	57.0	0.6	31.4	31.4	72.0	0.0	85.0	0.0	NA	NA
13	2	SP	95	114.0	0.0	114.0	0.6	62.7	62.7	72.0	0.0	85.0	0.0	NA	NA
12	3	SP	95	171.0	0.0	171.0	0.6	94.1	94.1	72.0	0.0	85.0	0.0	NA	NA
11	4	SP	95	228.0	0.0	228.0	0.6	125.4	125.4	72.0	0.0	85.0	0.0	NA	NA
10	5	SP	95	285.0	0.0	285.0	0.6	156.8	156.8	72.0	0.0	85.0	0.0	NA	NA
9	6	SP	95	342.0	0.0	342.0	0.6	188.1	188.1	72.0	0.0	85.0	0.0	NA	NA
8	7	SP	95	399.0	0.0	399.0	0.6	219.5	219.5	72.0	0.0	85.0	0.0	NA	NA
7	8	SP	95	456.0	0.0	456.0	0.6	250.8	250.8	72.0	0.0	85.0	0.0	NA	NA
6	9	SP	95	513.0	0.0	513.0	0.6	282.2	282.2	72.0	0.0	85.0	0.0	NA	NA
5	10	SP	95	570.0	0.0	570.0	0.6	313.5	313.5	72.0	0.0	85.0	0.0	NA	NA
4	11	SP	95	627.0	0.0	627.0	0.6	344.9	344.9	72.0	0.0	85.0	85.0	NA	4.1
3	12	SP	105	684.0	0.0	684.0	0.6	376.2	376.2	72.0	0.0	85.0	170.0	NA	2.2
2	13	SM	105	747.0	62.4	684.6	0.6	376.5	438.9	72.0	0.0	85.0	255.0	NA	1.7
1	14	SM	105	810.0	124.8	685.2	0.6	376.9	501.7	72.0	0.0	85.0	340.0	NA	1.5
0	15	SP	105	873.0	187.2	685.8	0.6	377.2	564.4	72.0	0.0	85.0	425.0	NA	1.3
-1	16	SP	105	978.0	249.6	728.4	0.6	400.6	650.2	72.0	0.0	85.0	510.0	NA	1.3
-2	17	SP	105	1083.0	312.0	771.0	0.6	424.1	736.1	72.0	0.0	85.0	595.0	NA	1.2
-3	18	SP	105	1188.0	374.4	813.6	0.6	447.5	821.9	72.0	0.0	85.0	680.0	NA	1.2
-4	19	SP	105	1293.0	436.8	856.2	0.6	470.9	907.7	72.0	0.0	85.0	765.0	NA	1.2
-5	20	CH	95	1398.0	499.2	898.8	0.6	494.3	993.5	72.0	0.0	85.0	850.0	NA	1.2
-6	21	CH	95	1493.0	561.6	931.4	0.6	512.3	1073.9	72.0	0.0	85.0	935.0	NA	1.1
-7	22	CH	95	1588.0	624.0	964.0	0.6	530.2	1154.2	72.0	0.0	85.0	1020.0	NA	1.1
-8	23	CH	95	1683.0	686.4	996.6	0.6	548.1	1234.5	72.0	0.0	85.0	1105.0	NA	1.1
-9	24	CH	95	1778.0	748.8	1029.2	0.6	566.1	1314.9	72.0	0.0	85.0	1190.0	NA	1.1
-10	25	CH	95	1873.0	811.2	1061.8	0.6	584.0	1395.2	72.0	0.0	85.0	1275.0	NA	1.1
-11	26	CH	95	1968.0	873.6	1094.4	0.6	601.9	1475.5	72.0	0.0	85.0	1360.0	NA	1.1
-12	27	CH	95	2063.0	936.0	1127.0	0.6	619.9	1555.9	72.0	0.0	85.0	1445.0	NA	1.1
-13	28	CH	95	2158.0	998.4	1159.6	0.6	637.8	1636.2	72.0	0.0	85.0	1530.0	NA	1.1
-14	29	CH	105	2253.0	1060.8	1192.2	0.6	655.7	1716.5	72.0	0.0	85.0	1615.0	NA	1.1
-15	30	CH	105	2358.0	1123.2	1234.8	0.6	679.1	1802.3	72.0	0.0	85.0	1700.0	NA	1.1
-16	31	CH	105	2463.0	1185.6	1277.4	0.6	702.6	1888.2	72.0	0.0	85.0	1785.0	NA	1.1
-17	32	SM	125	2568.0	1248.0	1320.0	0.6	726.0	1974.0	72.0	0.0	85.0	1870.0	NA	1.1
-18	33	SM	125	2693.0	1310.4	1382.6	0.6	760.4	2070.8	72.0	0.0	85.0	1955.0	NA	1.1
-19	34	SM	125	2818.0	1372.8	1445.2	0.6	794.9	2167.7	72.0	0.0	85.0	2040.0	NA	1.1
-20	35	SM	125	2943.0	1435.2	1507.8	0.6	829.3	2264.5	72.0	0.0	85.0	2125.0	NA	1.1
-21	36	SM	125	3068.0	1497.6	1570.4	0.6	863.7	2361.3	72.0	0.0	85.0	2210.0	NA	1.1
-22	37	SM	125	3193.0	1560.0	1633.0	0.6	898.2	2458.2	72.0	0.0	85.0	2295.0	NA	1.1
-23	38	SM	125	3318.0	1622.4	1695.6	0.6	932.6	2555.0	72.0	0.0	85.0	2380.0	NA	1.1
-24	39	SM	125	3443.0	1684.8	1758.2	0.6	967.0	2651.8	72.0	0.0	85.0	2465.0	NA	1.1
-25	40	SM	125	3568.0	1747.2	1820.8	0.6	1001.4	2748.6	72.0	0.0	85.0	2550.0	NA	1.1
-26	41	SM	125	3693.0	1809.6	1883.4	0.6	1035.9	2845.5	72.0	0.0	85.0	2635.0	NA	1.1
-27	42	SM	125	3818.0	1872.0	1946.0	0.6	1070.3	2942.3	72.0	0.0	85.0	2720.0	NA	1.1
-28	43	SM	125	3943.0	1934.4	2008.6	0.6	1104.7	3039.1	72.0	0.0	85.0	2805.0	NA	1.1
-29	44	SM	125	4068.0	1996.8	2071.2	0.6	1139.2	3136.0	72.0	0.0	85.0	2890.0	NA	1.1
-30	45	SM	125	4193.0	2059.2	2133.8	0.6	1173.6	3232.8	72.0	0.0	85.0	2975.0	NA	1.1
-31	46	SM	125	4318.0	2121.6	2196.4	0.6	1208.0	3329.6	72.0	0.0	85.0	3060.0	NA	1.1
-32	47	SM	125	4443.0	2184.0	2259.0	0.6	1242.5	3426.5	72.0	0.0	85.0	3145.0	NA	1.1
-33	48	SM	125	4568.0	2246.4	2321.6	0.6	1276.9	3523.3	72.0	0.0	85.0	3230.0	NA	1.1
-34	49	SM	125	4693.0	2308.8	2384.2	0.6	1311.3	3620.1	72.0	0.0	85.0	3315.0	NA	1.1
-35	50	CH	105	4818.0	2371.2	2446.8	0.6	1345.7	3716.9	72.0	0.0	85.0	3400.0	NA	1.1
-36	51	CH	105	4923.0	2433.6	2489.4	0.6	1369.2	3802.8	72.0	0.0	85.0	3485.0	NA	1.1
-37	52	CH	105	5028.0	2496.0	2532.0	0.6	1392.6	3888.6	72.0	0.0	85.0	3570.0	NA	1.1
-38	53	CH	105	5133.0	2558.4	2574.6	0.6	1416.0	3974.4	72.0	0.0	85.0	3655.0	NA	1.1

Table1c - Middle River; HSA through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-39	54	CH	105	5238.0	2620.8	2617.2	0.6	1439.5	4060.3	72.0	0.0	85.0	3740.0	NA	1.1
-40	55	CH	105	5343.0	2683.2	2659.8	0.6	1462.9	4146.1	72.0	0.0	85.0	3825.0	NA	1.1
-41	56	CH	105	5448.0	2745.6	2702.4	0.6	1486.3	4231.9	72.0	0.0	85.0	3910.0	NA	1.1
-42	57	CH	105	5553.0	2808.0	2745.0	0.6	1509.8	4317.8	72.0	0.0	85.0	3995.0	NA	1.1
-43	58	CH	105	5658.0	2870.4	2787.6	0.6	1533.2	4403.6	72.0	0.0	85.0	4080.0	NA	1.1
-44	59	CH	105	5763.0	2932.8	2830.2	0.6	1556.6	4489.4	72.0	0.0	85.0	4165.0	NA	1.1
-45	60	CH	105	5868.0	2995.2	2872.8	0.6	1580.0	4575.2	72.0	0.0	85.0	4250.0	NA	1.1
-46	61	CH	105	5973.0	3057.6	2915.4	0.6	1603.5	4661.1	72.0	0.0	85.0	4335.0	NA	1.1
-47	62	CH	105	6078.0	3120.0	2958.0	0.6	1626.9	4746.9	72.0	0.0	85.0	4420.0	NA	1.1
-48	63	CH	105	6183.0	3182.4	3000.6	0.6	1650.3	4832.7	72.0	0.0	85.0	4505.0	NA	1.1
-49	64	CH	105	6288.0	3244.8	3043.2	0.6	1673.8	4918.6	72.0	0.0	85.0	4590.0	NA	1.1
-50	65	CH	105	6393.0	3307.2	3085.8	0.6	1697.2	5004.4	72.0	0.0	85.0	4675.0	NA	1.1
-51	66	CH	105	6498.0	3369.6	3128.4	0.6	1720.6	5090.2	72.0	0.0	85.0	4760.0	NA	1.1
-52	67	CH	105	6603.0	3432.0	3171.0	0.6	1744.1	5176.1	72.0	0.0	85.0	4845.0	NA	1.1
-53	68	CH	105	6708.0	3494.4	3213.6	0.6	1767.5	5261.9	72.0	0.0	85.0	4930.0	NA	1.1
-54	69	CH	105	6813.0	3556.8	3256.2	0.6	1790.9	5347.7	72.0	0.0	85.0	5015.0	NA	1.1
-55	70	CH	105	6918.0	3619.2	3298.8	0.6	1814.3	5433.5	72.0	0.0	85.0	5100.0	NA	1.1
-56	71	CH	105	7023.0	3681.6	3341.4	0.6	1837.8	5519.4	72.0	0.0	85.0	5185.0	NA	1.1
-57	72	SP	120	7128.0	3744.0	3384.0	0.6	1861.2	5605.2	72.0	0.0	85.0	5270.0	NA	1.1
-58	73	SP	120	7248.0	3806.4	3441.6	0.6	1892.9	5699.3	72.0	0.0	85.0	5355.0	NA	1.1
-59	74	SP	120	7368.0	3868.8	3499.2	0.6	1924.6	5793.4	72.0	0.0	85.0	5440.0	NA	1.1
-60	75	SP	120	7488.0	3931.2	3556.8	0.6	1956.2	5887.4	72.0	0.0	85.0	5525.0	NA	1.1
-61	76	SP	120	7608.0	3993.6	3614.4	0.6	1987.9	5981.5	72.0	0.0	85.0	5610.0	NA	1.1
-62	77	SP	120	7728.0	4056.0	3672.0	0.6	2019.6	6075.6	72.0	0.0	85.0	5695.0	NA	1.1
-63	78	SP	120	7848.0	4118.4	3729.6	0.6	2051.3	6169.7	72.0	0.0	85.0	5780.0	NA	1.1
-64	79	SP	120	7968.0	4180.8	3787.2	0.6	2083.0	6263.8	72.0	0.0	85.0	5865.0	NA	1.1
-65	80	SP	120	8088.0	4243.2	3844.8	0.6	2114.6	6357.8	72.0	0.0	85.0	5950.0	NA	1.1
-66	81	SP	120	8208.0	4305.6	3902.4	0.6	2146.3	6451.9	72.0	0.0	85.0	6035.0	NA	1.1
-67	82	SP	120	8328.0	4368.0	3960.0	0.6	2178.0	6546.0	72.0	0.0	85.0	6120.0	NA	1.1
-68	83	SP	120	8448.0	4430.4	4017.6	0.6	2209.7	6640.1	72.0	0.0	85.0	6205.0	NA	1.1
-69	84	SP	120	8568.0	4492.8	4075.2	0.6	2241.4	6734.2	72.0	0.0	85.0	6290.0	NA	1.1
-70	85	SP	120	8688.0	4555.2	4132.8	0.6	2273.0	6828.2	72.0	0.0	85.0	6375.0	NA	1.1
-71	86	SP	120	8808.0	4617.6	4190.4	0.6	2304.7	6922.3	72.0	0.0	85.0	6460.0	NA	1.1
-72	87	SP	120	8928.0	4680.0	4248.0	0.6	2336.4	7016.4	72.0	0.0	85.0	6545.0	NA	1.1
-73	88	SP	120	9048.0	4742.4	4305.6	0.6	2368.1	7110.5	72.0	0.0	85.0	6630.0	NA	1.1
-74	89	SP	120	9168.0	4804.8	4363.2	0.6	2399.8	7204.6	72.0	0.0	85.0	6715.0	NA	1.1
-75	90	SP	120	9288.0	4867.2	4420.8	0.6	2431.4	7298.6	72.0	0.0	85.0	6800.0	NA	1.1
-76	91	SP	120	9408.0	4929.6	4478.4	0.6	2463.1	7392.7	72.0	0.0	85.0	6885.0	NA	1.1
-77	92	SP	120	9528.0	4992.0	4536.0	0.6	2494.8	7486.8	72.0	0.0	85.0	6970.0	NA	1.1
-78	93	SP	120	9648.0	5054.4	4593.6	0.6	2526.5	7580.9	72.0	0.0	85.0	7055.0	NA	1.1
-79	94	SP	120	9768.0	5116.8	4651.2	0.6	2558.2	7675.0	72.0	0.0	85.0	7140.0	NA	1.1
-80	95	SP	120	9888.0	5179.2	4708.8	0.6	2589.8	7769.0	72.0	0.0	85.0	7225.0	NA	1.1
-81	96	SP	120	10008.0	5241.6	4766.4	0.6	2621.5	7863.1	72.0	0.0	85.0	7310.0	NA	1.1
-82	97	CH	105	10128.0	5304.0	4824.0	0.6	2653.2	7957.2	72.0	0.0	85.0	7395.0	NA	1.1
-83	98	CH	105	10233.0	5366.4	4866.6	0.6	2676.6	8043.0	72.0	0.0	85.0	7480.0	NA	1.1
-84	99	CH	105	10338.0	5428.8	4909.2	0.6	2700.1	8128.9	72.0	0.0	85.0	7565.0	NA	1.1
-85	100	CH	105	10443.0	5491.2	4951.8	0.6	2723.5	8214.7	72.0	0.0	85.0	7650.0	NA	1.1
-86	101	CH	105	10548.0	5553.6	4994.4	0.6	2746.9	8300.5	72.0	0.0	85.0	7735.0	NA	1.1
-87	102	CH	105	10653.0	5616.0	5037.0	0.6	2770.4	8386.4	72.0	0.0	85.0	7820.0	NA	1.1
-88	103	CH	105	10758.0	5678.4	5079.6	0.6	2793.8	8472.2	72.0	0.0	85.0	7905.0	NA	1.1
-89	104	CH	105	10863.0	5740.8	5122.2	0.6	2817.2	8558.0	72.0	0.0	85.0	7990.0	NA	1.1
-90	105	CH	105	10968.0	5803.2	5164.8	0.6	2840.6	8643.8	72.0	0.0	85.0	8075.0	NA	1.1
-91	106	CH	105	11073.0	5865.6	5207.4	0.6	2864.1	8729.7	72.0	0.0	85.0	8160.0	NA	1.1
-92	107	CH	105	11178.0	5928.0	5250.0	0.6	2887.5	8815.5	72.0	0.0	85.0	8245.0	NA	1.1

Table1c - Middle River; HSA through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-93	108	CH	105	11283.0	5990.4	5292.6	0.6	2910.9	8901.3	72.0	0.0	85.0	8330.0	NA	1.1
-94	109	CH	105	11388.0	6052.8	5335.2	0.6	2934.4	8987.2	72.0	0.0	85.0	8415.0	NA	1.1
-95	110	CH	105	11493.0	6115.2	5377.8	0.6	2957.8	9073.0	72.0	0.0	85.0	8500.0	NA	1.1
-96	111	CH	105	11598.0	6177.6	5420.4	0.6	2981.2	9158.8	72.0	0.0	85.0	8585.0	NA	1.1
-97	112	ML	115	11703.0	6240.0	5463.0	0.6	3004.7	9244.7	72.0	0.0	85.0	8670.0	NA	1.1
-98	113	ML	115	11818.0	6302.4	5515.6	0.6	3033.6	9336.0	72.0	0.0	85.0	8755.0	NA	1.1
-99	114	ML	115	11933.0	6364.8	5568.2	0.6	3062.5	9427.3	72.0	0.0	85.0	8840.0	NA	1.1
-100	115	ML	115	12048.0	6427.2	5620.8	0.6	3091.4	9518.6	72.0	0.0	85.0	8925.0	NA	1.1
-101	116	ML	115	12163.0	6489.6	5673.4	0.6	3120.4	9610.0	72.0	0.0	85.0	9010.0	NA	1.1
-102	117	SM	105	12278.0	6552.0	5726.0	0.6	3149.3	9701.3	72.0	0.0	85.0	9095.0	NA	1.1
-103	118	SM	105	12383.0	6614.4	5768.6	0.6	3172.7	9787.1	72.0	0.0	85.0	9180.0	NA	1.1
-104	119	SM	105	12488.0	6676.8	5811.2	0.6	3196.2	9873.0	72.0	0.0	85.0	9265.0	NA	1.1
-105	120	SP	120	12593.0	6739.2	5853.8	0.6	3219.6	9958.8	72.0	0.0	85.0	9350.0	NA	1.1
-106	121	SP	120	12713.0	6801.6	5911.4	0.6	3251.3	10052.9	72.0	0.0	85.0	9435.0	NA	1.1
-107	122	SP	120	12833.0	6864.0	5969.0	0.6	3283.0	10147.0	72.0	0.0	85.0	9520.0	NA	1.1
-108	123	SP	120	12953.0	6926.4	6026.6	0.6	3314.6	10241.0	72.0	0.0	85.0	9605.0	NA	1.1
-109	124	SP	120	13073.0	6988.8	6084.2	0.6	3346.3	10335.1	72.0	0.0	85.0	9690.0	NA	1.1
-110	125	SP	120	13193.0	7051.2	6141.8	0.6	3378.0	10429.2	72.0	0.0	85.0	9775.0	NA	1.1
-111	126	SP	120	13313.0	7113.6	6199.4	0.6	3409.7	10523.3	72.0	0.0	85.0	9860.0	NA	1.1
-112	127	SP	120	13433.0	7176.0	6257.0	0.6	3441.4	10617.4	72.0	0.0	85.0	9945.0	NA	1.1
-113	128	SP	120	13553.0	7238.4	6314.6	0.6	3473.0	10711.4	72.0	0.0	85.0	10030.0	NA	1.1
-114	129	SP	120	13673.0	7300.8	6372.2	0.6	3504.7	10805.5	72.0	0.0	85.0	10115.0	NA	1.1
-115	130	SP	120	13673.0	7363.2	6309.8	0.6	3470.4	10833.6	72.0	0.0	85.0	10200.0	NA	1.1

