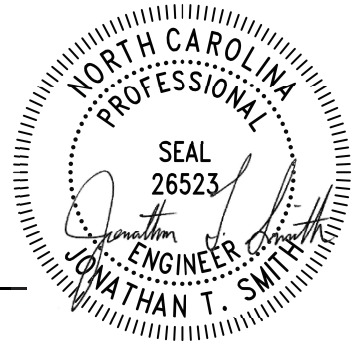


**PROJECT MANUAL**  
**FOR**  
**Legion Pond Dam**  
**Town of Chapel Hill**  
**Chapel Hill, North Carolina**

**P27-04**

**July 28, 2026**



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Jonathan Smith, P.E.  
Tetra Tech Engineering, P.C.  
4000 Sancar Way, Suite 175  
Research Triangle Park, NC 27709  
Company License # C-2644

**Owner Manager**  
Chad Brown



**Mayor**  
Jessica Anderson

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| <b><u>Document</u></b> | <b><u>Title</u></b> |
|------------------------|---------------------|
| C-000-COV              | Cover               |
| C-001-TOC              | Table of Contents   |

## BIDDING REQUIREMENTS

|           |                        |
|-----------|------------------------|
| C-111-AFB | Advertisement for Bids |
| C-200-ITB | Instruction to Bidders |

## REQUIRED FORMS

|           |                           |
|-----------|---------------------------|
| C-410-BF  | Bid Form                  |
| C-430-PSF | Bid Bond – Penal Sum Form |
| C-451-QS  | Qualifications Statement  |
|           | — Schedule A              |
|           | — Schedule B              |
|           | — Schedule C              |

## CONTRACT REQUIREMENTS

|            |                                                                  |
|------------|------------------------------------------------------------------|
| C-510-NOA  | Notice of Award                                                  |
| C-520-TOCH | Agreement between Owner and Contractor for Construction Contract |
| C-550-NTP  | Notice to Proceed                                                |
| C-620-AFP  | Contractor's Application for Payment                             |
| C-625-CSC  | Certificate of Substantial Completion                            |
| C-700-TOCH | General Conditions to Contract                                   |
| C-940-WCD  | Work Change Directive(s)                                         |
| C-941-CO   | Change Order(s)                                                  |
| C-942-FO   | Field Order(s)                                                   |

## TECHNICAL SPECIFICATIONS

See City of North Carolina, Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2024 (Available for download online): [NC DOT Standard Specifications](#)

## SUPPLEMENTAL SPECIFICATIONS

| <b><u>Document</u></b> | <b><u>Title</u></b>                             |
|------------------------|-------------------------------------------------|
| SS-1                   | Geotechnical Quality Assurance and Quality      |
| SS-2                   | Control and Monitoring of Dewatering Activities |

## APPENDICES

- Geotechnical Information:

- Appendix A - Transmittal - Laboratory Test Results - Legion Pond
- Appendix B - Report of Subsurface Investigation
- Appendix C - Geotechnical Report - Legion Pond Dam Repair and Dewatering Pond - Chapel Hill, North Carolina

END OF DOCUMENT

**ADVERTISEMENT FOR BIDS**

Town of Chapel Hill  
Chapel Hill, North Carolina  
Legion Pond Dam

**General Notice**

Town of Chapel Hill (Owner) is requesting Bids for the construction of the following Project:

**Legion Pond Dam  
Bid # P27-04**

Bids for the construction of the Project will be received at the Town Hall located at 405 Martin Luther King Jr Blvd, Chapel Hill, NC 27514, until **August 24, 2026 at 11:00 AM EST**. At that time the Bids received will be publicly opened and read in Conference Room 102. Late bids will not be accepted.

The Project includes the following Work:

The project will first require dewatering of the existing pond. The dewatering intake will be from the surface of the pond as required by Dam Safety. The dewatering outlet will discharge onto a rock pad to dissipate energy and minimize any erosion. Upon completion of dewatering the principal outlet barrel will be used to convey daily water flows through the dam. The demolition of the dam and embankment will work from the top down mainlining the bypass flow through the principal outlet pipe as long as possible. A bypass pump will be set when the excavation gets to elevations requiring the existing pipe to be removed. It is anticipated that earth moving equipment will be used for the project including but not limited to excavators, loaders, and dump trucks.

Bids are requested for the following Contract: **Bid # P27-04 - Legion Pond Dam**

The Project has an expected duration of 120 days.

**Obtaining the Bidding Documents**

Prospective Companies can view the Request for Bid (RFB) and all project documents on the Town of Chapel Hill website ([www.chapelhillnc.gov](http://www.chapelhillnc.gov)). Click on the "Town Government" menu, then "Doing Business with Chapel Hill" option, then select "Bids: Current", then click on the name of this project).

**Pre-bid Conference**

No Pre-bid Conference will be held for this project.

**Instructions to Bidders**

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

**This Advertisement is issued by:**

Owner: **Town of Chapel Hill**  
By: **Lenore Bishop**  
Title: **Purchasing and Contracts Manager**  
Date: **July 30, 2026**

# INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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## ARTICLE 1—DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office*—The office from which the Bidding Documents are to be issued.

## ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

- 2.02 Bidding Documents are available on the Town of Chapel Hill's website for the sole purpose of obtaining Bids for completion of the Project. Printed documents may not be re-sold under any circumstances.

- 2.03 Owner has established a Bidding Documents Website as indicated in the Advertisement. Bidder can obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. All Addenda will be posted on the Bidding Documents Website.

### 2.04 *Electronic Documents*

- A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader Version 2020 or later.

- B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.04.A above.

- C. After the Contract is awarded, the Owner will provide or direct the Engineer to provide for the use of the Contractor documents that were developed by Engineer as part of the Project design process, as Electronic Documents in native file formats.

1. Electronic Documents that are available in native file format include:

- a. Construction Plan Set in .dwg and .pdf format

2. Release of such documents will be solely for the convenience of the Contractor. No such document is a Contract Document.

3. Unless the Contract Documents explicitly identify that such information will be available to the Successful Bidder (Contractor), nothing herein will create an obligation on the part of the Owner or Engineer to provide or create such information, and the Contractor is not entitled to rely on the availability of such information in the preparation of its Bid

or pricing of the Work. In all cases, the Contractor shall take appropriate measures to verify that any electronic/digital information provided in Electronic Documents is appropriate and adequate for the Contractor's specific purposes.

4. In no case will the Contractor be entitled to additional compensation or time for completion due to any differences between the actual Contract Documents and any related document in native file format.

### **ARTICLE 3—QUALIFICATIONS OF BIDDERS**

3.01 Bidders are notified that relevant Articles of Chapter 87 of the General Statutes of North Carolina, will be observed in receiving and awarding contracts. Bidders for this Project must be properly licensed for the Work.

1. Unclassified: Contractor meets the qualifications for all classifications of licenser for General Contractors (Chapter 87, Article 1).
2. Public Utilities Contractor: Contractor is licensed for water and sewer mains and water and wastewater treatment facilities.
3. Public Utilities (Water Lines and Sewer Lines): Contractor is licensed for water and sewer mains, water storage tanks, lift stations, pump stations and appurtenances. Is not acceptable for water and wastewater treatment plants.
4. Public Utilities (Water Purification and Sewage Disposal): Contractor is licensed for water and wastewater treatment facilities and appurtenances. Is not acceptable for water and wastewater lines.
5. For Plumbing and HVAC Class I license is for all types of buildings. Class II is for single-family residential dwellings per 87-21(b).
6. Electrical requires one of the following limitations based on the estimated construction cost and the electrical size per GS 87-43.3 as amended in Sep 2014:

3.02 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:

- A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.
- B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.
- C. Bidder's state or other contractor license number, if applicable.
- D. Subcontractor and Supplier qualification information.
- E. Other required information regarding qualifications.

- 3.03 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.04 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

#### **ARTICLE 4—BID SCHEDULE**

|                                  |                                            |
|----------------------------------|--------------------------------------------|
| Bid Request Issued:              | July 30, 2026                              |
| Request for Interpretations Due: | August 10, 2026, by 4:00 PM EST            |
| Addendum Published:              | August 17, 2026                            |
| Bids Due:                        | August 24, 2026, by 11:00 AM EST           |
| Town Council Approval:           | September 9, 2026                          |
| Contract Execution:              | September 30, 2026                         |
| Project Completion Date:         | 120 Days after Notice to Proceed is issued |

#### **ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE**

##### **5.01 *Site and Other Areas***

- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

##### **5.02 *Existing Site Conditions***

###### **A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions***

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:
  - a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
  - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.
  - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
  - d. Technical Data contained in such reports and drawings.
2. Owner will furnish to any Bidder, upon request, copies of the reports and drawings referenced above. These documents are supplied for the Bidder's information only and shall not become part of the Contract Documents. The Owner makes no representation

or warranty as to their completeness, accuracy, or suitability, and the Bidder alone is responsible for any conclusions, interpretations, or inferences it draws from such reports or drawings.

3. *Geotechnical Baseline Report/Geotechnical Data Report*: The Bidding Documents contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).
  - a. As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.
  - b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.
  - c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.
  - d. As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.
- B. *Underground Facilities*: Locations of existing underground utilities shown on the Drawings are provided for the Bidder's information only and shall not become part of the Contract Documents. The Owner makes no representation or warranty as to their accuracy or completeness, and each Bidder is solely responsible for any conclusions or interpretations it draws from those drawings.

#### 5.03 *Site Visit and Testing by Bidders*

- A. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- B. Owner has control over the Site and hereby allows Bidders general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- C. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.04 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.05 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

**ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS**

6.01 *Express Representations and Certifications in Bid Form, Agreement*

- A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

**ARTICLE 7—INTERPRETATIONS AND ADDENDA**

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.

Bidder shall submit all questions about the meaning or intent of the Bidding Documents to the Project Manager in writing. Questions must be received by **August 10, 2026, at 4:00 PM EST** to be addressed in the Addendum.

Contact information and submittal procedures for such questions are as follows:

- A. Chad Brown – [cbrown1@chapelhillnc.gov](mailto:cbrown1@chapelhillnc.gov)

- 7.02 Interpretations or clarifications considered necessary by Project Manager in response to such questions will be issued by Addenda.

- 7.03 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

**ARTICLE 8—BID SECURITY**

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **five (5) percent** of Bidder's maximum Bid price (determined by adding the base bid and all alternates)

and in the form of a Bid bond issued by a surety. Such Bid bond will be issued in the form included in the Bidding Documents.

- 8.02 The Bid security must be placed in a separate envelope and be marked on the outside of the envelope with the Project Name, Project Number, Company Name, and Titled "Bid Bond".
- 8.03 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.
- 8.04 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven (7) days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.05 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven (7) days after the Bid opening.

#### **ARTICLE 9—CONTRACT TIMES**

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.
- 9.02 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

#### **ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS**

- 10.01 The Contract will be awarded on the basis of materials and equipment specified in the Bidding Documents. Any Bidder wishing to propose an alternate material or piece of equipment must submit a written request for clarification to the Project Manager, in accordance with Article 3 of the General Conditions, by **August 10, 2026, at 4:00 PM EST**. The Project Manager and Designer will evaluate and respond to all such requests by Addendum posted on the Town's website. No other method of approval shall be binding, and the Project Manager and Designer make no representation or warranty regarding the suitability of any proposed alternate. Bidders alone bear the risk of relying on any materials or equipment not expressly specified.
- 10.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as

supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

#### **ARTICLE 11—PREPARATION OF BID**

- 11.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
  - B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”
- 11.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.
- 11.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.
- 11.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.
- 11.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.
- 11.06 A Bid by an individual must show the Bidder’s name and official address.
- 11.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.
- 11.08 All names must be printed in ink below the signatures.
- 11.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.
- 11.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.
- 11.11 The Bid must contain evidence of Bidder’s authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

- 11.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

#### **ARTICLE 12—BASIS OF BID**

12.01 *Lump Sum with Allowances Method*

- A. Bidders shall submit a single Lump Sum Price with Allowances. In preparing that price, include all cash and contingency allowances (as identified in the Bid Form) for which the Bidder has allowed overhead, costs, profit, etc.

#### **ARTICLE 13—SUBMITTAL OF BID**

- 13.01 The Owner will receive sealed Bids at 405 Martin Luther King Jr Blvd, Chapel Hill, NC 27514, until **August 24, 2026 at 11:00 AM EST**. The Bids received will be publicly opened and read in Conference Room 102. Bids received after the indicated time and date shall not be considered.
- 13.02 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.
- 13.03 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must be accompanied by the Bid security and other required documents.
- 13.04 If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED – ATTN PURCHASING." A mailed Bid must be addressed to the location designated in the Advertisement.
- 13.05 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.
- 13.06 The Bidder shall be fully responsible for timely delivery at the location designated for receipt of the Bids.

#### **ARTICLE 14—MODIFICATION AND WITHDRAWAL OF BID**

- 14.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted



prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

- 14.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 14.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

#### **ARTICLE 15—OPENING OF BIDS**

- 15.01 Bids will be opened at the time and place indicated in the Advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

#### **ARTICLE 16—BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

- 16.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

#### **ARTICLE 17—EVALUATION OF BIDS AND AWARD OF CONTRACT**

- 17.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.
- 17.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.
- 17.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.
- 17.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.
- 17.05 *Evaluation of Bids*
- A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
  - B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner will announce to all bidders a “Base Bid plus alternates” budget after receiving all Bids, but prior to opening them. For comparison purposes alternates will be accepted, following the order of priority

established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

- C. For determination of the apparent low Bidder(s) when sectional bids are submitted, Bids will be compared on the basis of the aggregate of the Bids for separate sections and the Bids for combined sections that result in the lowest total amount for all of the Work.
  - D. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
  - E. For the determination of the apparent low Bidder when cost-plus-fee bids are submitted, Bids will be compared on the basis of the Guaranteed Maximum Price set forth by Bidder on the Bid Form.
- 17.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 17.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

#### **ARTICLE 18—BONDS AND INSURANCE**

- 18.01 Articles 34 through 36 of the General Conditions, as may be modified by the Supplementary Conditions, set forth the Owner's requirements for performance and payment bonds, other required bonds (if any), and insurance. When the successful Bidder delivers the executed Agreement to the Owner, it must be accompanied by the required bonds and evidence of insurance documentation.
- 18.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

#### **ARTICLE 19—SIGNING OF AGREEMENT**

When the Owner issues the Notice of Award, the Owner will provide unexecuted copies of the Agreement and all Contract Documents. Within fifteen (15) days after receipt of the Notice of Award, the successful Bidder shall (a) deliver to the Owner one fully executed original of the Agreement, (b) furnish the performance and payment bonds as required by Articles 34–35 of the General Conditions (as supplemented), and (c) deliver proof of insurance as required by Article 36.

## BID FORM FOR CONSTRUCTION CONTRACT

RETURN THIS FORM IN THE BID RESPONSE

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

### ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to:

Town of Chapel Hill  
Lenore Bishop  
405 Martin Luther King Jr. Blvd,  
Chapel Hill, NC 27514

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

### ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

- A. Required Bid security;
- B. List of Proposed Subcontractors;
- C. List of Proposed Suppliers;
- D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
- E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
- F. Required Bidder Qualification Statement with supporting data; and

### ARTICLE 3—BASIS OF BID— FIXED COSTS WITH ALLOWANCES

3.01 *Lump Sum Bids*

A. Bidder will complete the Work in accordance with the Contract Documents for the following lump sum (stipulated) price(s), together with any Unit Prices indicated in Paragraph 3.02:

- 1. Lump Sum Price (Single Lump Sum)

|                    |    |
|--------------------|----|
| Lump Sum Bid Price | \$ |
|--------------------|----|

B. All specified cash allowance(s) are included in the price(s) set forth below.

|                                            |    |
|--------------------------------------------|----|
| Lump Sum for Cash Allowance 1              | \$ |
| Lump Sum for Cash Allowance 2              | \$ |
| Lump Sum for Cash Allowance 3              | \$ |
| Total for all Lump Sum for Cash Allowances | \$ |

**3.02 Unit Price Bids**

A. Bidder will perform the following Work at the indicated unit prices:

| Item No.                                          | Spec. Section             | Description                                                                                                                         | Unit | Estimated Quantity | Bid Unit Price | Bid Amount |
|---------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------|--------------------|----------------|------------|
| <b>Demolition, Dewatering and Erosion Control</b> |                           |                                                                                                                                     |      |                    |                |            |
| 1                                                 | NCDOT 1101                | Work Zone Traffic Control                                                                                                           | LS   | 1                  | \$             | \$         |
| 2                                                 | NCDOT 226                 | Grading for Comprehensive Grading                                                                                                   | LS   | 1                  | \$             | \$         |
| 3                                                 | SS-2<br>Dewatering        | Control and Monitoring of Dewatering Activities (Dewatering Pump)                                                                   | LS   | 1                  | \$             | \$         |
| 4                                                 | NCDOT 1607                | Stone for Erosion Control, Class A (Gravel Construction Entrance)                                                                   | TN   | 27                 | \$             | \$         |
| 5                                                 | NCDOT 1607                | Geotextile for Drainage, Type 2 (Gravel Construction Entrance)                                                                      | SY   | 80                 | \$             | \$         |
| 6                                                 | NCDOT 876                 | Rip Rap, Class B (Guide for Rip Rap at Pipe Outlets)                                                                                | TN   | 5                  | \$             | \$         |
| 7                                                 | NCDOT 876                 | Geotextile for Drainage, Type 2 (Guide for Rip Rap at Pipe Outlets)                                                                 | SY   | 8                  | \$             | \$         |
| 8                                                 | NCDOT 1605                | Temporary Silt Fence                                                                                                                | LF   | 900                | \$             | \$         |
| 9                                                 | TOCH Detail -<br>EC-12.00 | Orange, UV Resistant High Tensile Strength Polyethylene Laminar Barricade Fabric, Steel Posts, and a Sign for Tree Protection Fence | LF   | 865                | \$             | \$         |
| 10                                                | NCDOT 1631                | Matting for Erosion Control (Matting Blanket, Matting Installation)                                                                 | SY   | 4,200              | \$             | \$         |
| 11                                                | NCDOT 1660                | Seeding and Mulching (Temporary Seed)                                                                                               | AC   | 6.6                | \$             | \$         |
| 12                                                | NCDOT 230                 | Borrow Excavation (Topsoil)                                                                                                         | CY   | 273                | \$             | \$         |

**Town of Chapel Hill, North Carolina Legion Pond Dam – Bid # P27-04**

|                                |            |                                                                                            |    |       |    |    |
|--------------------------------|------------|--------------------------------------------------------------------------------------------|----|-------|----|----|
| 13                             | NCDOT 1530 | Abandon 8" Utility Pipe (Remove Existing Pipe)                                             | LF | 66    | \$ | \$ |
| 14                             | ES102      | Concrete Washout Structure                                                                 | EA | 1     | \$ | \$ |
| 15                             | CD104      | 1" Diameter #57 Washed Stone (Standard Silt Fence Outlet)                                  | CY | 122   | \$ | \$ |
| 16                             | NCDOT 1651 | Selective Tree Removal, 4" - 8" Diameter                                                   | EA | 22    | \$ | \$ |
| 17                             | NCDOT 1651 | Selective Tree Removal, 8" - 12" Diameter                                                  | EA | 37    | \$ | \$ |
| 18                             | NCDOT 1651 | Selective Tree Removal, 12" - 18" Diameter                                                 | EA | 43    | \$ | \$ |
| 19                             | NCDOT 1651 | Selective Tree Removal, 18" and Larger Diameter                                            | EA | 50    | \$ | \$ |
| <b>Geotechnical</b>            |            |                                                                                            |    |       |    |    |
| 20                             | NCDOT 305  | 8" Drainage Pipe, Corrugated HDPE Pipe (Toe Drain & Animal Guard)                          | LF | 490   | \$ | \$ |
| 21                             | NCDOT 1631 | Matting for Erosion Control (Permanent Turf Reinforcement Mat (TRM))                       | SY | 361   | \$ | \$ |
| 22                             | NCDOT 815  | Subdrain Fine Aggregate (C33 Fine Aggregate, Toe Drain Detail & Filter Diaphragm)          | CY | 300   | \$ | \$ |
| 23                             | NCDOT 815  | Subdrain Coarse Aggregate (#57 Stone, Toe Drain Detail)                                    | CY | 73    | \$ | \$ |
| <b>Stormwater and Drainage</b> |            |                                                                                            |    |       |    |    |
| 24                             | NCDOT 840  | Masonry Drainage Structure (Trash Rack, Steps, Debris Shield, Styrofoam Plugs, Gate Valve) | EA | 1     | \$ | \$ |
| 25                             | NCDOT 462  | 4" Slope Protection, Portland Cement Concrete, Class B (Emergency Spillway)                | SY | 22    | \$ | \$ |
| 26                             | NCDOT 310  | 24" R.C. Pipe Culverts, Class V (Outlet Pipe, Concrete Cradle)                             | LF | 130   | \$ | \$ |
| 27                             | NCDOT 838  | Reinforced Endwall (Reinforced Concrete Headwall)                                          | CY | 4     | \$ | \$ |
| <b>Planting Plan</b>           |            |                                                                                            |    |       |    |    |
| 28                             | NCDOT 1660 | Seeding and Mulching (Permanent Grass)                                                     | AC | 6.6   | \$ | \$ |
| 29                             | NCDOT 1670 | Water for Planting (Permanent Grass)                                                       | GA | 1,000 | \$ | \$ |
| <b>General</b>                 |            |                                                                                            |    |       |    |    |

|    |           |                        |    |   |    |    |
|----|-----------|------------------------|----|---|----|----|
| 30 | NCDOT 800 | Mobilization           | LS | 1 | \$ | \$ |
| 31 | NCDOT 801 | Construction Surveying | LS | 1 | \$ | \$ |

|                                          |    |
|------------------------------------------|----|
| <b>Total of All Unit Price Bid Items</b> | \$ |
|------------------------------------------|----|

**B. Bidder acknowledges that:**

1. Each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and
2. Estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

**ARTICLE 4—TIME OF COMPLETION**

- 4.01 Bidder agrees that the Work will be substantially complete on or before the date, or within the number of consecutive calendar days, indicated in the Agreement, measured from the date established in the written Notice to Proceed as defined in Article 3.q of the Town of Chapel Hill General Conditions.
- 4.02 Bidder agrees that the Work will be substantially complete within 120 consecutive calendar days after the date specified in the written Notice to Proceed (see Article 23(b) of the Town of Chapel Hill General Conditions), and that the Work will be fully completed and ready for final payment within 140 consecutive calendar days after the date specified in the written Notice to Proceed, in accordance with the requirements for final payment set forth in Article 31 of the Town of Chapel Hill General Conditions.
- 4.03 Bidder accepts the provisions of the Agreement as to liquidated damages.

**ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA**

**5.01 *Bid Acceptance Period***

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

**5.02 *Instructions to Bidders***

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

A. Bidder hereby acknowledges receipt of the following Addenda:

| Addendum Number | Addendum Date |
|-----------------|---------------|
|                 |               |
|                 |               |
|                 |               |

**ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS**

6.01 *Bidder’s Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder’s (Contractor’s) safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
  - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
  - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
  - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
  - d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.