Table 2a - Grant Line; HSA through levee embankment, followed by RW

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
12	0	ML	110	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
11	1	ML	110	66.0	0.0	66.0	0.6	36.3	36.3	72.0	0.0	85.0	0.0	NA	NA
10	2	ML	110	132.0	0.0	132.0	0.6	72.6	72.6	72.0	0.0	85.0	0.0	NA	NA
9	3	ML	110	198.0	0.0	198.0	0.6	108.9	108.9	72.0	0.0	85.0	0.0	NA	NA
8	4	ML	110	264.0	0.0	264.0	0.6	145.2	145.2	72.0	0.0	85.0	0.0	NA	NA
7	5	ML	110	330.0	0.0	330.0	0.6	181.5	181.5	72.0	0.0	85.0	0.0	NA	NA
6	6	ML	110	396.0	0.0	396.0	0.6	217.8	217.8	72.0	0.0	85.0	0.0	NA	NA
5	7	ML	110	462.0	0.0	462.0	0.6	254.1	254.1	72.0	0.0	85.0	0.0	NA	NA
4	8	ML	110	528.0	0.0	528.0	0.6	290.4	290.4	72.0	0.0	85.0	0.0	NA	NA
3	9	ML	110	594.0	0.0	594.0	0.6	326.7	326.7	72.0	0.0	85.0	0.0	NA	NA
2	10	CH	90	660.0	0.0	660.0	0.6	363.0	363.0	72.0	0.0	85.0	0.0	NA	NA
1	11	CH	90	714.0	0.0	714.0	0.6	392.7	392.7	72.0	0.0	85.0	85.0	NA	4.6
0	12	CH	95	768.0	0.0	768.0	0.6	422.4	422.4	72.0	0.0	85.0	170.0	NA	2.5
-1	13	CH	95	825.0	62.4	762.6	0.6	419.4	481.8	72.0	0.0	85.0	255.0	NA	1.9
-2	14	CH	95	882.0	124.8	757.2	0.6	416.5	541.3	72.0	0.0	85.0	340.0	NA	1.6
-3	15	CH	95	939.0	187.2	751.8	0.6	413.5	600.7	72.0	0.0	85.0	425.0	NA	1.4
-4	16	CH	95	1034.0	249.6	784.4	0.6	431.4	681.0	72.0	0.0	85.0	510.0	NA	1.3
-5	17	CH	95	1129.0	312.0	817.0	0.6	449.4	761.4	72.0	0.0	85.0	595.0	NA	1.3
-6	18	CH	95	1224.0	374.4	849.6	0.6	467.3	841.7	72.0	0.0	85.0	680.0	NA	1.2
-7	19	CH	95	1319.0	436.8	882.2	0.6	485.2	922.0	72.0	0.0	85.0	765.0	NA	1.2
-8	20	CH	95	1414.0	499.2	914.8	0.6	503.1	1002.3	72.0	0.0	85.0	850.0	NA	1.2
-9	21	CH	95	1509.0	561.6	947.4	0.6	521.1	1082.7	72.0	0.0	85.0	935.0	NA	1.2
-10	22	CH	95	1604.0	624.0	980.0	0.6	539.0	1163.0	72.0	0.0	85.0	1020.0	NA	1.1
-11	23	CH	95	1699.0	686.4	1012.6	0.6	556.9	1243.3	72.0	0.0	85.0	1105.0	NA	1.1
-12	24	CH	95	1794.0	748.8	1045.2	0.6	574.9	1323.7	72.0	0.0	85.0	1190.0	NA	1.1
-13	25	CL	125	1889.0	811.2	1077.8	0.6	592.8	1404.0	72.0	0.0	85.0	1275.0	NA	1.1
-14	26	CL	125	2014.0	873.6	1140.4	0.6	627.2	1500.8	72.0	0.0	85.0	1360.0	NA	1.1
-15	27	CL	125	2139.0	936.0	1203.0	0.6	661.7	1597.7	72.0	0.0	85.0	1445.0	NA	1.1
-16	28	CL	125	2264.0	998.4	1265.6	0.6	696.1	1694.5	72.0	0.0	85.0	1530.0	NA	1.1
-17	29	CL	125	2389.0	1060.8	1328.2	0.6	730.5	1791.3	72.0	0.0	85.0	1615.0	NA	1.1
-18	30	CL	125	2514.0	1123.2	1390.8	0.6	764.9	1888.1	72.0	0.0	85.0	1700.0	NA	1.1
-19	31	CL	125	2639.0	1185.6	1453.4	0.6	799.4	1985.0	72.0	0.0	85.0	1785.0	NA	1.1
-20	32	CL	125	2764.0	1248.0	1516.0	0.6	833.8	2081.8	72.0	0.0	85.0	1870.0	NA	1.1
-21	33	CL	125	2889.0	1310.4	1578.6	0.6	868.2	2178.6	72.0	0.0	85.0	1955.0	NA	1.1
-22	34	CL	125	3014.0	1372.8	1641.2	0.6	902.7	2275.5	72.0	0.0	85.0	2040.0	NA	1.1
-23	35	CL	125	3139.0	1435.2	1703.8	0.6	937.1	2372.3	72.0	0.0	85.0	2125.0	NA	1.1
-24	36	CL	125	3264.0	1497.6	1766.4	0.6	971.5	2469.1	72.0	0.0	85.0	2210.0	NA	1.1
-25	37	CL	125	3389.0	1560.0	1829.0	0.6	1006.0	2566.0	72.0	0.0	85.0	2295.0	NA	1.1
-26	38	CL	125	3514.0	1622.4	1891.6	0.6	1040.4	2662.8	72.0	0.0	85.0	2380.0	NA	1.1
-27	39	CL	125	3639.0	1684.8	1954.2	0.6	1074.8	2759.6	72.0	0.0	85.0	2465.0	NA	1.1
-28	40	CL	125	3764.0	1747.2	2016.8	0.6	1109.2	2856.4	72.0	0.0	85.0	2550.0	NA	1.1
-29	41	CL	125	3889.0	1809.6	2079.4	0.6	1143.7	2953.3	72.0	0.0	85.0	2635.0	NA	1.1
-30	42	SP	120	4014.0	1872.0	2142.0	0.6	1178.1	3050.1	72.0	0.0	85.0	2720.0	NA	1.1
-31	43	SP	120	4134.0	1934.4	2199.6	0.6	1209.8	3144.2	72.0	0.0	85.0	2805.0	NA	1.1
-32	44	SP	120	4254.0	1996.8	2257.2	0.6	1241.5	3238.3	72.0	0.0	85.0	2890.0	NA	1.1
-33	45	SP	120	4374.0	2059.2	2314.8	0.6	1273.1	3332.3	72.0	0.0	85.0	2975.0	NA	1.1
-34	46	CL	125	4494.0	2121.6	2372.4	0.6	1304.8	3426.4	72.0	0.0	85.0	3060.0	NA	1.1
-35	47	CL	125	4619.0	2184.0	2435.0	0.6	1339.3	3523.3	72.0	0.0	85.0	3145.0	NA	1.1
-36	48	CL	125	4744.0	2246.4	2497.6	0.6	1373.7	3620.1	72.0	0.0	85.0	3230.0	NA	1.1
-37	49	CL	125	4869.0	2308.8	2560.2	0.6	1408.1	3716.9	72.0	0.0	85.0	3315.0	NA	1.1
-38	50	CL	125	4994.0	2371.2	2622.8	0.6	1442.5	3813.7	72.0	0.0	85.0	3400.0	NA	1.1
-39	51	CL	125	5119.0	2433.6	2685.4	0.6	1477.0	3910.6	72.0	0.0	85.0	3485.0	NA	1.1
-40	52	CL	125	5244.0	2496.0	2748.0	0.6	1511.4	4007.4	72.0	0.0	85.0	3570.0	NA	1.1
-41	53	CH	105	5369.0	2558.4	2810.6	0.6	1545.8	4104.2	72.0	0.0	85.0	3655.0	NA	1.1
-42	54	CH	105	5474.0	2620.8	2853.2	0.6	1569.3	4190.1	72.0	0.0	85.0	3740.0	NA	1.1
-43	55	CH	105	5579.0	2683.2	2895.8	0.6	1592.7	4275.9	72.0	0.0	85.0	3825.0	NA	1.1

Table 2a - Grant LIne; HSA through levee embankment, followed by RW

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-44	56	CH	105	5684.0	2745.6	2938.4	0.6	1616.1	4361.7	72.0	0.0	85.0	3910.0	NA	1.1
-45	57	CH	105	5789.0	2808.0	2981.0	0.6	1639.6	4447.6	72.0	0.0	85.0	3995.0	NA	1.1
-46	58	CH	105	5894.0	2870.4	3023.6	0.6	1663.0	4533.4	72.0	0.0	85.0	4080.0	NA	1.1
-47	59	CH	105	5999.0	2932.8	3066.2	0.6	1686.4	4619.2	72.0	0.0	85.0	4165.0	NA	1.1
-48	60	CH	105	6104.0	2995.2	3108.8	0.6	1709.8	4705.0	72.0	4464.0	85.0	4250.0	1.1	1.1
-49	61	CH	105	6209.0	3057.6	3151.4	0.6	1733.3	4790.9	72.0	4536.0	85.0	4335.0	1.1	1.1
-50	62	CH	105	6314.0	3120.0	3194.0	0.6	1756.7	4876.7	72.0	4608.0	85.0	4420.0	1.1	1.1
-51	63	CH	105	6419.0	3182.4	3236.6	0.6	1780.1	4962.5	72.0	4680.0	85.0	4505.0	1.1	1.1
-52	64	ML	115	6524.0	3244.8	3279.2	0.6	1803.6	5048.4	72.0	4752.0	85.0	4590.0	1.1	1.1
-53	65	CH	105	6639.0	3307.2	3331.8	0.6	1832.5	5139.7	72.0	4824.0	85.0	4675.0	1.1	1.1
-54	66	CH	105	6744.0	3369.6	3374.4	0.6	1855.9	5225.5	72.0	4896.0	85.0	4760.0	1.1	1.1
-55	67	CH	105	6849.0	3432.0	3417.0	0.6	1879.4	5311.4	72.0	4968.0	85.0	4845.0	1.1	1.1
-56	68	CH	105	6954.0	3494.4	3459.6	0.6	1902.8	5397.2	72.0	5040.0	85.0	4930.0	1.1	1.1
-57	69	CH	105	7059.0	3556.8	3502.2	0.6	1926.2	5483.0	72.0	5112.0	85.0	5015.0	1.1	1.1
-58	70	CH	105	7164.0	3619.2	3544.8	0.6	1949.6	5568.8	72.0	5184.0	85.0	5100.0	1.1	1.1
-59	71	CH	105	7269.0	3681.6	3587.4	0.6	1973.1	5654.7	72.0	5256.0	85.0	5185.0	1.1	1.1
-60	72	CH	105	7374.0	3744.0	3630.0	0.6	1996.5	5740.5	72.0	5328.0	85.0	5270.0	1.1	1.1
-61	73	CH	105	7479.0	3806.4	3672.6	0.6	2019.9	5826.3	72.0	5400.0	85.0	5355.0	1.1	1.1
-62	74	CH	105	7584.0	3868.8	3715.2	0.6	2043.4	5912.2	72.0	5472.0	85.0	5440.0	1.1	1.1
-63	75	CH	105	7689.0	3931.2	3757.8	0.6	2066.8	5998.0	72.0	5544.0	85.0	5525.0	1.1	1.1
-64	76	CH	105	7794.0	3993.6	3800.4	0.6	2090.2	6083.8	72.0	5616.0	85.0	5610.0	1.1	1.1
-65	77	CH	105	7899.0	4056.0	3843.0	0.6	2113.7	6169.7	72.0	5688.0	85.0	5695.0	1.1	1.1
-66	78	CH	105	8004.0	4118.4	3885.6	0.6	2137.1	6255.5	72.0	5760.0	85.0	5780.0	1.1	1.1
-67	79	CH	105	8109.0	4180.8	3928.2	0.6	2160.5	6341.3	72.0	5832.0	85.0	5865.0	1.1	1.1
-68	80	CH	105	8214.0	4243.2	3970.8	0.6	2183.9	6427.1	72.0	5904.0	85.0	5950.0	1.1	1.1
-69	81	CH	105	8319.0	4305.6	4013.4	0.6	2207.4	6513.0	72.0	5976.0	85.0	6035.0	1.1	1.1
-70	82	CH	105	8424.0	4368.0	4056.0	0.6	2230.8	6598.8	72.0	6048.0	85.0	6120.0	1.1	1.1
-71	83	CH	105	8529.0	4430.4	4098.6	0.6	2254.2	6684.6	72.0	6120.0	85.0	6205.0	1.1	1.1
-72	84	CH	105	8634.0	4492.8	4141.2	0.6	2277.7	6770.5	72.0	6192.0	85.0	6290.0	1.1	1.1
-73	85	CH	105	8739.0	4555.2	4183.8	0.6	2301.1	6856.3	72.0	6264.0	85.0	6375.0	1.1	1.1
-74	86	CH	105	8844.0	4617.6	4226.4	0.6	2324.5	6942.1	72.0	6336.0	85.0	6460.0	1.1	1.1
-75	87	SM	105	8949.0	4680.0	4269.0	0.6	2348.0	7028.0	72.0	6408.0	85.0	6545.0	1.1	1.1
-76	88	SM	105	9054.0	4742.4	4311.6	0.6	2371.4	7113.8	72.0	6480.0	85.0	6630.0	1.1	1.1
-77	89	SM	105	9159.0	4804.8	4354.2	0.6	2394.8	7199.6	72.0	6552.0	85.0	6715.0	1.1	1.1
-78	90	SM	105	9264.0	4867.2	4396.8	0.6	2418.2	7285.4	72.0	6624.0	85.0	6800.0	1.1	1.1
-79	91	SM	105	9369.0	4929.6	4439.4	0.6	2441.7	7371.3	72.0	6696.0	85.0	6885.0	1.1	1.1
-80	92	SM	105	9474.0	4992.0	4482.0	0.6	2465.1	7457.1	72.0	6768.0	85.0	6970.0	1.1	1.1
-81	93	SM	105	9579.0	5054.4	4524.6	0.6	2488.5	7542.9	72.0	6840.0	85.0	7055.0	1.1	1.1
-82	94	SM	105	9684.0	5116.8	4567.2	0.6	2512.0	7628.8	72.0	6912.0	85.0	7140.0	1.1	1.1
-83	95	SM	105	9789.0	5179.2	4609.8	0.6	2535.4	7714.6	72.0	6984.0	85.0	7225.0	1.1	1.1
-84	96	SM	105	9894.0	5241.6	4652.4	0.6	2558.8	7800.4	72.0	7056.0	85.0	7310.0	1.1	1.1
-85	97	SM	105	9999.0	5304.0	4695.0	0.6	2582.3	7886.3	72.0	7128.0	85.0	7395.0	1.1	1.1
-86	98	SM	105	10104.0	5366.4	4737.6	0.6	2605.7	7972.1	72.0	7200.0	85.0	7480.0	1.1	1.1
-87	99	SM	105	10209.0	5428.8	4780.2	0.6	2629.1	8057.9	72.0	7272.0	85.0	7565.0	1.1	1.1
-88	100	CH	105	10314.0	5491.2	4822.8	0.6	2652.5	8143.7	72.0	7344.0	85.0	7650.0	1.1	1.1
-89	101	CH	105	10419.0	5553.6	4865.4	0.6	2676.0	8229.6	72.0	7416.0	85.0	7735.0	1.1	1.1
-90	102	CH	105	10524.0	5616.0	4908.0	0.6	2699.4	8315.4	72.0	7488.0	85.0	7820.0	1.1	1.1
-91	103	CH	105	10629.0	5678.4	4950.6	0.6	2722.8	8401.2	72.0	7560.0	85.0	7905.0	1.1	1.1
-92	104	CH	105	10734.0	5740.8	4993.2	0.6	2746.3	8487.1	72.0	7632.0	85.0	7990.0	1.1	1.1
-93	105	CH	105	10839.0	5803.2	5035.8	0.6	2769.7	8572.9	72.0	7704.0	85.0	8075.0	1.1	1.1
-94	106	CH	105	10944.0	5865.6	5078.4	0.6	2793.1	8658.7	72.0	7776.0	85.0	8160.0	1.1	1.1
-95	107	ML	115	11049.0	5928.0	5121.0	0.6	2816.6	8744.6	72.0	7848.0	85.0	8245.0	1.1	1.1
-96	108	ML	115	11164.0	5990.4	5173.6	0.6	2845.5	8835.9	72.0	7920.0	85.0	8330.0	1.1	1.1
-97	109	ML	115	11279.0	6052.8	5226.2	0.6	2874.4	8927.2	72.0	7992.0	85.0	8415.0	1.1	1.1
-98	110	SM	125	11394.0	6115.2	5278.8	0.6	2903.3	9018.5	72.0	8064.0	85.0	8500.0	1.1	1.1
-99	111	SM	125	11519.0	6177.6	5341.4	0.6	2937.8	9115.4	72.0	8136.0	85.0	8585.0	1.1	1.1

Table 2a - Grant Line; HSA through levee embankment, followed by RW

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-100	112	SM	125	11644.0	6240.0	5404.0	0.6	2972.2	9212.2	72.0	8208.0	85.0	8670.0	1.1	1.1
-101	113	SM	125	11769.0	6302.4	5466.6	0.6	3006.6	9309.0	72.0	8280.0	85.0	8755.0	1.1	1.1
-102	114	SM	125	11894.0	6364.8	5529.2	0.6	3041.1	9405.9	72.0	8352.0	85.0	8840.0	1.1	1.1
-103	115	SM	125	12019.0	6427.2	5591.8	0.6	3075.5	9502.7	72.0	8424.0	85.0	8925.0	1.1	1.1
-104	116	SM	125	12144.0	6489.6	5654.4	0.6	3109.9	9599.5	72.0	8496.0	85.0	9010.0	1.1	1.1
-105	117	SM	125	12269.0	6552.0	5717.0	0.6	3144.4	9696.4	72.0	8568.0	85.0	9095.0	1.1	1.1
-106	118	SM	125	12394.0	6614.4	5779.6	0.6	3178.8	9793.2	72.0	8640.0	85.0	9180.0	1.1	1.1
-107	119	SM	125	12519.0	6676.8	5842.2	0.6	3213.2	9890.0	72.0	8712.0	85.0	9265.0	1.1	1.1
-108	120	SP	120	12644.0	6739.2	5904.8	0.6	3247.6	9986.8	72.0	8784.0	85.0	9350.0	1.1	1.1
-109	121	SP	120	12764.0	6801.6	5962.4	0.6	3279.3	10080.9	72.0	8856.0	85.0	9435.0	1.1	1.1
-110	122	SP	120	12884.0	6864.0	6020.0	0.6	3311.0	10175.0	72.0	8928.0	85.0	9520.0	1.1	1.1
-111	123	SP	120	13004.0	6926.4	6077.6	0.6	3342.7	10269.1	72.0	9000.0	85.0	9605.0	1.1	1.1
-112	124	SP	120	13124.0	6988.8	6135.2	0.6	3374.4	10363.2	72.0	9072.0	85.0	9690.0	1.1	1.1
-113	125	SP	120	13244.0	7051.2	6192.8	0.6	3406.0	10457.2	72.0	9144.0	85.0	9775.0	1.1	1.1
-114	126	SP	120	13364.0	7113.6	6250.4	0.6	3437.7	10551.3	72.0	9216.0	85.0	9860.0	1.1	1.1
-115	127	SP	120	13484.0	7176.0	6308.0	0.6	3469.4	10645.4	72.0	9288.0	85.0	9945.0	1.1	1.1
-116	128	SP	120	13604.0	7238.4	6365.6	0.6	3501.1	10739.5	72.0	9360.0	85.0	10030.0	1.1	1.1
-117	129	SP	120	13724.0	7300.8	6423.2	0.6	3532.8	10833.6	72.0	9432.0	85.0	10115.0	1.1	1.1
-118	130	SP	120	13724.0	7363.2	6360.8	0.6	3498.4	10861.6	72.0	9504.0	85.0	10200.0	1.1	1.1

Table 2b - Old River; HSA through levee embankment, followed by RW

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
15	0	CL	120	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
14	1	CL	120	72.0	0.0	72.0	0.6	39.6	39.6	72.0	0.0	85.0	0.0	NA	NA
13	2	CL	120	144.0	0.0	144.0	0.6	79.2	79.2	72.0	0.0	85.0	0.0	NA	NA
12	3	CL	120	216.0	0.0	216.0	0.6	118.8	118.8	72.0	0.0	85.0	0.0	NA	NA
11	4	CL	120	288.0	0.0	288.0	0.6	158.4	158.4	72.0	0.0	85.0	0.0	NA	NA
10	5	CL	120	360.0	0.0	360.0	0.6	198.0	198.0	72.0	0.0	85.0	0.0	NA	NA
9	6	CL	120	432.0	0.0	432.0	0.6	237.6	237.6	72.0	0.0	85.0	0.0	NA	NA
8	7	CL	120	504.0	0.0	504.0	0.6	277.2	277.2	72.0	0.0	85.0	0.0	NA	NA
7	8	CL	120	576.0	0.0	576.0	0.6	316.8	316.8	72.0	0.0	85.0	0.0	NA	NA
6	9	CL	120	648.0	0.0	648.0	0.6	356.4	356.4	72.0	0.0	85.0	0.0	NA	NA
5	10	CL	120	720.0	0.0	720.0	0.6	396.0	396.0	72.0	0.0	85.0	0.0	NA	NA
4	11	CL	120	792.0	0.0	792.0	0.6	435.6	435.6	72.0	0.0	85.0	85.0	NA	5.1
3	12	CH	100	864.0	0.0	864.0	0.6	475.2	475.2	72.0	0.0	85.0	170.0	NA	2.8
2	13	CH	100	924.0	0.0	924.0	0.6	508.2	508.2	72.0	0.0	85.0	255.0	NA	2.0
1	14	CH	100	984.0	0.0	984.0	0.6	541.2	541.2	72.0	0.0	85.0	340.0	NA	1.6
0	15	CH	105	1044.0	0.0	1044.0	0.6	574.2	574.2	72.0	0.0	85.0	425.0	NA	1.4
-1	16	CH	105	1149.0	62.4	1086.6	0.6	597.6	660.0	72.0	0.0	85.0	510.0	NA	1.3
-2	17	CH	105	1254.0	124.8	1129.2	0.6	621.1	745.9	72.0	0.0	85.0	595.0	NA	1.3
-3	18	CH	105	1359.0	187.2	1171.8	0.6	644.5	831.7	72.0	0.0	85.0	680.0	NA	1.2
-4	19	CH	105	1464.0	249.6	1214.4	0.6	667.9	917.5	72.0	0.0	85.0	765.0	NA	1.2
-5	20	CH	105	1569.0	312.0	1257.0	0.6	691.4	1003.4	72.0	0.0	85.0	850.0	NA	1.2
-6	21	CH	105	1674.0	374.4	1299.6	0.6	714.8	1089.2	72.0	0.0	85.0	935.0	NA	1.2
-7	22	CH	105	1779.0	436.8	1342.2	0.6	738.2	1175.0	72.0	0.0	85.0	1020.0	NA	1.2
-8	23	SP	105	1884.0	499.2	1384.8	0.6	761.6	1260.8	72.0	0.0	85.0	1105.0	NA	1.1
-9	24	SP	105	1989.0	561.6	1427.4	0.6	785.1	1346.7	72.0	0.0	85.0	1190.0	NA	1.1
-10	25	SP	105	2094.0	624.0	1470.0	0.6	808.5	1432.5	72.0	0.0	85.0	1275.0	NA	1.1
-11	26	SP	105	2199.0	686.4	1512.6	0.6	831.9	1518.3	72.0	0.0	85.0	1360.0	NA	1.1
-12	27	SP	105	2304.0	748.8	1555.2	0.6	855.4	1604.2	72.0	0.0	85.0	1445.0	NA	1.1
-13	28	CH	105	2409.0	811.2	1597.8	0.6	878.8	1690.0	72.0	0.0	85.0	1530.0	NA	1.1
-14	29	CH	105	2514.0	873.6	1640.4	0.6	902.2	1775.8	72.0	0.0	85.0	1615.0	NA	1.1
-15	30	CH	105	2619.0	936.0	1683.0	0.6	925.7	1861.7	72.0	0.0	85.0	1700.0	NA	1.1
-16	31	CH	105	2724.0	998.4	1725.6	0.6	949.1	1947.5	72.0	0.0	85.0	1785.0	NA	1.1
-17	32	CH	105	2829.0	1060.8	1768.2	0.6	972.5	2033.3	72.0	0.0	85.0	1870.0	NA	1.1
-18	33	CH	105	2934.0	1123.2	1810.8	0.6	995.9	2119.1	72.0	0.0	85.0	1955.0	NA	1.1
-19	34	CH	105	3039.0	1185.6	1853.4	0.6	1019.4	2205.0	72.0	0.0	85.0	2040.0	NA	1.1
-20	35	CH	105	3144.0	1248.0	1896.0	0.6	1042.8	2290.8	72.0	0.0	85.0	2125.0	NA	1.1
-21	36	CH	105	3249.0	1310.4	1938.6	0.6	1066.2	2376.6	72.0	0.0	85.0	2210.0	NA	1.1
-22	37	CH	105	3354.0	1372.8	1981.2	0.6	1089.7	2462.5	72.0	0.0	85.0	2295.0	NA	1.1
-23	38	CH	105	3459.0	1435.2	2023.8	0.6	1113.1	2548.3	72.0	0.0	85.0	2380.0	NA	1.1
-24	39	SM	125	3564.0	1497.6	2066.4	0.6	1136.5	2634.1	72.0	0.0	85.0	2465.0	NA	1.1
-25	40	SM	125	3689.0	1560.0	2129.0	0.6	1171.0	2731.0	72.0	0.0	85.0	2550.0	NA	1.1
-26	41	SM	125	3814.0	1622.4	2191.6	0.6	1205.4	2827.8	72.0	0.0	85.0	2635.0	NA	1.1
-27	42	SM	125	3939.0	1684.8	2254.2	0.6	1239.8	2924.6	72.0	0.0	85.0	2720.0	NA	1.1
-28	43	SM	125	4064.0	1747.2	2316.8	0.6	1274.2	3021.4	72.0	0.0	85.0	2805.0	NA	1.1
-29	44	SM	125	4189.0	1809.6	2379.4	0.6	1308.7	3118.3	72.0	0.0	85.0	2890.0	NA	1.1
-30	45	SM	125	4314.0	1872.0	2442.0	0.6	1343.1	3215.1	72.0	0.0	85.0	2975.0	NA	1.1
-31	46	ML	115	4439.0	1934.4	2504.6	0.6	1377.5	3311.9	72.0	0.0	85.0	3060.0	NA	1.1
-32	47	CH	105	4554.0	1996.8	2557.2	0.6	1406.5	3403.3	72.0	0.0	85.0	3145.0	NA	1.1
-33	48	CH	105	4659.0	2059.2	2599.8	0.6	1429.9	3489.1	72.0	0.0	85.0	3230.0	NA	1.1
-34	49	CH	105	4764.0	2121.6	2642.4	0.6	1453.3	3574.9	72.0	0.0	85.0	3315.0	NA	1.1
-35	50	CH	105	4869.0	2184.0	2685.0	0.6	1476.8	3660.8	72.0	0.0	85.0	3400.0	NA	1.1
-36	51	CH	105	4974.0	2246.4	2727.6	0.6	1500.2	3746.6	72.0	0.0	85.0	3485.0	NA	1.1
-37	52	CH	105	5079.0	2308.8	2770.2	0.6	1523.6	3832.4	72.0	0.0	85.0	3570.0	NA	1.1
-38	53	CH	105	5184.0	2371.2	2812.8	0.6	1547.0	3918.2	72.0	0.0	85.0	3655.0	NA	1.1
-39	54	CH	105	5289.0	2433.6	2855.4	0.6	1570.5	4004.1	72.0	0.0	85.0	3740.0	NA	1.1
-40	55	CH	105	5394.0	2496.0	2898.0	0.6	1593.9	4089.9	72.0	0.0	85.0	3825.0	NA	1.1

Table 2b - Old River; HSA through levee embankment, followed by RW

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-41	56	CH	105	5499.0	2558.4	2940.6	0.6	1617.3	4175.7	72.0	0.0	85.0	3910.0	NA	1.1
-42	57	CH	105	5604.0	2620.8	2983.2	0.6	1640.8	4261.6	72.0	0.0	85.0	3995.0	NA	1.1
-43	58	SM	125	5709.0	2683.2	3025.8	0.6	1664.2	4347.4	72.0	0.0	85.0	4080.0	NA	1.1
-44	59	SM	125	5834.0	2745.6	3088.4	0.6	1698.6	4444.2	72.0	0.0	85.0	4165.0	NA	1.1
-45	60	SM	125	5959.0	2808.0	3151.0	0.6	1733.1	4541.1	72.0	0.0	85.0	4250.0	NA	1.1
-46	61	SM	125	6084.0	2870.4	3213.6	0.6	1767.5	4637.9	72.0	0.0	85.0	4335.0	NA	1.1
-47	62	SM	125	6209.0	2932.8	3276.2	0.6	1801.9	4734.7	72.0	0.0	85.0	4420.0	NA	1.1
-48	63	SC	125	6334.0	2995.2	3338.8	0.6	1836.3	4831.5	72.0	0.0	85.0	4505.0	NA	1.1
-49	64	SC	125	6459.0	3057.6	3401.4	0.6	1870.8	4928.4	72.0	0.0	85.0	4590.0	NA	1.1
-50	65	CH	105	6584.0	3120.0	3464.0	0.6	1905.2	5025.2	72.0	4824.0	85.0	4675.0	1.0	1.1
-51	66	CH	105	6689.0	3182.4	3506.6	0.6	1928.6	5111.0	72.0	4896.0	85.0	4760.0	1.0	1.1
-52	67	CH	105	6794.0	3244.8	3549.2	0.6	1952.1	5196.9	72.0	4968.0	85.0	4845.0	1.0	1.1
-53	68	CH	105	6899.0	3307.2	3591.8	0.6	1975.5	5282.7	72.0	5040.0	85.0	4930.0	1.0	1.1
-54	69	CH	105	7004.0	3369.6	3634.4	0.6	1998.9	5368.5	72.0	5112.0	85.0	5015.0	1.1	1.1
-55	70	CH	105	7109.0	3432.0	3677.0	0.6	2022.4	5454.4	72.0	5184.0	85.0	5100.0	1.1	1.1
-56	71	CH	105	7214.0	3494.4	3719.6	0.6	2045.8	5540.2	72.0	5256.0	85.0	5185.0	1.1	1.1
-57	72	CH	105	7319.0	3556.8	3762.2	0.6	2069.2	5626.0	72.0	5328.0	85.0	5270.0	1.1	1.1
-58	73	CH	105	7424.0	3619.2	3804.8	0.6	2092.6	5711.8	72.0	5400.0	85.0	5355.0	1.1	1.1
-59	74	CH	105	7529.0	3681.6	3847.4	0.6	2116.1	5797.7	72.0	5472.0	85.0	5440.0	1.1	1.1
-60	75	CH	105	7634.0	3744.0	3890.0	0.6	2139.5	5883.5	72.0	5544.0	85.0	5525.0	1.1	1.1
-61	76	CH	105	7739.0	3806.4	3932.6	0.6	2162.9	5969.3	72.0	5616.0	85.0	5610.0	1.1	1.1
-62	77	CH	105	7844.0	3868.8	3975.2	0.6	2186.4	6055.2	72.0	5688.0	85.0	5695.0	1.1	1.1
-63	78	ML	115	7949.0	3931.2	4017.8	0.6	2209.8	6141.0	72.0	5760.0	85.0	5780.0	1.1	1.1
-64	79	ML	115	8064.0	3993.6	4070.4	0.6	2238.7	6232.3	72.0	5832.0	85.0	5865.0	1.1	1.1
-65	80	ML	115	8179.0	4056.0	4123.0	0.6	2267.7	6323.7	72.0	5904.0	85.0	5950.0	1.1	1.1
-66	81	ML	115	8294.0	4118.4	4175.6	0.6	2296.6	6415.0	72.0	5976.0	85.0	6035.0	1.1	1.1
-67	82	ML	115	8409.0	4180.8	4228.2	0.6	2325.5	6506.3	72.0	6048.0	85.0	6120.0	1.1	1.1
-68	83	ML	115	8524.0	4243.2	4280.8	0.6	2354.4	6597.6	72.0	6120.0	85.0	6205.0	1.1	1.1
-69	84	ML	115	8639.0	4305.6	4333.4	0.6	2383.4	6689.0	72.0	6192.0	85.0	6290.0	1.1	1.1
-70	85	ML	115	8754.0	4368.0	4386.0	0.6	2412.3	6780.3	72.0	6264.0	85.0	6375.0	1.1	1.1
-71	86	SM	125	8869.0	4430.4	4438.6	0.6	2441.2	6871.6	72.0	6336.0	85.0	6460.0	1.1	1.1
-72	87	SM	125	8994.0	4492.8	4501.2	0.6	2475.7	6968.5	72.0	6408.0	85.0	6545.0	1.1	1.1
-73	88	SM	125	9119.0	4555.2	4563.8	0.6	2510.1	7065.3	72.0	6480.0	85.0	6630.0	1.1	1.1
-74	89	SM	125	9244.0	4617.6	4626.4	0.6	2544.5	7162.1	72.0	6552.0	85.0	6715.0	1.1	1.1
-75	90	SM	125	9369.0	4680.0	4689.0	0.6	2579.0	7259.0	72.0	6624.0	85.0	6800.0	1.1	1.1
-76	91	SP	120	9494.0	4742.4	4751.6	0.6	2613.4	7355.8	72.0	6696.0	85.0	6885.0	1.1	1.1
-77	92	SP	120	9614.0	4804.8	4809.2	0.6	2645.1	7449.9	72.0	6768.0	85.0	6970.0	1.1	1.1
-78	93	SP	120	9734.0	4867.2	4866.8	0.6	2676.7	7543.9	72.0	6840.0	85.0	7055.0	1.1	1.1
-79	94	SP	120	9854.0	4929.6	4924.4	0.6	2708.4	7638.0	72.0	6912.0	85.0	7140.0	1.1	1.1
-80	95	SP	120	9974.0	4992.0	4982.0	0.6	2740.1	7732.1	72.0	6984.0	85.0	7225.0	1.1	1.1
-81	96	SP	120	10094.0	5054.4	5039.6	0.6	2771.8	7826.2	72.0	7056.0	85.0	7310.0	1.1	1.1
-82	97	SP	120	10214.0	5116.8	5097.2	0.6	2803.5	7920.3	72.0	7128.0	85.0	7395.0	1.1	1.1
-83	98	SP	120	10334.0	5179.2	5154.8	0.6	2835.1	8014.3	72.0	7200.0	85.0	7480.0	1.1	1.1
-84	99	SP	120	10454.0	5241.6	5212.4	0.6	2866.8	8108.4	72.0	7272.0	85.0	7565.0	1.1	1.1
-85	100	SP	120	10574.0	5304.0	5270.0	0.6	2898.5	8202.5	72.0	7344.0	85.0	7650.0	1.1	1.1
-86	101	SP	120	10694.0	5366.4	5327.6	0.6	2930.2	8296.6	72.0	7416.0	85.0	7735.0	1.1	1.1
-87	102	SP	120	10814.0	5428.8	5385.2	0.6	2961.9	8390.7	72.0	7488.0	85.0	7820.0	1.1	1.1
-88	103	SP	120	10934.0	5491.2	5442.8	0.6	2993.5	8484.7	72.0	7560.0	85.0	7905.0	1.1	1.1
-89	104	SP	120	11054.0	5553.6	5500.4	0.6	3025.2	8578.8	72.0	7632.0	85.0	7990.0	1.1	1.1
-90	105	SP	120	11174.0	5616.0	5558.0	0.6	3056.9	8672.9	72.0	7704.0	85.0	8075.0	1.1	1.1
-91	106	SP	120	11294.0	5678.4	5615.6	0.6	3088.6	8767.0	72.0	7776.0	85.0	8160.0	1.1	1.1
-92	107	SP	120	11414.0	5740.8	5673.2	0.6	3120.3	8861.1	72.0	7848.0	85.0	8245.0	1.1	1.1
-93	108	SP	120	11534.0	5803.2	5730.8	0.6	3151.9	8955.1	72.0	7920.0	85.0	8330.0	1.1	1.1
-94	109	SP	120	11654.0	5865.6	5788.4	0.6	3183.6	9049.2	72.0	7992.0	85.0	8415.0	1.1	1.1
-95	110	SP	120	11774.0	5928.0	5846.0	0.6	3215.3	9143.3	72.0	8064.0	85.0	8500.0	1.1	1.1
-96	111	SP	120	11894.0	5990.4	5903.6	0.6	3247.0	9237.4	72.0	8136.0	85.0	8585.0	1.1	1.1

Table 2b - Old River; HSA through levee embankment, followed by RW

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-97	112	SP	120	12014.0	6052.8	5961.2	0.6	3278.7	9331.5	72.0	8208.0	85.0	8670.0	1.1	1.1
-98	113	SP	120	12134.0	6115.2	6018.8	0.6	3310.3	9425.5	72.0	8280.0	85.0	8755.0	1.1	1.1
-99	114	SP	120	12254.0	6177.6	6076.4	0.6	3342.0	9519.6	72.0	8352.0	85.0	8840.0	1.1	1.1
-100	115	SP	120	12374.0	6240.0	6134.0	0.6	3373.7	9613.7	72.0	8424.0	85.0	8925.0	1.1	1.1
-101	116	SP	120	12494.0	6302.4	6191.6	0.6	3405.4	9707.8	72.0	8496.0	85.0	9010.0	1.1	1.1
-102	117	SP	120	12614.0	6364.8	6249.2	0.6	3437.1	9801.9	72.0	8568.0	85.0	9095.0	1.1	1.1
-103	118	SP	120	12734.0	6427.2	6306.8	0.6	3468.7	9895.9	72.0	8640.0	85.0	9180.0	1.1	1.1
-104	119	SP	120	12854.0	6489.6	6364.4	0.6	3500.4	9990.0	72.0	8712.0	85.0	9265.0	1.1	1.1
-105	120	SP	120	12974.0	6552.0	6422.0	0.6	3532.1	10084.1	72.0	8784.0	85.0	9350.0	1.1	1.1
-106	121	SP	120	13094.0	6614.4	6479.6	0.6	3563.8	10178.2	72.0	8856.0	85.0	9435.0	1.1	1.1
-107	122	SP	120	13214.0	6676.8	6537.2	0.6	3595.5	10272.3	72.0	8928.0	85.0	9520.0	1.2	1.1
-108	123	SP	120	13334.0	6739.2	6594.8	0.6	3627.1	10366.3	72.0	9000.0	85.0	9605.0	1.2	1.1
-109	124	SP	120	13454.0	6801.6	6652.4	0.6	3658.8	10460.4	72.0	9072.0	85.0	9690.0	1.2	1.1
-110	125	SP	120	13574.0	6864.0	6710.0	0.6	3690.5	10554.5	72.0	9144.0	85.0	9775.0	1.2	1.1
-111	126	SP	120	13694.0	6926.4	6767.6	0.6	3722.2	10648.6	72.0	9216.0	85.0	9860.0	1.2	1.1
-112	127	SP	120	13814.0	6988.8	6825.2	0.6	3753.9	10742.7	72.0	9288.0	85.0	9945.0	1.2	1.1
-113	128	SP	120	13934.0	7051.2	6882.8	0.6	3785.5	10836.7	72.0	9360.0	85.0	10030.0	1.2	1.1
-114	129	SP	120	14054.0	7113.6	6940.4	0.6	3817.2	10930.8	72.0	9432.0	85.0	10115.0	1.2	1.1
-115	130	SP	120	14054.0	7176.0	6878.0	0.6	3782.9	10958.9	72.0	9504.0	85.0	10200.0	1.2	1.1