BIDDER hereby submits this Bid as set forth above:

Bidder:

\_\_\_\_\_  
(typed or printed name of organization)

By:

\_\_\_\_\_  
(individual's signature)

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Date:

\_\_\_\_\_  
(typed or printed)

*If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.*

Attest:

\_\_\_\_\_  
(individual's signature)

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Date:

\_\_\_\_\_  
(typed or printed)

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_

Bidder's Contact:

Name:

\_\_\_\_\_  
(typed or printed)

Title:

\_\_\_\_\_  
(typed or printed)

Phone:

Email:

Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Bidder's Contractor License No.: (if applicable)

\_\_\_\_\_

## BID BOND (PENAL SUM FORM)

RETURN THIS FORM IN THE BID RESPONSE

|                                                                                                                                                                                                               |                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Bidder</b><br>Name: _____<br>Address (principal place of business): _____                                                                                                                                  | <b>Surety</b><br>Name: _____<br>Address (principal place of business): _____                                      |
| <b>Owner</b><br>Name: Town of Chapel Hill<br>Address: 405 Martin Luther King Jr. Blvd<br>Chapel Hill, NC 27514                                                                                                | <b>Bid</b><br>Project: Legion Pond Dam – Bid # P27-04<br><br>Bid Due Date: August 24 <sup>th</sup> @ 11:00 AM EST |
| <b>Bond</b><br>Penal Sum: _____<br>Date of Bond: _____                                                                                                                                                        |                                                                                                                   |
| Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative. |                                                                                                                   |
| Bidder                                                                                                                                                                                                        | Surety                                                                                                            |
| _____<br><i>(Full formal name of Bidder)</i>                                                                                                                                                                  | _____<br><i>(Full formal name of Surety) (corporate seal)</i>                                                     |
| By: _____<br><i>(Signature)</i>                                                                                                                                                                               | By: _____<br><i>(Signature) (Attach Power of Attorney)</i>                                                        |
| Name: _____<br><i>(Printed or typed)</i>                                                                                                                                                                      | Name: _____<br><i>(Printed or typed)</i>                                                                          |
| Title: _____                                                                                                                                                                                                  | Title: _____                                                                                                      |
| Attest: _____<br><i>(Signature)</i>                                                                                                                                                                           | Attest: _____<br><i>(Signature)</i>                                                                               |
| Name: _____<br><i>(Printed or typed)</i>                                                                                                                                                                      | Name: _____<br><i>(Printed or typed)</i>                                                                          |
| Title: _____                                                                                                                                                                                                  | Title: _____                                                                                                      |
| <i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i>                                      |                                                                                                                   |

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
  - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
  - 3.2. All Bids are rejected by Owner, or
  - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

RETURN THIS FORM IN THE BID RESPONSE

**ARTICLE 1—GENERAL INFORMATION**

1.01 Provide contact information for the Business:

|                                       |  |                |  |
|---------------------------------------|--|----------------|--|
| Legal Name of Business:               |  |                |  |
| Corporate Office                      |  |                |  |
| Name:                                 |  | Phone number:  |  |
| Title:                                |  | Email address: |  |
| Business address of corporate office: |  |                |  |
|                                       |  |                |  |
|                                       |  |                |  |
| Local Office                          |  |                |  |
| Name:                                 |  | Phone number:  |  |
| Title:                                |  | Email address: |  |
| Business address of local office:     |  |                |  |
|                                       |  |                |  |
|                                       |  |                |  |

1.02 Provide information on the Business's organizational structure:

|                                                                                                                                 |                                                                                                                        |                                                                                           |  |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--|
| Form of Business:                                                                                                               | <input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation |                                                                                           |  |
| <input type="checkbox"/> Limited Liability Company <input type="checkbox"/> Joint Venture comprised of the following companies: |                                                                                                                        |                                                                                           |  |
| 1.                                                                                                                              |                                                                                                                        |                                                                                           |  |
| 2.                                                                                                                              |                                                                                                                        |                                                                                           |  |
| 3.                                                                                                                              |                                                                                                                        |                                                                                           |  |
| Provide a separate Qualification Statement for each Joint Venturer.                                                             |                                                                                                                        |                                                                                           |  |
| Date Business was formed:                                                                                                       |                                                                                                                        | State in which Business was formed:                                                       |  |
| Is this Business authorized to operate in the Project location?                                                                 |                                                                                                                        | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Pending |  |

1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

|                   |  |              |  |
|-------------------|--|--------------|--|
| Name of business: |  | Affiliation: |  |
| Address:          |  |              |  |
| Name of business: |  | Affiliation: |  |
| Address:          |  |              |  |
| Name of business: |  | Affiliation: |  |
| Address:          |  |              |  |

1.04 Provide information regarding the Business’s officers, partners, and limits of authority.

|                               |                                                          |                     |    |
|-------------------------------|----------------------------------------------------------|---------------------|----|
| Name:                         |                                                          | Title:              |    |
| Authorized to sign contracts: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Limit of Authority: | \$ |
| Name:                         |                                                          | Title:              |    |
| Authorized to sign contracts: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Limit of Authority: | \$ |
| Name:                         |                                                          | Title:              |    |
| Authorized to sign contracts: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Limit of Authority: | \$ |
| Name:                         |                                                          | Title:              |    |

**ARTICLE 2—LICENSING**

2.01 Provide information regarding licensure for Business:

|                   |  |                  |  |
|-------------------|--|------------------|--|
| Name of License:  |  |                  |  |
| Licensing Agency: |  |                  |  |
| License No:       |  | Expiration Date: |  |
| Name of License:  |  |                  |  |
| Licensing Agency: |  |                  |  |
| License No:       |  | Expiration Date: |  |

**ARTICLE 3—SAFETY**

3.01 Provide information regarding Business’s safety organization and safety performance.

|                                    |                |  |            |
|------------------------------------|----------------|--|------------|
| Name of Business’s Safety Officer: |                |  |            |
| Safety Certifications              |                |  |            |
| Certification Name                 | Issuing Agency |  | Expiration |
|                                    |                |  |            |
|                                    |                |  |            |

3.02 Provide Worker’s Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last three (3) years and the EMR, TRFR, and MH history for the last three (3) years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

|         |     |      |    |     |      |    |     |      |    |
|---------|-----|------|----|-----|------|----|-----|------|----|
| Year    |     |      |    |     |      |    |     |      |    |
| Company | EMR | TRFR | MH | EMR | TRFR | MH | EMR | TRFR | MH |
|         |     |      |    |     |      |    |     |      |    |
|         |     |      |    |     |      |    |     |      |    |

#### ARTICLE 4—FINANCIAL

- 4.01 Provide information regarding the Business’s financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

|                                                                                                                             |  |                                   |  |
|-----------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|--|
| Financial Institution:                                                                                                      |  |                                   |  |
| Business address:                                                                                                           |  |                                   |  |
| Date of Business’s most recent financial statement:                                                                         |  | <input type="checkbox"/> Attached |  |
| Date of Business’s most recent audited financial statement:                                                                 |  | <input type="checkbox"/> Attached |  |
| Financial indicators from the most recent financial statement                                                               |  |                                   |  |
| Contractor’s Current Ratio (Current Assets ÷ Current Liabilities)                                                           |  |                                   |  |
| Contractor’s Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities) |  |                                   |  |

#### ARTICLE 5—SURETY INFORMATION

- 5.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------|--|
| Surety Name:                                                                                                                                                                                                                                                                                                                         |                                                          |                 |  |
| Surety is a corporation organized and existing under the laws of the state of:                                                                                                                                                                                                                                                       |                                                          |                 |  |
| Is surety authorized to provide surety bonds in the Project location?                                                                                                                                                                                                                                                                | <input type="checkbox"/> Yes <input type="checkbox"/> No |                 |  |
| Is surety listed in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury?<br><input type="checkbox"/> Yes <input type="checkbox"/> No |                                                          |                 |  |
| Mailing Address<br>(principal place of business):                                                                                                                                                                                                                                                                                    |                                                          |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
| Physical Address<br>(principal place of business):                                                                                                                                                                                                                                                                                   |                                                          |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
|                                                                                                                                                                                                                                                                                                                                      |                                                          |                 |  |
| Phone (main):                                                                                                                                                                                                                                                                                                                        |                                                          | Phone (claims): |  |

## ARTICLE 6—INSURANCE

- 6.01 Provide information regarding Business’s insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

|                                                                                 |  |                                                          |  |
|---------------------------------------------------------------------------------|--|----------------------------------------------------------|--|
| Name of insurance provider, and type of policy (CLE, auto, etc.):               |  |                                                          |  |
| Insurance Provider                                                              |  | Type of Policy (Coverage Provided)                       |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
| Are providers licensed or authorized to issue policies in the Project location? |  | <input type="checkbox"/> Yes <input type="checkbox"/> No |  |
| Does provider have an A.M. Best Rating of A-VII or better?                      |  | <input type="checkbox"/> Yes <input type="checkbox"/> No |  |
| Mailing Address<br>(principal place of business):                               |  |                                                          |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
| Physical Address<br>(principal place of business):                              |  |                                                          |  |
|                                                                                 |  |                                                          |  |
|                                                                                 |  |                                                          |  |
| Phone (main):                                                                   |  | Phone (claims):                                          |  |

## ARTICLE 7—CONSTRUCTION EXPERIENCE

- 7.01 Provide information that will identify the overall size and capacity of the Business.

|                                                |  |
|------------------------------------------------|--|
| Average number of current full-time employees: |  |
| Estimate of revenue for the current year:      |  |
| Estimate of revenue for the previous year:     |  |

- 7.02 Provide information regarding the Business’s previous contracting experience.

|                                                                                                                                                                       |  |                      |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------|--|
| Years of experience with projects like the proposed project:                                                                                                          |  |                      |  |
| As a general contractor:                                                                                                                                              |  | As a joint venturer: |  |
| Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:                                                                             |  |                      |  |
| Been disqualified as a bidder by any local, state, or federal agency within the last 5 years?<br><input type="checkbox"/> Yes <input type="checkbox"/> No             |  |                      |  |
| Been barred from contracting by any local, state, or federal agency within the last 5 years?<br><input type="checkbox"/> Yes <input type="checkbox"/> No              |  |                      |  |
| Been released from a bid in the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No                                                                |  |                      |  |
| Defaulted on a project or failed to complete any contract awarded to it? <input type="checkbox"/> Yes <input type="checkbox"/> No                                     |  |                      |  |
| Refused to construct or refused to provide materials defined in the contract documents or in a change order? <input type="checkbox"/> Yes <input type="checkbox"/> No |  |                      |  |

|                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------|
| Been a party to any currently pending litigation or arbitration? <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Provide full details in a separate attachment if the response to any of these questions is Yes.                           |

- 7.03 List all projects currently under contract in Schedule A and provide indicated information.
- 7.04 List a minimum of three (3) and a maximum of six (6) projects completed in the last five (5) years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.
- 7.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

#### **ARTICLE 8—REQUIRED ATTACHMENTS**

- 8.01 Provide the following information with the Statement of Qualifications:
- A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.
  - B. Certification of Business's safety performance if required by Paragraph 4.02.
  - C. Financial statements as required by Paragraph 5.01.
  - D. Attachments providing additional information as required by Paragraph 8.02.
  - E. Schedule A (Current Projects) as required by Paragraph 8.03.
  - F. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.
  - G. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.
  - H. Additional items as pertinent.



This Statement of Qualifications is offered by:

Business:

\_\_\_\_\_  
*(typed or printed name of organization)*

By:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Date:

\_\_\_\_\_  
*(date signed)*

*(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest:

\_\_\_\_\_  
*(individual's signature)*

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Designated Representative:

Name:

\_\_\_\_\_  
*(typed or printed)*

Title:

\_\_\_\_\_  
*(typed or printed)*

Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone:

\_\_\_\_\_

Email:

\_\_\_\_\_

**Schedule A—Current Projects**

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Name of Organization                                                                                                |                 |                        |                |                         |       |
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

**Town of Chapel Hill, North Carolina Legion Pond Dam – Bid # P27-04**

|                                                                                                                     |                 |                        |                |              |                         |  |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|--------------|-------------------------|--|
| Project Owner                                                                                                       |                 |                        |                | Project Name |                         |  |
| General Description of Project                                                                                      |                 |                        |                |              |                         |  |
| Project Cost                                                                                                        |                 |                        |                | Date Project |                         |  |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager |              | Quality Control Manager |  |
| Name                                                                                                                |                 |                        |                |              |                         |  |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |              |                         |  |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone    | Email                   |  |
| Owner                                                                                                               |                 |                        |                |              |                         |  |
| Designer                                                                                                            |                 |                        |                |              |                         |  |
| Construction Manager                                                                                                |                 |                        |                |              |                         |  |

**Schedule B—Previous Experience with Similar Projects**

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Name of Organization                                                                                                |                 |                        |                |                         |       |
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

**Town of Chapel Hill, North Carolina Legion Pond Dam – Bid # P27-04**

|                                                                                                                     |                 |                        |              |                |                         |  |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|--------------|----------------|-------------------------|--|
| Project Owner                                                                                                       |                 |                        |              | Project Name   |                         |  |
| General Description of Project                                                                                      |                 |                        |              |                |                         |  |
| Project Cost                                                                                                        |                 |                        |              | Date Project   |                         |  |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent |              | Safety Manager | Quality Control Manager |  |
| Name                                                                                                                |                 |                        |              |                |                         |  |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |              |                |                         |  |
|                                                                                                                     | Name            | Title/Position         | Organization | Telephone      | Email                   |  |
| Owner                                                                                                               |                 |                        |              |                |                         |  |
| Designer                                                                                                            |                 |                        |              |                |                         |  |
| Construction Manager                                                                                                |                 |                        |              |                |                         |  |

**Schedule B—Previous Experience with Similar Projects**

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Name of Organization                                                                                                |                 |                        |                |                         |       |
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

|                                                                                                                     |                 |                        |                |                         |       |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|----------------|-------------------------|-------|
| Project Owner                                                                                                       |                 |                        | Project Name   |                         |       |
| General Description of Project                                                                                      |                 |                        |                |                         |       |
| Project Cost                                                                                                        |                 |                        | Date Project   |                         |       |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent | Safety Manager | Quality Control Manager |       |
| Name                                                                                                                |                 |                        |                |                         |       |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |                |                         |       |
|                                                                                                                     | Name            | Title/Position         | Organization   | Telephone               | Email |
| Owner                                                                                                               |                 |                        |                |                         |       |
| Designer                                                                                                            |                 |                        |                |                         |       |
| Construction Manager                                                                                                |                 |                        |                |                         |       |

**Town of Chapel Hill, North Carolina Legion Pond Dam – Bid # P27-04**

|                                                                                                                     |                 |                        |              |                |                         |  |
|---------------------------------------------------------------------------------------------------------------------|-----------------|------------------------|--------------|----------------|-------------------------|--|
| Project Owner                                                                                                       |                 |                        |              | Project Name   |                         |  |
| General Description of Project                                                                                      |                 |                        |              |                |                         |  |
| Project Cost                                                                                                        |                 |                        |              | Date Project   |                         |  |
| Key Project Personnel                                                                                               | Project Manager | Project Superintendent |              | Safety Manager | Quality Control Manager |  |
| Name                                                                                                                |                 |                        |              |                |                         |  |
| Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference) |                 |                        |              |                |                         |  |
|                                                                                                                     | Name            | Title/Position         | Organization | Telephone      | Email                   |  |
| Owner                                                                                                               |                 |                        |              |                |                         |  |
| Designer                                                                                                            |                 |                        |              |                |                         |  |
| Construction Manager                                                                                                |                 |                        |              |                |                         |  |

**Schedule C—Key Individuals**

|                                                                                                              |  |                                       |                                   |
|--------------------------------------------------------------------------------------------------------------|--|---------------------------------------|-----------------------------------|
| <b>Project Manager</b>                                                                                       |  |                                       |                                   |
| Name of individual                                                                                           |  |                                       |                                   |
| Years of experience as project manager                                                                       |  |                                       |                                   |
| Years of experience with this organization                                                                   |  |                                       |                                   |
| Number of similar projects as project manager                                                                |  |                                       |                                   |
| Number of similar projects in other positions                                                                |  |                                       |                                   |
| Current Project Assignments                                                                                  |  |                                       |                                   |
| Name of assignment                                                                                           |  | Percent of time used for this project | Estimated project completion date |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) |  |                                       |                                   |
| Name                                                                                                         |  | Name                                  |                                   |
| Title/Position                                                                                               |  | Title/Position                        |                                   |
| Organization                                                                                                 |  | Organization                          |                                   |
| Telephone                                                                                                    |  | Telephone                             |                                   |
| Email                                                                                                        |  | Email                                 |                                   |
| Project                                                                                                      |  | Project                               |                                   |
| Candidate's role on project                                                                                  |  | Candidate's role on project           |                                   |
| <b>Project Superintendent</b>                                                                                |  |                                       |                                   |
| Name of individual                                                                                           |  |                                       |                                   |
| Years of experience as project superintendent                                                                |  |                                       |                                   |
| Years of experience with this organization                                                                   |  |                                       |                                   |
| Number of similar projects as project superintendent                                                         |  |                                       |                                   |
| Number of similar projects in other positions                                                                |  |                                       |                                   |
| Current Project Assignments                                                                                  |  |                                       |                                   |
| Name of assignment                                                                                           |  | Percent of time used for this project | Estimated project completion date |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) |  |                                       |                                   |
| Name                                                                                                         |  | Name                                  |                                   |
| Title/Position                                                                                               |  | Title/Position                        |                                   |
| Organization                                                                                                 |  | Organization                          |                                   |
| Telephone                                                                                                    |  | Telephone                             |                                   |
| Email                                                                                                        |  | Email                                 |                                   |
| Project                                                                                                      |  | Project                               |                                   |
| Candidate's role on project                                                                                  |  | Candidate's role on project           |                                   |



|                                                                                                              |  |                                       |                                   |
|--------------------------------------------------------------------------------------------------------------|--|---------------------------------------|-----------------------------------|
| <b>Safety Manager</b>                                                                                        |  |                                       |                                   |
| Name of individual                                                                                           |  |                                       |                                   |
| Years of experience as project manager                                                                       |  |                                       |                                   |
| Years of experience with this organization                                                                   |  |                                       |                                   |
| Number of similar projects as project manager                                                                |  |                                       |                                   |
| Number of similar projects in other positions                                                                |  |                                       |                                   |
| Current Project Assignments                                                                                  |  |                                       |                                   |
| Name of assignment                                                                                           |  | Percent of time used for this project | Estimated project completion date |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) |  |                                       |                                   |
| Name                                                                                                         |  | Name                                  |                                   |
| Title/Position                                                                                               |  | Title/Position                        |                                   |
| Organization                                                                                                 |  | Organization                          |                                   |
| Telephone                                                                                                    |  | Telephone                             |                                   |
| Email                                                                                                        |  | Email                                 |                                   |
| Project                                                                                                      |  | Project                               |                                   |
| Candidate's role on project                                                                                  |  | Candidate's role on project           |                                   |
| <b>Quality Control Manager</b>                                                                               |  |                                       |                                   |
| Name of individual                                                                                           |  |                                       |                                   |
| Years of experience as project superintendent                                                                |  |                                       |                                   |
| Years of experience with this organization                                                                   |  |                                       |                                   |
| Number of similar projects as project superintendent                                                         |  |                                       |                                   |
| Number of similar projects in other positions                                                                |  |                                       |                                   |
| Current Project Assignments                                                                                  |  |                                       |                                   |
| Name of assignment                                                                                           |  | Percent of time used for this project | Estimated project completion date |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
|                                                                                                              |  |                                       |                                   |
| Reference Contact Information (listing names indicates approval to contact named individuals as a reference) |  |                                       |                                   |
| Name                                                                                                         |  | Name                                  |                                   |
| Title/Position                                                                                               |  | Title/Position                        |                                   |
| Organization                                                                                                 |  | Organization                          |                                   |
| Telephone                                                                                                    |  | Telephone                             |                                   |
| Email                                                                                                        |  | Email                                 |                                   |
| Project                                                                                                      |  | Project                               |                                   |
| Candidate's role on project                                                                                  |  | Candidate's role on project           |                                   |

## NOTICE OF AWARD

Date of Issuance:

Owner: Town of Chapel Hill

Owner's Project No.: P27-04

Engineer: Tetra Tech Engineering, P.C.

Engineer's Project No.: 100-WTR-T43655

Project: Legion Pond Dam

Contract Name:

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated **[date]** for the above Contract, and that you are the Successful Bidder and are awarded a Contract for: **[Describe Work, alternates, or sections of Work awarded]**

The Contract Price of the awarded Contract is **[\$[Contract Price]]**. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

**[Number of copies sent]** unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☒ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner **[number of copies sent]** counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the executed Agreement the Contract security (performance and payment bonds) required by Article 34 of the Town of Chapel Hill General Conditions, and the certificates of insurance and endorsements required by Article 11 of the Town of Chapel Hill General Conditions, in the forms and amounts specified in the Instructions to Bidders.

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Article 4 of the General Conditions To Contract.

Owner: Town of Chapel Hill

By *(signature)*: \_\_\_\_\_

Name *(printed)*: \_\_\_\_\_

Title: \_\_\_\_\_

Copy: Jonathan Smith, P.E.

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**TOWN OF CHAPEL HILL, NORTH CAROLINA**  
**CONTRACT BETWEEN OWNER AND CONTRACTOR**  
**WITH PERFORMANCE & PAYMENT BONDS**  
**FOR LEGION POND DAM**

THIS CONTRACT BETWEEN OWNER AND CONTRACTOR (the “Agreement”), is made and entered into as of the date set forth below, between the Town of Chapel Hill (the “Owner”), and **{Insert Contractor’s Full Legal Name}** (the “Contractor”), a duly licensed contractor authorized and qualified to do business in North Carolina.

**Section 1.** For and in consideration of the payments and mutual promises made by the Owner and Contractor, and under the penalty expressed in the bond bearing even date with these presents, and hereunto annexed, the Contractor agrees with the Owner, at the Contractor’s own proper cost and expense and with skill and diligence, to provide the labor and furnish all the materials for performance of the work (the “Work”) necessary to construct and complete ready for use, Legion Pond Dam (the “Project”) or such portion thereof as may be awarded to said Contractor, or to furnish such materials as may be awarded, as herein set forth, all in conformity with the Instructions to Bidders, Plans and Specifications, Detail of Bid Items, insurance requirements and the Contractor's proposal dated **{Insert Date}** attached hereto, and incorporated herein by reference, and such detailed directions, drawings, and similar information as may be given by the Owner from time to time during the construction, and in full compliance with this Agreement.

**Section 2.** The Contractor agrees to accept the sum of **#{Insert Value}** (the “Contract Sum”) in full compensation for furnishing materials and for all labor in performing all the Work contemplated in this Agreement.

**Section 3.** For the purpose of this Agreement, all directions from the Owner to the Contractor shall be made by Tetra Tech Engineering, P.C. (the “Engineer”), whose address is 4000 Sancar Way, Suite 200, Research Triangle Park, NC 27709. No change orders shall be valid unless signed by the Engineer, Town Manager, Department Director, Town Attorney and the Town Finance Officer, and, if required by Town ordinance or resolution, approved and executed by the Town Council.

**Section 4.** The Work will be staked out by the Contractor, as necessary, and reviewed by the Engineer at the appropriate stages and times prior to placement of materials. The Contractor will be required to carefully preserve all stakes and grades until authorized to remove them. Construction staking is not a pay item.

The Contractor shall also furnish all proper and necessary assistance and access for reviewing and inspecting the Work.

**Section 5.** The Contractor agrees to substantially complete the Work within 120 calendar days following receipt of a written Notice to Proceed and to fully and finally complete the Work, including all punch list items, within 140 calendar days after Substantial Completion. Furthermore, the Owner and Contractor acknowledge that because the damages and losses to the Owner in the

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event of the Contractor's failure to perform the Work within the time set forth herein will be difficult to ascertain and quantify, that there will be **\$250.00** per calendar day assessed against the Contractor as liquidated damages for losses sustained by the Owner for the Contractor's failure to substantially complete the Work within the time established herein, and that the amount of the liquidated damages as provided herein is a reasonable estimate of the Owner's losses. The Owner will hold retainage, in accordance with the General Conditions.

**Section 6.** The Contractor agrees not to employ any incompetent or disorderly person on the Work, and will employ competent, experienced foremen to be in charge of their respective work.

**Section 7.** The Engineer, shall in all cases determine the quality and quantity of the Work, including the materials, furnished by the Contractor under this Agreement, and also shall determine all questions in relation to lines, levels, and dimensions of the work, and as to the interpretation of the plans and specifications and as to all time extension requests.

**Section 8.** The grand total of unit price extensions for the Work is \$ \_\_\_\_\_. The sum may be modified by valid change orders as provided in the Contract Documents.

**Section 9.** The Contractor agrees that the Contractor's Superintendent, Project Manager, or Foreman in charge of the Work or any part thereof, shall have authority to receive information or instructions regarding the Project and to act on behalf of the Contractor with respect to such information or instructions.

**Section 10.** The Owner may require the Contractor to furnish additional materials, and to do additional work not provided in this Agreement or in the specifications, but which may be found necessary to the proper prosecution and completion of the Work as set forth in Article 19 of the General Conditions of the Agreement (the "General Conditions"). Said General Conditions are attached hereto and incorporated by reference. **No work other than that included in this Agreement shall be done and no additional material shall be furnished by the Contractor without a written Change Order or Construction Change Directive signed by the Engineer, Town Manager, Town Department Director, Town Attorney and the Town Finance Officer, and, if required by ordinance or resolution, approved and executed by the Town Council.** In the absence of such written Change Order or Construction Change Directive, the Contractor shall not be entitled to the payment for any additional work.

**Section 11.** The Owner reserves the right to place inspectors on the Work or at the place of shipment, or delivery of materials, or at factory or works of the Contractor, to observe the quality and character of the Work performed and materials used, and the Contractor agrees to afford such inspectors all proper access and facilities for carrying out their duties.

It is agreed and understood that the right of the Owner to review or inspect the Work or materials is retained in order to secure the completion of the Work in conformity with the plans, specifications, and the contract documents, and without unnecessary inconvenience to the public, but nothing contained in the plans, specifications, and the contract documents shall be taken or understood to authorize control by the Owner of any of the Contractor's obligations, or of the means or methods for performance of the Work, or as to make the Contractor an agent of the Owner.

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**Section 12.** The Contractor acknowledges and agrees that no employee of the Owner or the Engineer HAS ANY POWER TO VARY THIS CONTRACT without a written Change Order or Construction Change Directive as set forth in Article 19 of the General Conditions and that any variation from this Agreement shall be at the Contractor's own risk.

**Section 13.** The Contractor and Owner agree that this Agreement may not be assigned or transferred, including any assignment by operation of law, without the consent of the other. The assignment or transfer, including any assignment by operation of law, of any part of the Work by the Contractor shall not in any way relieve the Contractor of the Contractor's obligations, and the Owner will look to the Contractor, and not the subcontractor, for the faithful performance of the Work.

**Section 14.** The Contractor agrees to immediately remove and reconstruct at the Contractor's own expense all work or materials not in conformity with this Agreement, and any failure on the part of the Engineer or Owner to reject nonconforming work or material before the final completion and acceptance of the entire Work or material, shall not be considered an acceptance of the Work or material, or any part of it, notwithstanding that such Work or material previously may have been paid for.

**Section 15.** On the final completion of the work, the Owner shall proceed with due diligence and in accordance with the General Conditions to pay or cause to be paid within thirty (30) days thereafter the Contract Sum as modified by valid change orders signed as provided herein, less progress payments previously made, in legal tender of the United States and the acceptance of payment of such final amount shall release the Owner from all claims by the Contractor for Work done, materials furnished, or any other claims under or relating to this Agreement.

**Section 16.** The Owner may at any time require full release of all claims for materials or labor furnished for the Work and may withhold payments of amounts reasonably adequate to pay such claims until the Contractor has produced evidence reasonably sufficient to establish that such claims have been resolved.

**Section 17.** The Contractor agrees to perform the Work in such a manner as to be of least inconvenience to the Owner and public. The Contractor agrees to comply with all ordinances and regulations affecting the Work in any manner, and with all sanitary rules and regulations, taking precaution to avoid creating unsanitary conditions.

**Section 18.** The Contractor further agrees that if there is a material breach of this Agreement by the Contractor as provided in Article 29 of the General Conditions, the Owner shall have the right to notify the Contractor of the Contractor's default. Upon notification of such a default, the Contractor shall discontinue said work or such part of parts thereof as the Owner may designate, and the Owner shall thereupon have the power and the right to proceed as provided in Article 27 or other applicable provision of the General Conditions.

**Section 19.** The Contractor shall maintain worker's compensation, general and automobile liability and property damage insurance as set forth in the General Conditions. The Contractor shall indemnify and save harmless the Owner from all costs, damages, expenses, suits, actions, proceedings of every name and description in law or equity, including reasonable attorneys' fees, brought against it or its officers, agents or employees arising out of or related to the performance of the Work, arising out of or related to infringement of any patent, or due to or in consequence of

## C-520-TOCH

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any negligence or any action, error or omission of the Contractor, where Contractor's actions are the proximate cause of the loss, damage or expense.

**Section 20.** The Contractor must be in full compliance with all applicable federal and state laws, including those on immigration.

**Section 21.** The Contractor contractually agrees to administer all functions pursuant to this Contract without discrimination because of race, creed, sex, national origin, age, economic status, sexual orientation, gender identity or gender expression.

**Section 22.** The Contractor shall furnish the Owner certified statements setting forth the cost of the materials purchased from each vendor and the amount of North Carolina sales and use taxes paid thereon. In the event the Contractor makes several purchases from the same vendor, the Contractor's certified statement shall indicate the invoice number, the inclusive dates of the invoices, the total amount of the invoices, and the North Carolina sales and use taxes paid thereon. The Contractor's certified statement shall also include the cost of any tangible personal property withdrawn from the Contractor's warehouse stock and the amount of North Carolina sales or use tax paid thereon by the Contractor. The Contractor shall furnish such additional information as the Commissioner of Revenue of the State of North Carolina may require to substantiate a refund claim by the Owner for sales or use taxes. The Contractor shall obtain and furnish to the Owner similar certified statements by the subcontractors. The certified statements to be furnished shall be in the form of the standard CONTRACTOR'S SALES TAX REPORT and shall be submitted with each request for payment. The Owner will not make payment to the Contractor until the CONTRACTOR'S SALES TAX REPORTS ARE SUBMITTED. Any and all refunds received by the Owner of said taxes shall remain with the Owner, and the Contractor shall not be entitled to such refund.