Table 2c - Middle River; HSA through levee embankment, followed by RW

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
15	0	SP	95	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
14	1	SP	95	57.0	0.0	57.0	0.6	31.4	31.4	72.0	0.0	85.0	0.0	NA	NA
13	2	SP	95	114.0	0.0	114.0	0.6	62.7	62.7	72.0	0.0	85.0	0.0	NA	NA
12	3	SP	95	171.0	0.0	171.0	0.6	94.1	94.1	72.0	0.0	85.0	0.0	NA	NA
11	4	SP	95	228.0	0.0	228.0	0.6	125.4	125.4	72.0	0.0	85.0	0.0	NA	NA
10	5	SP	95	285.0	0.0	285.0	0.6	156.8	156.8	72.0	0.0	85.0	0.0	NA	NA
9	6	SP	95	342.0	0.0	342.0	0.6	188.1	188.1	72.0	0.0	85.0	0.0	NA	NA
8	7	SP	95	399.0	0.0	399.0	0.6	219.5	219.5	72.0	0.0	85.0	0.0	NA	NA
7	8	SP	95	456.0	0.0	456.0	0.6	250.8	250.8	72.0	0.0	85.0	0.0	NA	NA
6	9	SP	95	513.0	0.0	513.0	0.6	282.2	282.2	72.0	0.0	85.0	0.0	NA	NA
5	10	SP	95	570.0	0.0	570.0	0.6	313.5	313.5	72.0	0.0	85.0	0.0	NA	NA
4	11	SP	95	627.0	0.0	627.0	0.6	344.9	344.9	72.0	0.0	85.0	85.0	NA	4.1
3	12	SP	105	684.0	0.0	684.0	0.6	376.2	376.2	72.0	0.0	85.0	170.0	NA	2.2
2	13	SM	105	747.0	62.4	684.6	0.6	376.5	438.9	72.0	0.0	85.0	255.0	NA	1.7
1	14	SM	105	810.0	124.8	685.2	0.6	376.9	501.7	72.0	0.0	85.0	340.0	NA	1.5
0	15	SP	105	873.0	187.2	685.8	0.6	377.2	564.4	72.0	0.0	85.0	425.0	NA	1.3
-1	16	SP	105	978.0	249.6	728.4	0.6	400.6	650.2	72.0	0.0	85.0	510.0	NA	1.3
-2	17	SP	105	1083.0	312.0	771.0	0.6	424.1	736.1	72.0	0.0	85.0	595.0	NA	1.2
-3	18	SP	105	1188.0	374.4	813.6	0.6	447.5	821.9	72.0	0.0	85.0	680.0	NA	1.2
-4	19	SP	105	1293.0	436.8	856.2	0.6	470.9	907.7	72.0	0.0	85.0	765.0	NA	1.2
-5	20	CH	95	1398.0	499.2	898.8	0.6	494.3	993.5	72.0	0.0	85.0	850.0	NA	1.2
-6	21	CH	95	1493.0	561.6	931.4	0.6	512.3	1073.9	72.0	0.0	85.0	935.0	NA	1.1
-7	22	CH	95	1588.0	624.0	964.0	0.6	530.2	1154.2	72.0	0.0	85.0	1020.0	NA	1.1
-8	23	CH	95	1683.0	686.4	996.6	0.6	548.1	1234.5	72.0	0.0	85.0	1105.0	NA	1.1
-9	24	CH	95	1778.0	748.8	1029.2	0.6	566.1	1314.9	72.0	0.0	85.0	1190.0	NA	1.1
-10	25	CH	95	1873.0	811.2	1061.8	0.6	584.0	1395.2	72.0	0.0	85.0	1275.0	NA	1.1
-11	26	CH	95	1968.0	873.6	1094.4	0.6	601.9	1475.5	72.0	0.0	85.0	1360.0	NA	1.1
-12	27	CH	95	2063.0	936.0	1127.0	0.6	619.9	1555.9	72.0	0.0	85.0	1445.0	NA	1.1
-13	28	CH	95	2158.0	998.4	1159.6	0.6	637.8	1636.2	72.0	0.0	85.0	1530.0	NA	1.1
-14	29	CH	105	2253.0	1060.8	1192.2	0.6	655.7	1716.5	72.0	0.0	85.0	1615.0	NA	1.1
-15	30	CH	105	2358.0	1123.2	1234.8	0.6	679.1	1802.3	72.0	0.0	85.0	1700.0	NA	1.1
-16	31	CH	105	2463.0	1185.6	1277.4	0.6	702.6	1888.2	72.0	0.0	85.0	1785.0	NA	1.1
-17	32	SM	125	2568.0	1248.0	1320.0	0.6	726.0	1974.0	72.0	0.0	85.0	1870.0	NA	1.1
-18	33	SM	125	2693.0	1310.4	1382.6	0.6	760.4	2070.8	72.0	0.0	85.0	1955.0	NA	1.1
-19	34	SM	125	2818.0	1372.8	1445.2	0.6	794.9	2167.7	72.0	0.0	85.0	2040.0	NA	1.1
-20	35	SM	125	2943.0	1435.2	1507.8	0.6	829.3	2264.5	72.0	0.0	85.0	2125.0	NA	1.1
-21	36	SM	125	3068.0	1497.6	1570.4	0.6	863.7	2361.3	72.0	0.0	85.0	2210.0	NA	1.1
-22	37	SM	125	3193.0	1560.0	1633.0	0.6	898.2	2458.2	72.0	0.0	85.0	2295.0	NA	1.1
-23	38	SM	125	3318.0	1622.4	1695.6	0.6	932.6	2555.0	72.0	0.0	85.0	2380.0	NA	1.1
-24	39	SM	125	3443.0	1684.8	1758.2	0.6	967.0	2651.8	72.0	0.0	85.0	2465.0	NA	1.1
-25	40	SM	125	3568.0	1747.2	1820.8	0.6	1001.4	2748.6	72.0	0.0	85.0	2550.0	NA	1.1
-26	41	SM	125	3693.0	1809.6	1883.4	0.6	1035.9	2845.5	72.0	0.0	85.0	2635.0	NA	1.1
-27	42	SM	125	3818.0	1872.0	1946.0	0.6	1070.3	2942.3	72.0	0.0	85.0	2720.0	NA	1.1
-28	43	SM	125	3943.0	1934.4	2008.6	0.6	1104.7	3039.1	72.0	0.0	85.0	2805.0	NA	1.1
-29	44	SM	125	4068.0	1996.8	2071.2	0.6	1139.2	3136.0	72.0	0.0	85.0	2890.0	NA	1.1
-30	45	SM	125	4193.0	2059.2	2133.8	0.6	1173.6	3232.8	72.0	0.0	85.0	2975.0	NA	1.1
-31	46	SM	125	4318.0	2121.6	2196.4	0.6	1208.0	3329.6	72.0	0.0	85.0	3060.0	NA	1.1
-32	47	SM	125	4443.0	2184.0	2259.0	0.6	1242.5	3426.5	72.0	0.0	85.0	3145.0	NA	1.1
-33	48	SM	125	4568.0	2246.4	2321.6	0.6	1276.9	3523.3	72.0	0.0	85.0	3230.0	NA	1.1
-34	49	SM	125	4693.0	2308.8	2384.2	0.6	1311.3	3620.1	72.0	0.0	85.0	3315.0	NA	1.1
-35	50	CH	105	4818.0	2371.2	2446.8	0.6	1345.7	3716.9	72.0	0.0	85.0	3400.0	NA	1.1
-36	51	CH	105	4923.0	2433.6	2489.4	0.6	1369.2	3802.8	72.0	0.0	85.0	3485.0	NA	1.1
-37	52	CH	105	5028.0	2496.0	2532.0	0.6	1392.6	3888.6	72.0	0.0	85.0	3570.0	NA	1.1
-38	53	CH	105	5133.0	2558.4	2574.6	0.6	1416.0	3974.4	72.0	0.0	85.0	3655.0	NA	1.1
-39	54	CH	105	5238.0	2620.8	2617.2	0.6	1439.5	4060.3	72.0	0.0	85.0	3740.0	NA	1.1
-40	55	CH	105	5343.0	2683.2	2659.8	0.6	1462.9	4146.1	72.0	0.0	85.0	3825.0	NA	1.1

Table 2c - Middle River; HSA through levee embankment, followed by RW

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-41	56	CH	105	5448.0	2745.6	2702.4	0.6	1486.3	4231.9	72.0	0.0	85.0	3910.0	NA	1.1
-42	57	CH	105	5553.0	2808.0	2745.0	0.6	1509.8	4317.8	72.0	0.0	85.0	3995.0	NA	1.1
-43	58	CH	105	5658.0	2870.4	2787.6	0.6	1533.2	4403.6	72.0	0.0	85.0	4080.0	NA	1.1
-44	59	CH	105	5763.0	2932.8	2830.2	0.6	1556.6	4489.4	72.0	0.0	85.0	4165.0	NA	1.1
-45	60	CH	105	5868.0	2995.2	2872.8	0.6	1580.0	4575.2	72.0	4464.0	85.0	4250.0	1.0	1.1
-46	61	CH	105	5973.0	3057.6	2915.4	0.6	1603.5	4661.1	72.0	4536.0	85.0	4335.0	1.0	1.1
-47	62	CH	105	6078.0	3120.0	2958.0	0.6	1626.9	4746.9	72.0	4608.0	85.0	4420.0	1.0	1.1
-48	63	CH	105	6183.0	3182.4	3000.6	0.6	1650.3	4832.7	72.0	4680.0	85.0	4505.0	1.0	1.1
-49	64	CH	105	6288.0	3244.8	3043.2	0.6	1673.8	4918.6	72.0	4752.0	85.0	4590.0	1.0	1.1
-50	65	CH	105	6393.0	3307.2	3085.8	0.6	1697.2	5004.4	72.0	4824.0	85.0	4675.0	1.0	1.1
-51	66	CH	105	6498.0	3369.6	3128.4	0.6	1720.6	5090.2	72.0	4896.0	85.0	4760.0	1.0	1.1
-52	67	CH	105	6603.0	3432.0	3171.0	0.6	1744.1	5176.1	72.0	4968.0	85.0	4845.0	1.0	1.1
-53	68	CH	105	6708.0	3494.4	3213.6	0.6	1767.5	5261.9	72.0	5040.0	85.0	4930.0	1.0	1.1
-54	69	CH	105	6813.0	3556.8	3256.2	0.6	1790.9	5347.7	72.0	5112.0	85.0	5015.0	1.0	1.1
-55	70	CH	105	6918.0	3619.2	3298.8	0.6	1814.3	5433.5	72.0	5184.0	85.0	5100.0	1.0	1.1
-56	71	CH	105	7023.0	3681.6	3341.4	0.6	1837.8	5519.4	72.0	5256.0	85.0	5185.0	1.1	1.1
-57	72	SP	120	7128.0	3744.0	3384.0	0.6	1861.2	5605.2	72.0	5328.0	85.0	5270.0	1.1	1.1
-58	73	SP	120	7248.0	3806.4	3441.6	0.6	1892.9	5699.3	72.0	5400.0	85.0	5355.0	1.1	1.1
-59	74	SP	120	7368.0	3868.8	3499.2	0.6	1924.6	5793.4	72.0	5472.0	85.0	5440.0	1.1	1.1
-60	75	SP	120	7488.0	3931.2	3556.8	0.6	1956.2	5887.4	72.0	5544.0	85.0	5525.0	1.1	1.1
-61	76	SP	120	7608.0	3993.6	3614.4	0.6	1987.9	5981.5	72.0	5616.0	85.0	5610.0	1.1	1.1
-62	77	SP	120	7728.0	4056.0	3672.0	0.6	2019.6	6075.6	72.0	5688.0	85.0	5695.0	1.1	1.1
-63	78	SP	120	7848.0	4118.4	3729.6	0.6	2051.3	6169.7	72.0	5760.0	85.0	5780.0	1.1	1.1
-64	79	SP	120	7968.0	4180.8	3787.2	0.6	2083.0	6263.8	72.0	5832.0	85.0	5865.0	1.1	1.1
-65	80	SP	120	8088.0	4243.2	3844.8	0.6	2114.6	6357.8	72.0	5904.0	85.0	5950.0	1.1	1.1
-66	81	SP	120	8208.0	4305.6	3902.4	0.6	2146.3	6451.9	72.0	5976.0	85.0	6035.0	1.1	1.1
-67	82	SP	120	8328.0	4368.0	3960.0	0.6	2178.0	6546.0	72.0	6048.0	85.0	6120.0	1.1	1.1
-68	83	SP	120	8448.0	4430.4	4017.6	0.6	2209.7	6640.1	72.0	6120.0	85.0	6205.0	1.1	1.1
-69	84	SP	120	8568.0	4492.8	4075.2	0.6	2241.4	6734.2	72.0	6192.0	85.0	6290.0	1.1	1.1
-70	85	SP	120	8688.0	4555.2	4132.8	0.6	2273.0	6828.2	72.0	6264.0	85.0	6375.0	1.1	1.1
-71	86	SP	120	8808.0	4617.6	4190.4	0.6	2304.7	6922.3	72.0	6336.0	85.0	6460.0	1.1	1.1
-72	87	SP	120	8928.0	4680.0	4248.0	0.6	2336.4	7016.4	72.0	6408.0	85.0	6545.0	1.1	1.1
-73	88	SP	120	9048.0	4742.4	4305.6	0.6	2368.1	7110.5	72.0	6480.0	85.0	6630.0	1.1	1.1
-74	89	SP	120	9168.0	4804.8	4363.2	0.6	2399.8	7204.6	72.0	6552.0	85.0	6715.0	1.1	1.1
-75	90	SP	120	9288.0	4867.2	4420.8	0.6	2431.4	7298.6	72.0	6624.0	85.0	6800.0	1.1	1.1
-76	91	SP	120	9408.0	4929.6	4478.4	0.6	2463.1	7392.7	72.0	6696.0	85.0	6885.0	1.1	1.1
-77	92	SP	120	9528.0	4992.0	4536.0	0.6	2494.8	7486.8	72.0	6768.0	85.0	6970.0	1.1	1.1
-78	93	SP	120	9648.0	5054.4	4593.6	0.6	2526.5	7580.9	72.0	6840.0	85.0	7055.0	1.1	1.1
-79	94	SP	120	9768.0	5116.8	4651.2	0.6	2558.2	7675.0	72.0	6912.0	85.0	7140.0	1.1	1.1
-80	95	SP	120	9888.0	5179.2	4708.8	0.6	2589.8	7769.0	72.0	6984.0	85.0	7225.0	1.1	1.1
-81	96	SP	120	10008.0	5241.6	4766.4	0.6	2621.5	7863.1	72.0	7056.0	85.0	7310.0	1.1	1.1
-82	97	CH	105	10128.0	5304.0	4824.0	0.6	2653.2	7957.2	72.0	7128.0	85.0	7395.0	1.1	1.1
-83	98	CH	105	10233.0	5366.4	4866.6	0.6	2676.6	8043.0	72.0	7200.0	85.0	7480.0	1.1	1.1
-84	99	CH	105	10338.0	5428.8	4909.2	0.6	2700.1	8128.9	72.0	7272.0	85.0	7565.0	1.1	1.1
-85	100	CH	105	10443.0	5491.2	4951.8	0.6	2723.5	8214.7	72.0	7344.0	85.0	7650.0	1.1	1.1
-86	101	CH	105	10548.0	5553.6	4994.4	0.6	2746.9	8300.5	72.0	7416.0	85.0	7735.0	1.1	1.1
-87	102	CH	105	10653.0	5616.0	5037.0	0.6	2770.4	8386.4	72.0	7488.0	85.0	7820.0	1.1	1.1
-88	103	CH	105	10758.0	5678.4	5079.6	0.6	2793.8	8472.2	72.0	7560.0	85.0	7905.0	1.1	1.1
-89	104	CH	105	10863.0	5740.8	5122.2	0.6	2817.2	8558.0	72.0	7632.0	85.0	7990.0	1.1	1.1
-90	105	CH	105	10968.0	5803.2	5164.8	0.6	2840.6	8643.8	72.0	7704.0	85.0	8075.0	1.1	1.1
-91	106	CH	105	11073.0	5865.6	5207.4	0.6	2864.1	8729.7	72.0	7776.0	85.0	8160.0	1.1	1.1
-92	107	CH	105	11178.0	5928.0	5250.0	0.6	2887.5	8815.5	72.0	7848.0	85.0	8245.0	1.1	1.1
-93	108	CH	105	11283.0	5990.4	5292.6	0.6	2910.9	8901.3	72.0	7920.0	85.0	8330.0	1.1	1.1
-94	109	CH	105	11388.0	6052.8	5335.2	0.6	2934.4	8987.2	72.0	7992.0	85.0	8415.0	1.1	1.1
-95	110	CH	105	11493.0	6115.2	5377.8	0.6	2957.8	9073.0	72.0	8064.0	85.0	8500.0	1.1	1.1
-96	111	CH	105	11598.0	6177.6	5420.4	0.6	2981.2	9158.8	72.0	8136.0	85.0	8585.0	1.1	1.1

Table 2c - Middle River; HSA through levee embankment, followed by RW

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-97	112	ML	115	11703.0	6240.0	5463.0	0.6	3004.7	9244.7	72.0	8208.0	85.0	8670.0	1.1	1.1
-98	113	ML	115	11818.0	6302.4	5515.6	0.6	3033.6	9336.0	72.0	8280.0	85.0	8755.0	1.1	1.1
-99	114	ML	115	11933.0	6364.8	5568.2	0.6	3062.5	9427.3	72.0	8352.0	85.0	8840.0	1.1	1.1
-100	115	ML	115	12048.0	6427.2	5620.8	0.6	3091.4	9518.6	72.0	8424.0	85.0	8925.0	1.1	1.1
-101	116	ML	115	12163.0	6489.6	5673.4	0.6	3120.4	9610.0	72.0	8496.0	85.0	9010.0	1.1	1.1
-102	117	SM	105	12278.0	6552.0	5726.0	0.6	3149.3	9701.3	72.0	8568.0	85.0	9095.0	1.1	1.1
-103	118	SM	105	12383.0	6614.4	5768.6	0.6	3172.7	9787.1	72.0	8640.0	85.0	9180.0	1.1	1.1
-104	119	SM	105	12488.0	6676.8	5811.2	0.6	3196.2	9873.0	72.0	8712.0	85.0	9265.0	1.1	1.1
-105	120	SP	120	12593.0	6739.2	5853.8	0.6	3219.6	9958.8	72.0	8784.0	85.0	9350.0	1.1	1.1
-106	121	SP	120	12713.0	6801.6	5911.4	0.6	3251.3	10052.9	72.0	8856.0	85.0	9435.0	1.1	1.1
-107	122	SP	120	12833.0	6864.0	5969.0	0.6	3283.0	10147.0	72.0	8928.0	85.0	9520.0	1.1	1.1
-108	123	SP	120	12953.0	6926.4	6026.6	0.6	3314.6	10241.0	72.0	9000.0	85.0	9605.0	1.1	1.1
-109	124	SP	120	13073.0	6988.8	6084.2	0.6	3346.3	10335.1	72.0	9072.0	85.0	9690.0	1.1	1.1
-110	125	SP	120	13193.0	7051.2	6141.8	0.6	3378.0	10429.2	72.0	9144.0	85.0	9775.0	1.1	1.1
-111	126	SP	120	13313.0	7113.6	6199.4	0.6	3409.7	10523.3	72.0	9216.0	85.0	9860.0	1.1	1.1
-112	127	SP	120	13433.0	7176.0	6257.0	0.6	3441.4	10617.4	72.0	9288.0	85.0	9945.0	1.1	1.1
-113	128	SP	120	13553.0	7238.4	6314.6	0.6	3473.0	10711.4	72.0	9360.0	85.0	10030.0	1.1	1.1
-114	129	SP	120	13673.0	7300.8	6372.2	0.6	3504.7	10805.5	72.0	9432.0	85.0	10115.0	1.1	1.1
-115	130	SP	120	13673.0	7363.2	6309.8	0.6	3470.4	10833.6	72.0	9504.0	85.0	10200.0	1.1	1.1