**Section 23.** The Contractor hereby agrees that the Contractor has read each and every clause of this Agreement and fully understands the meaning of the same, and that the Contractor will comply with all the terms herein. This Agreement is to be executed in two copies, one copy to be delivered to the Contractor and the other to be retained by the Owner.

**Section 24.** This Agreement is subject to the terms of all federal, state, and local requirements for the Work whether or not such requirements are set forth in the body of this contract.

**Section 25.** This Agreement shall be governed by and interpreted in accordance with the laws of the State of North Carolina.

**Section 26.** This agreement may be amended or modified only by a writing signed by the Owner and Contractor.

**Section 27.** This Contract is subject to the provisions of the North Carolina General Statutes regarding the dispute resolution process. Accordingly, the following procedure shall be used to resolve any disputed issues, where the amount in controversy exceeds \$10,000, arising out of this contract or the construction process thereunder. If a dispute occurs between the Owner and Contractor arising out of or relating to the Contract or an alleged breach thereof, the Owner and Contractor agree to attempt to resolve the dispute by engaging in good faith negotiations. If the dispute cannot be resolved by negotiation, the Owner and Contractor agree as a condition

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precedent to commencing a lawsuit to submit the dispute to non-binding mediation under the construction mediation rules of the American Arbitration Association. The parties agree to exercise good faith efforts to complete any such mediation within ninety (90) days after the demand for resolution has been delivered. The work shall proceed as required by the contract documents during the pendency of any mediation or litigation. In the event a dispute cannot be resolved through non-binding mediation, the courts and the authorities of the State of North Carolina shall have exclusive jurisdiction over all controversies between the parties which may arise under or in relation to this Contract. Venue is properly laid in Orange County, North Carolina for any state court action and in the Middle District of North Carolina for any federal court action.

**Section 28. E-Verify:** Contractor shall comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. Further, should Contractor utilize a subcontractor(s), Contractor shall require the subcontractor(s) to comply with the requirements of Article 2, Chapter 64 of the General Statutes.

**Section 29. Contractor's Affidavit:** The final payment of retained amount due the Contractor on account of the Contract shall not become due until the Contractor has furnished to the Owner directly or through the Engineer an affidavit signed, sworn and notarized to the effect that all payments for materials, labor, services or subcontracted Work in connection with this Contract have been satisfied, and that no claims or liens exist against the Contractor in connection with this Contract.

*[SIGNATURES ON FOLLOWING PAGE]*



C-520-TOCH

This Contract is between the Town of Chapel Hill and {Insert Contractor's Full Legal Name} for Legion Pond Dam.

IN WITNESS WHEREOF, the parties hereto cause this agreement to be executed in their respective names.

{INSERT CONTRACTOR'S FULL LEGAL NAME}

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
PRINTED NAME & TITLE

\_\_\_\_\_  
WITNESS

\_\_\_\_\_  
PRINTED NAME & TITLE

**TOWN OF CHAPEL HILL**

\_\_\_\_\_  
DEPARTMENT HEAD/EXECUTIVE DIRECTOR OR DEPUTY/TOWN MANAGER

\_\_\_\_\_  
PRINTED NAME & DEPARTMENT

ATTEST BY TOWN CLERK:

\_\_\_\_\_  
TOWN CLERK

TOWN SEAL

**Town Clerk** attests date this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Approved as to Form and Authorization. This is to certify that I have examined the attached Contract Documents, other than the Detailed Specifications and Appendices thereto; that after said examination I am of the opinion that such documents conform to the Laws of the State of North Carolina and that execution of the Contract and the Performance and Payment Bonds are in due and proper form and; that the Owner signatures are duly authorized to execute said Contract.

\_\_\_\_\_  
ATTORNEY FOR TOWN

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

\_\_\_\_\_  
FINANCE OFFICER

\_\_\_\_\_  
DATE

## NOTICE TO PROCEED

Owner: Town of Chapel Hill Owner's Project No.: P27-04  
Engineer: Tetra Tech Engineering, P.C. Engineer's Project No.: 100-WTR- T43655  
Contractor: \_\_\_\_\_ Contractor's Project No.: \_\_\_\_\_  
Project: Legion Pond Dam  
Contract Name: \_\_\_\_\_  
Effective Date of Contract: \_\_\_\_\_

Owner hereby gives Contractor written Notice to Proceed, and further notifies Contractor that the Contract Times under the above Contract will commence to run on **[insert date]**, in accordance with Article 4.01 'Commencement of Contract Times; Notice to Proceed' of the Town of Chapel Hill General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement: **140 days**

The number of days to achieve Substantial Completion is **120** from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of **[date, calculated from commencement date above]**; and the number of days to achieve readiness for final payment is **[number of days, from Agreement]** from the commencement date of the Contract Times, resulting in a date for readiness for final payment of **[date, calculated from commencement date above]**.

Before starting any Work at the Site, Contractor must comply with the following:

State and Federal laws, any applicable permits and regulations, and local requirements.

Owner: Town of Chapel Hill  
By (signature): \_\_\_\_\_  
Name (printed): \_\_\_\_\_  
Title: \_\_\_\_\_  
Date Issued: \_\_\_\_\_  
Copy: Engineer

**Contractor's Application for Payment**

|                                                              |                                                      |
|--------------------------------------------------------------|------------------------------------------------------|
| <b>Owner:</b> <u>Town of Chapel Hill</u>                     | <b>Owner's Project No.:</b> _____                    |
| <b>Engineer:</b> <u>Tetra Tech Engineering, P.C.</u>         | <b>Engineer's Project No.:</b> <u>100-WTR-T43655</u> |
| <b>Contractor:</b> _____                                     | <b>Contractor's Project No.:</b> _____               |
| <b>Project:</b> <u>Legion Pond Dam</u>                       | _____                                                |
| <b>Contract:</b> _____                                       | _____                                                |
| <b>Application No.:</b> _____                                | <b>Application Date:</b> _____                       |
| <b>Application Period:</b> <b>From</b> _____ <b>to</b> _____ |                                                      |

|                                                                                                                        |    |   |
|------------------------------------------------------------------------------------------------------------------------|----|---|
| 1. Original Contract Price                                                                                             | \$ | - |
| 2. Net change by Change Orders                                                                                         | \$ | - |
| 3. Current Contract Price (Line 1 + Line 2)                                                                            | \$ | - |
| 4. Total Work completed and materials stored to date<br>(Sum of Column G Lump Sum Total and Column J Unit Price Total) | \$ | - |
| 5. Retainage                                                                                                           |    |   |
| a. _____ X \$ _____ Work Completed                                                                                     | \$ | - |
| b. _____ X \$ _____ Stored Materials                                                                                   | \$ | - |
| c. Total Retainage (Line 5.a + Line 5.b)                                                                               | \$ | - |
| 6. Amount eligible to date (Line 4 - Line 5.c)                                                                         | \$ | - |
| 7. Less previous payments (Line 6 from prior application)                                                              |    |   |
| 8. Amount due this application                                                                                         | \$ | - |
| 9. Balance to finish, including retainage (Line 3 - Line 4)                                                            | \$ | - |

**Contractor's Certification**

The undersigned Contractor certifies, to the best of its knowledge, the following:

(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;

(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such liens, security interest, or encumbrances); and

(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

|                          |                    |
|--------------------------|--------------------|
| <b>Contractor:</b> _____ |                    |
| <b>Signature:</b> _____  | <b>Date:</b> _____ |

|                                   |                          |
|-----------------------------------|--------------------------|
| <b>Recommended by Engineer</b>    | <b>Approved by Owner</b> |
| <b>By:</b> _____                  | <b>By:</b> _____         |
| <b>Title:</b> _____               | <b>Title:</b> _____      |
| <b>Date:</b> _____                | <b>Date:</b> _____       |
| <b>Approved by Funding Agency</b> |                          |
| <b>By:</b> _____                  | <b>By:</b> _____         |
| <b>Title:</b> _____               | <b>Title:</b> _____      |
| <b>Date:</b> _____                | <b>Date:</b> _____       |

### **Contractor's Application for Payment**

|                           |                |
|---------------------------|----------------|
| Owner's Project No.:      |                |
| Engineer's Project No.:   | 100-WTR-T43655 |
| Contractor's Project No.: |                |

| Application No.: _____   |             | Application Period:  |       | From               | to                                   | Application Date: _____                              |                                                       |                                                  |                                                                      |                                            |                                      |
|--------------------------|-------------|----------------------|-------|--------------------|--------------------------------------|------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------|--------------------------------------|
| A                        | B           | C                    | D     | E                  | F                                    | G                                                    | H                                                     | I                                                | J                                                                    | K                                          | L                                    |
| Bid Item<br>No.          | Description | Contract Information |       |                    |                                      | Work Completed                                       |                                                       | Materials Currently<br>Stored (not in G)<br>(\$) | Work Completed<br>and Materials<br>Stored to Date<br>(H + I)<br>(\$) | % of<br>Value of<br>Item<br>(J / F)<br>(%) | Balance to Finish (F<br>- J)<br>(\$) |
|                          |             | Item Quantity        | Units | Unit Price<br>(\$) | Value of Bid Item<br>(C X E)<br>(\$) | Estimated<br>Quantity<br>Incorporated in<br>the Work | Value of Work<br>Completed to Date<br>(E X G)<br>(\$) |                                                  |                                                                      |                                            |                                      |
| Original Contract        |             |                      |       |                    |                                      |                                                      |                                                       |                                                  |                                                                      |                                            |                                      |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
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|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
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|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
|                          |             |                      |       |                    | -                                    |                                                      | -                                                     |                                                  | -                                                                    |                                            | -                                    |
| Original Contract Totals |             |                      |       |                    | \$ -                                 |                                                      | \$ -                                                  | \$ -                                             | \$ -                                                                 |                                            | \$ -                                 |

## Contractor's Application for Payment

|                    |                              |                                  |                |
|--------------------|------------------------------|----------------------------------|----------------|
| <b>Owner:</b>      | Town of Chapel Hill          | <b>Owner's Project No.:</b>      |                |
| <b>Engineer:</b>   | Tetra Tech Engineering, P.C. | <b>Engineer's Project No.:</b>   | 100-WTR-T43655 |
| <b>Contractor:</b> |                              | <b>Contractor's Project No.:</b> |                |
| <b>Project:</b>    | Legion Pond Dam              |                                  |                |
| <b>Contract:</b>   |                              |                                  |                |

[illegible]

### Contractor's Application for Payment

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### Contractor's Application for Payment

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### Stored Materials Summary

### Contractor's Application for Payment

|             |                              |                           |                |
|-------------|------------------------------|---------------------------|----------------|
| Owner:      | Town of Chapel Hill          | Owner's Project No.:      |                |
| Engineer:   | Tetra Tech Engineering, P.C. | Engineer's Project No.:   | 100-WTR-T43655 |
| Contractor: |                              | Contractor's Project No.: |                |
| Project:    | Legion Pond Dam              |                           |                |
| Contract:   |                              |                           |                |

|                  |                     |      |    |                   |
|------------------|---------------------|------|----|-------------------|
| Application No.: | Application Period: | From | to | Application Date: |
|------------------|---------------------|------|----|-------------------|

| A                                                                 | B                       | C                                                       | D                                               | E                | F                                                            | G                                 | H                                    | I                                      | J                                                        | K                                                         | L                                                            | M                                                     |
|-------------------------------------------------------------------|-------------------------|---------------------------------------------------------|-------------------------------------------------|------------------|--------------------------------------------------------------|-----------------------------------|--------------------------------------|----------------------------------------|----------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|
| Item No.<br>(Lump Sum Tab)<br>or Bid Item No.<br>(Unit Price Tab) | Supplier<br>Invoice No. | Submittal No.<br>(with<br>Specification<br>Section No.) | Description of Materials or<br>Equipment Stored | Storage Location | Application<br>No. When<br>Materials<br>Placed in<br>Storage | Materials Stored                  |                                      |                                        | Incorporated in Work                                     |                                                           |                                                              | Materials<br>Remaining in<br>Storage<br>(I-L)<br>(\$) |
|                                                                   |                         |                                                         |                                                 |                  |                                                              | Previous Amount<br>Stored<br>(\$) | Amount Stored this<br>Period<br>(\$) | Amount Stored to<br>Date (G+H)<br>(\$) | Amount Previously<br>Incorporated in the<br>Work<br>(\$) | Amount<br>Incorporated in the<br>Work this Period<br>(\$) | Total Amount<br>Incorporated in the<br>Work<br>(J+K)<br>(\$) |                                                       |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
|                                                                   |                         |                                                         |                                                 |                  |                                                              |                                   |                                      | -                                      |                                                          |                                                           | -                                                            | -                                                     |
| <b>Totals</b>                                                     |                         |                                                         |                                                 |                  |                                                              | \$ -                              | \$ -                                 | \$ -                                   | \$ -                                                     | \$ -                                                      | \$ -                                                         | \$ -                                                  |



## CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner: Town of Chapel Hill

Engineer: Tetra Tech Engineering, P.C.

Contractor:

Project: Legion Pond Dam

Owner's Project No.: P27-04

Engineer's Project No.: 100-WTR-T43655

Contractor's Project No.:

Contract Name:

This ☐ Preliminary ☐ Final Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

**[Describe the portion of the work for which Certificate of Substantial Completion is issued]**

Date of Substantial Completion: **[Enter date, as determined by Engineer]**

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate shall be made only by mutual written agreement of Owner and Contractor, as provided in Article 19 ('Changes in the Work') of the Town of Chapel Hill General Conditions (Revised 3/2017).

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: ☐ None ☐ As follows:

**[List amendments to Owner's Responsibilities]**

Amendments to Contractor's Responsibilities: ☐ None ☐ As follows:

**[List amendments to Contractor's Responsibilities]**

The following documents are attached to and made a part of this Certificate:

**[List attachments such as punch list; other documents]**

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Engineer

By *(signature)*: \_\_\_\_\_

Name *(printed)*: \_\_\_\_\_

Title: \_\_\_\_\_

# **GENERAL CONDITIONS TO CONTRACT**

**C-700-TOCH**

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## GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

### ARTICLE 1 - DEFINITIONS

- a. **Addenda**, written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
- b. **Agreement**, the written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
- c. **Application for Payment**, the document prepared by Contractor, in a form acceptable to Designer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
- d. **Bid**, the offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
- e. **Bidder**, an individual or entity that submits a Bid to Owner.
- f. **Bidding Documents**, the Bidding Requirements, the proposed Contract Documents, and all Addenda.
- g. **Bidding Requirements**, the Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
- h. **Change Order**, as used herein, shall mean a written order to the Contractor subsequent to the signing of the contract authorizing a change in the contract. The Change Order shall be signed by the Contractor, Designer and the Owner, including the Town Manager, and Town Finance Director (consistent with Section 10 of the Contract).
- i. **Change Proposal**, a written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Designer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
- j. **Claim**
  - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the

- acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Designer has declined to address; or seeking other relief with respect to the terms of the Contract.
- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Designer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Designer has declined to address.
  - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, concerning disputes arising after Designer has issued a recommendation of final payment.
  - d. A demand for money or services by a third party is not a Claim.
- k. **Constituent of Concern**, asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
- l. **Contract**, the entire and integrated written contract between Owner and Contractor concerning the Work.
- m. The **Contract Documents** consist of the agreement between Owner and Contractor (hereinafter the Contract), conditions of the contract (general, supplementary and other conditions) Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the agreement and modifications issued after execution of the contract. A modification is (1) a written amendment to the Contract signed by both parties, (2) a change order, (3) a construction change directive or (4) a written order for a minor change in the work issued by the architect. The contract documents form the contract for construction. The contract represents the entire and integrated agreement between the parties and supersedes prior negotiations, representations, or agreements, either written or oral. The contract may be amended or modified only by a modification. The contract documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and Contractor (2) between the Owner and a Subcontractor or Sub-subcontractor, (3) between the Owner and Architect or (4) between any persons or entities other than the Owner and Contractor
- n. **Contract Price**, the money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
- o. **Contract Sum** is the amount stated in the Contract as the Contractor's compensation for the completion of the Work, as modified by Change Order.
- p. The **Contractor** is the party who is awarded the Contract for the Work. The term "Contractor" includes the Contractor or the Contractor's authorized representative.

- q. The **Designer(s)**, as referred to herein, shall mean the architect, landscape architect, and/or engineer and their authorized representatives, including subcontractors and subconsultants.
- r. The **Drawings** are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.
- s. **Effective Date of the Contract**, the date, indicated in the Agreement, on which the Contract becomes effective.
- t. **Electronic Document**, Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
- u. **Electronic Means**, electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.
- v. **Field Order**, a written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
- w. **Hazardous Environmental Condition**, the presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
  - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
  - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
  - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
- x. **Laws and Regulations; Laws or Regulations**, any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.



- y. **Liens**, charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
- z. **Liquidated damages**, as stated in the Contract Documents, is an amount reasonably estimated in advance to cover the losses incurred by the Owner by reason of failure of the Contractor to complete the Work within the specified Time of Completion.
- aa. **Milestone**, a principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
- bb. **Notice of Award**, the written notice by Owner to a Bidder of Owner's acceptance of the Bid.
- cc. **Notice to Proceed**, a written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
- dd. **OWASA** is the Orange Water and Sewer Authority, an independent utility provider.
- ee. The **Owner** is the Town of Chapel Hill.
- ff. **Progress Schedule**, a schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
- gg. The **Project** is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate Contractors.
- hh. **Project Expediter**, as used herein, shall be the Contractor. In multi-prime situations, the General Contractor shall be the Project Expediter. The Project Expediter shall have the following responsibilities:
  - a. Prepare and maintain the project progress schedule in accordance with Article 14.
  - b. Collect, review and submit shop drawings, product data, samples and other such items and submit them to the Designer in accordance with the Contract Documents.
  - c. Give adequate notice to all Contractors to ensure efficient continuity of all phases of the work.
  - d. Notify the Designer of any actual or anticipated changes in the project progress schedule.
  - e. Coordinate the work among the various Contractors and Subcontractors, utilities, and regulatory authorities so that the Work is completed without delay and within the Contract time.

- ii. **Project Site.** The term Project Site is defined as the space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other work as part of the project. The extent of the Project Site is shown on the Drawings.
- jj. **Resident Project Representative,** the authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
- kk. **Samples,** physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
- ll. **Schedule of Submittals,** a schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.
- mm. **Schedule of Values,** a schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
- nn. **Shop Drawings,** all drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
- oo. **Site,** lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
- pp. The **Specifications** are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.
- qq. A **Subcontractor,** as the term is used herein, is one who has entered into a direct contract with a Contractor, and includes one who furnishes labor and materials worked to a special design in accordance with the Contract Documents, but does not include one who only sells or furnishes materials not requiring Work so described or detailed. In general, a Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the Project Site. The term "Subcontractor" does not include a separate Contractor or Subcontractors of a separate Contractor.
- rr. **Submittal,** a written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs;

sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

- ss. **Substantial Completion** is the stage in the progress of the Work, when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or use the Work for its intended use.
- tt. **Successful Bidder**, the Bidder to which the Owner makes an award of contract.
- uu. **Supplementary Conditions**, the part of the Contract that amends or supplements these General Conditions.
- vv. **Supplier**, a manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
- ww. **Surety** shall mean the bonding company or corporate body which is bound with and for the Contractor, and which engages to be responsible for the Contractor and his acceptable performance of the Work and payment of subcontractors and suppliers.
- xx. **Technical Data**
  - a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
  - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
  - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

yy. **Time of Completion, or Contract Time**, as stated in the Contract Documents, is to be interpreted as consecutive calendar days measured from the date established in the written Notice to Proceed, as modified by Change Order, or such other date as may be established herein.

zz. The **Town** means The Town of Chapel Hill in its capacity as a regulatory body or agency, as opposed to its capacity as Owner of the project.

aaa. **Underground Facilities**, all active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

bbb. **Unit Price Work**, work to be paid for on the basis of unit prices.

ccc. **Work**, as used herein as a noun, is intended to include materials, services, labor and workmanship of the appropriate Contractor in connection with the construction of the Project. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations and labor, materials, equipment and services provided or to be provided by a Subcontractor, sub-Subcontractor, material supplier or any other entity for whom the Contractor is responsible under or pursuant to the Contract Documents. The Work shall include such materials whether or not located on the Project Site. The Work may constitute the whole or a part of the Project.

ddd. **Work Change Directive**, a written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

## **ARTICLE 2 - INTENT AND EXECUTION OF DOCUMENTS**

- a. The Contract Documents shall be signed by authorized representatives of the Owner and Contractor.
- b. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The intent of the Drawings and Specifications are complementary, one to the other. That which is shown on the Drawings or called for in the Specifications shall be as binding as if it were both called for and shown. The intent of the Drawings and Specifications is to establish the scope of all labor, materials, transportation, equipment, and any and all other things

necessary to provide a complete Project. The Drawings shall be accurately followed, preference being given to figured dimensions over scaled, and to large scale drawings over small scale drawings. If sufficient detail is lacking in the Contract Documents or if discrepancies appear among the Contract Documents, then the Contractor shall request clarification or interpretation from the Designer. The order of precedence and priority of the Contract Documents shall be as follows: The Contract; the General and Supplemental Conditions; and the Drawings and Specifications. In the case of an inconsistency between Drawings and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided.

- c. Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.
- d. Any material specified in the Specifications by reference to the number, symbol or title of specific standards, such as commercial standards, federal specifications, trade association standards, or similar standards, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Contract, except as limited to type, class or grade, or modified in such reference by a given date. The standard referred to, except as modified in the Specifications, shall have full force and effect as though printed in the Specifications. These standards have not been furnished to the Contractor as the Contractor and its manufacturers and Subcontractors are assumed to be familiar with their requirements.

### **ARTICLE 3 - CLARIFICATIONS, DETAIL DRAWINGS, AND INVESTIGATIONS**

#### **Clarifications**

- a. Where the nature of the Work requires clarification by the Designer, such clarification shall be furnished by the Designer with reasonable promptness by means of written instructions or detail drawings, or both. Clarifications and drawings shall be consistent with the intent of the Contract Documents, and shall become a part thereof.
- b. The Contractor, if deemed necessary, shall include in the project progress schedule dates upon which foreseeable clarifications will be required. The Designer shall furnish drawings or clarifications in accordance with that schedule. The Contractor shall not proceed with the Work without such detail drawings and/or written clarifications.

#### **Contractor's Investigation.**

- a. By executing the Contract, the Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the Work, and that it has investigated and satisfied itself as to the general and local conditions which can affect

the Work or its cost, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during Work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory Work done by the Owner, as well as from the Drawings and Specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the Work, or for proceeding to successfully perform the Work without additional expense to the Owner.

- b. The Contractor shall examine and study the Contract Documents, including the Drawings and Specifications, and fully understand the project design, and shall provide constant and efficient supervision to the Work. Should it discover any discrepancies of any sort in the Drawings or Specifications, it shall report them to the Designer without delay. Contractor will not be held responsible for discrepancies in the Drawings and/or Specifications, unless it recognized such discrepancy and knowingly failed to report it to the Designer, but shall be held responsible to report discrepancies should they become known. If the Contractor performs any construction activity knowing it involves a recognized error, variance, inconsistency or omission in the Contract Documents without such notice to the Designer, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable cost for correction. Notwithstanding anything to the contrary in the foregoing, the Contractor represents that it has carefully examined the Drawings and Specifications, and that, except as the Contractor may have advised the Owner in a written notice delivered prior to the execution of the contract, the Drawings and Specifications are sufficient in content and detail to complete the Work and to enable the Contractor to deliver, within the contract sum and the contract time, a fully completed project with all pertinent improvements without the need for any change to the contract sum or contract time.
- c. The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Owner. The Owner assumes no responsibility for any understanding reached or representation made concerning conditions which can affect the Work by any of its officers or agents before the execution of the Contract, unless that understanding or representation is expressly stated in the Contract.
- d. Information furnished by the Owner relating to surveys, subsurface investigations, soil borings, utility line locations and other similar information is for general information only and is not part of the Contract Documents. The Owner does not guarantee the completeness or accuracy of such information unless specifically

noted otherwise. The furnishing of such information by the Owner shall not excuse the Contractor from responsibility for verifying existing grade elevations, conditions and dimensions of existing structures and features at the Project Site. The Contractor shall report to the Designer and Owner any errors or inconsistencies found in such information.

- e. Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to Designer at once.

#### **ARTICLE 4 - COPIES OF DRAWINGS AND SPECIFICATIONS**

Unless otherwise agreed, the Owner shall furnish free of charge to the Contractor such copies of the Drawings and Specifications as are reasonably necessary for execution of the Work.

#### **ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLES, PRODUCT DATA**

- a. The **Shop Drawings** are drawings, diagrams, schedules and other data especially prepared for the work by the Contractor or a Subcontractor, sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the work. **Samples** are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged. **Product data** are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the work. The purpose of the submittal of shop drawings, samples, product data and similar submittals is to demonstrate for those portions of the work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.
- b. The Contractor shall submit to the Designer all shop drawings, product or data samples, color charts, etc., required for the Work. All such submittals shall be reviewed and approved by the Contractor and shall bear the Contractor's stamp of approval before being forwarded to the Designer. Shop drawings shall be submitted in quadruplicate and shall be made with reasonable promptness and in such sequence as to cause no delay of the Work or any part thereof and in no case less than six (6) weeks prior to the date on which the submittal must be returned to the Contractor to avoid delays in the Work. On all submittals the Contractor shall: (1) indicate the date the Contractor received or created each submittal, (2) stamp each submittal with a "reviewed by Contractor" stamp, (3) number each submittal sequentially, and (4) indicate the date it was transmitted to the party responsible for reviewing it. Any transmittal of any submittal by the Contractor constitutes a representation that the Contractor has reviewed and approved the submittal whether or not such dating procedures are followed. When delivering any submittal, the

Contractor shall advise the party receiving it in writing of the date the submittal must be returned to the Contractor to avoid delays in the Work. The Contractor shall promptly notify the Owner if any submittal is not returned by the date designated by the Contractor.

- c. The Contractor shall perform no portion of the Work requiring submittal and review of shop drawings, product data, samples or similar submittals until the Designer has advised the Contractor that such submittal has been approved. Such work shall be in accordance with approved submittals. By approving and submitting shop drawings, product data, samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and the Contract Documents and that the Contractor has, or immediately will, notify the Designer of any discrepancies or deviations found. The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by any approval of shop drawings, product data, samples or similar submittals unless the Contractor has specifically informed the party reviewing them in writing of such deviation at the time of submittal and such party has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors and omissions in shop drawings, product data, samples or similar materials by the approval thereof by the party reviewing them. The Contractor shall direct specific attention, in writing or on resubmitted shop drawings, product data, samples or similar submittals, to revisions other than those requested by the party reviewing them on previous submittals. The Designer shall review the shop drawings promptly, noting desired corrections, if any, and shall return two copies to the Contractor within twenty (20) calendar days after receipt from the Contractor. The Contractor shall furnish corrected drawings in triplicate to the Designer. Two copies of approved drawings shall be returned to the Contractor.
- d. Contractor shall prepare and keep current, for Designer's approval, a schedule of submittals that is coordinated with the Contractor's construction schedule. The Contractor shall submit a schedule of initial submittals for the early stages of the Work within thirty (30) days after the Contract is awarded. A complete schedule of submittals for the entirety of the Work shall thereafter be submitted by Contractor in a reasonable time so as to allow for orderly contract administration.