Table 3a- Grant Line; CPT through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
12	0	ML	110	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
11	1	ML	110	66.0	0.0	66.0	0.6	36.3	36.3	72.0	0.0	85.0	0.0	NA	NA
10	2	ML	110	132.0	0.0	132.0	0.6	72.6	72.6	72.0	0.0	85.0	0.0	NA	NA
9	3	ML	110	198.0	0.0	198.0	0.6	108.9	108.9	72.0	0.0	85.0	0.0	NA	NA
8	4	ML	110	264.0	0.0	264.0	0.6	145.2	145.2	72.0	0.0	85.0	0.0	NA	NA
7	5	ML	110	330.0	0.0	330.0	0.6	181.5	181.5	72.0	0.0	85.0	0.0	NA	NA
6	6	ML	110	396.0	0.0	396.0	0.6	217.8	217.8	72.0	0.0	85.0	0.0	NA	NA
5	7	ML	110	462.0	0.0	462.0	0.6	254.1	254.1	72.0	0.0	85.0	0.0	NA	NA
4	8	ML	110	528.0	0.0	528.0	0.6	290.4	290.4	72.0	0.0	85.0	0.0	NA	NA
3	9	ML	110	594.0	0.0	594.0	0.6	326.7	326.7	72.0	0.0	85.0	0.0	NA	NA
2	10	CH	90	660.0	0.0	660.0	0.6	363.0	363.0	72.0	0.0	85.0	0.0	NA	NA
1	11	CH	90	714.0	0.0	714.0	0.6	392.7	392.7	72.0	0.0	85.0	85.0	NA	4.6
0	12	CH	95	768.0	0.0	768.0	0.6	422.4	422.4	72.0	0.0	85.0	170.0	NA	2.5
-1	13	CH	95	825.0	62.4	762.6	0.6	419.4	481.8	72.0	0.0	85.0	255.0	NA	1.9
-2	14	CH	95	882.0	124.8	757.2	0.6	416.5	541.3	72.0	0.0	85.0	340.0	NA	1.6
-3	15	CH	95	939.0	187.2	751.8	0.6	413.5	600.7	72.0	0.0	85.0	425.0	NA	1.4
-4	16	CH	95	1034.0	249.6	784.4	0.6	431.4	681.0	72.0	0.0	85.0	510.0	NA	1.3
-5	17	CH	95	1129.0	312.0	817.0	0.6	449.4	761.4	72.0	0.0	85.0	595.0	NA	1.3
-6	18	CH	95	1224.0	374.4	849.6	0.6	467.3	841.7	72.0	0.0	85.0	680.0	NA	1.2
-7	19	CH	95	1319.0	436.8	882.2	0.6	485.2	922.0	72.0	0.0	85.0	765.0	NA	1.2
-8	20	CH	95	1414.0	499.2	914.8	0.6	503.1	1002.3	72.0	0.0	85.0	850.0	NA	1.2
-9	21	CH	95	1509.0	561.6	947.4	0.6	521.1	1082.7	72.0	0.0	85.0	935.0	NA	1.2
-10	22	CH	95	1604.0	624.0	980.0	0.6	539.0	1163.0	72.0	0.0	85.0	1020.0	NA	1.1
-11	23	CH	95	1699.0	686.4	1012.6	0.6	556.9	1243.3	72.0	0.0	85.0	1105.0	NA	1.1
-12	24	CH	95	1794.0	748.8	1045.2	0.6	574.9	1323.7	72.0	0.0	85.0	1190.0	NA	1.1
-13	25	CL	125	1889.0	811.2	1077.8	0.6	592.8	1404.0	72.0	0.0	85.0	1275.0	NA	1.1
-14	26	CL	125	2014.0	873.6	1140.4	0.6	627.2	1500.8	72.0	0.0	85.0	1360.0	NA	1.1
-15	27	CL	125	2139.0	936.0	1203.0	0.6	661.7	1597.7	72.0	0.0	85.0	1445.0	NA	1.1
-16	28	CL	125	2264.0	998.4	1265.6	0.6	696.1	1694.5	72.0	0.0	85.0	1530.0	NA	1.1
-17	29	CL	125	2389.0	1060.8	1328.2	0.6	730.5	1791.3	72.0	0.0	85.0	1615.0	NA	1.1
-18	30	CL	125	2514.0	1123.2	1390.8	0.6	764.9	1888.1	72.0	0.0	85.0	1700.0	NA	1.1
-19	31	CL	125	2639.0	1185.6	1453.4	0.6	799.4	1985.0	72.0	0.0	85.0	1785.0	NA	1.1
-20	32	CL	125	2764.0	1248.0	1516.0	0.6	833.8	2081.8	72.0	0.0	85.0	1870.0	NA	1.1
-21	33	CL	125	2889.0	1310.4	1578.6	0.6	868.2	2178.6	72.0	0.0	85.0	1955.0	NA	1.1
-22	34	CL	125	3014.0	1372.8	1641.2	0.6	902.7	2275.5	72.0	0.0	85.0	2040.0	NA	1.1
-23	35	CL	125	3139.0	1435.2	1703.8	0.6	937.1	2372.3	72.0	0.0	85.0	2125.0	NA	1.1
-24	36	CL	125	3264.0	1497.6	1766.4	0.6	971.5	2469.1	72.0	0.0	85.0	2210.0	NA	1.1
-25	37	CL	125	3389.0	1560.0	1829.0	0.6	1006.0	2566.0	72.0	0.0	85.0	2295.0	NA	1.1
-26	38	CL	125	3514.0	1622.4	1891.6	0.6	1040.4	2662.8	72.0	0.0	85.0	2380.0	NA	1.1
-27	39	CL	125	3639.0	1684.8	1954.2	0.6	1074.8	2759.6	72.0	0.0	85.0	2465.0	NA	1.1
-28	40	CL	125	3764.0	1747.2	2016.8	0.6	1109.2	2856.4	72.0	0.0	85.0	2550.0	NA	1.1
-29	41	CL	125	3889.0	1809.6	2079.4	0.6	1143.7	2953.3	72.0	0.0	85.0	2635.0	NA	1.1
-30	42	SP	120	4014.0	1872.0	2142.0	0.6	1178.1	3050.1	72.0	0.0	85.0	2720.0	NA	1.1
-31	43	SP	120	4134.0	1934.4	2199.6	0.6	1209.8	3144.2	72.0	0.0	85.0	2805.0	NA	1.1
-32	44	SP	120	4254.0	1996.8	2257.2	0.6	1241.5	3238.3	72.0	0.0	85.0	2890.0	NA	1.1
-33	45	SP	120	4374.0	2059.2	2314.8	0.6	1273.1	3332.3	72.0	0.0	85.0	2975.0	NA	1.1
-34	46	CL	125	4494.0	2121.6	2372.4	0.6	1304.8	3426.4	72.0	0.0	85.0	3060.0	NA	1.1
-35	47	CL	125	4619.0	2184.0	2435.0	0.6	1339.3	3523.3	72.0	0.0	85.0	3145.0	NA	1.1
-36	48	CL	125	4744.0	2246.4	2497.6	0.6	1373.7	3620.1	72.0	0.0	85.0	3230.0	NA	1.1
-37	49	CL	125	4869.0	2308.8	2560.2	0.6	1408.1	3716.9	72.0	0.0	85.0	3315.0	NA	1.1
-38	50	CL	125	4994.0	2371.2	2622.8	0.6	1442.5	3813.7	72.0	0.0	85.0	3400.0	NA	1.1
-39	51	CL	125	5119.0	2433.6	2685.4	0.6	1477.0	3910.6	72.0	0.0	85.0	3485.0	NA	1.1
-40	52	CL	125	5244.0	2496.0	2748.0	0.6	1511.4	4007.4	72.0	0.0	85.0	3570.0	NA	1.1
-41	53	CH	105	5369.0	2558.4	2810.6	0.6	1545.8	4104.2	72.0	0.0	85.0	3655.0	NA	1.1
-42	54	CH	105	5474.0	2620.8	2853.2	0.6	1569.3	4190.1	72.0	0.0	85.0	3740.0	NA	1.1
-43	55	CH	105	5579.0	2683.2	2895.8	0.6	1592.7	4275.9	72.0	0.0	85.0	3825.0	NA	1.1

Table 3a- Grant Line; CPT through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-44	56	CH	105	5684.0	2745.6	2938.4	0.6	1616.1	4361.7	72.0	0.0	85.0	3910.0	NA	1.1
-45	57	CH	105	5789.0	2808.0	2981.0	0.6	1639.6	4447.6	72.0	0.0	85.0	3995.0	NA	1.1
-46	58	CH	105	5894.0	2870.4	3023.6	0.6	1663.0	4533.4	72.0	0.0	85.0	4080.0	NA	1.1
-47	59	CH	105	5999.0	2932.8	3066.2	0.6	1686.4	4619.2	72.0	0.0	85.0	4165.0	NA	1.1
-48	60	CH	105	6104.0	2995.2	3108.8	0.6	1709.8	4705.0	72.0	0.0	85.0	4250.0	NA	1.1
-49	61	CH	105	6209.0	3057.6	3151.4	0.6	1733.3	4790.9	72.0	0.0	85.0	4335.0	NA	1.1
-50	62	CH	105	6314.0	3120.0	3194.0	0.6	1756.7	4876.7	72.0	0.0	85.0	4420.0	NA	1.1
-51	63	CH	105	6419.0	3182.4	3236.6	0.6	1780.1	4962.5	72.0	0.0	85.0	4505.0	NA	1.1
-52	64	ML	115	6524.0	3244.8	3279.2	0.6	1803.6	5048.4	72.0	0.0	85.0	4590.0	NA	1.1
-53	65	CH	105	6639.0	3307.2	3331.8	0.6	1832.5	5139.7	72.0	0.0	85.0	4675.0	NA	1.1
-54	66	CH	105	6744.0	3369.6	3374.4	0.6	1855.9	5225.5	72.0	0.0	85.0	4760.0	NA	1.1
-55	67	CH	105	6849.0	3432.0	3417.0	0.6	1879.4	5311.4	72.0	0.0	85.0	4845.0	NA	1.1
-56	68	CH	105	6954.0	3494.4	3459.6	0.6	1902.8	5397.2	72.0	0.0	85.0	4930.0	NA	1.1
-57	69	CH	105	7059.0	3556.8	3502.2	0.6	1926.2	5483.0	72.0	0.0	85.0	5015.0	NA	1.1
-58	70	CH	105	7164.0	3619.2	3544.8	0.6	1949.6	5568.8	72.0	0.0	85.0	5100.0	NA	1.1
-59	71	CH	105	7269.0	3681.6	3587.4	0.6	1973.1	5654.7	72.0	0.0	85.0	5185.0	NA	1.1
-60	72	CH	105	7374.0	3744.0	3630.0	0.6	1996.5	5740.5	72.0	0.0	85.0	5270.0	NA	1.1
-61	73	CH	105	7479.0	3806.4	3672.6	0.6	2019.9	5826.3	72.0	0.0	85.0	5355.0	NA	1.1
-62	74	CH	105	7584.0	3868.8	3715.2	0.6	2043.4	5912.2	72.0	0.0	85.0	5440.0	NA	1.1
-63	75	CH	105	7689.0	3931.2	3757.8	0.6	2066.8	5998.0	72.0	0.0	85.0	5525.0	NA	1.1
-64	76	CH	105	7794.0	3993.6	3800.4	0.6	2090.2	6083.8	72.0	0.0	85.0	5610.0	NA	1.1
-65	77	CH	105	7899.0	4056.0	3843.0	0.6	2113.7	6169.7	72.0	0.0	85.0	5695.0	NA	1.1
-66	78	CH	105	8004.0	4118.4	3885.6	0.6	2137.1	6255.5	72.0	0.0	85.0	5780.0	NA	1.1
-67	79	CH	105	8109.0	4180.8	3928.2	0.6	2160.5	6341.3	72.0	0.0	85.0	5865.0	NA	1.1
-68	80	CH	105	8214.0	4243.2	3970.8	0.6	2183.9	6427.1	72.0	0.0	85.0	5950.0	NA	1.1
-69	81	CH	105	8319.0	4305.6	4013.4	0.6	2207.4	6513.0	72.0	0.0	85.0	6035.0	NA	NA
-70	82	CH	105	8424.0	4368.0	4056.0	0.6	2230.8	6598.8	72.0	0.0	85.0	6120.0	NA	NA
-71	83	CH	105	8529.0	4430.4	4098.6	0.6	2254.2	6684.6	72.0	0.0	85.0	6205.0	NA	NA
-72	84	CH	105	8634.0	4492.8	4141.2	0.6	2277.7	6770.5	72.0	0.0	85.0	6290.0	NA	NA
-73	85	CH	105	8739.0	4555.2	4183.8	0.6	2301.1	6856.3	72.0	0.0	85.0	6375.0	NA	NA
-74	86	CH	105	8844.0	4617.6	4226.4	0.6	2324.5	6942.1	72.0	0.0	85.0	6460.0	NA	NA
-75	87	SM	105	8949.0	4680.0	4269.0	0.6	2348.0	7028.0	72.0	0.0	85.0	6545.0	NA	NA
-76	88	SM	105	9054.0	4742.4	4311.6	0.6	2371.4	7113.8	72.0	0.0	85.0	6630.0	NA	NA
-77	89	SM	105	9159.0	4804.8	4354.2	0.6	2394.8	7199.6	72.0	0.0	85.0	6715.0	NA	NA
-78	90	SM	105	9264.0	4867.2	4396.8	0.6	2418.2	7285.4	72.0	0.0	85.0	6800.0	NA	NA
-79	91	SM	105	9369.0	4929.6	4439.4	0.6	2441.7	7371.3	72.0	0.0	85.0	6885.0	NA	NA
-80	92	SM	105	9474.0	4992.0	4482.0	0.6	2465.1	7457.1	72.0	0.0	85.0	6970.0	NA	NA
-81	93	SM	105	9579.0	5054.4	4524.6	0.6	2488.5	7542.9	72.0	0.0	85.0	7055.0	NA	NA
-82	94	SM	105	9684.0	5116.8	4567.2	0.6	2512.0	7628.8	72.0	0.0	85.0	7140.0	NA	NA
-83	95	SM	105	9789.0	5179.2	4609.8	0.6	2535.4	7714.6	72.0	0.0	85.0	7225.0	NA	NA
-84	96	SM	105	9894.0	5241.6	4652.4	0.6	2558.8	7800.4	72.0	0.0	85.0	7310.0	NA	NA
-85	97	SM	105	9999.0	5304.0	4695.0	0.6	2582.3	7886.3	72.0	0.0	85.0	7395.0	NA	NA
-86	98	SM	105	10104.0	5366.4	4737.6	0.6	2605.7	7972.1	72.0	0.0	85.0	7480.0	NA	NA
-87	99	SM	105	10209.0	5428.8	4780.2	0.6	2629.1	8057.9	72.0	0.0	85.0	7565.0	NA	NA
-88	100	CH	105	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-89	101	CH	105	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-90	102	CH	105	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-91	103	CH	105	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-92	104	CH	105	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-93	105	CH	105	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-94	106	CH	105	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-95	107	ML	115	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-96	108	ML	115	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-97	109	ML	115	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-98	110	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-99	111	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA

Table 3a- Grant Line; CPT through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-100	112	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-101	113	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-102	114	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-103	115	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-104	116	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-105	117	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-106	118	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-107	119	SM	125	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-108	120	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-109	121	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-110	122	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-111	123	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-112	124	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-113	125	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-114	126	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-115	127	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-116	128	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-117	129	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA
-118	130	SP	120	10209.0	5491.2	4717.8	0.6	2594.8	8086.0	72.0	0.0	85.0	7650.0	NA	NA

Table 3b - Old River; CPT through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
15	0	CL	120	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
14	1	CL	120	72.0	0.0	72.0	0.6	39.6	39.6	72.0	0.0	85.0	0.0	NA	NA
13	2	CL	120	144.0	0.0	144.0	0.6	79.2	79.2	72.0	0.0	85.0	0.0	NA	NA
12	3	CL	120	216.0	0.0	216.0	0.6	118.8	118.8	72.0	0.0	85.0	0.0	NA	NA
11	4	CL	120	288.0	0.0	288.0	0.6	158.4	158.4	72.0	0.0	85.0	0.0	NA	NA
10	5	CL	120	360.0	0.0	360.0	0.6	198.0	198.0	72.0	0.0	85.0	0.0	NA	NA
9	6	CL	120	432.0	0.0	432.0	0.6	237.6	237.6	72.0	0.0	85.0	0.0	NA	NA
8	7	CL	120	504.0	0.0	504.0	0.6	277.2	277.2	72.0	0.0	85.0	0.0	NA	NA
7	8	CL	120	576.0	0.0	576.0	0.6	316.8	316.8	72.0	0.0	85.0	0.0	NA	NA
6	9	CL	120	648.0	0.0	648.0	0.6	356.4	356.4	72.0	0.0	85.0	0.0	NA	NA
5	10	CL	120	720.0	0.0	720.0	0.6	396.0	396.0	72.0	0.0	85.0	0.0	NA	NA
4	11	CL	120	792.0	0.0	792.0	0.6	435.6	435.6	72.0	0.0	85.0	85.0	NA	5.1
3	12	CH	100	864.0	0.0	864.0	0.6	475.2	475.2	72.0	0.0	85.0	170.0	NA	2.8
2	13	CH	100	924.0	0.0	924.0	0.6	508.2	508.2	72.0	0.0	85.0	255.0	NA	2.0
1	14	CH	100	984.0	0.0	984.0	0.6	541.2	541.2	72.0	0.0	85.0	340.0	NA	1.6
0	15	CH	105	1044.0	0.0	1044.0	0.6	574.2	574.2	72.0	0.0	85.0	425.0	NA	1.4
-1	16	CH	105	1149.0	62.4	1086.6	0.6	597.6	660.0	72.0	0.0	85.0	510.0	NA	1.3
-2	17	CH	105	1254.0	124.8	1129.2	0.6	621.1	745.9	72.0	0.0	85.0	595.0	NA	1.3
-3	18	CH	105	1359.0	187.2	1171.8	0.6	644.5	831.7	72.0	0.0	85.0	680.0	NA	1.2
-4	19	CH	105	1464.0	249.6	1214.4	0.6	667.9	917.5	72.0	0.0	85.0	765.0	NA	1.2
-5	20	CH	105	1569.0	312.0	1257.0	0.6	691.4	1003.4	72.0	0.0	85.0	850.0	NA	1.2
-6	21	CH	105	1674.0	374.4	1299.6	0.6	714.8	1089.2	72.0	0.0	85.0	935.0	NA	1.2
-7	22	CH	105	1779.0	436.8	1342.2	0.6	738.2	1175.0	72.0	0.0	85.0	1020.0	NA	1.2
-8	23	SP	105	1884.0	499.2	1384.8	0.6	761.6	1260.8	72.0	0.0	85.0	1105.0	NA	1.1
-9	24	SP	105	1989.0	561.6	1427.4	0.6	785.1	1346.7	72.0	0.0	85.0	1190.0	NA	1.1
-10	25	SP	105	2094.0	624.0	1470.0	0.6	808.5	1432.5	72.0	0.0	85.0	1275.0	NA	1.1
-11	26	SP	105	2199.0	686.4	1512.6	0.6	831.9	1518.3	72.0	0.0	85.0	1360.0	NA	1.1
-12	27	SP	105	2304.0	748.8	1555.2	0.6	855.4	1604.2	72.0	0.0	85.0	1445.0	NA	1.1
-13	28	CH	105	2409.0	811.2	1597.8	0.6	878.8	1690.0	72.0	0.0	85.0	1530.0	NA	1.1
-14	29	CH	105	2514.0	873.6	1640.4	0.6	902.2	1775.8	72.0	0.0	85.0	1615.0	NA	1.1
-15	30	CH	105	2619.0	936.0	1683.0	0.6	925.7	1861.7	72.0	0.0	85.0	1700.0	NA	1.1
-16	31	CH	105	2724.0	998.4	1725.6	0.6	949.1	1947.5	72.0	0.0	85.0	1785.0	NA	1.1
-17	32	CH	105	2829.0	1060.8	1768.2	0.6	972.5	2033.3	72.0	0.0	85.0	1870.0	NA	1.1
-18	33	CH	105	2934.0	1123.2	1810.8	0.6	995.9	2119.1	72.0	0.0	85.0	1955.0	NA	1.1
-19	34	CH	105	3039.0	1185.6	1853.4	0.6	1019.4	2205.0	72.0	0.0	85.0	2040.0	NA	1.1
-20	35	CH	105	3144.0	1248.0	1896.0	0.6	1042.8	2290.8	72.0	0.0	85.0	2125.0	NA	1.1
-21	36	CH	105	3249.0	1310.4	1938.6	0.6	1066.2	2376.6	72.0	0.0	85.0	2210.0	NA	1.1
-22	37	CH	105	3354.0	1372.8	1981.2	0.6	1089.7	2462.5	72.0	0.0	85.0	2295.0	NA	1.1
-23	38	CH	105	3459.0	1435.2	2023.8	0.6	1113.1	2548.3	72.0	0.0	85.0	2380.0	NA	1.1
-24	39	SM	125	3564.0	1497.6	2066.4	0.6	1136.5	2634.1	72.0	0.0	85.0	2465.0	NA	1.1
-25	40	SM	125	3689.0	1560.0	2129.0	0.6	1171.0	2731.0	72.0	0.0	85.0	2550.0	NA	1.1
-26	41	SM	125	3814.0	1622.4	2191.6	0.6	1205.4	2827.8	72.0	0.0	85.0	2635.0	NA	1.1
-27	42	SM	125	3939.0	1684.8	2254.2	0.6	1239.8	2924.6	72.0	0.0	85.0	2720.0	NA	1.1
-28	43	SM	125	4064.0	1747.2	2316.8	0.6	1274.2	3021.4	72.0	0.0	85.0	2805.0	NA	1.1
-29	44	SM	125	4189.0	1809.6	2379.4	0.6	1308.7	3118.3	72.0	0.0	85.0	2890.0	NA	1.1
-30	45	SM	125	4314.0	1872.0	2442.0	0.6	1343.1	3215.1	72.0	0.0	85.0	2975.0	NA	1.1
-31	46	ML	115	4439.0	1934.4	2504.6	0.6	1377.5	3311.9	72.0	0.0	85.0	3060.0	NA	1.1
-32	47	CH	105	4554.0	1996.8	2557.2	0.6	1406.5	3403.3	72.0	0.0	85.0	3145.0	NA	1.1
-33	48	CH	105	4659.0	2059.2	2599.8	0.6	1429.9	3489.1	72.0	0.0	85.0	3230.0	NA	1.1
-34	49	CH	105	4764.0	2121.6	2642.4	0.6	1453.3	3574.9	72.0	0.0	85.0	3315.0	NA	1.1
-35	50	CH	105	4869.0	2184.0	2685.0	0.6	1476.8	3660.8	72.0	0.0	85.0	3400.0	NA	1.1
-36	51	CH	105	4974.0	2246.4	2727.6	0.6	1500.2	3746.6	72.0	0.0	85.0	3485.0	NA	1.1
-37	52	CH	105	5079.0	2308.8	2770.2	0.6	1523.6	3832.4	72.0	0.0	85.0	3570.0	NA	1.1
-38	53	CH	105	5184.0	2371.2	2812.8	0.6	1547.0	3918.2	72.0	0.0	85.0	3655.0	NA	1.1
-39	54	CH	105	5289.0	2433.6	2855.4	0.6	1570.5	4004.1	72.0	0.0	85.0	3740.0	NA	1.1
-40	55	CH	105	5394.0	2496.0	2898.0	0.6	1593.9	4089.9	72.0	0.0	85.0	3825.0	NA	1.1