## **ARTICLE 6 - WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE; AS BUILT DRAWINGS**

- a. The Contractor shall maintain, in readable condition at his job office on the Project Site, one complete record set of the Drawings, Specifications, addenda, Change Orders and other modifications, in good order and marked currently to record changes and selections made during construction, along with approved shop drawings, product data, samples and similar required submittals. Such drawings



and specifications shall be available for use by the Designer or his authorized representative.

- b. The Contractor shall maintain at the job office on the project site a day-to-day record of work-in-place that is at variance with the Contract Documents. Such record is to be provided in full to the Designer upon completion and acceptance of the project.
- c. “As-built drawings,” as used in this clause, means drawings submitted by the Contractor or Subcontractor at any tier to show the construction of a particular structure or Work as actually completed under the contract. “As-built” drawings shall be synonymous with “Record drawings.” Final as-built Drawings shall be provided to the Designer by all Contractors, unless the Designer excuses the provision of as-builts. Contractors are also responsible for providing as-built Drawings to the applicable utilities, such as OWASA, if such utilities require as-built Drawings.
- d. The Contractor shall provide the Designer accurate information to be used in the preparation of permanent as-built drawings. For this purpose, the Contractor shall record on one set of contract drawings all changes from the installations originally indicated, and record final locations of underground lines by depth from finish grade and by accurate horizontal offset distances to permanent surface improvements such as buildings, curbs, or edges of walks.
- e. This article shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all as-built drawings prepared by Subcontractors are submitted to the Designer in connection with the Contractor’s final application for payment.

## **ARTICLE 7 - OWNERSHIP OF DRAWINGS AND SPECIFICATIONS**

All Drawings and Specifications are instruments of service and remain the property of the Owner. The use of these instruments on Work other than this Contract without permission of the Owner is prohibited. All copies of Drawings and Specifications other than contract copies shall be returned to the Owner upon request after completion of the Work.

## **ARTICLE 8 - MATERIALS, EQUIPMENT, WORKMANSHIP**

- a. The Contractor shall supply and pay for all labor, transportation, materials, tools, apparatus, lights, power, heat, sanitary facilities, water, scaffolding and incidentals necessary for the completion of its Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work, and shall install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same, and shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the Drawings, stated in the Specifications, or reasonably implied there from, all in accordance with the Contract Documents.
- b. All materials shall be new and of the quality specified, except where reclaimed material is authorized and approved for use. Workmanship shall be free of defects and shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be, at the election of the Owner, considered defective and may be rejected.
- c. Upon request by the Owner, the Contractor shall furnish evidence as to quality of materials.
- d. Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer combination listed. However, the Contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specific brand, make, manufacturer or specific name; that they are used only to set forth and convey to bidders the general style, type, character and quality of product desired; and that equivalent products will be acceptable. Substitution of materials, items or equipment of equal or equivalent design shall be submitted to the Designer for approval or disapproval.

- e. Each Contractor shall obtain written approval from the Designer for the use of substitute products, materials or equipment claimed as equal to those specified. Such approvals must be obtained as soon after contract award as possible and before any materials are ordered. Written applications for approvals of substitutes shall be made by the Contractor and not by Subcontractors or material suppliers.
- f. The Designer is the judge of equality for proposed substitution of products, materials or equipment.

## **ARTICLE 9 - ROYALTIES, LICENSES AND PATENTS**

It is the intention of the Contract Documents that the Work covered herein will not constitute in any way infringement of any patent whatsoever unless the fact of such patent is clearly evidenced herein. The Contractor shall protect, indemnify and save harmless the Owner against suit on account of alleged or actual infringement. The Contractor shall pay all royalties and/or license fees required on account of patented articles or processes, whether the patent rights are evidenced hereinafter.

## **ARTICLE 10 - PERMITS, INSPECTIONS, FEES, REGULATIONS, TOWN AS REGULATOR**

- a. The Contractor shall give all notices and comply with all laws, ordinances, codes, rules, regulations and lawful orders of public authorities bearing on the conduct of the Work. If the Contractor observes that the Drawings and Specifications are at variance therewith, he shall promptly notify the Designer in writing. Any necessary changes required after contract award shall be made by Change Order in accordance with Article 19. If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, codes, rules and regulations, and without such notice to the Designer, it shall bear all costs arising there from.
- b. All Work under this contract shall conform to the Contract Documents, Drawings and Specifications, the North Carolina State Building Code and other state, local and national codes as are applicable. Except as otherwise provided herein, the cost of all required inspections and permits shall be the responsibility of the Contractor, except that the fees for Town-issued building permits are waived.
- c. If the Contractor performs any Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without prompt notice to the Designer and Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable damages, losses, costs and expenses.
- d. Contractor acknowledges that it has reviewed the requirements and specifications of the various utilities having jurisdiction affecting the Work including, but not limited to, OWASA, Duke Power Company, Public Service Gas Company, Southern Bell, and other such utilities. Contractor shall comply with the requirements and specifications imposed by such utilities, and shall coordinate the Work, including

the Work of other Contractors and Subcontractors, with such utilities. If Contractor becomes aware of any discrepancy between the requirements of a utility and the Contract Documents, it shall immediately report such discrepancy to the Designer. Contractor acknowledges that such utilities are independent entities, and are not agents, subcontractors, or separate Contractors of the Owner.

- e. Contractor acknowledges that the Town, in its role as regulatory body, has the inspection and regulatory duties imposed by applicable law, including, but not limited to, inspection of streets, roadways, and clearing limit lines, issuance of permits and certificates of occupancy, and other such duties. Contractor acknowledges the role of the Town as Owner under this Contract, and that any delays, disruptions, extra costs or other items caused or allegedly caused by the Town in its role as regulatory body are not attributable to the Owner, nor is the Owner responsible for such delays, disruptions, or extra costs, unless otherwise provided in the Contract Documents.
- f. Contractor shall pay sales, consumer use and similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted when bids are received or negotiations concluded whether or not yet effective or merely scheduled to go into effect.

#### **ARTICLE 11 - PROTECTION OF WORK, PROPERTY AND THE PUBLIC**

- a. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.
- b. The Contractor shall take all reasonable precautions for safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:
  - 1. Employees and other persons performing the Work and other persons who may be affected thereby;
  - 2. The work and materials and equipment to be incorporated therein, whether in storage on or off the Project Site, under care, custody or control of the Contractor or of the Contractor's Subcontractors or sub-Subcontractors; and
  - 3. Other property at the Project Site or adjacent thereto, such as, but not limited to, trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
  - 4. The Contractor shall properly remedy damage and loss to the property referred to above caused in whole or in part by the Contractor, a Subcontractor, a sub-Subcontractor, or anyone directly or indirectly

employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible.

- c. The Contractor shall provide cover and protect all portions of the Work when the Work is not in progress, provide and set all temporary roofs, covers for doorways, sashes and windows, and all other materials necessary to protect all the Work whether set by him, or any of the Subcontractors. Any work damaged through the lack of proper protection or from any other cause, shall be repaired or replaced without extra cost to the Owner.
- d. No fires of any kind will be allowed inside or around the operations during the course of construction without special permission from the Designer.
- e. The Contractor shall protect all trees and shrubs designated to remain in the vicinity of the Work. It shall comply with local ordinances, including, without limitation, the Tree Protection Ordinance as in effect at the time of construction, and with the Drawings and Specifications as they relate to the protection of trees and shrubs. It shall barricade all walks, roads, etc., as directed by the Designer to protect persons on the site and to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the Work shall be well barricaded and properly lighted at night.
- f. The Contractor shall, as part of the Work, provide all earth retention systems, shoring, lateral and subjacent support necessary to prevent any damage to adjacent or nearby property owners and shall, if such shoring or support is insufficient, be solely responsible to pay for any damage incurred by such property owners by reason of excavations and execution of the Work. If entry on or encroachment upon adjoining property or public right-of-way is necessary to perform the Work, the Owner shall obtain any necessary permissions, permits or licenses and pay all costs and fees therefore. However, it is the Contractor's responsibility to investigate alternative construction methods that could avoid such encroachments and to provide evidence to the Owner that such encroachments are necessary and unavoidable.
- g. The Contractor shall provide all necessary safety measures for the protection of all persons on the job, including the requirements of the A.G.C. *Accident Prevention Manual in Construction*, as amended, and shall fully comply with all state laws or regulations and North Carolina State Building Code requirements, including the Occupational Safety and Health Act ("OSHA") as adopted in North Carolina, to prevent accident or injury to persons on or about the location of the Work. It shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, floor penetrations, elevator shafts, stairwells and similar hazards. It shall protect against damage or injury resulting from falling materials and it shall maintain all protective devices and signs throughout the progress of the Work. All trenching work shall be accomplished in strict compliance with OSHA regulations and other applicable regulations, laws and codes.

- h. The Contractor shall designate a responsible member of its organization as safety inspector, whose duties shall include accident prevention on the Work. Unless otherwise agreed, that person shall be the Contractor's superintendent. The name of the safety inspector shall be made known to the Designer at the time the Work is started. Any safety violation shall be reported to the Owner and Designer and corrected immediately.
- i. In the event the Contractor encounters on the Project Site material reasonably believed to be hazardous material including, but not limited to, asbestos, asbestos products, polychlorinated biphenyl (pcb) or other toxic substances which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Designer in writing. The suspected hazardous material shall be examined by a qualified specialist at the Owner's expense. Should the examination confirm the presence of previously unidentified hazardous material, the Owner shall be responsible for conducting clean up or abatement by separate Contractor to remove the potential hazard. If the Contractor caused the hazardous material to exist on the Project Site without the Owner's prior consent, the Contractor shall promptly reimburse the Owner for the cost of said clean up or abatement. The qualified specialist shall certify that no hazardous material exists or that abatement has been satisfactorily completed. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner and Contractor if in fact the material is hazardous material and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of a hazardous material, or when it has been rendered harmless, as certified by the qualified specialist. Any losses suffered by the Contractor relating to the performance of the Work and not attributable to a wrongful act or omission of the Contractor and which are due to the hazardous material on the Project Site shall be compensated by the Owner and reflected in a Change Order.
- j. When use or storage of hazardous materials or equipment or unusual methods are necessary, the Contractor shall give the Owner ten days' notice in advance of such use, storage or unusual methods. All hazardous or toxic materials or waste used, stored, or generated at the Project Site shall be used, stored, transported and disposed of in strict conformity with applicable laws, codes, rules, regulations and orders of governmental authorities having jurisdiction. This includes, but is not limited to, the provision of appropriate material safety data sheets ("MSDS") and compliance with applicable "right to know" laws. The Contractor shall not include asbestos, polychlorinated biphenyls or urea formaldehyde in any construction materials. The Contractor shall be responsible for the removal and clean up of all hazardous and toxic materials and waste brought to the Project Site or generated at the Project Site by the Contractor or any Subcontractor. The Contractor shall indemnify, defend and hold harmless the Owner from and against all claims, suits, damages, losses, fines, penalties, costs and expenses, including reasonable attorney's fees, arising from or in connection or otherwise relating to the use,

generation, storage, release, transporting and disposal of any hazardous or toxic materials or waste in the performance of the work.

- k. In the event of emergency affecting the safety of life, the protection of Work, or the safety of adjoining properties, the Contractor is hereby authorized to act at its own discretion to prevent such threatened injury or damage. Any compensation claimed by the Contractor on account of such action shall be determined as provided for under Article 19.
- l. The Contractor shall promptly report in writing to the Owner and Designer all accidents arising out of or in connection with the work which caused death, personal injury or property damage, giving full details and statements of any witnesses. In addition, if death or serious personal injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner and Designer.

## **ARTICLE 12 - SEDIMENTATION POLLUTION CONTROL ACT OF 1973**

- a. Any land-disturbing activity performed by the Contractor in connection with the project shall comply with all erosion control measures set forth in the Contract Documents and any additional measures which may be required in order to ensure that the project is in full compliance with the laws, regulations and ordinances then in effect, including but not limited to the Sedimentation Pollution Control Act of 1973 ("S.P.C.A."), as implemented by Title 15, North Carolina Administrative Code, Chapter 4, Sedimentation Control, Subchapters 4A, 4B and 4C, as amended (15 N.C.A.C. 4A, 4B and 4C). The Town, as regulator, reserves the option to impose standards more rigorous than those contained in the S.P.C.A., as included in the Specifications.
- b. Upon receipt of notice that a land-disturbing activity is in violation of the S.P.C.A. or other erosion control measures or regulations, the Contractor shall be responsible for ensuring that all steps or actions necessary to bring the project in compliance with such act or measures are promptly taken.
- c. The Contractor shall be responsible for defending any legal actions instituted pursuant to N.C. Gen. Stat. 113A-64 or other erosion control laws or regulations against any party or persons described in this article.
- d. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, the Designer and the agents, consultants and employees of the Owner and Designer, from and against all claims, damages, civil penalties, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance of Work or failure of performance of Work, provided that any such claim, damage, civil penalty, loss or expense is attributable to a violation of the S.P.C.A. or other erosion control measures, laws, or regulations. Such obligation shall not be construed to negate, abridge or otherwise reduce any other

right or obligation of indemnity which would otherwise exist as to any party or persons described in this article.

### **ARTICLE 13 - INSPECTION OF THE WORK; TESTING**

- a. The Work shall be subject to inspection during normal working hours by the Designer, designated representatives of the Owner, and those persons required by state or local law or ordinance to test special work for official approval, including representatives of the Town, as regulator. The Contractor shall therefore provide safe access to the Work at all times for such inspections.
- b. All instructions to the Contractor will be made only by or through the Designer or his designated project representative. Observations made by representatives of the Owner and of regulatory authorities shall be conveyed to the Designer for review and coordination prior to issuance to the Contractor.
- c. Where special inspection or testing is required by virtue of any state or local laws, instructions of the Designer, specifications or codes, the Contractor shall give adequate notice to the Designer of the time set for such inspection or test, if the inspection or test will be conducted by a party other than the Designer. Such special tests or inspections will be made in the presence of the Designer, or his authorized representative, and it shall be the Contractor's responsibility to serve ample notice of such tests.
- d. All laboratory tests shall be paid by the Owner unless provided otherwise in the Contract Documents except the general Contractor shall pay for laboratory tests to establish design mix for concrete and asphalt, and for additional tests to prove compliance with Contract Documents where materials have tested deficient.
- e. Should any work required to be inspected by the Contract Documents, direction of the Designer or provisions of law be covered up or concealed prior to inspection and approval by the Designer, such work shall be uncovered or exposed for inspection, if so requested by the Designer in writing. Inspection of the work will be made promptly upon notice from the Contractor. All costs involved in uncovering, repairing, replacing, recovering and restoring the work to design condition will be paid by the Contractor involved.
- f. If any other portion of the Work not required to be inspected or which the Designer has not specifically requested to observe prior to being covered, has been covered, the Designer may request to see such work and it shall be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such work is found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it is found that this condition was caused by the Owner or a separate Contractor, in which event the Owner or the separate Contractor shall be responsible for the payment of such costs.



- g. The Owner may (but shall not be obligated to) from time to time, at its own cost and expense, perform or cause to be performed such additional tests and inspections of the work as the Owner may determine to be necessary or appropriate, and the Contractor shall, upon receipt of reasonable prior written notice identifying any such tests and inspections, coordinate the Work so as to accommodate the performance of such tests and inspections. Copies of any results of such Owner initiated test and inspection shall be made available to the Contractor if the Contractor so requests, provided, the Contractor shall not be entitled to rely upon such results (and the Owner makes no representation or warranty as to the accuracy or completeness thereof) and the Owner's performance of any test and inspection shall not serve to relieve the Contractor of its obligation to perform the work in accordance with the requirements set forth in the Contract Documents.
- h. If the Designer, Owner or public authorities having jurisdiction determine that portions of the work will require additional testing, inspection or approval not included under the preceding subparagraphs of this article, the Designer will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Designer and the Owner of when and where tests and inspections are to be made so the Designer and Owner may observe such procedures. The Owner shall bear such cost except as otherwise provided in this Article.
- i. If such procedures for testing, inspection or approval under subparagraphs f, g and h reveal failure of the portions of the work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs made necessary by such failure including those of repeated procedures and compensation for the Designer's services and expenses.

## **ARTICLE 14 - CONSTRUCTION SUPERVISION AND SCHEDULING**

### **Supervision**

- a. Throughout the progress of the Work, each Contractor shall keep on the job a competent superintendent or supervisory staff satisfactory to the Designer. The superintendent shall not be changed without the consent of the Designer and Owner unless the superintendent ceases to be employed by the Contractor or ceases to be competent. The superintendent shall be satisfactory to the Owner in all respects, and the Owner shall have the right to initially approve the superintendent and the right to require Contractor to replace any superintendent whose performance is not satisfactory to the Owner. The superintendent shall have authority to act on behalf of the Contractor, and instructions, directions or notices given to him shall be as binding as if given to the Contractor.

### **Scheduling and Coordination**

The Contractor shall cooperate and consult with all other Contractors during the construction of this project. The Contractor shall lay out and execute his Work so as to cause the least delay to other Contractors. The Contractor shall be responsible for any damage to other Contractor's work, and each Contractor shall be financially responsible to other Contractors for undue delay caused to other Contractors on the project.

- a. The Contractor shall coordinate its work with each other separate Contractor within the total time frame established by the project progress schedule that is made a part of the Contract Documents. This time frame shall be as called for in the progress schedule, which requires the participation and agreement of all Contractors in its preparation and acceptance. Should any separate Contractor allege that the Contractor has caused a delay in the work of the separate Contractor, then the Contractor shall defend, indemnify and hold harmless the Owner and the Designer from any claim, demand, suit, or cause of action arising in whole or in part out of the alleged delay or delays, and the Contractor shall bear all costs and expenses, including all attorneys' fees and court costs, which the Owner, and/or Designer may incur in connection with any such claims.

The Contractor is required to attend monthly job site progress conferences as called by the Designer. The Contractor's representatives shall have authority to act on behalf of the Contractor. These meetings shall be open to Subcontractors, material suppliers and any others who can contribute toward maintaining required job progress. Subcontractors, whose work is on the critical path of the work for the thirty days following the monthly meeting, or any part thereof, shall attend the meeting unless excused by the Designer. It shall be the principal purpose of these meetings to effect coordination, cooperation and assistance in every practical way toward the end of maintaining progress of the project on schedule and to complete the project within the specified contract time. The Contractor shall be prepared to assess progress of the Work as required in his particular contract and to recommend remedial measures for correction of progress as may be appropriate. The Designer or his authorized representative shall be the coordinator of the conferences and shall preside as chairman, and shall produce written minutes of the meeting.

It shall be the responsibility of the project expeditor to cooperate with and obtain from the several Contractors on the job their respective schedules and to integrate them into a project progress schedule that will show graphically, by a detailed bar chart, critical path method (CPM) or other acceptable and approved methods, the projected progress of the job from start to finish and within the allotted time frame. The Contractor along with other Contractors, shall review the proposed progress schedule, and all amended schedules and updates, and approve them in writing to the Designer and the Project Expediter. Such written approval shall be indicated by each Contractor's signature on the graphic schedule.

The progress schedule shall be presented to the Designer no later than ten (10) days after written notice to proceed. All prime Contractors shall initial or sign the initial graphic progress schedule. No application for payment will be processed until this signed progress schedule is received and approved by the Designer and Owner.

The Project Expediter shall distribute the progress schedule to all the Contractors and display it at the job site.

The several Contractors shall be responsible for the progress schedule and must notify the Project Expediter of any changes or adjustments to their schedules. The Project Expediter shall maintain the progress schedule, making monthly adjustments, updates, corrections, etc. On a monthly basis, the Project Expediter shall prepare and present at the monthly meeting a progress report in a form in sufficient detail, and of a character approved by the Owner. The progress report shall specify, among other things, the estimated percentage of completion, whether the Project is on schedule and, if not, the reasons therefore. Accompanying the progress report shall be an updated progress schedule, and a listing and the status of all Change Orders, modifications, bulletins and other relevant documents that are necessary, keeping all Contractors and the Designer fully informed. Failure to provide a progress report or updated schedule may be grounds for withholding payment as set forth in Article 31.

The Project Expediter shall notify each Contractor of such events or time frames that are critical to the progress of the job. Such notice shall be timely and reasonable. Should the progress be delayed due to the Work of any of the several Contractors, it shall be the duty of the Project Expediter to immediately notify the Contractor(s) responsible for such delay, the Designer and other prime Contractors.

Designation as Project Expediter entails an additional project control responsibility and does not alter in any way the responsibility of the Contractor so designated, or the responsibility of the other Contractors involved in the project.

## **ARTICLE 15 - SEPARATE CONTRACTS AND CONTRACTOR RELATIONSHIPS**

- a. In some instances, the North Carolina General Statutes require separate contracts to be awarded for the general construction, heating and ventilating and air conditioning, plumbing, and electrical installations. In such case, the Owner reserves the right to prepare separate specifications, receive separate bids, and award separate contracts for such other major items of work as may be in the Owner's best interest.
- b. All Contractors shall cooperate with each other in the execution of their work, and shall plan their work in such manner as to avoid conflicting schedules or delay of the work.
- c. If any part of Contractor's work depends upon the work of another Contractor, defects which may affect that Work shall be reported to the Designer in order that prompt inspection may be made and the defects corrected. Commencement of work by a Contractor where such condition exists will constitute acceptance of the other Contractor's work as satisfactory in all respects to receive the work commenced, except as to defects which may later develop. The Designer shall be the judge as to the quality of work and shall settle all disputes on the matter between Contractors.
- d. Any mechanical or electrical work such as sleeves, inserts, chases, etc., which is located in the work of the general Contractor shall be built in by the general Contractor. The respective mechanical and electrical Contractors shall set all sleeves, inserts and other devices built into the structure in cooperation and under the supervision of the general contractor. The responsibility for the exact location of such items shall be that of the mechanical and/or electrical contractor.
- e. Should a Contractor cause damage to the work or property of another Contractor, it shall be directly responsible, and upon notice, shall promptly settle the claim or otherwise resolve the dispute.
- f. The Contractor agrees to coordinate construction activities with the activities of regulatory authorities, utilities, and the Owner's maintenance personnel; to isolate construction work areas from interior areas with dust isolating partitions; and to schedule construction activities and to locate materials, equipment, and supplies on the Project Site in a manner that facilitates the Owner's regular operations in and around the Project with the least interference practicable.
- g. If at any time during the construction and completion of the Work covered by these Contract Documents, the conduct of any worker of the various crafts should be adjudged a nuisance to the Owner or Designer, or if any worker should be considered unfit or detrimental to the Work, the Contractor shall order such parties removed immediately from the grounds.

## **ARTICLE 16 - SUBCONTRACTS AND SUBCONTRACTORS**

- a. Within fourteen (14) days after award of the contract, the Contractor shall submit to the Designer a list giving the names and addresses of Subcontractors and equipment and material suppliers it proposes to use, together with the scope of their respective parts of the work. Should any subcontractor be disapproved by the Designer, the Designer shall submit his reasons for disapproval in writing to the Owner. No portion of the work shall be awarded to any Subcontractor not approved by the Designer and Owner. The Designer shall act promptly in the approval of subcontractors, and when approval of the list is given, no changes of subcontractors will be permitted except for cause or reason considered justifiable by the Designer.
- b. The Contractor is and remains fully responsible for his own acts or omissions as well as those of any subcontractor or of any employee of either. The Contractor agrees that no contractual relationship exists between the subcontractor and the Owner in regard to the Contract.
- c. The Owner reserves the right to limit the amount of portions of work to be subcontracted.

## **ARTICLE 17 - CONTRACTOR AND SUBCONTRACTOR RELATIONSHIPS**

- a. By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume towards the Contractor all the obligations and responsibilities that the Contractor, by these documents, assumes toward the Owner and Designer. Such assumption by the Subcontractor shall not relieve the Contractor of any of its obligations under the Contract Documents. Each subcontract agreement shall preserve and protect the rights of the Owner and Designer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract agreement, copies of the Contract Documents applicable to the portion of the Work to be performed by such Subcontractor.
- b. Any part of the work performed for the Contractor by a Subcontractor shall be pursuant to a written subcontract between the Contractor and such Subcontractor, which shall be prepared on a master form of subcontract which the Contractor has, prior to the execution of any subcontract, submitted to the Owner to insure that each such subcontract contains provisions that:
  - 1. Require that such portion of the work be performed in accordance with the requirements of the Contract Documents;

2. Require timely submission of Subcontractor's applications for payment and ancillary materials in order to enable the Contractor to apply for payment in accordance with the Contract Documents;
  3. Waive all rights the subcontracting parties may have against one another or that the Subcontractor may have against the Owner for damages caused by fire or other perils covered by the property insurance required in the Contract Documents, except for such rights as they have to the proceeds of such insurance held by the Owner;
  4. Recognize the rights of the Owner pursuant to the contingent assignment of subcontracts and require the Subcontractor (upon notice by the Owner that the Owner has terminated the agreement with the Contractor pursuant to the terms of the Contract Documents, and that the Owner has elected to retain the Subcontractor pursuant to the terms of its subcontract with the Contractor) to complete the unperformed obligations under such subcontract and, if requested by the Owner, to enter into an appropriate agreement evidencing the fact that the Subcontractor is bound to the Owner under his subcontract in the manner in which he has been bound to the Contractor;
  5. Require the Subcontractor to carry and maintain the appropriate insurance, unless otherwise approved by Owner, and to deliver certificates of insurance prior to the commencement of its portion of the Work and certified copies of the policies of insurance upon request of the Owner.
- c. Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:
1. This assignment is effective only after termination of the Contract by the Owner for cause and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor in writing; and
  2. This assignment is subject to the prior rights of the Surety, if any, obligated under bond relating to the Contract.

If the Work has been suspended for more than thirty (30) days, the Subcontractor's compensation shall be equitably adjusted.

Upon the Owner's reasonable request, the Contractor shall promptly execute further documentation conditionally assigning each subcontract agreement to the Owner (and the Contractor shall cause the Subcontractor to acknowledge said assignment). Copies of the executed subcontract agreement shall promptly be delivered to the Owner upon the Owner's request.

- d. The Contractor shall promptly advise the Owner in writing of any claim or demand by a Subcontractor claiming that any amount is due to such Subcontractor or claiming any default by the Contractor in any of its obligations to such Subcontractor.

## **ARTICLE 18 - DESIGNER'S STATUS**

- a. The Designer shall provide general administration of the performance of construction contracts, including liaison and necessary inspection of the Work to ensure compliance with Drawings and Specifications. He is the agent of the Owner only for the purpose of constructing this work and to the extent stipulated in the Contract Documents. He has authority to stop work or to order work removed, or to order corrections of faulty work where such action may be necessary to assure successful completion of the work.
- b. Should the Designer cease to be employed on the work for any reason whatsoever, then the Owner shall employ a competent replacement who shall assume the status of the former Designer.
- c. The Designer will visit the Project Site at intervals appropriate to the stage of construction to become familiar with the progress and quality of the completed work and to determine if the work is being performed in a manner indicating that the work, when completed, will be in accordance with the Contract Documents. On the basis of on-site observations, the Designer will keep the Owner informed of the progress of the work, and will endeavor to guard the Owner against defects and deficiencies in the work.
- d. The Designer and the Owner shall have access to the work whenever it is in preparation and progress during normal working hours. The Contractor shall provide facilities for such access so the Designer may perform his functions under the Contract Documents.
- e. The Designer will recommend to the Owner rejection of work which does not conform to the Contract Documents. Whenever the Designer considers it necessary or advisable for implementation of the intent of the Contract Documents, the Designer will recommend to the Owner additional inspection or testing of the work, whether or not such work is fabricated, installed or completed.
- f. Based on the Designer's observations and evaluations of the Contractor's applications for payment, the Designer will review and certify the amounts due the Contractor and will issue certificates for payment in such amounts.
- g. The Designer will prepare any Drawings required for Change Orders.
- h. The Designer will conduct inspections to determine the date or dates of substantial completion and completion of each building and of the entirety of the work and the

date of final completion of the entirety of the work, will receive and forward to the Owner for the Owner's review and records written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final certificate for payment upon compliance with the requirements of the Contract Documents.

- i. Interpretations and recommendations of the Designer will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing. When making such interpretations and recommendations, the Designer will endeavor to secure faithful performance by both Owner and Contractor and will not show partiality to either.

## **ARTICLE 19 - CHANGES IN THE WORK**

- a. Changes in the Work may be accomplished after execution of the Contract by Change Order, Construction Change Directive, or by order for a minor change in the Work. These changes will not invalidate and will not relieve or release the Contractor from any guarantee given by him pertinent to the contract provisions. These changes will not affect the validity of the performance or payment bonds and will not relieve the surety or sureties of said bonds. All extra work shall be executed under conditions of the original contract.
- b. Except in an emergency endangering life or property, NO CHANGE SHALL BE MADE BY THE CONTRACTOR EXCEPT UPON WRITTEN ORDER FROM THE DESIGNER, COUNTERSIGNED BY THE OWNER, INCLUDING THE TOWN MANAGER AUTHORIZING SUCH CHANGE. NO CLAIM FOR ADJUSTMENTS OF THE CONTRACT PRICE OR TIME SHALL BE VALID UNLESS THIS PROCEDURE IS FOLLOWED.

### **Change Order and Construction Change Directives**

A **Change Order** is a written instrument prepared by the Designer and signed by the Owner and Contractor stating their agreement upon all of the following:

- a. A change in the Work;
- b. The amount of the adjustment in the Contract Sum, if any; and
- c. The extent of the adjustment in the Contract Time, if any.

Methods used in determining adjustments to the Contract Sum may include those listed in subparagraph d.3.

### **Construction Change Directives**



- a. A Construction Change Directive is a written order prepared by the Owner or the Contractor and signed by the Owner, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and/or Contract Time being adjusted accordingly.
- b. A Construction Change Directive shall be used by the Owner in the absence of total agreement on terms of a Change Order.
- c. If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:
  - 1. By estimating and acceptance in a lump sum. The Contractor shall submit change proposals which include a complete itemization of quantities of materials, unit cost of materials when applicable, unit labor cost for each item of Work or total labor hours and applicable hourly rates for each classification of labor, as stated in the [contract] between Owner and Contractor relating to the Work, if any, and the number of calendar days (if any) required to complete the extra Work in addition to the Contract Time or the reduction in calendar days (if any) in the Contract Time for omitted Work. Daily operational costs of temporary facilities may be included only when an extension of time is agreed upon.
  - 2. By unit prices stated in the Contract, if any, or subsequently agreed upon. The Contractor shall submit an estimate itemizing the number of unit quantities of each part of the Work which is changed, multiplying such unit quantities by the applicable unit prices. The change in Contract Time shall be as described in Sub-Subparagraph c.3. above.
  - 3. By cost and percentage or by cost and fixed fee. The Contractor shall keep correct records of materials, labor, equipment, transportation, and other items used or expended to effect the required change. Such records shall be kept on forms acceptable to the Owner and submitted to the Owner for review each day that such Work is performed. Only acceptable documents will be considered in establishing the cost of the change. The change in Contract Time shall be as described in Sub-subparagraph d.3. (a) above.
  - 4. As provided in Subparagraph c.1.
- d. Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Owner of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum and/or Contract Time.

- e. A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in the Contract Sum and/or Contract Time or the method for determining them. Upon execution, such agreement shall be considered as a Change Order.
- f. If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Owner on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. Overhead shall include costs of engineering, shop drawing and change order review, labor of managers, superintendents, technical engineers, timekeepers, clerks, and other office personnel, small tools, and home office expenses. In such case, and also under subparagraph 3. d. above, the Contractor shall keep and present, in such form as the Owner may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this subparagraph shall be limited to the following:
  - 1. Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' or workmen's compensation insurance;
  - 2. Costs of materials, supplies and equipment, including costs of transportation, whether incorporated or consumed;
  - 3. Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
  - 4. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
  - 5. Additional costs of supervision and field personnel directly attributable to the change.
- g. Pending final determination of cost to the Owner, amounts not in dispute may be included in Applications for Payment. Unless otherwise provided, in the Agreement, the amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract sum shall be actual net cost as confirmed by the Owner. When both additions and credits covering related Work or substitution are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase or decrease, if any, with respect to that change.
- h. If the Owner and Contractor do not agree with the adjustment in Contract Time or the method for determining it, the Owner may elect to refer the matter to the

Designer for initial determination, provided such determination by the Designer shall not be binding on the parties if either or both parties disagree in good faith with such determination.

- i. When the Owner and Contractor agree with any determination made by the Designer concerning the adjustments in the Contract Sum and/or Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective upon execution of an appropriate Change Order.
- j. Measurements for Work in a unit price basis, if applicable, shall be made in accordance with United States Standard measures. When specified by weight, measurement shall be computed from weight slips. Measurement for area and linear quantities shall be taken on a horizontal plane. Measurement for volume of excavation and embankment shall be computed from cross-sections by the method of average end areas. Volume of other materials shall be computed by multiplication of the surface area on a horizontal plan times the specified depth or thickness. If materials are specified to be placed in a structure, the actual volume within the neat lines of the structure, as shown on the Drawings, shall be the basis for computing the Work.

ALL CHANGE ORDERS SHALL BE SUPPORTED BY A BREAKDOWN SHOWING METHOD OF ARRIVING AT NET COST AS DEFINED ABOVE.

In all change orders, the Contractor shall obtain quotations and supporting data, and verify correctness. The Designer shall prepare the change order, secure the Contractor's signature, certify the change order by his signature, and forward the change order and all supporting data to the Owner for the Owner's signature. The Owner will forward the change order to the Owner for final approval.

At the time of signing a change order, the Contractor shall be required to certify as follows:

"I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety and that, in the case of an increase in the Contract Sum of more than 5% of the original contract, the penal sum of the bonds will be increased in an amount corresponding to the increase in the Contract Sum."

A change order, when issued, shall be full compensation, or credit, for the extra Work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the Work. The Contractor's signature on the Change Order constitutes a release of any claim for additional cost or time relative to the Change Order Work.

### **Concealed Conditions**

- a. The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Designer of (1) subsurface or latent physical conditions at the

site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site(s), of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the contract.

- b. The Designer shall investigate the site conditions promptly after receiving the notice. Work shall not proceed at the affected site, except at the Contractor's risk, until the Designer has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the Work under this contract, whether or not changed as a result of the conditions, the Contractor shall file a claim in writing to the Owner within ten days after receipt of such instructions and, in any event, before proceeding with the Work. An equitable adjustment in the contract price, the delivery schedule, or both shall be made under this clause and the contract modified in writing accordingly.
- c. No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required. No adjustment in the Contract Time or Contract Sum shall be permitted in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews, and pre-construction services for the Project, or (2) inspections, tests, reviews, and pre-construction services which the Contractor had the opportunity to make or should have performed in connection with the Project. No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

## **ARTICLE 20 - CLAIMS FOR EXTRA COST**

- a. Should the Contractor consider that, for any reason, it is entitled to an increase in the Contract Sum, not authorized by Change Order, Construction Change Directive, or by an order for a minor change in the Work, it shall give written notice thereof to the Designer within seven (7) days without delay, and shall not proceed with the Work affected until further advised, except in an emergency involving the safety of life or property. Failure to provide such notice constitutes a waiver of such claim, and no claims for extra cost will be considered unless the notice is so made. The Designer shall render a written decision within seven (7) days of receipt of claim.
- b. THE CONTRACTOR SHALL NOT ACT ON INSTRUCTIONS RECEIVED BY HIM FROM PERSONS OTHER THAN THE DESIGNER, AND ANY CLAIMS FOR EXTRA COST OR EXTENSION OF TIME ON ACCOUNT OF SUCH INSTRUCTION WILL NOT BE HONORED. The Designer will not be responsible for misunderstandings claimed by the Contractor of oral instructions that have not been confirmed in writing, and in no case shall instructions be interpreted as

permitting a departure from the Contract Documents unless such instruction is confirmed in writing and supported by a properly authorized Change Order.

- c. The Contractor and Owner waive claims against each other for consequential damages arising out of or relating to this contract. This mutual waiver includes:
  - 1. Damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
  - 2. Damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work. This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with the contract documents. Nothing contained in this paragraph shall be deemed to preclude an award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.

#### **ARTICLE 21 - MINOR CHANGES IN THE WORK**

The Designer has the authority to order minor changes in the Work not involving an adjustment in the contract sum or time for completion, and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

#### **ARTICLE 22 - UNCORRECTED NONCONFORMING WORK**

If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, which acceptance must be in writing and signed by the Owner, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be affected whether or not final payment has been made.

#### **ARTICLE 23 - TIME OF COMPLETION, DELAYS, EXTENSION OF TIME**

- a. Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Contract, the Contractor agrees that the Contract Time is a reasonable period for performing the work. The Project Expediter, upon notice of award of contract, shall confer with other Contractors, prepare a construction progress schedule based on the allowed time, and submit such a progress schedule to the other Contractors for approval and coordination with a copy to the Designer and Owner for comment. When the schedule has been approved by all Contractors, the Project Expediter shall distribute a copy to the Designer and Owner for approval.

All Contractors shall maintain progress in accordance with the progress schedule and with the terms of the Contract Documents. The progress schedule shall be revised as required by the Project Expediter in cooperation with other Contractors, the Designer and the Owner.

- b. The Contractor shall commence the Work on the date specified in the written notice to proceed and shall fully complete all Work within the number of consecutive calendar days stated. The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the Project Site or elsewhere prior to the effective date of the insurance required by the Contract Documents. For each day in excess of the above number of days stated, the Contractor shall pay the Owner the sum stated as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner by reason of failure of said Contractor to complete the Work within the time specified, such time being of the essence of this contract and a material consideration thereof.
- c. The Contractor covenants and agrees to exert all reasonable best efforts to avoid the occurrence of any cause for delay and to avoid any extension of performance dates. Any claim for extension of time shall be made by the Contractor to the Owner in writing and shall be received not more than five (5) working days after the commencement of the alleged cause for delay and within five (5) working days after the cessation of such alleged cause for delay. Contractor shall notify the Owner of such cessation and the total amount of delay, if any, in performance dates which Contractor claims by reason of any such occurrence. Immediately following the commencement of any such cause for delay representatives of the Contractor and Owner shall confer for the purpose of endeavoring to determine a course of action which would terminate or eliminate the occurrence or event which is causing delay. Failure of Contractor to timely assert any alleged claim for extension shall constitute a waiver of the particular claim. Notwithstanding anything to the contrary in the foregoing, the Contractor shall not be entitled to an extension of time unless the event or circumstance giving rise to a delay constitutes an Excusable Event of Delay and the Contractor can demonstrate to the reasonable satisfaction of the Owner that the activity delayed will result in a delay of the Scheduled Completion Date for a building or any other improvements comprising a part of the Work. “Excusable Events of Delay” mean (i) strikes, lockouts or picketing (legal or illegal) which are not limited to the Project Site or projects with which only the Contractor or any of its Subcontractors are involved; (ii) governmental action and condemnation, (iii) riot, civil commotion, insurrection, and war; (iii) fire or other casualty, accident, acts of God or the enemy; (iv) unusual adverse weather conditions not reasonably expected for the location of the Project and the time of the year in question; (v) the passage or unanticipated first time interpretation or application of any statute, law, regulation or moratorium of any governmental authority; (vi) delays caused by an act or neglect of the Owner or any separate contractor, by delay authorized by the Owner in writing, or by Change Order or Construction Change Directives; or (viii) causes beyond the reasonable control of the Contractor, provided neither the acts or omissions of Subcontractors or suppliers nor (so long as the Owner makes payments

in accordance with the requirements of the Contract Documents) the Contractor's or any Subcontractor's insufficiency of funds, bankruptcy or insolvency shall be deemed an Excusable Event of Delay.

Should the Contractor, in the absence of the notification described in the preceding paragraph, fail, refuse or neglect to supply sufficient workmen or to deliver the materials with such promptness as to prevent the delay in the progress of the Work, or fail in any respect diligently to commence and prosecute the Work and proceed to the point to which the Contractor should have proceeded under the construction schedule, and such failure is not cured within seven (7) days after receipt of written notice from the Owner, the Owner shall have the right to direct the Contractor to furnish upon three (3) days' notice, additional labor and, at the Contractor's cost and expense, to expedite deliveries of materials (or the Owner may expedite such deliveries at the cost of the Contractor), which labor shall, in the owner's opinion, be sufficient to speed up and achieve Completion (as defined in the agreement) of the Work by the Scheduled Completion Date. If such additional labor shall not be available, the Owner shall have the right to direct the Contractor, at the latter's own cost and expense, to work overtime to such an extent as will be sufficient, to speed up and complete the Work as herein provided. In addition, on direction of the Owner, the Contractor shall, without additional charge to the Owner, require its employees to work on such days as may be declared holidays by the trades employed by the Contractor, provided such days are not recognized as holidays by other branches of the building trades working on the project.

- d. Contractor's remedy for delay, hindrances in the performance of work, loss of productivity, impact damages, other consequential damages and similar damages, shall be an extension of the contract time or other adjustment to the construction schedule, and a change order allowing an increase in material and storage costs resulting from the delay, unless caused by acts constituting intentional interference by the Owner with the Contractor's performance of the work, but only if, and to the extent, such acts continue after Contractor's written notice to the Owner of such interference, or unless caused by the Owner's suspension of the work (if the work is suspended, the Contractor shall be entitled to an equitable adjustment to the contract sub). The Owner's exercise of any of its rights and remedies under the contract documents, and the performance by the Town of its duties and its role as regulator, shall not under any circumstances be construed as intentional interference by the Owner with the Contractor's performance of the work. If the Contractor, but for a delay not within its control, would have completed the work prior to the expiration of the contract time, the Contractor shall not be entitled to recovery of damages arising out of any event or delay which prevented such early completion of the work.
- e. Time extensions will not be granted for rain, wind, snow or other natural phenomena of normal intensity for the locality where Work is performed. For purpose of determining extent of delay attributable to unusual weather phenomena, Contractor

agrees that it may expect inclement weather for the number of calendar days in accordance with the following table:

|     | .1 in. Precipitation, or more | 32 Degrees F., or less |
|-----|-------------------------------|------------------------|
| Jan | 10                            | 3                      |
| Feb | 10                            | 1                      |
| Mar | 10                            | 0                      |
| Apr | 9                             | 0                      |
| May | 10                            | 0                      |
| Jun | 9                             | 0                      |
| Jul | 11                            | 0                      |
| Aug | 10                            | 0                      |
| Sep | 8                             | 0                      |
| Oct | 7                             | 0                      |
| Nov | 8                             | 0                      |
| Dec | 9                             | 0                      |

The Contractor agrees that the measure of extreme weather during the period covered by this Contract shall be the number of days in excess of those shown for each month in the table above, in which precipitation exceeded .10 inch, or in which the highest temperature was 32 Degrees F. or less from RDU Airport, NC-NSW Station, over the same period of time, which is the same source of data used to determine normal weather losses. If a total number of accumulated calendar days lost to inclement weather, from the start of Work until the building is enclosed, exceeds the total accumulated number to be expected for the same period from the table above, time for completion will be extended by the number of calendar days needed to include the excess number of calendar days loss. No extension of time will be made for days due to weather occurring after the building is enclosed. For the purposes of this Contract, the term “enclosed” is defined to mean when the building is sufficiently roofed and sealed, either temporarily or permanently, to permit the structure to be heated and the plastering and drywall trades to work. The Designer shall determine when the structure is “enclosed”.

- f. The Contractor shall notify its surety in writing of any extension of time granted.
- g. No claim shall be allowed on account of failure of the Designer to furnish drawings or instructions until two (2) weeks after written demand for such drawings and/or instructions.

#### **ARTICLE 24 - PARTIAL UTILIZATION AND BENEFICIAL OCCUPANCY**

- a. The Owner may occupy all or a portion of the project when the work is substantially complete. Unless otherwise agreed, partial occupancy or use of a portion or portions of the work shall not constitute acceptance of work not complying with the requirements of the Contract Documents.



- b. Prior to the final payment, the Owner may request the Contractor in writing, through the Designer if applicable, to permit the Owner to use a specified part of the project which it believes it may use without significant interference with construction of the other parts of the project. If the Contractor agrees, the Designer will schedule a beneficial occupancy inspection after which the Designer may issue a partial certificate of substantial completion. The certificate shall include the following documentation:
  - 1. Date of substantial completion.
  - 2. Description of the portion of the project excluded and included.
  - 3. Authorization of the public authorities having jurisdiction over the project for such use.
  - 4. A tentative list of items to be completed or corrected before final payment.
  - 5. Establishing responsibility between Contractor and Owner for maintenance, heat, utilities and insurance.
  - 6. Establishing the date for guarantees and warranties under terms of the contract.
  - 7. Consent of surety.
  - 8. Endorsement from insurance company permitting occupancy.
- c. The Owner shall have the right to exclude the Contractor from any part of the project which the Designer has so certified to be substantially complete, but the Owner will allow the Contractor reasonable access to complete or correct work to bring it into compliance with the Contract.
- d. Occupancy by the Owner under this article will in no way relieve the Contractor from the contractual requirement to fully complete the project within the specified time. The Contractor will not be relieved of liquidated damages because of beneficial occupancy. The Designer may prorate liquidated damages based on the percentage of project occupied.

## **ARTICLE 25 - FINAL INSPECTION AND ACCEPTANCE**

- a. The Contractor shall determine when the work is completed and ready for final inspection and shall schedule a final inspection at a time and date acceptable to the Owner and Designer.
- b. At the final inspection, the Designer and the Owner shall record a list of items that are found to be incomplete or not in accordance with the Contract Documents. At

the conclusion of the final inspection, the Designer shall make the following determinations:

1. That the project is fully and finally completed and accepted, or
2. That the project is accepted subject to the list of discrepancies (punch list). All punch list items must be completed within thirty (30) days of acceptance with the exception of landscaping which, if directed by the Designer, shall be planted subsequently, or
3. That the project is not complete and another date for a final inspection will be established.

c. The date of acceptance will establish the following:

1. The beginning of guarantees and warranties period.
2. The date on which the Contractor's insurance coverage for public liability, property damage and builder's risk may be terminated.
3. That no liquidated damages (if applicable) shall be assessed after this date.
4. The termination date of utility cost to the Contractor.

## **ARTICLE 26 - CORRECTION OF WORK BEFORE FINAL PAYMENT**

- a. The Contractor shall promptly correct Work rejected by the Designer or the Owner or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear costs, risks and expenses of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's and the Designer's services and expenses made necessary thereof.
- b. If, within one year after the date of acceptance of the entire Work, or after the date for commencement of warranties (provided except with respect to warranties on equipment within a building, which one-year period will commence on the date of Substantial Completion of the portion of the Work comprising such building, such one-year period shall in no event be less than one year after Substantial Completion of the entire Work), or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly at the Contractor's sole cost, risk and expense after receipt of written notice from the owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Contractor agrees that with respect to any corrective work which affects the habitability of a unit, as reasonably determined by the Owner, the Contractor shall respond to the Owner's notice and commence the corrective work as quickly as is possible, but in any event within 24 hours. All other corrective work will be commenced within 72 hours after receipt of notice from the Owner. If the Contractor fails to undertake required corrective work within the applicable foregoing period of time or fails to complete corrective work after such work has been initiated, then in either such event, the Owner shall have the right but not the obligation, to complete such corrective work. In such event, the Contractor shall reimburse the Owner upon demand for all costs and expenses incurred by the Owner in completing the subject corrective work together with an administrative fee equal to 10% of the costs and expenses so incurred by the Owner. The Contractor shall diligently and continuously proceed with the completion of all corrective work, and all such work shall be performed so as to minimize, to the extent reasonable, practicable, disruption of the Owner's operations. This period of one year shall be extended with respect to portions of Work first performed after acceptance by the period of time between acceptance and the actual performance of the Work. This obligation under this subparagraph b. shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.
- c. The Contractor shall remove from the Project Site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

- d. If the Contractor fails to correct nonconforming Work within a reasonable time or, if applicable, the time frames provided in Paragraph 26 b. above, the owner may correct it. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Owner or Designer, the Owner may remove it and store the salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner may upon ten additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Designer's services and expenses made necessary thereby and attorneys' fees and expenses. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner immediately upon demand.
- e. The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.
- f. Nothing contained in this Article 26 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one year as described in subparagraph 26.b. relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.
- g. All Contractors, Subcontractors and Sub-subcontractors shall execute and deliver to the Owner the following Warranty Acknowledgment before a Certificate of Final Completion is issued:

**Warranty Acknowledgment.**

(Name of Contractor, Subcontractor or Sub-subcontractor) ("Contractor") hereby agrees and warrants that all of its Work complies with the requirements of the Contract Documents. If, within one year after the date of Substantial Completion of the entire Work or after the date for commencement of warranties (provided, except with respect to warranties on equipment within a building, which one-year period shall commence on the date of Substantial Completion of the Work comprising such building, such one-year period shall in no event be less than one year following Substantial Completion of the entire Work, any of the Contractor's Work is found to be not in accordance with the requirements of the Contract Documents, Contractor shall correct the Work at its sole expense promptly after

receipt of written notice from the Owner to do so unless the Owner has previously given Contractor a written acceptance of such condition. The Contractor agrees that with respect to any corrective work which affects the habitability of a unit, as reasonably determined by the Owner, the Contractor shall respond to the Owner's notice and commence the corrective work as quickly as is possible, but in any event within 24 hours. All other corrective work will be commenced within seventy-two hours after receipt of notice from the Owner. If the Contractor fails to undertake required corrective work within the applicable foregoing period of time or fails to complete corrective work after such work has been initiated, then in either such event, the Owner shall have the right but not the obligation, to complete such corrective work. In such event, the Contractor shall reimburse the Owner upon demand for all costs and expenses incurred by the Owner in completed the subject corrective work together with an administrative fee equal to 10% of the costs and expenses so incurred by the Owner. The Contractor shall diligently and continuously proceed with the completion of all corrective work, and all such work shall be performed so as to minimize, to the extent reasonable practicable, disruption of the Owner's operations. This period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of Contractor's Work. These obligations shall survive acceptance of the Work under the Contract and termination of the Contract.

This warranty shall be in addition to the terms of any other warranty or longer period of obligation specified in the Contract Documents, any applicable special warranty required by the Contract Documents, or the terms of any general warranty and is not in lieu of any of them. This warranty shall not be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced or any proceeding commenced.

The Warranty Acknowledgment shall be set forth on each Contractor's, Subcontractor's or Sub-subcontractor's letterhead (which shall include, at a minimum, the name, address, telephone number and facsimile number of such entity or person) and shall include the original signature of a person authorized to sign such an instrument on behalf of such Contractor, Subcontractor or Sub-subcontractor.

## **ARTICLE 27 - OWNER'S RIGHT TO DO WORK**

If during the progress of the work or during the period of guarantee, the Contractor fails to prosecute the work properly or to perform any provision of the contract, the Owner, after fifteen (15) days' written notice, or on such shorter notice as is stated in the General Conditions, to the Contractor from the Designer of such failure, may perform or have performed that portion of the work. The cost of the work may be deducted from any amounts due or to become due to the Contractor, such action and cost of same having been first approved by the Designer. Should the cost of such action of the Owner exceed the amount due or to become due the Contractor, then the Contractor shall be liable for and shall pay to the Owner the amount of said excess.

## **ARTICLE 28 - TERMINATION OF CONTRACT**

If the Contractor fails to begin the work under the contract within the time specified, or the progress of the Work is not maintained in keeping with the progress schedule, or the Work is not completed within the time specified, or the Contractor fails to perform the work with sufficient workers and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall discontinue the prosecution of the work, or if the Contractor shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against it unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or if it submits an Application for Payment, sworn statement, waiver of lien, affidavit, or document of any nature which is intentionally falsified, or for any other cause whatsoever shall not carry on the work in an acceptable manner, the Owner may give notice in writing to the Contractor and his surety of such delay, neglect or default, specifying the same, and if the Contractor within a period of fifteen (15) days after such notice shall not proceed in accordance therewith, then the Owner shall declare this contract in default due to the Contractor(s) material breach of the contract. The Owner shall have full power and authority, without violating the contract, to take the prosecution of the work out of the hands of said Contractor, to accept the contingent assignment of subcontractors, if allowed to do so by law, to appropriate or use any or all contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof or use such other methods as in the Owner's opinion shall be required for the completion of said contract in an acceptable manner. All costs and charges incurred by the Owner, together with the costs of completing the work under contract, shall be deducted from any monies due or which may become due said Contractor. Unless otherwise provided in the Contract Documents, such costs shall include (but not be limited to) the cost of any reasonable additional design, administrative, and managerial services required, any costs incurred in retaining another contractor or subcontractor, attorneys' fees and expenses, and any other costs and expenses incurred by Owner. In case the expense so incurred by the Owner shall be less than the sum which would have been payable under the contract, if it had been completed by said Contractor, then the said Contractor shall be entitled to receive the difference, but in case such expense shall exceed the sum which would have been payable under the contract, then the Contractor shall be liable and shall pay to the Owner the amount of said excess.