Table 3b - Old River; CPT through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-41	56	CH	105	5499.0	2558.4	2940.6	0.6	1617.3	4175.7	72.0	0.0	85.0	3910.0	NA	1.1
-42	57	CH	105	5604.0	2620.8	2983.2	0.6	1640.8	4261.6	72.0	0.0	85.0	3995.0	NA	1.1
-43	58	SM	125	5709.0	2683.2	3025.8	0.6	1664.2	4347.4	72.0	0.0	85.0	4080.0	NA	1.1
-44	59	SM	125	5834.0	2745.6	3088.4	0.6	1698.6	4444.2	72.0	0.0	85.0	4165.0	NA	1.1
-45	60	SM	125	5959.0	2808.0	3151.0	0.6	1733.1	4541.1	72.0	0.0	85.0	4250.0	NA	1.1
-46	61	SM	125	6084.0	2870.4	3213.6	0.6	1767.5	4637.9	72.0	0.0	85.0	4335.0	NA	1.1
-47	62	SM	125	6209.0	2932.8	3276.2	0.6	1801.9	4734.7	72.0	0.0	85.0	4420.0	NA	1.1
-48	63	SC	125	6334.0	2995.2	3338.8	0.6	1836.3	4831.5	72.0	0.0	85.0	4505.0	NA	1.1
-49	64	SC	125	6459.0	3057.6	3401.4	0.6	1870.8	4928.4	72.0	0.0	85.0	4590.0	NA	1.1
-50	65	CH	105	6584.0	3120.0	3464.0	0.6	1905.2	5025.2	72.0	0.0	85.0	4675.0	NA	1.1
-51	66	CH	105	6689.0	3182.4	3506.6	0.6	1928.6	5111.0	72.0	0.0	85.0	4760.0	NA	1.1
-52	67	CH	105	6794.0	3244.8	3549.2	0.6	1952.1	5196.9	72.0	0.0	85.0	4845.0	NA	1.1
-53	68	CH	105	6899.0	3307.2	3591.8	0.6	1975.5	5282.7	72.0	0.0	85.0	4930.0	NA	1.1
-54	69	CH	105	7004.0	3369.6	3634.4	0.6	1998.9	5368.5	72.0	0.0	85.0	5015.0	NA	1.1
-55	70	CH	105	7109.0	3432.0	3677.0	0.6	2022.4	5454.4	72.0	0.0	85.0	5100.0	NA	1.1
-56	71	CH	105	7214.0	3494.4	3719.6	0.6	2045.8	5540.2	72.0	0.0	85.0	5185.0	NA	1.1
-57	72	CH	105	7319.0	3556.8	3762.2	0.6	2069.2	5626.0	72.0	0.0	85.0	5270.0	NA	1.1
-58	73	CH	105	7424.0	3619.2	3804.8	0.6	2092.6	5711.8	72.0	0.0	85.0	5355.0	NA	1.1
-59	74	CH	105	7529.0	3681.6	3847.4	0.6	2116.1	5797.7	72.0	0.0	85.0	5440.0	NA	1.1
-60	75	CH	105	7634.0	3744.0	3890.0	0.6	2139.5	5883.5	72.0	0.0	85.0	5525.0	NA	1.1
-61	76	CH	105	7739.0	3806.4	3932.6	0.6	2162.9	5969.3	72.0	0.0	85.0	5610.0	NA	1.1
-62	77	CH	105	7844.0	3868.8	3975.2	0.6	2186.4	6055.2	72.0	0.0	85.0	5695.0	NA	1.1
-63	78	ML	115	7949.0	3931.2	4017.8	0.6	2209.8	6141.0	72.0	0.0	85.0	5780.0	NA	1.1
-64	79	ML	115	8064.0	3993.6	4070.4	0.6	2238.7	6232.3	72.0	0.0	85.0	5865.0	NA	1.1
-65	80	ML	115	8179.0	4056.0	4123.0	0.6	2267.7	6323.7	72.0	0.0	85.0	5950.0	NA	1.1
-66	81	ML	115	8294.0	4118.4	4175.6	0.6	2296.6	6415.0	72.0	0.0	85.0	6035.0	NA	NA
-67	82	ML	115	8409.0	4180.8	4228.2	0.6	2325.5	6506.3	72.0	0.0	85.0	6120.0	NA	NA
-68	83	ML	115	8524.0	4243.2	4280.8	0.6	2354.4	6597.6	72.0	0.0	85.0	6205.0	NA	NA
-69	84	ML	115	8639.0	4305.6	4333.4	0.6	2383.4	6689.0	72.0	0.0	85.0	6290.0	NA	NA
-70	85	ML	115	8754.0	4368.0	4386.0	0.6	2412.3	6780.3	72.0	0.0	85.0	6375.0	NA	NA
-71	86	SM	125	8869.0	4430.4	4438.6	0.6	2441.2	6871.6	72.0	0.0	85.0	6460.0	NA	NA
-72	87	SM	125	8994.0	4492.8	4501.2	0.6	2475.7	6968.5	72.0	0.0	85.0	6545.0	NA	NA
-73	88	SM	125	9119.0	4555.2	4563.8	0.6	2510.1	7065.3	72.0	0.0	85.0	6630.0	NA	NA
-74	89	SM	125	9244.0	4617.6	4626.4	0.6	2544.5	7162.1	72.0	0.0	85.0	6715.0	NA	NA
-75	90	SM	125	9369.0	4680.0	4689.0	0.6	2579.0	7259.0	72.0	0.0	85.0	6800.0	NA	NA
-76	91	SP	120	9494.0	4742.4	4751.6	0.6	2613.4	7355.8	72.0	0.0	85.0	6885.0	NA	NA
-77	92	SP	120	9614.0	4804.8	4809.2	0.6	2645.1	7449.9	72.0	0.0	85.0	6970.0	NA	NA
-78	93	SP	120	9734.0	4867.2	4866.8	0.6	2676.7	7543.9	72.0	0.0	85.0	7055.0	NA	NA
-79	94	SP	120	9854.0	4929.6	4924.4	0.6	2708.4	7638.0	72.0	0.0	85.0	7140.0	NA	NA
-80	95	SP	120	9974.0	4992.0	4982.0	0.6	2740.1	7732.1	72.0	0.0	85.0	7225.0	NA	NA
-81	96	SP	120	10094.0	5054.4	5039.6	0.6	2771.8	7826.2	72.0	0.0	85.0	7310.0	NA	NA
-82	97	SP	120	10214.0	5116.8	5097.2	0.6	2803.5	7920.3	72.0	0.0	85.0	7395.0	NA	NA
-83	98	SP	120	10334.0	5179.2	5154.8	0.6	2835.1	8014.3	72.0	0.0	85.0	7480.0	NA	NA
-84	99	SP	120	10454.0	5241.6	5212.4	0.6	2866.8	8108.4	72.0	0.0	85.0	7565.0	NA	NA
-85	100	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-86	101	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-87	102	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-88	103	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-89	104	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-90	105	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-91	106	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-92	107	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-93	108	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-94	109	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-95	110	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-96	111	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA

Table 3b - Old River; CPT through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-97	112	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-98	113	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-99	114	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-100	115	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-101	116	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-102	117	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-103	118	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-104	119	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-105	120	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-106	121	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-107	122	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-108	123	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-109	124	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-110	125	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-111	126	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-112	127	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-113	128	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-114	129	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA
-115	130	SP	120	10454.0	5304.0	5150.0	0.6	2832.5	8136.5	72.0	0.0	85.0	7650.0	NA	NA

Table 3c - Middle River, CPT through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
15	0	SP	95	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
14	1	SP	95	57.0	0.0	57.0	0.6	31.4	31.4	72.0	0.0	85.0	0.0	NA	NA
13	2	SP	95	114.0	0.0	114.0	0.6	62.7	62.7	72.0	0.0	85.0	0.0	NA	NA
12	3	SP	95	171.0	0.0	171.0	0.6	94.1	94.1	72.0	0.0	85.0	0.0	NA	NA
11	4	SP	95	228.0	0.0	228.0	0.6	125.4	125.4	72.0	0.0	85.0	0.0	NA	NA
10	5	SP	95	285.0	0.0	285.0	0.6	156.8	156.8	72.0	0.0	85.0	0.0	NA	NA
9	6	SP	95	342.0	0.0	342.0	0.6	188.1	188.1	72.0	0.0	85.0	0.0	NA	NA
8	7	SP	95	399.0	0.0	399.0	0.6	219.5	219.5	72.0	0.0	85.0	0.0	NA	NA
7	8	SP	95	456.0	0.0	456.0	0.6	250.8	250.8	72.0	0.0	85.0	0.0	NA	NA
6	9	SP	95	513.0	0.0	513.0	0.6	282.2	282.2	72.0	0.0	85.0	0.0	NA	NA
5	10	SP	95	570.0	0.0	570.0	0.6	313.5	313.5	72.0	0.0	85.0	0.0	NA	NA
4	11	SP	95	627.0	0.0	627.0	0.6	344.9	344.9	72.0	0.0	85.0	85.0	NA	4.1
3	12	SP	105	684.0	0.0	684.0	0.6	376.2	376.2	72.0	0.0	85.0	170.0	NA	2.2
2	13	SM	105	747.0	62.4	684.6	0.6	376.5	438.9	72.0	0.0	85.0	255.0	NA	1.7
1	14	SM	105	810.0	124.8	685.2	0.6	376.9	501.7	72.0	0.0	85.0	340.0	NA	1.5
0	15	SP	105	873.0	187.2	685.8	0.6	377.2	564.4	72.0	0.0	85.0	425.0	NA	1.3
-1	16	SP	105	978.0	249.6	728.4	0.6	400.6	650.2	72.0	0.0	85.0	510.0	NA	1.3
-2	17	SP	105	1083.0	312.0	771.0	0.6	424.1	736.1	72.0	0.0	85.0	595.0	NA	1.2
-3	18	SP	105	1188.0	374.4	813.6	0.6	447.5	821.9	72.0	0.0	85.0	680.0	NA	1.2
-4	19	SP	105	1293.0	436.8	856.2	0.6	470.9	907.7	72.0	0.0	85.0	765.0	NA	1.2
-5	20	CH	95	1398.0	499.2	898.8	0.6	494.3	993.5	72.0	0.0	85.0	850.0	NA	1.2
-6	21	CH	95	1493.0	561.6	931.4	0.6	512.3	1073.9	72.0	0.0	85.0	935.0	NA	1.1
-7	22	CH	95	1588.0	624.0	964.0	0.6	530.2	1154.2	72.0	0.0	85.0	1020.0	NA	1.1
-8	23	CH	95	1683.0	686.4	996.6	0.6	548.1	1234.5	72.0	0.0	85.0	1105.0	NA	1.1
-9	24	CH	95	1778.0	748.8	1029.2	0.6	566.1	1314.9	72.0	0.0	85.0	1190.0	NA	1.1
-10	25	CH	95	1873.0	811.2	1061.8	0.6	584.0	1395.2	72.0	0.0	85.0	1275.0	NA	1.1
-11	26	CH	95	1968.0	873.6	1094.4	0.6	601.9	1475.5	72.0	0.0	85.0	1360.0	NA	1.1
-12	27	CH	95	2063.0	936.0	1127.0	0.6	619.9	1555.9	72.0	0.0	85.0	1445.0	NA	1.1
-13	28	CH	95	2158.0	998.4	1159.6	0.6	637.8	1636.2	72.0	0.0	85.0	1530.0	NA	1.1
-14	29	CH	105	2253.0	1060.8	1192.2	0.6	655.7	1716.5	72.0	0.0	85.0	1615.0	NA	1.1
-15	30	CH	105	2358.0	1123.2	1234.8	0.6	679.1	1802.3	72.0	0.0	85.0	1700.0	NA	1.1
-16	31	CH	105	2463.0	1185.6	1277.4	0.6	702.6	1888.2	72.0	0.0	85.0	1785.0	NA	1.1
-17	32	SM	125	2568.0	1248.0	1320.0	0.6	726.0	1974.0	72.0	0.0	85.0	1870.0	NA	1.1
-18	33	SM	125	2693.0	1310.4	1382.6	0.6	760.4	2070.8	72.0	0.0	85.0	1955.0	NA	1.1
-19	34	SM	125	2818.0	1372.8	1445.2	0.6	794.9	2167.7	72.0	0.0	85.0	2040.0	NA	1.1
-20	35	SM	125	2943.0	1435.2	1507.8	0.6	829.3	2264.5	72.0	0.0	85.0	2125.0	NA	1.1
-21	36	SM	125	3068.0	1497.6	1570.4	0.6	863.7	2361.3	72.0	0.0	85.0	2210.0	NA	1.1
-22	37	SM	125	3193.0	1560.0	1633.0	0.6	898.2	2458.2	72.0	0.0	85.0	2295.0	NA	1.1
-23	38	SM	125	3318.0	1622.4	1695.6	0.6	932.6	2555.0	72.0	0.0	85.0	2380.0	NA	1.1
-24	39	SM	125	3443.0	1684.8	1758.2	0.6	967.0	2651.8	72.0	0.0	85.0	2465.0	NA	1.1
-25	40	SM	125	3568.0	1747.2	1820.8	0.6	1001.4	2748.6	72.0	0.0	85.0	2550.0	NA	1.1
-26	41	SM	125	3693.0	1809.6	1883.4	0.6	1035.9	2845.5	72.0	0.0	85.0	2635.0	NA	1.1
-27	42	SM	125	3818.0	1872.0	1946.0	0.6	1070.3	2942.3	72.0	0.0	85.0	2720.0	NA	1.1
-28	43	SM	125	3943.0	1934.4	2008.6	0.6	1104.7	3039.1	72.0	0.0	85.0	2805.0	NA	1.1
-29	44	SM	125	4068.0	1996.8	2071.2	0.6	1139.2	3136.0	72.0	0.0	85.0	2890.0	NA	1.1
-30	45	SM	125	4193.0	2059.2	2133.8	0.6	1173.6	3232.8	72.0	0.0	85.0	2975.0	NA	1.1
-31	46	SM	125	4318.0	2121.6	2196.4	0.6	1208.0	3329.6	72.0	0.0	85.0	3060.0	NA	1.1
-32	47	SM	125	4443.0	2184.0	2259.0	0.6	1242.5	3426.5	72.0	0.0	85.0	3145.0	NA	1.1
-33	48	SM	125	4568.0	2246.4	2321.6	0.6	1276.9	3523.3	72.0	0.0	85.0	3230.0	NA	1.1
-34	49	SM	125	4693.0	2308.8	2384.2	0.6	1311.3	3620.1	72.0	0.0	85.0	3315.0	NA	1.1
-35	50	CH	105	4818.0	2371.2	2446.8	0.6	1345.7	3716.9	72.0	0.0	85.0	3400.0	NA	1.1
-36	51	CH	105	4923.0	2433.6	2489.4	0.6	1369.2	3802.8	72.0	0.0	85.0	3485.0	NA	1.1
-37	52	CH	105	5028.0	2496.0	2532.0	0.6	1392.6	3888.6	72.0	0.0	85.0	3570.0	NA	1.1
-38	53	CH	105	5133.0	2558.4	2574.6	0.6	1416.0	3974.4	72.0	0.0	85.0	3655.0	NA	1.1
-39	54	CH	105	5238.0	2620.8	2617.2	0.6	1439.5	4060.3	72.0	0.0	85.0	3740.0	NA	1.1
-40	55	CH	105	5343.0	2683.2	2659.8	0.6	1462.9	4146.1	72.0	0.0	85.0	3825.0	NA	1.1

Table 3c - Middle River, CPT through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-41	56	CH	105	5448.0	2745.6	2702.4	0.6	1486.3	4231.9	72.0	0.0	85.0	3910.0	NA	1.1
-42	57	CH	105	5553.0	2808.0	2745.0	0.6	1509.8	4317.8	72.0	0.0	85.0	3995.0	NA	1.1
-43	58	CH	105	5658.0	2870.4	2787.6	0.6	1533.2	4403.6	72.0	0.0	85.0	4080.0	NA	1.1
-44	59	CH	105	5763.0	2932.8	2830.2	0.6	1556.6	4489.4	72.0	0.0	85.0	4165.0	NA	1.1
-45	60	CH	105	5868.0	2995.2	2872.8	0.6	1580.0	4575.2	72.0	0.0	85.0	4250.0	NA	1.1
-46	61	CH	105	5973.0	3057.6	2915.4	0.6	1603.5	4661.1	72.0	0.0	85.0	4335.0	NA	1.1
-47	62	CH	105	6078.0	3120.0	2958.0	0.6	1626.9	4746.9	72.0	0.0	85.0	4420.0	NA	1.1
-48	63	CH	105	6183.0	3182.4	3000.6	0.6	1650.3	4832.7	72.0	0.0	85.0	4505.0	NA	1.1
-49	64	CH	105	6288.0	3244.8	3043.2	0.6	1673.8	4918.6	72.0	0.0	85.0	4590.0	NA	1.1
-50	65	CH	105	6393.0	3307.2	3085.8	0.6	1697.2	5004.4	72.0	0.0	85.0	4675.0	NA	1.1
-51	66	CH	105	6498.0	3369.6	3128.4	0.6	1720.6	5090.2	72.0	0.0	85.0	4760.0	NA	1.1
-52	67	CH	105	6603.0	3432.0	3171.0	0.6	1744.1	5176.1	72.0	0.0	85.0	4845.0	NA	1.1
-53	68	CH	105	6708.0	3494.4	3213.6	0.6	1767.5	5261.9	72.0	0.0	85.0	4930.0	NA	1.1
-54	69	CH	105	6813.0	3556.8	3256.2	0.6	1790.9	5347.7	72.0	0.0	85.0	5015.0	NA	1.1
-55	70	CH	105	6918.0	3619.2	3298.8	0.6	1814.3	5433.5	72.0	0.0	85.0	5100.0	NA	1.1
-56	71	CH	105	7023.0	3681.6	3341.4	0.6	1837.8	5519.4	72.0	0.0	85.0	5185.0	NA	1.1
-57	72	SP	120	7128.0	3744.0	3384.0	0.6	1861.2	5605.2	72.0	0.0	85.0	5270.0	NA	1.1
-58	73	SP	120	7248.0	3806.4	3441.6	0.6	1892.9	5699.3	72.0	0.0	85.0	5355.0	NA	1.1
-59	74	SP	120	7368.0	3868.8	3499.2	0.6	1924.6	5793.4	72.0	0.0	85.0	5440.0	NA	1.1
-60	75	SP	120	7488.0	3931.2	3556.8	0.6	1956.2	5887.4	72.0	0.0	85.0	5525.0	NA	1.1
-61	76	SP	120	7608.0	3993.6	3614.4	0.6	1987.9	5981.5	72.0	0.0	85.0	5610.0	NA	1.1
-62	77	SP	120	7728.0	4056.0	3672.0	0.6	2019.6	6075.6	72.0	0.0	85.0	5695.0	NA	1.1
-63	78	SP	120	7848.0	4118.4	3729.6	0.6	2051.3	6169.7	72.0	0.0	85.0	5780.0	NA	1.1
-64	79	SP	120	7968.0	4180.8	3787.2	0.6	2083.0	6263.8	72.0	0.0	85.0	5865.0	NA	1.1
-65	80	SP	120	8088.0	4243.2	3844.8	0.6	2114.6	6357.8	72.0	0.0	85.0	5950.0	NA	1.1
-66	81	SP	120	8208.0	4305.6	3902.4	0.6	2146.3	6451.9	72.0	0.0	85.0	6035.0	NA	NA
-67	82	SP	120	8328.0	4368.0	3960.0	0.6	2178.0	6546.0	72.0	0.0	85.0	6120.0	NA	NA
-68	83	SP	120	8448.0	4430.4	4017.6	0.6	2209.7	6640.1	72.0	0.0	85.0	6205.0	NA	NA
-69	84	SP	120	8568.0	4492.8	4075.2	0.6	2241.4	6734.2	72.0	0.0	85.0	6290.0	NA	NA
-70	85	SP	120	8688.0	4555.2	4132.8	0.6	2273.0	6828.2	72.0	0.0	85.0	6375.0	NA	NA
-71	86	SP	120	8808.0	4617.6	4190.4	0.6	2304.7	6922.3	72.0	0.0	85.0	6460.0	NA	NA
-72	87	SP	120	8928.0	4680.0	4248.0	0.6	2336.4	7016.4	72.0	0.0	85.0	6545.0	NA	NA
-73	88	SP	120	9048.0	4742.4	4305.6	0.6	2368.1	7110.5	72.0	0.0	85.0	6630.0	NA	NA
-74	89	SP	120	9168.0	4804.8	4363.2	0.6	2399.8	7204.6	72.0	0.0	85.0	6715.0	NA	NA
-75	90	SP	120	9288.0	4867.2	4420.8	0.6	2431.4	7298.6	72.0	0.0	85.0	6800.0	NA	NA
-76	91	SP	120	9408.0	4929.6	4478.4	0.6	2463.1	7392.7	72.0	0.0	85.0	6885.0	NA	NA
-77	92	SP	120	9528.0	4992.0	4536.0	0.6	2494.8	7486.8	72.0	0.0	85.0	6970.0	NA	NA
-78	93	SP	120	9648.0	5054.4	4593.6	0.6	2526.5	7580.9	72.0	0.0	85.0	7055.0	NA	NA
-79	94	SP	120	9768.0	5116.8	4651.2	0.6	2558.2	7675.0	72.0	0.0	85.0	7140.0	NA	NA
-80	95	SP	120	9888.0	5179.2	4708.8	0.6	2589.8	7769.0	72.0	0.0	85.0	7225.0	NA	NA
-81	96	SP	120	10008.0	5241.6	4766.4	0.6	2621.5	7863.1	72.0	0.0	85.0	7310.0	NA	NA
-82	97	CH	105	10128.0	5304.0	4824.0	0.6	2653.2	7957.2	72.0	0.0	85.0	7395.0	NA	NA
-83	98	CH	105	10233.0	5366.4	4866.6	0.6	2676.6	8043.0	72.0	0.0	85.0	7480.0	NA	NA
-84	99	CH	105	10338.0	5428.8	4909.2	0.6	2700.1	8128.9	72.0	0.0	85.0	7565.0	NA	NA
-85	100	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-86	101	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-87	102	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-88	103	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-89	104	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-90	105	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-91	106	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-92	107	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-93	108	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-94	109	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-95	110	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-96	111	CH	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA

Table 3c - Middle River, CPT through levee embankment

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-97	112	ML	115	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-98	113	ML	115	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-99	114	ML	115	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-100	115	ML	115	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-101	116	ML	115	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-102	117	SM	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-103	118	SM	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-104	119	SM	105	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-105	120	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-106	121	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-107	122	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-108	123	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-109	124	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-110	125	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-111	126	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-112	127	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-113	128	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-114	129	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA
-115	130	SP	120	10338.0	5491.2	4846.8	0.6	2665.7	8156.9	72.0	0.0	85.0	7650.0	NA	NA

Table 4a - Grant Line; HSA on landside levee toe

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
1	0	CH	100	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
0	1	CH	100	100.0	0.0	100.0	0.6	55.0	55.0	72.0	0.0	85.0	0.0	NA	NA
-1	2	CH	100	200.0	0.0	200.0	0.6	110.0	110.0	72.0	0.0	85.0	0.0	NA	NA
-2	3	CH	100	300.0	0.0	300.0	0.6	165.0	165.0	72.0	0.0	85.0	0.0	NA	NA
-3	4	CH	100	400.0	62.4	337.6	0.6	185.7	248.1	72.0	0.0	85.0	0.0	NA	NA
-4	5	CH	100	500.0	124.8	375.2	0.6	206.4	331.2	72.0	0.0	85.0	0.0	NA	NA
-5	6	CH	100	600.0	187.2	412.8	0.6	227.0	414.2	72.0	0.0	85.0	0.0	NA	NA
-6	7	CH	100	700.0	249.6	450.4	0.6	247.7	497.3	72.0	0.0	85.0	0.0	NA	NA
-7	8	SM	120	800.0	312.0	488.0	0.6	268.4	580.4	72.0	0.0	85.0	0.0	NA	NA
-8	9	SM	120	920.0	374.4	545.6	0.6	300.1	674.5	72.0	0.0	85.0	0.0	NA	NA
-9	10	SM	120	1040.0	436.8	603.2	0.6	331.8	768.6	72.0	0.0	85.0	0.0	NA	NA
-10	11	SM	120	1160.0	499.2	660.8	0.6	363.4	862.6	72.0	0.0	85.0	85.0	NA	10.1
-11	12	SM	125	1280.0	561.6	718.4	0.6	395.1	956.7	72.0	0.0	85.0	170.0	NA	5.6
-12	13	SM	125	1405.0	624.0	781.0	0.6	429.6	1053.6	72.0	0.0	85.0	255.0	NA	4.1
-13	14	CH	105	1530.0	686.4	843.6	0.6	464.0	1150.4	72.0	0.0	85.0	340.0	NA	3.4
-14	15	CH	105	1635.0	748.8	886.2	0.6	487.4	1236.2	72.0	0.0	85.0	425.0	NA	2.9
-15	16	CH	105	1740.0	811.2	928.8	0.6	510.8	1322.0	72.0	0.0	85.0	510.0	NA	2.6
-16	17	CH	105	1845.0	873.6	971.4	0.6	534.3	1407.9	72.0	0.0	85.0	595.0	NA	2.4
-17	18	CH	105	1950.0	936.0	1014.0	0.6	557.7	1493.7	72.0	0.0	85.0	680.0	NA	2.2
-18	19	CH	105	2055.0	998.4	1056.6	0.6	581.1	1579.5	72.0	0.0	85.0	765.0	NA	2.1
-19	20	CH	105	2160.0	1060.8	1099.2	0.6	604.6	1665.4	72.0	0.0	85.0	850.0	NA	2.0
-20	21	CH	105	2265.0	1123.2	1141.8	0.6	628.0	1751.2	72.0	0.0	85.0	935.0	NA	1.9
-21	22	CH	105	2370.0	1185.6	1184.4	0.6	651.4	1837.0	72.0	0.0	85.0	1020.0	NA	1.8
-22	23	CH	105	2475.0	1248.0	1227.0	0.6	674.9	1922.9	72.0	0.0	85.0	1105.0	NA	1.7
-23	24	CH	105	2580.0	1310.4	1269.6	0.6	698.3	2008.7	72.0	0.0	85.0	1190.0	NA	1.7
-24	25	CH	105	2685.0	1372.8	1312.2	0.6	721.7	2094.5	72.0	0.0	85.0	1275.0	NA	1.6
-25	26	CH	105	2790.0	1435.2	1354.8	0.6	745.1	2180.3	72.0	0.0	85.0	1360.0	NA	1.6
-26	27	SM	125	2895.0	1497.6	1397.4	0.6	768.6	2266.2	72.0	0.0	85.0	1445.0	NA	1.6
-27	28	SM	125	3020.0	1560.0	1460.0	0.6	803.0	2363.0	72.0	0.0	85.0	1530.0	NA	1.5
-28	29	SM	125	3145.0	1622.4	1522.6	0.6	837.4	2459.8	72.0	0.0	85.0	1615.0	NA	1.5
-29	30	SM	125	3270.0	1684.8	1585.2	0.6	871.9	2556.7	72.0	0.0	85.0	1700.0	NA	1.5
-30	31	SM	125	3395.0	1747.2	1647.8	0.6	906.3	2653.5	72.0	0.0	85.0	1785.0	NA	1.5
-31	32	SM	125	3520.0	1809.6	1710.4	0.6	940.7	2750.3	72.0	0.0	85.0	1870.0	NA	1.5
-32	33	SM	125	3645.0	1872.0	1773.0	0.6	975.2	2847.2	72.0	0.0	85.0	1955.0	NA	1.5
-33	34	SM	125	3770.0	1934.4	1835.6	0.6	1009.6	2944.0	72.0	0.0	85.0	2040.0	NA	1.4
-34	35	SM	125	3895.0	1996.8	1898.2	0.6	1044.0	3040.8	72.0	0.0	85.0	2125.0	NA	1.4
-35	36	SM	125	4020.0	2059.2	1960.8	0.6	1078.4	3137.6	72.0	0.0	85.0	2210.0	NA	1.4
-36	37	SM	125	4145.0	2121.6	2023.4	0.6	1112.9	3234.5	72.0	0.0	85.0	2295.0	NA	1.4
-37	38	SM	125	4270.0	2184.0	2086.0	0.6	1147.3	3331.3	72.0	0.0	85.0	2380.0	NA	1.4
-38	39	SM	125	4395.0	2246.4	2148.6	0.6	1181.7	3428.1	72.0	0.0	85.0	2465.0	NA	1.4
-39	40	SM	125	4520.0	2308.8	2211.2	0.6	1216.2	3525.0	72.0	0.0	85.0	2550.0	NA	1.4
-40	41	SM	125	4645.0	2371.2	2273.8	0.6	1250.6	3621.8	72.0	0.0	85.0	2635.0	NA	1.4
-41	42	SM	125	4770.0	2433.6	2336.4	0.6	1285.0	3718.6	72.0	0.0	85.0	2720.0	NA	1.4
-42	43	CH	105	4895.0	2496.0	2399.0	0.6	1319.5	3815.5	72.0	0.0	85.0	2805.0	NA	1.4
-43	44	CH	105	5000.0	2558.4	2441.6	0.6	1342.9	3901.3	72.0	0.0	85.0	2890.0	NA	1.3
-44	45	CH	105	5105.0	2620.8	2484.2	0.6	1366.3	3987.1	72.0	0.0	85.0	2975.0	NA	1.3
-45	46	CH	105	5210.0	2683.2	2526.8	0.6	1389.7	4072.9	72.0	0.0	85.0	3060.0	NA	1.3
-46	47	CH	105	5315.0	2745.6	2569.4	0.6	1413.2	4158.8	72.0	0.0	85.0	3145.0	NA	1.3
-47	48	CH	105	5420.0	2808.0	2612.0	0.6	1436.6	4244.6	72.0	0.0	85.0	3230.0	NA	1.3
-48	49	CH	105	5525.0	2870.4	2654.6	0.6	1460.0	4330.4	72.0	0.0	85.0	3315.0	NA	1.3
-49	50	CH	105	5630.0	2932.8	2697.2	0.6	1483.5	4416.3	72.0	0.0	85.0	3400.0	NA	1.3
-50	51	CH	105	5735.0	2995.2	2739.8	0.6	1506.9	4502.1	72.0	0.0	85.0	3485.0	NA	1.3
-51	52	CH	105	5840.0	3057.6	2782.4	0.6	1530.3	4587.9	72.0	0.0	85.0	3570.0	NA	1.3
-52	53	CH	105	5945.0	3120.0	2825.0	0.6	1553.8	4673.8	72.0	0.0	85.0	3655.0	NA	1.3
-53	54	CH	105	6050.0	3182.4	2867.6	0.6	1577.2	4759.6	72.0	0.0	85.0	3740.0	NA	1.3
-54	55	CH	105	6155.0	3244.8	2910.2	0.6	1600.6	4845.4	72.0	0.0	85.0	3825.0	NA	1.3
-55	56	CH	105	6260.0	3307.2	2952.8	0.6	1624.0	4931.2	72.0	0.0	85.0	3910.0	NA	1.3
-56	57	CH	105	6365.0	3369.6	2995.4	0.6	1647.5	5017.1	72.0	0.0	85.0	3995.0	NA	1.3
-57	58	CH	105	6470.0	3432.0	3038.0	0.6	1670.9	5102.9	72.0	0.0	85.0	4080.0	NA	1.3
-58	59	CH	105	6575.0	3494.4	3080.6	0.6	1694.3	5188.7	72.0	0.0	85.0	4165.0	NA	1.2
-59	60	CH	105	6680.0	3556.8	3123.2	0.6	1717.8	5274.6	72.0	0.0	85.0	4250.0	NA	1.2
-60	61	CH	105	6785.0	3619.2	3165.8	0.6	1741.2	5360.4	72.0	0.0	85.0	4335.0	NA	1.2
-61	62	CH	105	6890.0	3681.6	3208.4	0.6	1764.6	5446.2	72.0	0.0	85.0	4420.0	NA	1.2
-62	63	CH	105	6995.0	3744.0	3251.0	0.6	1788.1	5532.1	72.0	0.0	85.0	4505.0	NA	1.2
-63	64	CH	105	7100.0	3806.4	3293.6	0.6	1811.5	5617.9	72.0	0.0	85.0	4590.0	NA	1.2
-64	65	CH	105	7205.0	3868.8	3336.2	0.6	1834.9	5703.7	72.0	0.0	85.0	4675.0	NA	1.2
-65	66	CH	105	7310.0	3931.2	3378.8	0.6	1858.3	5789.5	72.0	0.0	85.0	4760.0	NA	1.2
-66	67	CH	105	7415.0	3993.6	3421.4	0.6	1881.8	5875.4	72.0	0.0	85.0	4845.0	NA	1.2
-67	68	CH	105	7520.0	4056.0	3464.0	0.6	1905.2	5961.2	72.0	0.0	85.0	4930.0	NA	1.2
-68	69	CH	105	7625.0	4118.4	3506.6	0.6	1928.6	6047.0	72.0	0.0	85.0	5015.0	NA	1.2

Table 4a - Grant Line; HSA on landside levee toe

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-69	70	CH	105	7730.0	4180.8	3549.2	0.6	1952.1	6132.9	72.0	0.0	85.0	5100.0	NA	1.2
-70	71	CH	105	7835.0	4243.2	3591.8	0.6	1975.5	6218.7	72.0	0.0	85.0	5185.0	NA	1.2
-71	72	CH	105	7940.0	4305.6	3634.4	0.6	1998.9	6304.5	72.0	0.0	85.0	5270.0	NA	1.2
-72	73	SM	125	8045.0	4368.0	3677.0	0.6	2022.4	6390.4	72.0	0.0	85.0	5355.0	NA	1.2
-73	74	SM	125	8170.0	4430.4	3739.6	0.6	2056.8	6487.2	72.0	0.0	85.0	5440.0	NA	1.2
-74	75	SM	125	8295.0	4492.8	3802.2	0.6	2091.2	6584.0	72.0	0.0	85.0	5525.0	NA	1.2
-75	76	SM	125	8420.0	4555.2	3864.8	0.6	2125.6	6680.8	72.0	0.0	85.0	5610.0	NA	1.2
-76	77	SM	125	8545.0	4617.6	3927.4	0.6	2160.1	6777.7	72.0	0.0	85.0	5695.0	NA	1.2
-77	78	SM	125	8670.0	4680.0	3990.0	0.6	2194.5	6874.5	72.0	0.0	85.0	5780.0	NA	1.2
-78	79	SM	125	8795.0	4742.4	4052.6	0.6	2228.9	6971.3	72.0	0.0	85.0	5865.0	NA	1.2
-79	80	SM	125	8920.0	4804.8	4115.2	0.6	2263.4	7068.2	72.0	0.0	85.0	5950.0	NA	1.2
-80	81	SM	125	9045.0	4867.2	4177.8	0.6	2297.8	7165.0	72.0	0.0	85.0	6035.0	NA	NA
-81	82	SM	125	9170.0	4929.6	4240.4	0.6	2332.2	7261.8	72.0	0.0	85.0	6120.0	NA	NA
-82	83	SM	125	9295.0	4992.0	4303.0	0.6	2366.7	7358.7	72.0	0.0	85.0	6205.0	NA	NA
-83	84	SM	125	9420.0	5054.4	4365.6	0.6	2401.1	7455.5	72.0	0.0	85.0	6290.0	NA	NA
-84	85	SM	125	9545.0	5116.8	4428.2	0.6	2435.5	7552.3	72.0	0.0	85.0	6375.0	NA	NA
-85	86	SM	125	9670.0	5179.2	4490.8	0.6	2469.9	7649.1	72.0	0.0	85.0	6460.0	NA	NA
-86	87	SM	125	9795.0	5241.6	4553.4	0.6	2504.4	7746.0	72.0	0.0	85.0	6545.0	NA	NA
-87	88	ML	115	9920.0	5304.0	4616.0	0.6	2538.8	7842.8	72.0	0.0	85.0	6630.0	NA	NA
-88	89	ML	115	10035.0	5366.4	4668.6	0.6	2567.7	7934.1	72.0	0.0	85.0	6715.0	NA	NA
-89	90	CH	105	10150.0	5428.8	4721.2	0.6	2596.7	8025.5	72.0	0.0	85.0	6800.0	NA	NA
-90	91	CH	105	10255.0	5491.2	4763.8	0.6	2620.1	8111.3	72.0	0.0	85.0	6885.0	NA	NA
-91	92	CH	105	10360.0	5553.6	4806.4	0.6	2643.5	8197.1	72.0	0.0	85.0	6970.0	NA	NA
-92	93	CH	105	10465.0	5616.0	4849.0	0.6	2667.0	8283.0	72.0	0.0	85.0	7055.0	NA	NA
-93	94	CH	105	10570.0	5678.4	4891.6	0.6	2690.4	8368.8	72.0	0.0	85.0	7140.0	NA	NA
-94	95	CH	105	10675.0	5740.8	4934.2	0.6	2713.8	8454.6	72.0	0.0	85.0	7225.0	NA	NA
-95	96	CH	105	10780.0	5803.2	4976.8	0.6	2737.2	8540.4	72.0	0.0	85.0	7310.0	NA	NA
-96	97	CH	105	10885.0	5865.6	5019.4	0.6	2760.7	8626.3	72.0	0.0	85.0	7395.0	NA	NA
-97	98	ML	115	10990.0	5928.0	5062.0	0.6	2784.1	8712.1	72.0	0.0	85.0	7480.0	NA	NA
-98	99	ML	115	11105.0	5990.4	5114.6	0.6	2813.0	8803.4	72.0	0.0	85.0	7565.0	NA	NA
-99	100	ML	115	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-100	101	ML	115	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-101	102	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-102	103	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-103	104	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-104	105	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-105	106	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-106	107	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-107	108	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-108	109	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-109	110	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-110	111	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-111	112	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-112	113	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-113	114	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-114	115	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-115	116	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-116	117	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-117	118	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-118	119	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-119	120	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-120	121	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-121	122	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-122	123	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-123	124	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-124	125	SP	120	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-125	126	CH	105	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-126	127	CH	105	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-127	128	CH	105	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-128	129	CH	105	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA
-129	130	CH	105	11105.0	6052.8	5052.2	0.6	2778.7	8831.5	72.0	0.0	85.0	7650.0	NA	NA