## **ARTICLE 29 - CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT**

- a. Should the work be stopped by order of a court having jurisdiction, or by order of any other public authority for a period of three months, due to cause beyond the fault or control of the Contractor, or if the Owner should fail or refuse to make payment on account of a certificate issued by the Designer within thirty (30) days after receipt of same, then the Contractor, after fifteen (15) days' written notice to the Owner and the Designer, may suspend operations on the work or terminate the contract.
- b. In the event of such a termination by the Contractor, the Contractor may recover for the cost of all materials delivered and work performed on this Contract plus no more than 20 percent overhead and profit and shall make such payment. The Designer shall be the judge as to the correctness of such payment.

## **ARTICLE 30 - REQUEST FOR PAYMENT**

- a. Not later than the fifth day of the month, the Contractor shall submit to the Designer a request for payment for work done during the previous month. The request shall be in the form agreed upon between the Contractor and the Designer, but shall show substantially the value of work done and materials delivered to the site during the period since the last payment, and shall include the following information:
  - 1. Total of contract sum including approved change orders.
  - 2. Value of work completed to date.
  - 3. Less five percent (5%) retainage, provided however, that after fifty percent (50%) of the work has been satisfactorily completed on schedule, with approval of the Owner and written consent of the surety, retainage may be reduced to zero percent (0%) if the Work continues to be completed satisfactorily and on schedule. Owner retains the right to reinstate retainage should Work become unsatisfactory in accordance with Section 143-134.1 of the General Statute of North Carolina.
  - 4. Less previous payments.
  - 5. Current amount due.
- b. The Contractor, upon request of the Designer, shall substantiate the request for payment with invoices, vouchers, payrolls, or other evidence, including, but not limited to, invoices demonstrating payments for materials and labor, and certificates or other evidence demonstrating payment to subcontractors.
- c. Prior to submitting the first request, the Contractor shall prepare for the Designer a schedule of values in a format acceptable to Designer showing a breakdown of the

contract price into values of the various parts of the Work, so arranged as to facilitate payments to subcontractors.

- d. When payment is made on account of stored materials and equipment, such materials must be stored on the Owner's property, and the requests for payments shall be accompanied by invoices or bills of sale or other evidence to establish the Owner's title to such materials and equipment. Responsibility for such stored materials and equipment shall remain with the Contractor regardless of ownership title. Such stored materials and equipment shall not be removed from the Owner's property. Should the space for storage on-site be limited, the Contractor, at its option, shall be permitted to store such materials and/or equipment in a suitable space off-site. Should the Contractor desire to include any such materials or equipment in his application for payment, they must be stored in the name of the Owner in a commercial warehouse approved by the Designer and located as close to the site as possible. The warehouse selected must be approved by the Contractor's bonding and insurance companies; the material to be paid for shall be assigned to the Owner and shall be inspected by the Designer. Upon approval by the Designer of the storage facilities and materials and equipment, payment therefore will be certified. Such stored materials and equipment shall not be moved except for transportation to the Project Site.
- e. The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payment to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in similar manner.

#### **ARTICLE 31 - CERTIFICATES OF PAYMENT AND FINAL PAYMENT**

- a. Within five (5) days from receipt of request for payment from the Contractor, the Designer shall issue and forward to the Owner a certificate for payment. This certificate shall indicate the amount requested by the Contractor as approved by the Designer. If the request for payment is not certified by the Designer, he shall, within five (5) days of receipt of the request, state in writing to the Contractor and the Owner his reasons for withholding payment.
- b. No certificate issued or payment made shall constitute an acceptance of the work or any part thereof.
- c. The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those claims previously made in writing and identified by the payee as unsettled at the time of final Application for Payment.



- d. The Designer shall not authorize final payment until the work under contract has been certified as fully and finally complete by Designer, and that the entire balance found to be due to the Contractor and noted in the final Certificate as due and payable. .
- e. Final certificate of payment shall be accompanied by the following:
  - 1. Warranties and guarantees required by the contract, including warranties, Owner's and Operator's manuals relating to all equipment installed.
  - 2. Releases and waivers of claim for contractors and subcontractors.
  - 3. Affidavit of Contractors of payment to material and labor suppliers and subcontractors. (See Article 36.)
  - 4. Certificates of state and local agencies required by law.
  - 5. Certificate of final completion by Designer.
  - 6. Consent of surety to final payment.
  - 7. Complete set of "as-built" drawings.
- f. Should the Contractor fail to substantially complete the Work on or before the date stipulated for substantial completion (or such later date as may result from extension of time granted by the Owner), it shall pay the Owner, as liquidated damages, the sum of **\$ 250.00** for each consecutive calendar day that the terms of the Contract remain unfulfilled beyond the date allowed by the Contract, which sum is agreed upon as a reasonable and proper measure of damages that the Owner will sustain per day by failure of the Contractor to complete the Work within the time as stipulated; it being recognized by the Owner and the Contractor that the injury to the Owner which could result from a failure of the Contractor to complete on schedule is uncertain and cannot be computed exactly. In no way shall costs or liquidated damages be construed as a penalty on the Contractor. For each consecutive calendar day that the Work remains incomplete after the date established for final completion, the Owner will retain from the compensation otherwise to be paid to the Contractor the sum of **\$ 250.00**. This amount is the minimum measure of damages the Owner will sustain by failure of the Contractor to complete all remedial work, correct deficient work, clean up the project and other miscellaneous tasks as required to complete all work specified. This amount is in addition to the liquidated damages prescribed for substantial completion. The amounts of liquidated damages set forth in this paragraph shall be assessed cumulatively. Items of costs included in the assessment of liquidated damages are not defined in the General Conditions. This provision for liquidated damages does not bar Owner's right to enforce other rights and remedies against Contractor, including, but not limited to, specific performance or injunctive relief.

## **ARTICLE 32 - PAYMENTS WITHHELD**

- a. The Designer may refuse to certify applications for payment for the following reasons:
  - 1. Defective Work not corrected.
  - 2. Absence of a timely and properly approved project progress schedule, with required updates.
  - 3. Reasonable evidence that the unpaid balance of the contract sum is insufficient to complete the Work.
  - 4. Reasonable evidence that the Work cannot be completed in the Contract Time, and that the contract balance is not sufficient to cover actual or liquidated damages for anticipated delays in completion.
  - 5. Claims filed against the Contractor or evidence that a claim will be filed.
  - 6. Evidence that subcontractors have not been paid.
- b. When grounds for withholding payments have been removed, payment will be released. The Owner shall not be deemed in default by reason of withholding payments while any of the above grounds remain uncured.

## **ARTICLE 33 - MINIMUM INSURANCE REQUIREMENTS**

The work under this contract shall not commence until the Contractor has obtained all required insurance and verifying certificates of insurance have been approved in writing by the Owner. All insurance shall be provided by companies licensed to do business in North Carolina. These certificates of insurance shall contain a provision that coverage's afforded under the policies will not be canceled, reduced in amount or coverage's eliminated until at least thirty (30) days after mailing written notice, by certified mail, return receipt requested, to the insured and the Owner of such alteration or cancellation.

### **Contractor's Liability Insurance.**

- a. The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in North Carolina such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by any one for whose acts any of them may be liable:

1. Claims under worker's compensation, disability, benefit and other similar employee benefit acts that are applicable to the work to be performed;
  2. Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
  3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
  4. Claims for damages insured by usual personal injury liability coverage;
  5. Claims for damages, other than to the work itself; because of injury to or destruction of tangible property, including loss of use resulting there from;
  6. Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
  7. Claims for bodily injury or property damage arising out of completed operations; and
  8. Claims involving contractual liability insurance applicable to the Contractor's obligations under the indemnity article of this Contract.
- b. The insurance required shall be written for not less than limits of liability specified in the contract documents or required by law, whichever coverage is greater. Coverage [whether] written on an occurrence [or] claims made basis, shall be maintained without interruptions from the date of commencement of the work until date final payment and determination of any coverage required to be maintained after final payment.
- c. Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to the commencement of the work. These certificates and the insurance policies required by this article shall contain a provision that coverage is afforded under the policies will not be canceled or allowed to expire until at least thirty days prior written notice has been given to the Owner. If any of the foregoing insurance coverage's are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final application for payment as required by the Contract Documents. Information concerning reduction of coverage on account of revised limits or claims paid under the general aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.
- d. The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

- e. Optionally, the Owner may require the Contractor to purchase and maintain project management protective liability insurance from the Contractor's usual sources as primary coverage for the Owner's, Contractor's and Designer's vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased for such coverage shall be equal to the aggregate of the limits required for Contractor's liability insurance under subparagraphs 2 through 5 above.
- f. To the extent damages are covered by project management protective liability insurance, the Owner, Contractor and Designer waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.

## **Property Insurance**

- a. The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in the Contract Documents or otherwise in writing by all persons and entitled who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property required by this paragraph to be covered, whichever is later. This insurance shall include interest of the owner, the Contractor, Subcontractors and Sub-subcontractors in the project.
  - 1. Property insurance shall be on an "all risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

2. If the property insurance required deductibles, the Owner shall pay costs not covered because of such deductibles.
  3. This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.
- b. Partial occupancy or use shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance. If the Owner intends to occupy premises before Certificate of Occupancy is received, insurance company will be contacted to endorse policy.

### **Boiler and Machinery Insurance**

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interest of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insured.

### **Loss of Use Insurance**

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

- a. If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.
- b. If during the project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the project, or if after final payment property insurance is to be provided on the completed project through a policy or policies other than those insuring the project during the construction period, the Owner shall waive all rights in accordance with the terms of subparagraphs g.7. for damages caused by fire or other causes of loss covered by this separate insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

- c. Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverage's required. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

### **Waivers of Subrogation.**

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-contractors, agents and employees, each of the other, and (2) the Architect, Architect's consultant, separate contractors, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this paragraph or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors, if any, and the Subcontractors, Sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

- a. A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insured's, as their interest may appear, subject to requirements of any applicable mortgagee clause. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.
- b. If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a change in the Work.
- c. The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power. If such objection is made,

the dispute shall be resolved as provided in Article 46 below. The Owner as fiduciary shall, in the case of arbitration, make settlement with insurers in accordance with directions of the arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

#### **ARTICLE 34 - PERFORMANCE BOND AND PAYMENT BOND**

Each Contractor shall furnish a performance bond and payment bond executed by a surety company authorized to do business in North Carolina. The bonds shall be in the full contract sum, as increased by Change Order or Construction Change Directive. All bonds shall be countersigned by an authorized agent of the bonding company who is licensed to do business in North Carolina. The Contractor shall obtain a Performance Bond and a Payment Bond, in a form acceptable to the Owner. The bonds shall guarantee the Contractor's faithful performance of the contract and the payment of all obligations arising there under. The bonds shall remain in force until (1) all work has been fully and finally completed and accepted by the Owner, (2) the provisions of all guarantees or warranties required by these Contract Documents have been fulfilled, and the time limitation for all guarantees or warranties has expired, or (3) until the time for the filing of all mechanics liens has expired, whichever is longer, after which it shall become void. The Contractor shall pay all charges in connection with the bonds as a part of the contract. One original executed and sealed copy of the bonds, together with an original and sealed power of attorney shall be attached to each copy of the contract before they are returned for the Owner's signature.

Unless otherwise, agreed, the bonds shall be written on AIA Document A-311, latest edition. Copies of AIA Document A-311 may be obtained from the local office supply or stationery store or may be ordered from the American Institute of Architects, 1735 New York Avenue, N.W., Washington, DC 20006. A current Power-of-Attorney shall be attached to this bond. Notarized originals are required.

#### **ARTICLE 35 - CONTRACTOR'S AFFIDAVIT**

The final payment of retained amount due the Contractor on account of the contract shall not become due until the Contractor has furnished to the Owner through the Designer an affidavit signed, sworn and notarized to the effect that all payments for materials, labor, services or subcontracted Work in connection with his contract have been satisfied, and that no claims or liens exist against the Contractor in connection with this contract.

#### **ARTICLE 36 - ASSIGNMENTS**

Except as otherwise provided herein, the Contractor shall not assign any portion of this contract or subcontract in its entirety. Except as may be required under terms of the performance bond or payment bond, no funds or sums of money due or become due the Contractor under the contract may be assigned.

#### **ARTICLE 37 - USE OF PREMISES**

- a. The Contractor shall confine its apparatus, equipment, the storage of materials and the operations of its workers to limits indicated by law, ordinances, permits or directions of the Designer and shall not exceed those established limits in his operations.
- b. The Contractor shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.
- c. The Contractor shall enforce the Designer's instructions regarding signs, advertisements, fires, smoking, firearms, and use of alcohol or other controlled substances.

#### **ARTICLE 38 - CUTTING, PATCHING AND DIGGING**

- a. The Contractor shall do all cutting, fitting or patching of his work that may be required to make its several parts come together properly and fit to receive or be received by work of other Contractors shown upon or reasonably implied by the drawings and specifications for the completed structure, as the Designer may direct.
- b. Any cost brought about by defective or ill-timed work shall be borne by the party responsible therefore.
- c. No Contractor shall endanger any work of another Contractor by cutting, digging or other means. No Contractor shall cut or alter the work of any other Contractor without the consent of the Designer and the affected Contractor.

#### **ARTICLE 39 - UTILITIES, STRUCTURES, SIGNS**

- a. The Contractor shall provide necessary and adequate facilities and pay all costs for water, electricity, gas, oil, sewer and other utility services which may be necessary and required for completion of the project according to the Contract Documents. Any permanent meters installed shall be listed in the Contractor's name until its work is fully accepted by the Owner.
- b. Meters shall be relisted in the Owner's name on the day following completion and acceptance of the Contractor's work and the Owner shall pay for services used after that date.
- c. The Owner shall be reimbursed for all metered utility service charges paid by or attributed to the Owner after the meter is relisted in the Owner's name and prior to completion and acceptance of the work of all Contractors. Reimbursement shall be made by the Contractor whose work has not been completed and accepted. If the work of two or more Contractors has not been completed and accepted, reimbursement to the Owner shall be paid by the Contractors involved on the basis of assessments by the Designer.



- d. All Contractors shall have the permanent building systems in sufficient readiness for furnishing temporary climatic control at the time a building is enclosed. The HVAC systems shall maintain climatic control throughout the enclosed portion of the building sufficient to allow completion of the interior finishes of the building. A building shall be considered enclosed when it has windows installed and when doorways and other openings have protection which will provide reasonable climatic control. The appropriate climatic condition shall be jointly determined by the Contractor(s) and the Designer. Use of the equipment in this manner shall in no way affect the warranty requirements of the Contractor(s).
- e. Adequate security locks shall be provided by Contractor.
- f. The electrical contractor shall have the building's permanent power wiring distribution system in sufficient readiness to provide power as required by the HVAC contractor for temporary climatic control.
- g. The electrical contractor shall have the building's permanent lighting system ready at the time the general contractor begins interior painting and shall provide adequate lighting in those areas where interior painting and finishing is being performed.
- h. Each prime Contractor shall be responsible for his permanently fixed service facilities and systems in use during progress of the work. The following procedures shall be strictly adhered to:
  - 1. Prior to acceptance of work by the Owner, each Contractor shall remove and replace any parts of the permanent building systems damaged through its use during construction.
  - 2. Temporary filters shall be installed in each of the heating and air conditioning units during construction. New filters shall be installed in each unit prior to the Owner's acceptance of the Work.
  - 3. Extra effort shall be maintained to keep the building clean and under no circumstances shall air systems be operated if finishing operations are creating dust in excess of what would be considered normal if the building were occupied. The Designer may require that return grilles in the habitable space also be covered with filter media. The intent is to present the duct system in a clean condition at final inspection.
  - 4. It shall be understood that any warranty on equipment presented to the Owner shall extend from the day of final acceptance by the Owner. The cost of warranting the equipment during operation in the finishing stages of construction shall be borne by the Contractor whose system is utilized.

5. The electrical Contractor shall have all lamps in proper working condition at the time of final project acceptance.
- i. The Contractor shall provide, if required and where directed, a shed for toilet facilities and shall furnish and install in this shed all water closets required for a complete and adequate sanitary arrangement. These facilities will be available to other Contractors on the job and shall be kept in a neat and sanitary condition at all times. Chemical toilets are acceptable.
- j. The Contractor shall erect a temporary field office, complete with lights, telephone, heat and air conditioning. A portion of this office shall be partitioned off, of sufficient size, for the use of a resident inspector, should the Designer so direct.
- k. The Contractor will erect one sign on the project if required. The sign shall be of sound construction, and shall be neatly lettered. The sign shall bear the name of the project, and the names of prime Contractors on the project, and the name of the Designer and consultants. Directional signs may be erected on the Owner's property subject to approval of the Owner.

#### **ARTICLE 40 - CLEANING UP**

The Contractor shall keep the building and surrounding area reasonably free from rubbish at all times, and shall remove debris from the site from time to time or when directed to do so by the Designer or general Contractor. Before final inspection and acceptance of the building, each Contractor shall clean his portion of the Work, including glass, hardware, fixtures, masonry, tile and marble (using no acid), clean and wax all floors as specified, and completely prepare the building for use by the Owner, with no cleaning required by the Owner.

#### **ARTICLE 41 - GUARANTEE**

- a. Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The Contractor shall replace such defective equipment or materials, without cost to the Owner, within the manufacturer's warranty period.
- b. The Contractor shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the final acceptance of the Work and shall replace such defective materials or workmanship without cost to the Owner.
- c. Additionally, the Contractor shall guarantee materials and workmanship against latent defects arising from faulty materials, faulty workmanship or negligence which is hidden or not readily apparent to the Owner at the time of final acceptance and which is discovered by the Owner within six (6) years following final acceptance of the work. The guarantee for latent defects related to the structural

System shall be ten (10) years. The Contractor shall replace such defective materials or workmanship without cost to the Owner.

- d. Roof guarantees are stipulated in the roofing specification.

#### **ARTICLE 42 - CODES AND STANDARDS**

Wherever reference is given to codes, standard specifications or other data published by regulating agencies including, but not limited to, national electrical codes, North Carolina state building codes, federal specifications, ASTM specifications, various institute specifications, etc., it shall be understood that such reference is to the latest edition including addenda published prior to the date of the Contract Documents.

#### **ARTICLE 43 - INDEMNIFICATION**

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, the Designer and the agents, consultants and employees of the Owner from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance or failure of performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting there from, and (2) is caused in whole or in part by any negligent act or omission of the Contractor, the Contractor's subcontractor, or the agents of either the Contractor or the Contractor's subcontractor. Such obligation shall not be construed to negate, abridge or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this article.

**“WHEN A PROJECT IS FEDERALLY FUNDED, EITHER IN WHOLE OR IN PART, THE APPLICABLE THIRD PARTY CONTRACT CLAUSES WILL BE MADE A PART OF THE PROJECT SOLICITATION AS WELL AS THE CONTRACT DOCUMENT”**

#### **ARTICLE 44 - EQUAL OPPORTUNITY CLAUSE**

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the secretary of Labor, are incorporated herein.

- a. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or handicap.
- b. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, or handicap. Such action shall include, but not be limited to, (1) employment, (2) upgrading, (3) demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or

other forms of compensation, and (8) selection for training, including apprenticeship.

- c. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor; state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, or handicap.
- d. The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding the notice to be provided by the Designer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.
- e. The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.
- f. The Contractor shall furnish all information and reports required by Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto. The Contractor shall permit access to its books, records, and accounts by the Owner for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- g. The Contractor shall include the terms and conditions of this clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

## **ARTICLE 45 - RESOLUTION OF DISPUTES**

Subject to the provisions of the North Carolina General Statutes regarding a dispute resolution process, the following procedure shall be used to resolve any disputed issues, where the amount in controversy exceeds \$10,000, arising out of a contract or the construction process thereunder.

- 1. At the request of any party with a substantial interest in the dispute, all other parties shall, in good faith, participate in the dispute resolution process set out in paragraph 2 below, and make good faith efforts to resolve the matter in dispute through such process.
- 2. The parties to the dispute shall participate in a mediated dispute settlement conference.
  - 2.1 If the parties to the dispute are able to agree on a mediator or a process for selection of a mediator for the conference, they shall also scheduled a date

for the mediation, which shall be conducted within 45 days of the request for mediation.

- 2.2 If the parties to the dispute are unable to agree on a mediator for the conference the mediator shall be selected according to the following procedure:
  - a. The name of a certified mediator in the North Carolina Judicial District 15-B shall be selected at random from among a list of all mediators certified in District 15-B according to the local rules for Civil Superior Court, Judicial District 15-B.
  - b. In the event the mediator selected is unable to serve, the random selection process shall continue until a mediator is selected who can serve.
  - c. Upon selection of a mediator by this method, the mediator shall schedule a date for mediation which shall be conducted within 45 days of the selection.
3. In the event the dispute resolution process set out in paragraph 2, above, does not lead to a full resolution of the matters in dispute, all parties may use any other legally available procedures to seek resolution of the disputed matters.
4. The cost of the dispute resolution process provided above shall be borne as follows: "The costs shall be divided evenly among the parties involved in the dispute except that the Town, if a party to the dispute, shall be responsible for a minimum of one-third of the cost of the process".

#### **ARTICLE 46 - LEAD BASED PAINT**

The Contractor shall comply with the prohibition against the use of lead-based paint contained in the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846) as implemented by 24 CFR Part 35.

#### **ARTICLE 47 - EXAMINATION AND RETENTION OF CONTRACTOR'S RECORDS**

- a. The Owner shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.

- b. The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding \$10,000.
- c. The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the ***Resolution of Disputes*** clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the Owner or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

#### **ARTICLE 48 - LABOR STANDARDS - DAVIS-BACON AND RELATED ACTS**

**This Article shall apply only to projects which are funded (fully or in part) by Federal Funds. If the total amount of a contract exceeds \$2,000, the Federal labor standards set forth in the clauses below shall apply to the construction Work to be performed under the contract.**

a. **Minimum Wages.**

- 1. All laborers and mechanics employed or working upon the site of the work (or, under the United States Housing Act of 1937 or under the Housing Act of 1949, in the construction or development of the project) will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the regular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid not less than the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at

all times by the Contractor and its subcontractors at the site of the Work in a prominent and accessible place where it can be easily seen by the workers.

2. (i) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination.

(ii) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (b)(2)(ii) or (iii) of this clause shall be paid to all workers performing Work in the classification under this contract from the first day on which Work is performed in the classification.

3. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

- b. **Withholding of funds.** The Owner upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the Work (or, under the United States Housing Act of 1937 or under the Housing Act of 1949, in the construction or development of the project), all or part of the wages required by the contract, the Owner may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. The Owner may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due.

- c. **Payrolls and basic records.**

1. Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or, under the United States Housing Act of 1937 or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2) (B) of the Davis-Bacon Act), daily and weekly number of hours worked,

deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

2. (i) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Owner. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under subparagraph (c) (1) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The prime Contractor is responsible for the submission of copies of payrolls by all subcontractors.
- (ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or sub-Contractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
  - (A) That the payroll for the payroll period contains the information required to be maintained under paragraph (c) (1) of this clause and that such information is correct and complete;
  - (B) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3; and
  - (C) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash



equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

- (iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirements for submission of the “Statement of Compliance” required by subparagraph (c)(2)(ii) of this clause.
- (iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

- 3. The Contractor or subcontractor shall make the records required under subparagraph (d)(1) available for inspection, copying, or transcription by authorized representatives of the Owner and shall permit such representatives of HUD to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Owner may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

d. **Compliance with Davis-Bacon and related Act requirements.**

All rulings and interpretations of the Davis-Bacon and related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

**WORK CHANGE DIRECTIVE NO.: [Number of Work Change Directive]**

Owner: Town of Chapel Hill  
Engineer: Tetra Tech Engineering, P.C.  
Contractor:  
Project: Legion Pond Dam  
Contract Name:  
Date Issued:

Owner's Project No.: P27-04  
Engineer's Project No.: 100-WTR-T43655  
Contractor's Project No.:  
  
Effective Date of Work Change Directive:

Contractor is directed to proceed promptly with the following change(s):

Description:

**[Description of the change to the Work]**

Attachments:

**[List documents related to the change to the Work]**

Purpose for the Work Change Directive:

**[Describe the purpose for the change to the Work]**

Directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to:

**Notes to User—Check one or both of the following:**

☐ Non-agreement on pricing of proposed change. ☐ Necessity to proceed for schedule or other reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price: \$ \_\_\_\_\_ **[increase] [decrease] [not yet estimated].**

Contract Time: \_\_\_\_\_ days **[increase] [decrease] [not yet estimated].**

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price ☐ Cost of the Work ☐ Other

Recommended by Engineer

Authorized by Owner

By:

Title:

Date:

|       |       |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

**CHANGE ORDER NO.: [Number of Change Order]**

Owner: Town of Chapel Hill  
 Engineer: Tetra Tech Engineering, P.C.  
 Contractor:  
 Project: Legion Pond Dam  
 Contract Name:  
 Date Issued:

Owner's Project No.: P27-04  
 Engineer's Project No.: 100-WTR-T43655  
 Contractor's Project No.:

Effective Date of Change Order:

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

Description:

**[Description of the change]**

Attachments:

**[List documents related to the change]**

| Change in Contract Price                                                                                                                | Change in Contract Times                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Original Contract Price:<br>\$ _____                                                                                                    | Original Contract Times:<br>Substantial Completion: _____<br>Ready for final payment: _____                                                                                                   |
| <b>[Increase] [Decrease]</b> from previously approved Change Orders No. 1 to No. <b>[Number of previous Change Order]</b> :<br>\$ _____ | <b>[Increase] [Decrease]</b> from previously approved Change Orders No.1 to No. <b>[Number of previous Change Order]</b> :<br>Substantial Completion: _____<br>Ready for final payment: _____ |
| Contract Price prior to this Change Order:<br>\$ _____                                                                                  | Contract Times prior to this Change Order:<br>Substantial Completion: _____<br>Ready for final payment: _____                                                                                 |
| <b>[Increase] [Decrease]</b> this Change Order:<br>\$ _____                                                                             | <b>[Increase] [Decrease]</b> this Change Order:<br>Substantial Completion: _____<br>Ready for final payment: _____                                                                            |
| Contract Price incorporating this Change Order:<br>\$ _____                                                                             | Contract Times with all approved Change Orders:<br>Substantial Completion: _____<br>Ready for final payment: _____                                                                            |

Recommended by Engineer (if required)

Accepted by Contractor

By: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Date: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Authorized by Owner

Approved by Funding Agency (if applicable)

By: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Date: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Attachment 1 - Final Change Order:**

The Owner and Contractor intend that this Final Change Order incorporate and resolve all prior, pending, and unresolved change order requests, claims, and/or disputes which have been submitted or which could have been submitted prior to the date of execution of this Final Change Order. This Final Change Order represents full and final settlement of all disputes or claims between the Parties to the Contract, and by executing this Final Change Order and in consideration of the modifications agreed to herein, Contractor expressly releases and waives all further claims for equitable adjustment; compensation in the form of money or time (days) for additional work, services, labor, or materials; damages for delay including but not limited to claims for additional overhead, lost productivity, ripple effect, cumulative impact, or acceleration; and any direct, indirect, or impacts costs including but not limited to any costs, losses, damages, charges, fees, expenses, interest, or attorneys' fees arising from or in connection with the Contract or this Final Change Order.