Table 4b - Old River; HSA on landside levee toe

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
0	0	ML	110	0.0	0.0	0.0	0.6	0.0	0.0	72.0	0.0	85.0	0.0	NA	NA
-1	1	ML	110	110.0	0.0	110.0	0.6	60.5	60.5	72.0	0.0	85.0	0.0	NA	NA
-2	2	ML	110	220.0	0.0	220.0	0.6	121.0	121.0	72.0	0.0	85.0	0.0	NA	NA
-3	3	ML	110	330.0	0.0	330.0	0.6	181.5	181.5	72.0	0.0	85.0	0.0	NA	NA
-4	4	ML	110	440.0	62.4	377.6	0.6	207.7	270.1	72.0	0.0	85.0	0.0	NA	NA
-5	5	ML	110	550.0	124.8	425.2	0.6	233.9	358.7	72.0	0.0	85.0	0.0	NA	NA
-6	6	ML	110	660.0	187.2	472.8	0.6	260.0	447.2	72.0	0.0	85.0	0.0	NA	NA
-7	7	ML	110	770.0	249.6	520.4	0.6	286.2	535.8	72.0	0.0	85.0	0.0	NA	NA
-8	8	ML	110	880.0	312.0	568.0	0.6	312.4	624.4	72.0	0.0	85.0	0.0	NA	NA
-9	9	ML	110	990.0	374.4	615.6	0.6	338.6	713.0	72.0	0.0	85.0	0.0	NA	NA
-10	10	ML	110	1100.0	436.8	663.2	0.6	364.8	801.6	72.0	0.0	85.0	0.0	NA	NA
-11	11	ML	110	1210.0	499.2	710.8	0.6	390.9	890.1	72.0	0.0	85.0	85.0	NA	10.5
-12	12	ML	110	1320.0	561.6	758.4	0.6	417.1	978.7	72.0	0.0	85.0	170.0	NA	5.8
-13	13	ML	110	1430.0	624.0	806.0	0.6	443.3	1067.3	72.0	0.0	85.0	255.0	NA	4.2
-14	14	ML	110	1540.0	686.4	853.6	0.6	469.5	1155.9	72.0	0.0	85.0	340.0	NA	3.4
-15	15	ML	115	1650.0	748.8	901.2	0.6	495.7	1244.5	72.0	0.0	85.0	425.0	NA	2.9
-16	16	ML	115	1765.0	811.2	953.8	0.6	524.6	1335.8	72.0	0.0	85.0	510.0	NA	2.6
-17	17	ML	115	1880.0	873.6	1006.4	0.6	553.5	1427.1	72.0	0.0	85.0	595.0	NA	2.4
-18	18	SM	125	1995.0	936.0	1059.0	0.6	582.5	1518.5	72.0	0.0	85.0	680.0	NA	2.2
-19	19	SM	125	2120.0	998.4	1121.6	0.6	616.9	1615.3	72.0	0.0	85.0	765.0	NA	2.1
-20	20	SM	125	2245.0	1060.8	1184.2	0.6	651.3	1712.1	72.0	0.0	85.0	850.0	NA	2.0
-21	21	SM	125	2370.0	1123.2	1246.8	0.6	685.7	1808.9	72.0	0.0	85.0	935.0	NA	1.9
-22	22	SM	125	2495.0	1185.6	1309.4	0.6	720.2	1905.8	72.0	0.0	85.0	1020.0	NA	1.9
-23	23	SM	125	2620.0	1248.0	1372.0	0.6	754.6	2002.6	72.0	0.0	85.0	1105.0	NA	1.8
-24	24	SM	125	2745.0	1310.4	1434.6	0.6	789.0	2099.4	72.0	0.0	85.0	1190.0	NA	1.8
-25	25	CH	105	2870.0	1372.8	1497.2	0.6	823.5	2196.3	72.0	0.0	85.0	1275.0	NA	1.7
-26	26	CH	105	2975.0	1435.2	1539.8	0.6	846.9	2282.1	72.0	0.0	85.0	1360.0	NA	1.7
-27	27	CH	105	3080.0	1497.6	1582.4	0.6	870.3	2367.9	72.0	0.0	85.0	1445.0	NA	1.6
-28	28	CH	105	3185.0	1560.0	1625.0	0.6	893.8	2453.8	72.0	0.0	85.0	1530.0	NA	1.6
-29	29	CH	105	3290.0	1622.4	1667.6	0.6	917.2	2539.6	72.0	0.0	85.0	1615.0	NA	1.6
-30	30	CH	105	3395.0	1684.8	1710.2	0.6	940.6	2625.4	72.0	0.0	85.0	1700.0	NA	1.5
-31	31	CH	105	3500.0	1747.2	1752.8	0.6	964.0	2711.2	72.0	0.0	85.0	1785.0	NA	1.5
-32	32	CH	105	3605.0	1809.6	1795.4	0.6	987.5	2797.1	72.0	0.0	85.0	1870.0	NA	1.5
-33	33	CH	105	3710.0	1872.0	1838.0	0.6	1010.9	2882.9	72.0	0.0	85.0	1955.0	NA	1.5
-34	34	CH	105	3815.0	1934.4	1880.6	0.6	1034.3	2968.7	72.0	0.0	85.0	2040.0	NA	1.5
-35	35	CH	105	3920.0	1996.8	1923.2	0.6	1057.8	3054.6	72.0	0.0	85.0	2125.0	NA	1.4
-36	36	CH	105	4025.0	2059.2	1965.8	0.6	1081.2	3140.4	72.0	0.0	85.0	2210.0	NA	1.4
-37	37	CH	105	4130.0	2121.6	2008.4	0.6	1104.6	3226.2	72.0	0.0	85.0	2295.0	NA	1.4
-38	38	CH	105	4235.0	2184.0	2051.0	0.6	1128.1	3312.1	72.0	0.0	85.0	2380.0	NA	1.4
-39	39	CH	105	4340.0	2246.4	2093.6	0.6	1151.5	3397.9	72.0	0.0	85.0	2465.0	NA	1.4
-40	40	CH	105	4445.0	2308.8	2136.2	0.6	1174.9	3483.7	72.0	0.0	85.0	2550.0	NA	1.4
-41	41	CH	105	4550.0	2371.2	2178.8	0.6	1198.3	3569.5	72.0	0.0	85.0	2635.0	NA	1.4
-42	42	CH	105	4655.0	2433.6	2221.4	0.6	1221.8	3655.4	72.0	0.0	85.0	2720.0	NA	1.3
-43	43	ML	115	4760.0	2496.0	2264.0	0.6	1245.2	3741.2	72.0	0.0	85.0	2805.0	NA	1.3
-44	44	ML	115	4875.0	2558.4	2316.6	0.6	1274.1	3832.5	72.0	0.0	85.0	2890.0	NA	1.3
-45	45	ML	115	4990.0	2620.8	2369.2	0.6	1303.1	3923.9	72.0	0.0	85.0	2975.0	NA	1.3
-46	46	ML	115	5105.0	2683.2	2421.8	0.6	1332.0	4015.2	72.0	0.0	85.0	3060.0	NA	1.3
-47	47	ML	115	5220.0	2745.6	2474.4	0.6	1360.9	4106.5	72.0	0.0	85.0	3145.0	NA	1.3
-48	48	SP	120	5335.0	2808.0	2527.0	0.6	1389.9	4197.9	72.0	0.0	85.0	3230.0	NA	1.3
-49	49	SP	120	5455.0	2870.4	2584.6	0.6	1421.5	4291.9	72.0	0.0	85.0	3315.0	NA	1.3
-50	50	SP	120	5575.0	2932.8	2642.2	0.6	1453.2	4386.0	72.0	0.0	85.0	3400.0	NA	1.3
-51	51	SP	120	5695.0	2995.2	2699.8	0.6	1484.9	4480.1	72.0	0.0	85.0	3485.0	NA	1.3
-52	52	SP	120	5815.0	3057.6	2757.4	0.6	1516.6	4574.2	72.0	0.0	85.0	3570.0	NA	1.3
-53	53	SP	120	5935.0	3120.0	2815.0	0.6	1548.3	4668.3	72.0	0.0	85.0	3655.0	NA	1.3
-54	54	SP	120	6055.0	3182.4	2872.6	0.6	1579.9	4762.3	72.0	0.0	85.0	3740.0	NA	1.3
-55	55	SP	120	6175.0	3244.8	2930.2	0.6	1611.6	4856.4	72.0	0.0	85.0	3825.0	NA	1.3
-56	56	SP	120	6295.0	3307.2	2987.8	0.6	1643.3	4950.5	72.0	0.0	85.0	3910.0	NA	1.3
-57	57	SP	120	6415.0	3369.6	3045.4	0.6	1675.0	5044.6	72.0	0.0	85.0	3995.0	NA	1.3
-58	58	SP	120	6535.0	3432.0	3103.0	0.6	1706.7	5138.7	72.0	0.0	85.0	4080.0	NA	1.3
-59	59	SP	120	6655.0	3494.4	3160.6	0.6	1738.3	5232.7	72.0	0.0	85.0	4165.0	NA	1.3
-60	60	SP	120	6775.0	3556.8	3218.2	0.6	1770.0	5326.8	72.0	0.0	85.0	4250.0	NA	1.3
-61	61	SP	120	6895.0	3619.2	3275.8	0.6	1801.7	5420.9	72.0	0.0	85.0	4335.0	NA	1.3
-62	62	CH	105	7015.0	3681.6	3333.4	0.6	1833.4	5515.0	72.0	0.0	85.0	4420.0	NA	1.2
-63	63	CH	105	7120.0	3744.0	3376.0	0.6	1856.8	5600.8	72.0	0.0	85.0	4505.0	NA	1.2

Table 4b - Old River; HSA on landside levee toe

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_0	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-64	64	CH	105	7225.0	3806.4	3418.6	0.6	1880.2	5686.6	72.0	0.0	85.0	4590.0	NA	1.2
-65	65	CH	105	7330.0	3868.8	3461.2	0.6	1903.7	5772.5	72.0	0.0	85.0	4675.0	NA	1.2
-66	66	CH	105	7435.0	3931.2	3503.8	0.6	1927.1	5858.3	72.0	0.0	85.0	4760.0	NA	1.2
-67	67	CH	105	7540.0	3993.6	3546.4	0.6	1950.5	5944.1	72.0	0.0	85.0	4845.0	NA	1.2
-68	68	CH	105	7645.0	4056.0	3589.0	0.6	1974.0	6030.0	72.0	0.0	85.0	4930.0	NA	1.2
-69	69	CH	105	7750.0	4118.4	3631.6	0.6	1997.4	6115.8	72.0	0.0	85.0	5015.0	NA	1.2
-70	70	CH	105	7855.0	4180.8	3674.2	0.6	2020.8	6201.6	72.0	0.0	85.0	5100.0	NA	1.2
-71	71	CH	105	7960.0	4243.2	3716.8	0.6	2044.2	6287.4	72.0	0.0	85.0	5185.0	NA	1.2
-72	72	CH	105	8065.0	4305.6	3759.4	0.6	2067.7	6373.3	72.0	0.0	85.0	5270.0	NA	1.2
-73	73	CH	105	8170.0	4368.0	3802.0	0.6	2091.1	6459.1	72.0	0.0	85.0	5355.0	NA	1.2
-74	74	SM	125	8275.0	4430.4	3844.6	0.6	2114.5	6544.9	72.0	0.0	85.0	5440.0	NA	1.2
-75	75	SM	125	8400.0	4492.8	3907.2	0.6	2149.0	6641.8	72.0	0.0	85.0	5525.0	NA	1.2
-76	76	SM	125	8525.0	4555.2	3969.8	0.6	2183.4	6738.6	72.0	0.0	85.0	5610.0	NA	1.2
-77	77	SM	125	8650.0	4617.6	4032.4	0.6	2217.8	6835.4	72.0	0.0	85.0	5695.0	NA	1.2
-78	78	SM	125	8775.0	4680.0	4095.0	0.6	2252.3	6932.3	72.0	0.0	85.0	5780.0	NA	1.2
-79	79	SM	125	8900.0	4742.4	4157.6	0.6	2286.7	7029.1	72.0	0.0	85.0	5865.0	NA	1.2
-80	80	SM	125	9025.0	4804.8	4220.2	0.6	2321.1	7125.9	72.0	0.0	85.0	5950.0	NA	1.2
-81	81	SM	125	9150.0	4867.2	4282.8	0.6	2355.5	7222.7	72.0	0.0	85.0	6035.0	NA	NA
-82	82	SM	125	9275.0	4929.6	4345.4	0.6	2390.0	7319.6	72.0	0.0	85.0	6120.0	NA	NA
-83	83	SM	125	9400.0	4992.0	4408.0	0.6	2424.4	7416.4	72.0	0.0	85.0	6205.0	NA	NA
-84	84	SM	125	9525.0	5054.4	4470.6	0.6	2458.8	7513.2	72.0	0.0	85.0	6290.0	NA	NA
-85	85	CH	105	9650.0	5116.8	4533.2	0.6	2493.3	7610.1	72.0	0.0	85.0	6375.0	NA	NA
-86	86	CH	105	9755.0	5179.2	4575.8	0.6	2516.7	7695.9	72.0	0.0	85.0	6460.0	NA	NA
-87	87	CH	105	9860.0	5241.6	4618.4	0.6	2540.1	7781.7	72.0	0.0	85.0	6545.0	NA	NA
-88	88	CH	105	9965.0	5304.0	4661.0	0.6	2563.6	7867.6	72.0	0.0	85.0	6630.0	NA	NA
-89	89	CH	105	10070.0	5366.4	4703.6	0.6	2587.0	7953.4	72.0	0.0	85.0	6715.0	NA	NA
-90	90	SM	125	10175.0	5428.8	4746.2	0.6	2610.4	8039.2	72.0	0.0	85.0	6800.0	NA	NA
-91	91	SM	125	10300.0	5491.2	4808.8	0.6	2644.8	8136.0	72.0	0.0	85.0	6885.0	NA	NA
-92	92	SM	125	10425.0	5553.6	4871.4	0.6	2679.3	8232.9	72.0	0.0	85.0	6970.0	NA	NA
-93	93	SM	125	10550.0	5616.0	4934.0	0.6	2713.7	8329.7	72.0	0.0	85.0	7055.0	NA	NA
-94	94	SM	125	10675.0	5678.4	4996.6	0.6	2748.1	8426.5	72.0	0.0	85.0	7140.0	NA	NA
-95	95	SM	125	10800.0	5740.8	5059.2	0.6	2782.6	8523.4	72.0	0.0	85.0	7225.0	NA	NA
-96	96	SM	125	10925.0	5803.2	5121.8	0.6	2817.0	8620.2	72.0	0.0	85.0	7310.0	NA	NA
-97	97	SM	125	11050.0	5865.6	5184.4	0.6	2851.4	8717.0	72.0	0.0	85.0	7395.0	NA	NA
-98	98	SM	125	11175.0	5928.0	5247.0	0.6	2885.9	8813.9	72.0	0.0	85.0	7480.0	NA	NA
-99	99	SM	125	11300.0	5990.4	5309.6	0.6	2920.3	8910.7	72.0	0.0	85.0	7565.0	NA	NA
-100	100	SM	125	11425.0	6052.8	5372.2	0.6	2954.7	9007.5	72.0	0.0	85.0	7650.0	NA	NA
-101	101	SM	125	11550.0	6115.2	5434.8	0.6	2989.1	9104.3	72.0	0.0	85.0	7735.0	NA	NA
-102	102	SM	125	11675.0	6177.6	5497.4	0.6	3023.6	9201.2	72.0	0.0	85.0	7820.0	NA	NA
-103	103	SM	125	11800.0	6240.0	5560.0	0.6	3058.0	9298.0	72.0	0.0	85.0	7905.0	NA	NA
-104	104	SP	120	11925.0	6302.4	5622.6	0.6	3092.4	9394.8	72.0	0.0	85.0	7990.0	NA	NA
-105	105	SP	120	12045.0	6364.8	5680.2	0.6	3124.1	9488.9	72.0	0.0	85.0	8075.0	NA	NA
-106	106	SP	120	12165.0	6427.2	5737.8	0.6	3155.8	9583.0	72.0	0.0	85.0	8160.0	NA	NA
-107	107	SP	120	12285.0	6489.6	5795.4	0.6	3187.5	9677.1	72.0	0.0	85.0	8245.0	NA	NA
-108	108	SP	120	12405.0	6552.0	5853.0	0.6	3219.2	9771.2	72.0	0.0	85.0	8330.0	NA	NA
-109	109	SP	120	12525.0	6614.4	5910.6	0.6	3250.8	9865.2	72.0	0.0	85.0	8415.0	NA	NA
-110	110	SP	120	12645.0	6676.8	5968.2	0.6	3282.5	9959.3	72.0	0.0	85.0	8500.0	NA	NA
-111	111	SP	120	12765.0	6739.2	6025.8	0.6	3314.2	10053.4	72.0	0.0	85.0	8585.0	NA	NA
-112	112	SP	120	12885.0	6801.6	6083.4	0.6	3345.9	10147.5	72.0	0.0	85.0	8670.0	NA	NA
-113	113	SP	120	13005.0	6864.0	6141.0	0.6	3377.6	10241.6	72.0	0.0	85.0	8755.0	NA	NA
-114	114	CH	105	13125.0	6926.4	6198.6	0.6	3409.2	10335.6	72.0	0.0	85.0	8840.0	NA	NA
-115	115	CH	105	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-116	116	CH	105	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-117	117	CH	105	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-118	118	CH	105	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-119	119	CH	105	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-120	120	CH	105	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-121	121	CH	105	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-122	122	CH	105	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-123	123	CH	105	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-124	124	ML	115	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-125	125	ML	115	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-126	126	ML	115	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-127	127	ML	115	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA

Table 4b - Old River; HSA on landside levee toe

Approx Elev. (feet)	Depth (feet)	Geology		Earth Pressure Calculation						Fluid inside borehole				Factor of safety of drilling fluid	Factor of safety of grout fluid
		Soil Type	Total unit weight (pcf)	Total overburden pressure (psf)	Pore water pressure (psf)	Effective vertical stress (psf)	At rest lateral earth pressure coefficient K_o	Effective horizontal stress (psf)	Horizontal stress (psf)	Drilling fluid unit weight (pcf)	Drilling fluid pressure (psf)	Grout fluid unit weight (pcf)	Grout fluid pressure (psf)		
-128	128	ML	115	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-129	129	ML	115	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA
-130	130	ML	115	13125.0	6988.8	6136.2	0.6	3374.9	10363.7	72.0	0.0	85.0	8925.0	NA	NA

ITEM 13

RD 773: MASTER CALENDAR

JANUARY

FEBRUARY

- Send out Form 700s, remind Trustees of April 1 filing date
- Board Meeting
- Insurance renewal. Policy renews April.

MARCH

- Hire Employees for Seasonal Levee Work.

APRIL

- April 1: Form 700s due
- Board Meeting
- Draft Budget
- Adopt Annual CEQA Exemption for levee maintenance.
- Subventions Resolution

MAY

JUNE

- Approve Audit Contract for expiring fiscal year
- Adopted Annual Budget
- Board Meeting
- Adopt Resolution for setting Assessments and submit to County Assessor's Office

JULY

AUGUST

- August 1: Deadline to certify assessments for tax-roll and deliver to County (duration of current assessment: Indefinite).
- Send handbills for collection of assessments for public entity-owned properties
- In election years, opening of period for secretary to receive petitions for nomination of Trustees (75 days from date of election.) (*Cal. Wat. Code* §50731.5)
- Board Meeting

SEPTEMBER

- In election years, last legal deadline to post notice that petitions for nomination of Trustees may be received (7 days prior to close of closure.) (*Cal. Wat. Code* §50731.5).
- In election years, closing of acceptance of petitions for nomination of Trustees (54 days from date of election.) (*Cal. Wat. Code* §50731.5).

OCTOBER

- Publish Notice of Election, odd numbered years (once per week, 4 times, commencing at least 1 month prior to election).
- Board Meeting

NOVEMBER

- Election: to be held first Tuesday after first Monday of each odd-numbered year.

DECEMBER

- New Trustee(s) take office, outgoing Trustee(s) term(s) end on first Friday of each odd-numbered year.
- Board Meeting

Term of Current Board Members:

Name	Term Commenced	Term Ends
Ryan Bacchetti	First Friday 12/2021	First Friday of 12/2025
Joe Enos	First Friday 12/2019	First Friday of 12/2027
Mark R. Bacchetti	First Friday 12/2019	First Friday of 12/2027

No Expiration on Assessment

Trustee Ryan Bacchetti appointed to fill vacancy within first half of term. Second half of term expiring in 2025 will be filled at District's 2023 General Election.

ITEM 14

RECLAMATION DISTRICT 773							
Bills for Approval of Payment							
January - March, 2025							
NAME	**INVOICE DATE**	**INVOICE #**	**AMOUNT**	**TOTAL $**	**WARRANT #**	**CHECK #**	**RATIFICATION**
Kjeldsen, Sinnock & Neudeck	2/28/2025	39847	$71.25		2124		
	2/28/2025	39848	$1,370.75				
	2/28/2025	39849	$2,159.50				
	2/28/2025	39850	$6,814.60				
	2/28/2025	39851	$99.00				
	3/28/2025	40087	$90.00				
	3/28/2025	40088	$327.00				
	3/28/2025	40089	$655.75				
	3/28/2025	40090	$58.25				
	3/28/2025	40091	$8,316.10				
	3/28/2025	40092	$99.00				
				$20,061.20			
Neumiller & Beardslee	2/7/2025	352221	$736.00		2125		
	3/10/2025	352866	$3,735.00				
				$4,471.00			
Croce, Sanguinetti, & Vander Veen	1/31/2025	21752	$5,410.00		2126		
				$5,410.00			
DRJ CPAs, Inc.	2/15/2025	1025	$225.00		2127		
				$225.00			
NOTES:			**Warrant Total**	**$30,167.20**			
Fund Balance as of March 27, 2025		$654,265.21					
Less Submitted Warrants for Payment:		$30,167.20					
Total:		**$624,098.01**					
Bank of Stockton Balance as of 2/28/25		$1,238.30					