**FIELD ORDER NO.: [Number of Field Order]**

Owner: Town of Chapel Hill  
Engineer: Tetra Tech Engineering, P.C.  
Contractor:  
Project: Legion Pond Dam  
Contract Name:  
Date Issued:

Owner's Project No.: P27-04  
Engineer's Project No.: 100-WTR-T43655  
Contractor's Project No.:

Effective Date of Field Order:

Contractor is hereby directed to promptly perform the Work described in this written order, issued in accordance with Article 21 ('Minor Changes in the Work') of the Town of Chapel Hill General Conditions. This order does not involve any adjustment to the Contract Sum or Contract Time. If Contractor believes that an adjustment in Contract Sum or Contract Time is required, Contractor shall submit a Change Order pursuant to Article 19 ('Changes in the Work') of the Town of Chapel Hill General Conditions before proceeding with the Work.

**Reference:**

Specification Section(s):  
Drawing(s) / Details (s):

**Description:**

**[Description of the change to the Work]**

**Attachments:**

**[List documents supporting change]**

**Issued by Engineer**

By: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

**SUPPLEMENTAL SPECIFICATION  
FOR  
GEOTECHNICAL QUALITY ASSURANCE AND QUALITY CONTROL**

**1.0 Description:**

- A.** This work shall consist of the quality assurance and quality control requirements, testing, construction monitoring, and report submissions.
1. CONTRACTOR shall identify and assign an on-site Geotechnical Engineer to inspect and prepare the listed submittals of quality assurance and quality control. The Geotechnical Engineer shall be a professional engineer, licensed in North Carolina, and shall have a minimum of 3 years of demonstrated experience in geotechnical quality assurance and quality control and related work.
  2. The purpose of quality assurance and quality control testing is to avoid damages and potential claims that alleged damage were caused by construction activities. The required submittal of Details of Prequalification, Routine Documentation, and a final grading report does not alleviate the CONTRACTOR of his responsibility to protect existing structures from damage associated with his construction activities.
- B. Submittals**
1. Details of Prequalification: borrow materials, aggregates, riprap, and geosynthetics. The baseline moisture-density relationships of accepted/approved borrow soils, characteristics of the planned seedbed soils ("topsoil"), foundation preparation, and the bases for subgrade acceptance/approval.
  2. Routine Documentation: in-place moisture-density testing to demonstrate compliant fill construction.
  3. The Town of Chapel Hill Stormwater Management Office must be provided with a final grading report that includes the corresponding compaction test results and certifies the type of fill material and its proper placement with as-built.

## **C. Project Conditions**

Project-Site Information: Laboratory test results, a report of subsurface investigation, and a geotechnical report have been provided. OWNER will not be responsible for interpretations or conclusions drawn from this data. The laboratory test results, subsurface investigation, and geotechnical report is included in Appendix of the Project Manual

### **2.0 Procedure:**

#### **A. Fill Material**

1. Placement of any fill material must be conducted under the observation of a qualified licensed geotechnical engineer and upon completion of the earthwork activities.
2. All fill material to be used for the dam embankment shall be taken from borrow areas approved by the on-site geotechnical engineer. Embankment fill is USCS classification of CL (lean clay), ML (silt), CL-ML (lean silty clay), SM (silty sand), or SC (clayey sand) with a minimum of 40 percent fines (less than #200 sieve). Embankment fill material shall be constructed of clean structural soil, free of roots, stumps, wood, stones greater than 2" and other objectionable material. Embankment fill shall be placed in 6" loose layers (3" loose layers within 3' on either side of the principal pipe to a depth of 2" over the pipe) compacted to at least 98% standard Proctor maximum dry density within -1 to +3 percent of optimum moisture content. All compaction is to be determined by ASTM D698 (Standard Proctor).
3. All fill material to be used for the riser structure shall be taken from borrow areas approved by the on-site geotechnical engineer. Gradation must be in accordance with NCDOT 1016 Class III, Type 3 select material. Riser fill material shall be constructed of clean structural soil, free of roots, stumps, wood, stones greater than 2" and other objectionable material. Riser fill shall be placed in 6" loose layers (3" loose layers within 3' on either side of the principal pipe to a depth of 2" over the pipe), compacted to 98% of Standard Proctor maximum dry density within -1 to +3 percent of optimum moisture content. All compaction is to be determined by ASTM D698 (Standard Proctor).
4. The geotechnical engineer shall observe and certify all aspects of the construction of the embankment (i.e., preparation of foundation,

installation of the cut-off trench, installation of principal spillway pipe, installation of internal drainage, installation of compacted fill, etc.). The frequency of observation and testing must be sufficient for the geotechnical engineer to state, in their opinion, that the specific items observed and tested were installed in accordance with the approved construction drawings and specifications. Lifts of fill should be integrated (e.g., benched or keyed) into adjacent slopes and the underlying lift of fill (e.g., via scarification or roughening of the surface).

### **3.0 Method of Measurement and Payment:**

Payment for the act of quality assurance and quality control testing is not paid for separately but incidental to other items. Payment for all testing activities described in the supplemental specification shall be full compensation for all tools, labor, materials, equipment, and incidentals necessary to complete the work (CONTRACTOR is responsible for determining appropriate order of activities).



**SUPPLEMENTAL SPECIFICATION  
FOR  
CONTROL AND MONITORING OF DEWATERING ACTIVITIES**

**1.0 Description:**

**A.** This work shall consist of the monitoring and protection of existing structures from dewatering-induced damage due to any construction activity including settlement due to the lowering of the groundwater necessary to perform excavations and prepare an adequate and stable subgrade at the bottom of the excavation.

1. CONTRACTOR shall identify and assign a Dewatering Specialist to prepare and execute the Dewatering and Groundwater Monitoring and Control Program. The Dewatering Specialist shall be a professional engineer, licensed in North Carolina, with a background in geotechnical and hydrogeology and shall have a minimum of 3 years of demonstrated experience in groundwater monitoring and related work.
2. The purpose of dewatering and groundwater monitoring and control is to avoid damages and potential claims that alleged damages were caused by construction activities. The required submittal of the Dewatering and Groundwater Monitoring Plan for approval does not alleviate the CONTRACTOR of his responsibility to protect existing structures from damage associated with his construction activities.

**B. Submittals**

1. Dewatering Plan for dewatering system. Show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; and means of discharge and disposal of water.
  - a) Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
  - b) Include a written report outlining control procedures to be adopted if dewatering problems arise.
  - c) Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.
  - d) Submit procedures for detection of movement.
2. Qualification Data: For installer and CONTRACTOR's engineer.
3. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be

misconstrued as damage caused by dewatering operations or construction related vibrations. See Paragraph 3.1, CONDITION ASSESSMENT requirements.

4. Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions performed during dewatering.
5. Note locations and capping depth of wells and well points.
6. Field Test Reports: Before starting excavation, submit test results and computations demonstrating that the dewatering system is capable of meeting performance requirements.
7. All required permits for disposal of water from dewatering operations.

### **C. Project Conditions**

Project-Site Information: Geotechnical borings and laboratory information have been provided. OWNER will not be responsible for interpretations or conclusions drawn from this data.

1. Make additional testing borings and conduct other exploratory operations necessary for dewatering program.
2. The geotechnical report and data is included in Appendix of the Project Manual

## **2.0 Procedure:**

### **A. Dewatering Installation**

1. The Contractor shall submit to the OWNER a Dewatering Plan indicating the proposed locations of dewatering wells, well points, pumping facilities, dewatering conveyance system, routing, discharge pipes, and discharge points. The dewatering plan shall include dewatering methods that will limit the extent of the water table drawdown beyond the construction, including counter- pumping wells, thin wall slurry cutoff, jet grouting, sheet pile walls, and slurry walls, or any combination, or other means of limiting the generation of water and drawdown, subject to the review and approval of the OWNER. The plan shall include provisions for the installation and mounting of sufficient piezometers to show that all trench excavation is predrained prior to excavation.
2. Water-Leveling Monitoring – The Contractor shall control pumping rates to prevent excessive drawdown of the water table during construction dewatering. The Contractor shall monitor the extent of the

water table drawdown caused by dewatering. The Contractor shall ensure dewatering efficiency by controlling groundwater pumping rates based on water level measurements made using continual monitoring instrumentation, including water level transducers and data loggers during predrainage and construction dewatering. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system (loosening of the foundation strata, or instability of slopes, or damage to foundations or structures), perform work necessary for reinstatement of foundation soil and damaged structure resulting from such inadequacy or failure by CONTRACTOR, at no additional cost to OWNER. Immediately repair damages to adjacent facilities caused by dewatering operations.

## **B. Observation Wells**

1. Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated and additional observation wells may be required by authorities having jurisdiction.
2. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
3. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. Suspend construction activities in areas where observation wells are not functioning properly until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.

Decommission or abandon observation wells all in accordance with local and state requirements, but at a minimum remove piezometers, and fill holes when dewatering is completed.

## **C. Post-Construction Structural Survey**

Following completion of the work, the CONTRACTOR shall conduct a post-construction inspection of all structures previously inspected under the preconstruction structural survey. Documentation procedures shall be identical to those performed under the pre-construction inspection. Changes or deviation from the pre-construction inspection conditions in any structure shall be identified and described in the post-construction inspection document. Three copies of the post-construction document shall be submitted to the OWNER for his records.

#### 4.0 Method of Measurement and Payment

Payment for the act of dewatering is not paid for separately but incidental to other items. Payment for all monitoring and control for dewatering activities described in the supplemental specification shall be made at the lump sum price and shall be full compensation for all tools, labor, materials, equipment and incidentals necessary to complete the work. The entire lump sum payment will be made on percentages of the lump sum bid item per the following schedule (CONTRACTOR is responsible for determining appropriate order of activities):

- A. 25% Evaluation (submitting for approval by OWNER):
  - Submission of Dewatering Monitoring and Control Plan
- B. 50% Monitoring and control (arrive at monthly basis for invoice)
  - Monitoring and Control of Dewatering
  - Monitoring and Control of Vibrations
- C. 10% Demobilization of Dewatering and facilities

| Pay Item                             | Pay Unit |
|--------------------------------------|----------|
| Control and monitoring of dewatering | L.S.     |

## **APPENDIX A**

### **TRANSMITTAL – LABORATORY TEST RESULTS – LEGION POND**

June 19, 2025



Project No. R-2025-143-001

Aaron Gross  
Summit Design & Eng. Services  
504 Meadowland Drive  
Hillsborough, NC 27278

[Aaron.gross@summitde.net](mailto:Aaron.gross@summitde.net)

**Transmittal**  
**Laboratory Test Results**  
**Legion Pond**

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,  
**Geotechnics, Inc.**

Michael P. Smith  
Regional Manager

***We understand that you have a choice in your laboratory services  
and we thank you for choosing Geotechnics.***

## MOISTURE CONTENT

ASTM D 2216-19

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001

|                              |             |            |             |             |             |
|------------------------------|-------------|------------|-------------|-------------|-------------|
| Lab ID:                      | 001         | 002        | 003         | 004         | 005         |
| Boring No.:                  | B-25-1      | B-25-1     | B-25-2      | B-25-3      | B-25-3      |
| Depth (ft):                  | 0.0-1.5     | 2.0-4.0    | 0.0-2.0     | 2.0-4.0     | 6.0-8.0     |
| Sample No.:                  | ST-1        | SS-2       | SS-1        | SS-2        | SS-4        |
| Tare Number                  | 4-a         | 453        | 31-A        | 455         | 450         |
| Wt. of Tare & Wet Sample (g) | 311.46      | 568.49     | 192.10      | 453.31      | 379.87      |
| Wt. of Tare & Dry Sample (g) | 275.45      | 532.58     | 182.71      | 407.70      | 354.96      |
| Weight of Tare (g)           | 88.53       | 146.30     | 136.69      | 141.41      | 144.34      |
| Weight of Water (g)          | 36.01       | 35.91      | 9.39        | 45.61       | 24.91       |
| Weight of Dry Sample (g)     | 186.92      | 386.28     | 46.02       | 266.29      | 210.62      |
| <b>Water Content (%)</b>     | <b>19.3</b> | <b>9.3</b> | <b>20.4</b> | <b>17.1</b> | <b>11.8</b> |

|                              |             |             |             |                |             |
|------------------------------|-------------|-------------|-------------|----------------|-------------|
| Lab ID                       | 006         | 007         | 009         | 010            | 012         |
| Boring No.                   | B-25-3      | B-25-3      | B-25-4      | B-25-4         | B-25-4      |
| Depth (ft)                   | 12.0-14.0   | 16.0-18.0   | 2.0-4.0     | 8.0-14.0       | 22.0-24.0   |
| Sample No.                   | SS-7        | SS-9        | SS-2        | SS-5,SS-6,SS-7 | SS-12       |
| Tare Number                  | 468         | 414         | 469         | 27-A           | 746         |
| Wt. of Tare & Wet Sample (g) | 240.09      | 363.80      | 498.83      | 481.24         | 448.05      |
| Wt. of Tare & Dry Sample (g) | 222.79      | 342.92      | 452.42      | 429.20         | 392.53      |
| Weight of Tare (g)           | 137.50      | 144.71      | 146.07      | 135.77         | 140.49      |
| Weight of Water (g)          | 17.30       | 20.88       | 46.41       | 52.04          | 55.52       |
| Weight of Dry Sample (g)     | 85.29       | 198.21      | 306.35      | 293.43         | 252.04      |
| <b>Water Content (%)</b>     | <b>20.3</b> | <b>10.5</b> | <b>15.1</b> | <b>17.7</b>    | <b>22.0</b> |

Notes :

Tested By BS Date 5/21/25 Checked By AES Date 5/22/25

## MOISTURE CONTENT

ASTM D 2216-19

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001

|                              |             |                  |             |
|------------------------------|-------------|------------------|-------------|
| Lab ID:                      | 013         | 014              | 015         |
| Boring No.:                  | B-25-5      | B-25-5           | B-25-5      |
| Depth (ft):                  | 2.0-4.0     | 6.0-12.0         | 12.0-14.0   |
| Sample No.:                  | SS-2        | SS-4, SS-5, SS-6 | SS-7        |
| Tare Number                  | 37-A        | 418              | TB-09       |
| Wt. of Tare & Wet Sample (g) | 339.87      | 429.39           | 355.79      |
| Wt. of Tare & Dry Sample (g) | 310.12      | 380.00           | 325.02      |
| Weight of Tare (g)           | 136.09      | 138.23           | 133.81      |
| Weight of Water (g)          | 29.75       | 49.39            | 30.77       |
| Weight of Dry Sample (g)     | 174.03      | 241.77           | 191.21      |
| <b>Water Content (%)</b>     | <b>17.1</b> | <b>20.4</b>      | <b>16.1</b> |

Notes :

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | BS | Date | 5/21/25 | Checked By | AES | Date | 5/22/25 |
|-----------|----|------|---------|------------|-----|------|---------|

page 1 of 1 DCN: CT-S1 DATE: 3/18/13 REVISION: 4



**pH OF SOILS**  
AASHTO T 289-91 (2013)

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001

|                      |             |                |                |
|----------------------|-------------|----------------|----------------|
| Lab ID:              | 008         | 010            | 014            |
| Boring No.:          | B-25-4      | B-25-4         | B-25-5         |
| Depth (ft):          | 1.0-6.0     | 8.0-14.0       | 6.0-12.0       |
| Sample No.:          | S-1         | SS-5,SS-6,SS-7 | SS-4,SS-5,SS-6 |
| Drying Tare No.:     | X-1         | X-2            | X-3            |
| Testing Tare No.:    | 819         | 814            | 818            |
| Temperature (°C):    | 23.6        | 23.3           | 23.1           |
| <b>pH of Sample:</b> | <b>5.05</b> | <b>5.39</b>    | <b>5.39</b>    |

| Meter Calibration<br>(as used each day) |                       |                 |
|-----------------------------------------|-----------------------|-----------------|
| Buffer<br>pH                            | Meter<br>Reading      | Meter<br>Model  |
| 4.00<br>7.00<br>10.01                   | 4.01<br>7.00<br>10.01 | ORION Dual Star |

Tested By BS Date 6/10/25 Checked By AES Date 6/12/25

page 1 of 1 DCN: CT-S36B DATE 6/5/14 REVISION: 1

## PERCENT PASSING # 200 SIEVE

ASTM D 1140-17

Client Summit Design & Eng. Services  
 Client Reference Legion Pond  
 Project No. R-2025-143-001

|                             |             |             |             |                |             |                  |
|-----------------------------|-------------|-------------|-------------|----------------|-------------|------------------|
| Lab Id.                     | 002         | 003         | 007         | 010            | 012         | 014              |
| Boring No.                  | B-25-1      | B-25-2      | B-25-3      | B-25-4         | B-25-4      | B-25-5           |
| Depth (ft)                  | 2.0-4.0     | 0.0-2.0     | 16.0-18.0   | 8.0-14.0       | 22.0-24.0   | 6.0-12.0         |
| Sample No.                  | SS-2        | SS-1        | SS-9        | SS-5,SS-6,SS-7 | SS-12       | SS-4, SS-5, SS-6 |
| Tare Number                 | 453         | 31-A        | 414         | 27-A           | 746         | 418              |
| Wt. of Tare & WS (gm)       | 568.49      | 440.66      | 363.8       | 481.24         | 448.05      | 429.39           |
| Wt. of Tare & DS (gm)       | 532.58      | 389.16      | 342.92      | 429.2          | 392.53      | 380              |
| Wt. of Tare (gm)            | 146.3       | 136.69      | 144.71      | 135.77         | 140.49      | 138.23           |
| Wt. of Water (gm)           | 35.91       | 51.5        | 20.88       | 52.04          | 55.52       | 49.39            |
| Wt. of DS (gm)              | 386.28      | 252.47      | 198.21      | 293.43         | 252.04      | 241.77           |
| <b>Water Content (%)</b>    | <b>9.3</b>  | <b>20.4</b> | <b>10.5</b> | <b>17.7</b>    | <b>22.0</b> | <b>20.4</b>      |
| Wt. of Washed Soil & Tare   | 188.57      | 245.47      | 151.33      | 225.7          | 171.38      | 197.39           |
| <b>Percent Passing #200</b> | <b>89.1</b> | <b>56.9</b> | <b>96.7</b> | <b>69.4</b>    | <b>87.7</b> | <b>75.5</b>      |

Tested By BS Date 6/5/25 Checked By AES Date 6/6/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001

Boring No.: B-25-1  
 Depth (ft): 0.0-1.5  
 Sample No.: ST-1  
 Soil Color: Brown



**USCS Symbol:**  
**SM, TESTED**

**D50 = 0.11**

**USCS Classification:**  
**SILTY SAND**

Tested By CB

Date 6/12/25

Checked By

AES

Date

6/12/25

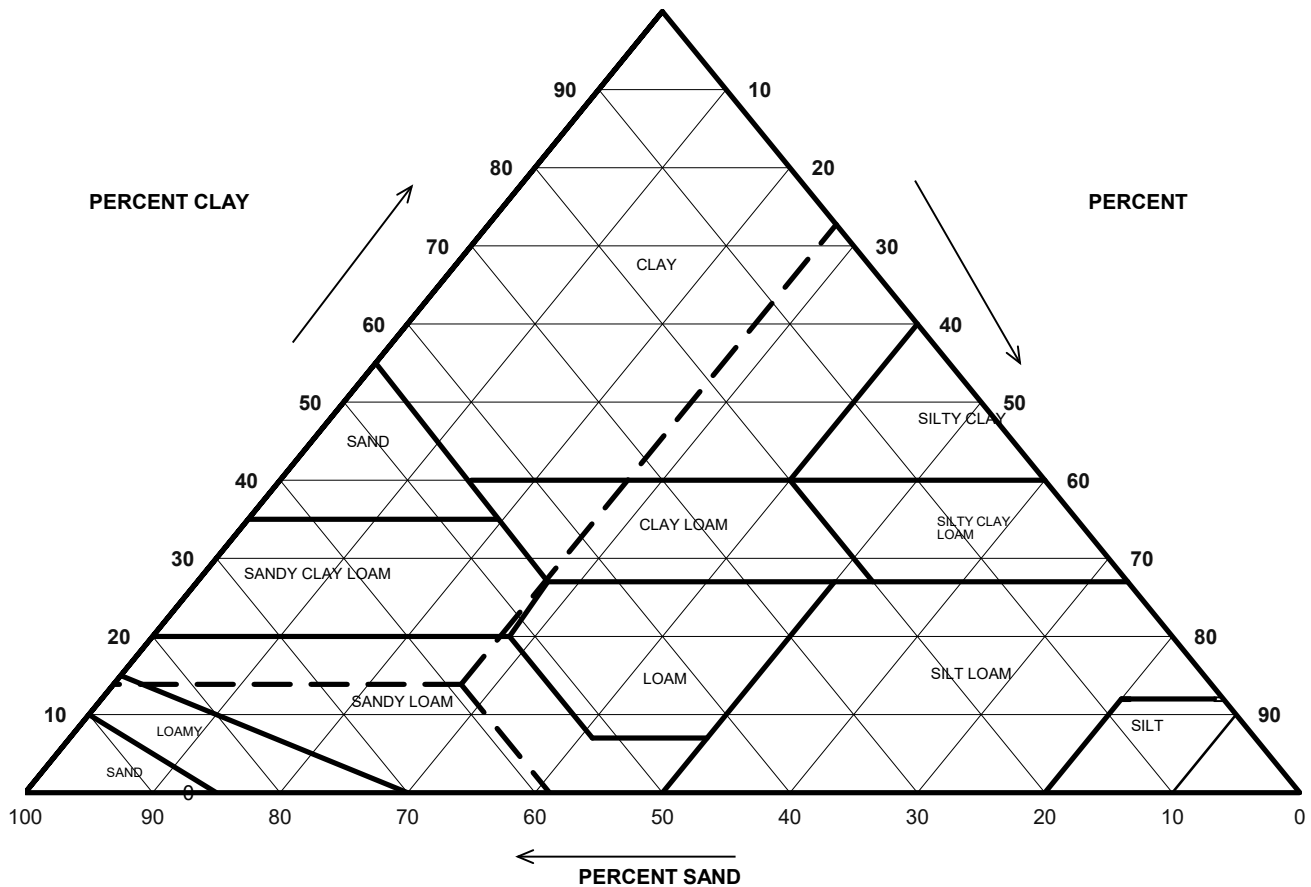
page 1 of 4

DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-001

Boring No.: B-25-1  
Depth (ft): 0.0-1.5  
Sample No.: ST-1  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.62              |                                                              |
| 2                  | 99.38         | Sand   | 58.50             | 58.86                                                        |
| 0.05               | 40.88         | Silt   | 27.10             | 27.27                                                        |
| 0.002              | 13.78         | Clay   | 13.78             | 13.87                                                        |

USDA Classification: **SANDY LOAM**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001

Boring No.: B-25-1  
 Depth (ft): 0.0-1.5  
 Sample No.: ST-1  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 4-a         | Tare No.:                          | NA         | Tare No.:                                  | 4-a        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 311.46      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 311.46     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 275.45      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 275.45     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 88.53       | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 88.53      | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 36.01       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 36.01      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 186.92      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 186.92     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>19.3</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 186.92     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 186.92     |
| Tare No. (Sub-Specimen)                   | 4-a         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 4-a        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 311.46      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 311.46     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 88.53       | Dry Weight of - 3/4" Sample (g):   | 186.92     | Weight of Tare (g):                        | 88.53      | Dry Weight of - 3/4" Sample (g):   | 186.92     |
| Sub-Specimen Wet Weight (g):              | 222.93      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 222.93     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 186.92     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 186.92     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.36                        | 0.19                 | 0.19                             | 99.81             | 99.8                          |
| #10        | 2                  | 0.80                        | 0.43                 | 0.62                             | 99.38             | 99.4                          |
| #20        | 0.85               | 8.01                        | ( ** )               | 4.91                             | 95.09             | 95.1                          |
| #40        | 0.425              | 21.76                       | 11.64                | 16.55                            | 83.45             | 83.5                          |
| #60        | 0.25               | 23.80                       | 12.73                | 29.28                            | 70.72             | 70.7                          |
| #100       | 0.15               | 25.60                       | 13.70                | 42.98                            | 57.02             | 57.0                          |
| #140       | 0.106              | 15.21                       | 8.14                 | 51.11                            | 48.89             | 48.9                          |
| #200       | 0.075              | 12.69                       | 6.79                 | 57.90                            | 42.10             | 42.1                          |
| Pan        | -                  | 78.69                       | 42.10                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/12/25 Checked By AES Date 6/12/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 30.8       | 23.3       | 2.45        | 11.1                     | 0.0435 | 96.1                       | 40.5                        |
| 2                  | 28.3       | 23.3       | 2.45        | 11.5                     | 0.0314 | 87.6                       | 36.9                        |
| 4                  | 25.8       | 23.3       | 2.45        | 12.0                     | 0.0226 | 79.1                       | 33.3                        |
| 8                  | 22.8       | 23.3       | 2.45        | 12.5                     | 0.0163 | 68.9                       | 29.0                        |
| 15                 | 20.5       | 23.3       | 2.45        | 12.9                     | 0.0121 | 61.3                       | 25.8                        |
| 30                 | 18.8       | 23.3       | 2.45        | 13.2                     | 0.0087 | 55.4                       | 23.3                        |
| 60                 | 16.3       | 23.4       | 2.41        | 13.7                     | 0.0062 | 47.0                       | 19.8                        |
| 240                | 12.8       | 23.4       | 2.41        | 14.3                     | 0.0032 | 35.1                       | 14.8                        |
| 1440               | 9.8        | 27.3       | 0.79        | 14.8                     | 0.0013 | 30.4                       | 12.8                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 211    | Percent Finer than # 200: | 42.10        |
| Wt. of Tare & Dry Material (g): | 204.58 |                           |              |
| Weight of Tare (g):             | 170.46 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 29.12  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |        |            |     |      |         |
|-----------|----|------|--------|------------|-----|------|---------|
| Tested By | CB | Date | 6/6/25 | Checked By | AES | Date | 6/12/25 |
|-----------|----|------|--------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001

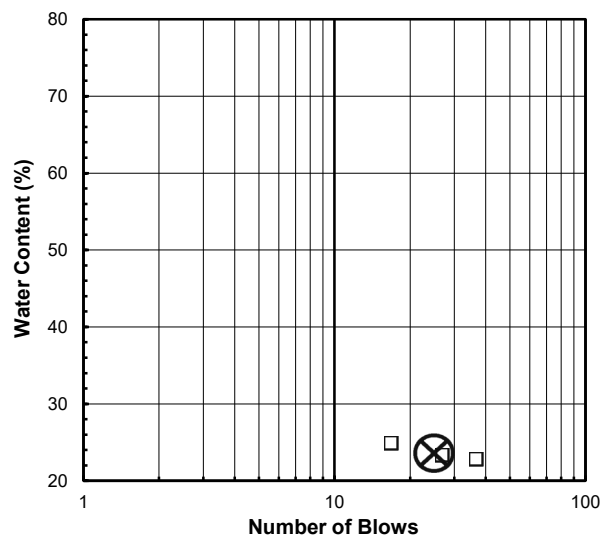
Boring No.: B-25-1  
 Depth (ft): 0.0-1.5  
 Sample No.: ST-1  
 Soil Description: BROWN SILT

**Note: The USCS symbol used with this test refers only to the minus No. 40** (Minus #40 sieve material, Air dried)  
**sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.**

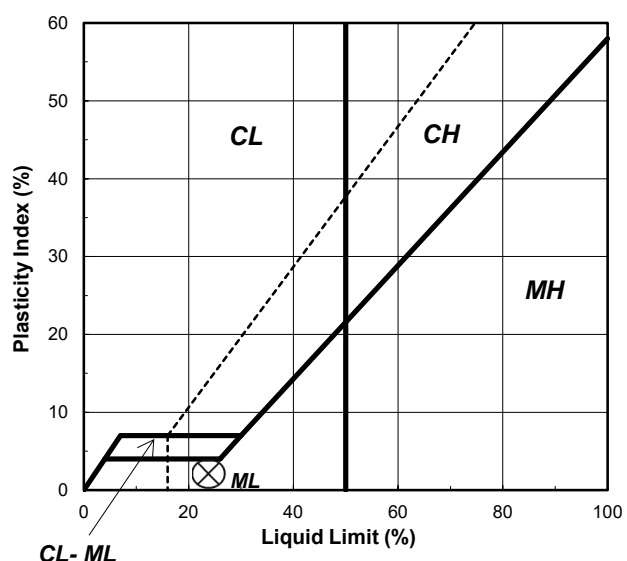
| As Received Moisture Content  |             | Liquid Limit Test |             |             |          |
|-------------------------------|-------------|-------------------|-------------|-------------|----------|
| ASTM D2216-19                 |             | <b>1</b>          | <b>2</b>    | <b>3</b>    | <b>M</b> |
| Tare Number:                  | 4-a         | A-B               | I           | V-2         | U        |
| Wt. of Tare & Wet Sample (g): | 311.46      | 32.72             | 30.83       | 32.36       | L        |
| Wt. of Tare & Dry Sample (g): | 275.45      | 29.53             | 27.87       | 29.02       | T        |
| Weight of Tare (g):           | 88.53       | 15.46             | 15.12       | 15.53       | I        |
| Weight of Water (g):          | 36.0        | 3.2               | 3.0         | 3.3         | P        |
| Weight of Dry Sample (g):     | 186.9       | 14.1              | 12.8        | 13.5        | O        |
| Was As Received MC Preserved: | Yes         |                   |             |             | I        |
| <b>Moisture Content (%):</b>  | <b>19.3</b> | <b>22.7</b>       | <b>23.2</b> | <b>24.8</b> | <b>N</b> |
| <b>Number of Blows:</b>       |             | <b>37</b>         | <b>27</b>   | <b>17</b>   | <b>T</b> |

| Plastic Limit Test                                                                      | 1           | 2           | Range      | Test Results                   |
|-----------------------------------------------------------------------------------------|-------------|-------------|------------|--------------------------------|
| Tare Number:                                                                            | 13          | 15          |            |                                |
| Wt. of Tare & Wet Sample (g):                                                           | 13.47       | 14.42       |            | <b>Liquid Limit (%): 24</b>    |
| Wt. of Tare & Dry Sample (g):                                                           | 12.32       | 13.10       |            | <b>Plastic Limit (%): 22</b>   |
| Weight of Tare (g):                                                                     | 7.02        | 6.98        |            | <b>Plasticity Index (%): 2</b> |
| Weight of Water (g):                                                                    | 1.2         | 1.3         |            | <b>USCS Symbol: ML</b>         |
| Weight of Dry Sample (g):                                                               | 5.3         | 6.1         |            |                                |
| <b>Moisture Content (%):</b>                                                            | <b>21.7</b> | <b>21.6</b> | <b>0.1</b> |                                |
| <i>Note: The acceptable range of the two Moisture Contents is <math>\pm</math> 0.84</i> |             |             |            |                                |

Flow Curve



Plasticity Chart

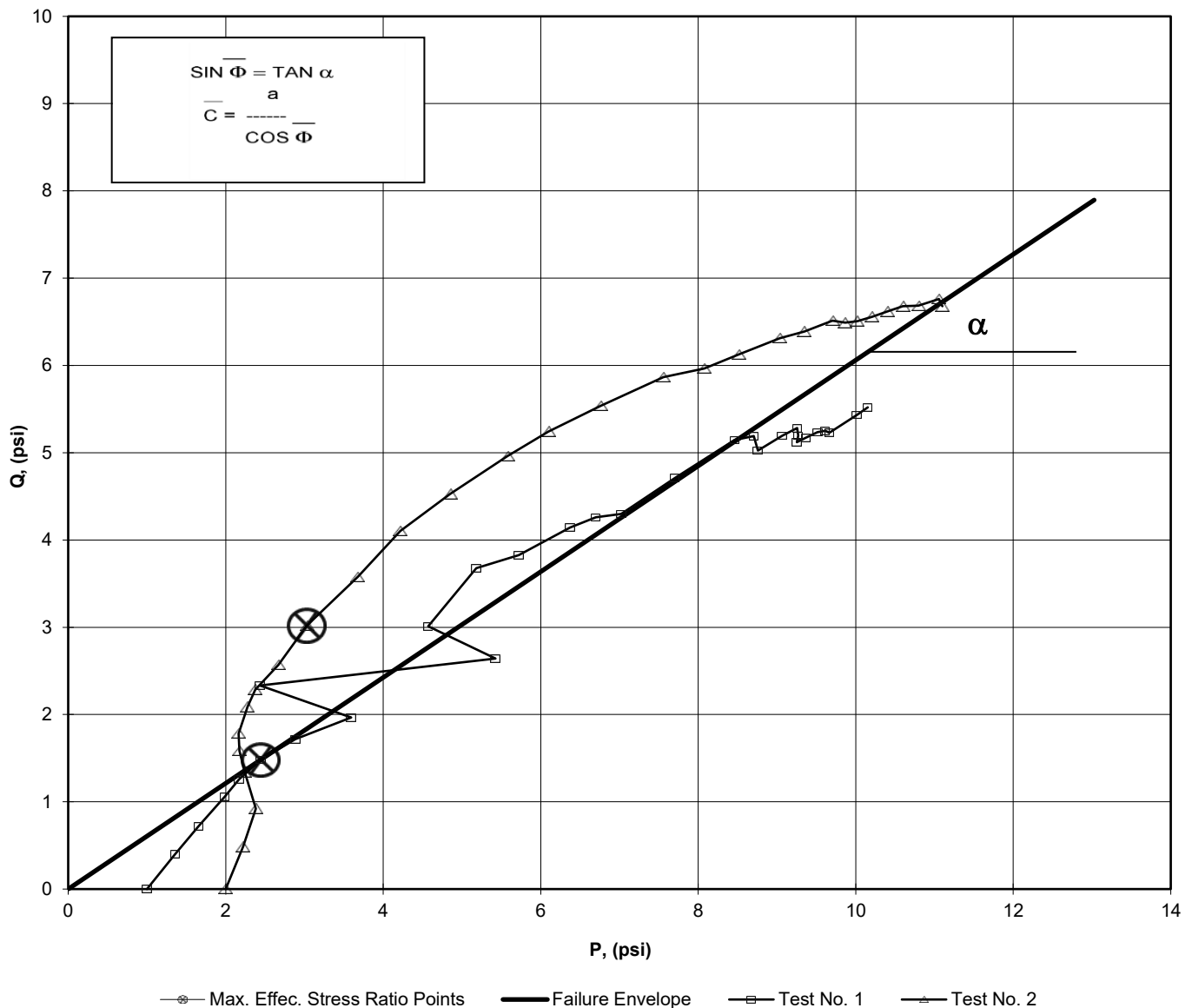


Tested By JCB IV Date 6/12/25 Checked By AES Date 6/13/25

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS  
ASTM D4767-11**

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            |             |         |

**Consolidated Undrained Triaxial Test with Pore Pressure**



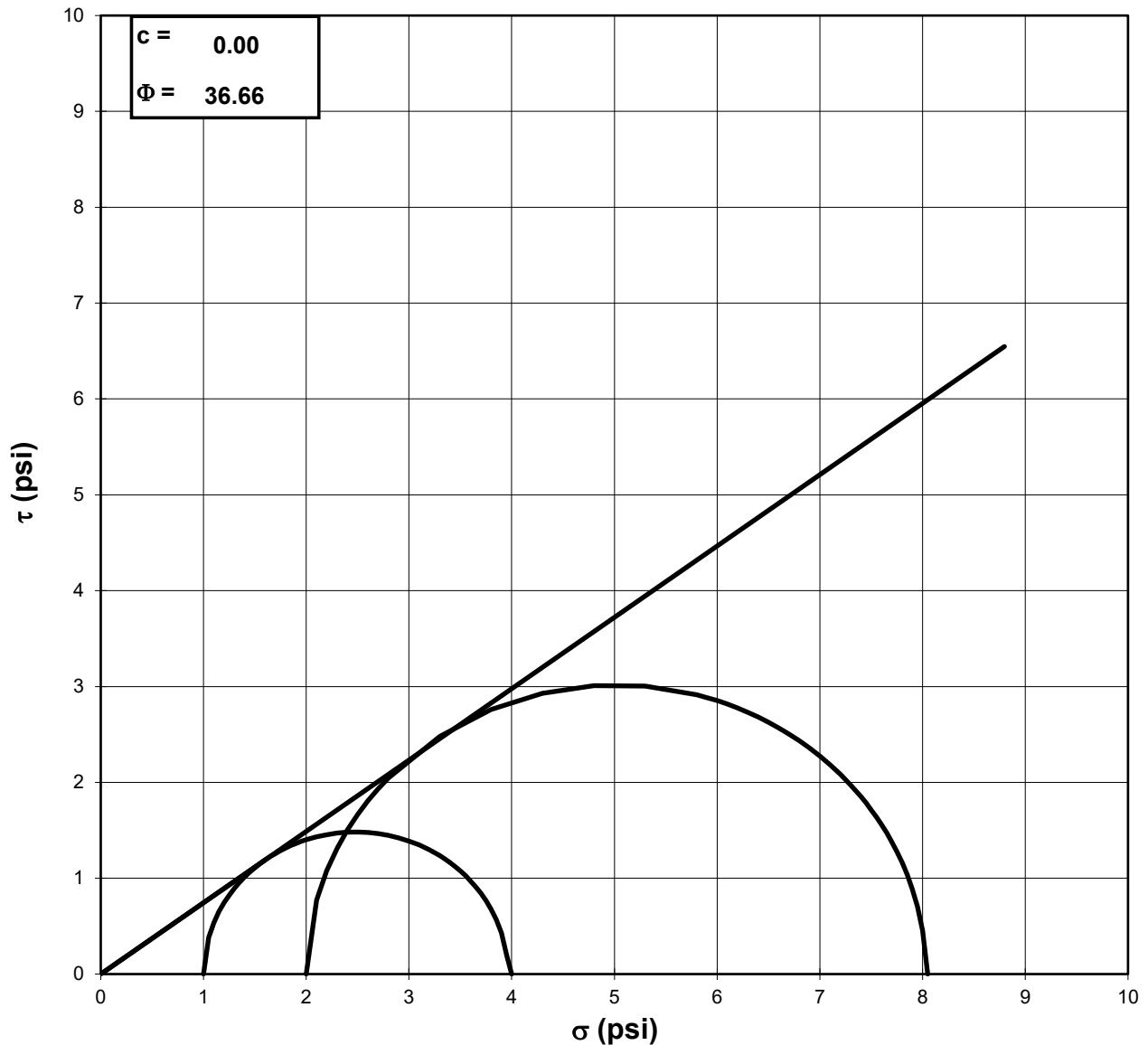
|          |          |             |          |          |              |
|----------|----------|-------------|----------|----------|--------------|
| <b>a</b> | <b>=</b> | <b>0.00</b> | <b>C</b> | <b>=</b> | <b>0.00</b>  |
| <b>α</b> | <b>=</b> | <b>31.2</b> | <b>Φ</b> | <b>=</b> | <b>37.31</b> |

|            |    |       |        |              |     |       |        |
|------------|----|-------|--------|--------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Approved By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|--------------|-----|-------|--------|



**MOHR TOTAL STRENGTH ENVELOPE**  
ASTM D4767-11

|                     |                                              |             |         |
|---------------------|----------------------------------------------|-------------|---------|
| Client:             | Summit Design & Eng. Services                | Boring No.: | B-25-1  |
| Client Reference:   | Legion Pond                                  | Depth (ft): | 0.0-1.5 |
| Project No.:        | R-2025-143-001                               | Sample No.: | ST-1    |
| Lab ID:             | R-2025-143-001-001                           |             |         |
| Visual Description: | Brown Sand with Clay and Roots (UNDISTURBED) |             |         |



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

|            |    |       |        |              |     |       |        |
|------------|----|-------|--------|--------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Approved By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|--------------|-----|-------|--------|

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11



|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            |             |         |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|           |   |
|-----------|---|
| Stage No. | 1 |
| Test No.  | 1 |

**INITIAL SAMPLE DIMENSIONS (in)**

|              |       |             |       |
|--------------|-------|-------------|-------|
| Length 1:    | 6.106 | Diameter 1: | 2.848 |
| Length 2:    | 6.065 | Diameter 2: | 2.865 |
| Length 3:    | 6.108 | Diameter 3: | 2.846 |
| Avg. Length: | 6.093 | Avg. Diam.: | 2.853 |

**PRESSURES (psi)**

|                           |      |
|---------------------------|------|
| Cell Pressure (psi)       | 61.0 |
| Back Pressure (psi)       | 60.0 |
| Eff. Conf. Pressure (psi) | 1.0  |
| Pore Pressure             |      |
| Response (%)              | 96   |

**VOLUME CHANGE**

|                              |      |
|------------------------------|------|
| Initial Burette Reading (ml) | 24.0 |
| Final Burette Reading (ml)   | 24.0 |
| Final Change (ml)            | 0.0  |

**MAXIMUM OBLIQUITY POINTS**

|   |   |      |
|---|---|------|
| P | = | 2.44 |
| Q | = | 1.48 |

|                                        |     |
|----------------------------------------|-----|
| Initial Dial Reading (mil)             | 243 |
| Dial Reading After Saturation (mil)    | 234 |
| Dial Reading After Consolidation (mil) | 234 |

| LOAD<br>(LB) | DEFORMATION<br>(IN) | PORE PRESSURE<br>(PSI) |
|--------------|---------------------|------------------------|
| 16.7         | 0.000               | 60.0                   |
| 21.9         | 0.001               | 60.0                   |
| 26.0         | 0.003               | 60.1                   |
| 30.3         | 0.009               | 60.1                   |
| 32.9         | 0.015               | 60.1                   |
| 35.8         | 0.021               | 60.0                   |
| 38.9         | 0.029               | 59.8                   |
| 42.1         | 0.039               | 59.4                   |
| 46.9         | 0.050               | 60.9                   |
| 51.0         | 0.072               | 58.2                   |
| 56.0         | 0.101               | 59.4                   |
| 65.0         | 0.136               | 59.5                   |
| 67.3         | 0.173               | 59.1                   |
| 71.8         | 0.214               | 58.8                   |
| 73.6         | 0.244               | 58.6                   |
| 74.6         | 0.286               | 58.3                   |
| 80.8         | 0.344               | 58.0                   |
| 87.4         | 0.404               | 57.7                   |
| 88.6         | 0.450               | 57.5                   |
| 87.1         | 0.509               | 57.3                   |
| 90.0         | 0.554               | 57.1                   |
| 91.9         | 0.599               | 57.0                   |
| 91.3         | 0.644               | 56.9                   |
| 90.6         | 0.674               | 56.9                   |
| 91.7         | 0.704               | 56.8                   |
| 93.0         | 0.734               | 56.7                   |
| 93.7         | 0.764               | 56.6                   |
| 94.0         | 0.809               | 56.6                   |
| 97.8         | 0.854               | 56.4                   |
| 99.5         | 0.884               | 56.4                   |
| 102.8        | 0.914               | 56.3                   |

|               |              |                       |              |
|---------------|--------------|-----------------------|--------------|
| Tested By: DL | Date: 6/2/25 | Input Checked By: MPS | Date: 6/6/25 |
|---------------|--------------|-----------------------|--------------|

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11



|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            |             |         |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|                                    |     |           |   |
|------------------------------------|-----|-----------|---|
| Effective Confining Pressure (psi) | 1.0 | Stage No. | 1 |
|                                    |     | Test No   | 1 |

**INITIAL DIMENSIONS**

|                                          |       |
|------------------------------------------|-------|
| Initial Sample Length (in)               | 6.09  |
| Initial Sample Diameter (in)             | 2.85  |
| Initial Sample Area (in <sup>2</sup> )   | 6.39  |
| Initial Sample Volume (in <sup>3</sup> ) | 38.95 |

**VOLUME CHANGE**

|                                               |       |
|-----------------------------------------------|-------|
| Volume After Consolidation (in <sup>3</sup> ) | 39.12 |
| Length After Consolidation (in)               | 6.10  |
| Area After Consolidation (in <sup>2</sup> )   | 6.412 |

| Strain (%) | Deviator Stress PSI | Δ U   | σ <sub>1</sub> | σ <sub>3</sub> | Effective Principal Stress Ratio | A     | P     | Q    |
|------------|---------------------|-------|----------------|----------------|----------------------------------|-------|-------|------|
| 0.02       | 0.80                | 0.04  | 1.76           | 1.0            | 1.837                            | 0.06  | 1.36  | 0.40 |
| 0.05       | 1.44                | 0.06  | 2.37           | 0.9            | 2.537                            | 0.05  | 1.65  | 0.72 |
| 0.15       | 2.12                | 0.07  | 3.05           | 0.9            | 3.280                            | 0.04  | 1.99  | 1.06 |
| 0.24       | 2.52                | 0.09  | 3.43           | 0.9            | 3.765                            | 0.04  | 2.17  | 1.26 |
| 0.34       | 2.96                | 0.04  | 3.93           | 1.0            | 4.077                            | 0.01  | 2.44  | 1.48 |
| 0.48       | 3.43                | -0.17 | 4.60           | 1.2            | 3.943                            | -0.05 | 2.88  | 1.72 |
| 0.63       | 3.93                | -0.63 | 5.56           | 1.6            | 3.420                            | -0.17 | 3.59  | 1.97 |
| 0.82       | 4.67                | 0.90  | 4.77           | 0.1            | 47.681                           | 0.20  | 2.43  | 2.33 |
| 1.17       | 5.28                | -1.78 | 8.07           | 2.8            | 2.899                            | -0.35 | 5.42  | 2.64 |
| 1.65       | 6.02                | -0.56 | 7.58           | 1.6            | 4.861                            | -0.10 | 4.57  | 3.01 |
| 2.23       | 7.35                | -0.50 | 8.86           | 1.5            | 5.890                            | -0.07 | 5.18  | 3.68 |
| 2.84       | 7.65                | -0.90 | 9.55           | 1.9            | 5.037                            | -0.12 | 5.72  | 3.83 |
| 3.51       | 8.28                | -1.23 | 10.51          | 2.2            | 4.712                            | -0.15 | 6.37  | 4.14 |
| 4.00       | 8.52                | -1.44 | 10.96          | 2.4            | 4.492                            | -0.18 | 6.70  | 4.26 |
| 4.69       | 8.60                | -1.72 | 11.32          | 2.7            | 4.157                            | -0.21 | 7.02  | 4.30 |
| 5.63       | 9.42                | -1.99 | 12.41          | 3.0            | 4.149                            | -0.22 | 7.70  | 4.71 |
| 6.62       | 10.30               | -2.31 | 13.61          | 3.3            | 4.106                            | -0.23 | 8.46  | 5.15 |
| 7.37       | 10.38               | -2.51 | 13.89          | 3.5            | 3.953                            | -0.25 | 8.70  | 5.19 |
| 8.34       | 10.05               | -2.73 | 13.78          | 3.7            | 3.695                            | -0.28 | 8.76  | 5.03 |
| 9.08       | 10.39               | -2.87 | 14.26          | 3.9            | 3.681                            | -0.29 | 9.07  | 5.19 |
| 9.81       | 10.57               | -2.97 | 14.54          | 4.0            | 3.659                            | -0.29 | 9.26  | 5.28 |
| 10.56      | 10.39               | -3.07 | 14.47          | 4.1            | 3.553                            | -0.31 | 9.27  | 5.20 |
| 11.04      | 10.24               | -3.13 | 14.37          | 4.1            | 3.478                            | -0.32 | 9.25  | 5.12 |
| 11.54      | 10.34               | -3.20 | 14.54          | 4.2            | 3.465                            | -0.32 | 9.37  | 5.17 |
| 12.02      | 10.47               | -3.28 | 14.75          | 4.3            | 3.446                            | -0.33 | 9.51  | 5.23 |
| 12.52      | 10.50               | -3.36 | 14.86          | 4.4            | 3.408                            | -0.33 | 9.61  | 5.25 |
| 13.26      | 10.45               | -3.44 | 14.89          | 4.4            | 3.355                            | -0.34 | 9.67  | 5.23 |
| 14.00      | 10.87               | -3.58 | 15.45          | 4.6            | 3.372                            | -0.34 | 10.02 | 5.43 |
| 14.49      | 11.04               | -3.63 | 15.67          | 4.6            | 3.383                            | -0.34 | 10.15 | 5.52 |
| 14.98      | 11.41               | -3.70 | 16.12          | 4.7            | 3.427                            | -0.34 | 10.41 | 5.71 |

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**

ASTM D4767-11

|                   |                               |             |          |
|-------------------|-------------------------------|-------------|----------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1   |
| Client Reference: | Legion Pond                   | Depth (ft): | 9.9-10.4 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1     |
| Lab ID:           | R-2025-143-001-001            |             |          |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|           |   |
|-----------|---|
| Stage No. | 1 |
| Test No.  | 2 |

**INITIAL SAMPLE DIMENSIONS (in)**

|              |       |             |       |
|--------------|-------|-------------|-------|
| Length 1:    | 6.134 | Diameter 1: | 2.864 |
| Length 2:    | 5.875 | Diameter 2: | 2.863 |
| Length 3:    | 6.060 | Diameter 3: | 2.853 |
| Avg. Length: | 6.023 | Avg. Diam.: | 2.860 |

**PRESSURES (psi)**

|                           |      |
|---------------------------|------|
| Cell Pressure (psi)       | 62.0 |
| Back Pressure (psi)       | 60.0 |
| Eff. Conf. Pressure (psi) | 2.0  |
| Pore Pressure             |      |
| Response (%)              | 95   |

**VOLUME CHANGE**

|                              |      |
|------------------------------|------|
| Initial Burette Reading (ml) | 24.0 |
| Final Burette Reading (ml)   | 23.6 |
| Final Change (ml)            | 0.4  |

**MAXIMUM OBLIQUITY POINTS**

|           |   |      |
|-----------|---|------|
| $\bar{P}$ | = | 3.03 |
| Q         | = | 3.02 |

|                                        |     |
|----------------------------------------|-----|
| Initial Dial Reading (mil)             | 170 |
| Dial Reading After Saturation (mil)    | 169 |
| Dial Reading After Consolidation (mil) | 171 |

| LOAD<br>(LB) | DEFORMATION<br>(IN) | PORE PRESSURE<br>(PSI) |
|--------------|---------------------|------------------------|
| 15.9         | 0.000               | 60.0                   |
| 22.1         | 0.001               | 60.3                   |
| 27.7         | 0.002               | 60.5                   |
| 33.2         | 0.008               | 61.1                   |
| 36.3         | 0.014               | 61.4                   |
| 38.9         | 0.020               | 61.6                   |
| 42.8         | 0.030               | 61.8                   |
| 45.4         | 0.038               | 61.9                   |
| 49.2         | 0.050               | 61.9                   |
| 55.1         | 0.071               | 62.0                   |
| 62.7         | 0.101               | 61.9                   |
| 69.9         | 0.137               | 61.9                   |
| 75.8         | 0.173               | 61.7                   |
| 82.0         | 0.216               | 61.4                   |
| 86.1         | 0.246               | 61.1                   |
| 90.6         | 0.288               | 60.8                   |
| 95.8         | 0.344               | 60.3                   |
| 98.1         | 0.405               | 59.9                   |
| 101.0        | 0.450               | 59.6                   |
| 104.5        | 0.510               | 59.3                   |
| 106.3        | 0.555               | 59.0                   |
| 108.9        | 0.601               | 58.8                   |
| 109.3        | 0.646               | 58.6                   |
| 110.0        | 0.675               | 58.5                   |
| 111.3        | 0.706               | 58.3                   |
| 112.8        | 0.736               | 58.2                   |
| 114.2        | 0.767               | 58.1                   |
| 115.2        | 0.812               | 57.9                   |
| 117.2        | 0.857               | 57.7                   |
| 116.5        | 0.887               | 57.6                   |
| 118.6        | 0.917               | 57.5                   |

|            |    |       |        |                   |     |       |        |
|------------|----|-------|--------|-------------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Input Checked By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|-------------------|-----|-------|--------|

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11

|                   |                               |             |          |
|-------------------|-------------------------------|-------------|----------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1   |
| Client Reference: | Legion Pond                   | Depth (ft): | 9.9-10.4 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1     |
| Lab ID:           | R-2025-143-001-001            |             |          |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|                                    |     |           |   |
|------------------------------------|-----|-----------|---|
| Effective Confining Pressure (psi) | 2.0 | Stage No. | 1 |
|                                    |     | Test No   | 2 |

**INITIAL DIMENSIONS**

|                                          |       |
|------------------------------------------|-------|
| Initial Sample Length (in)               | 6.02  |
| Initial Sample Diameter (in)             | 2.86  |
| Initial Sample Area (in <sup>2</sup> )   | 6.42  |
| Initial Sample Volume (in <sup>3</sup> ) | 38.69 |

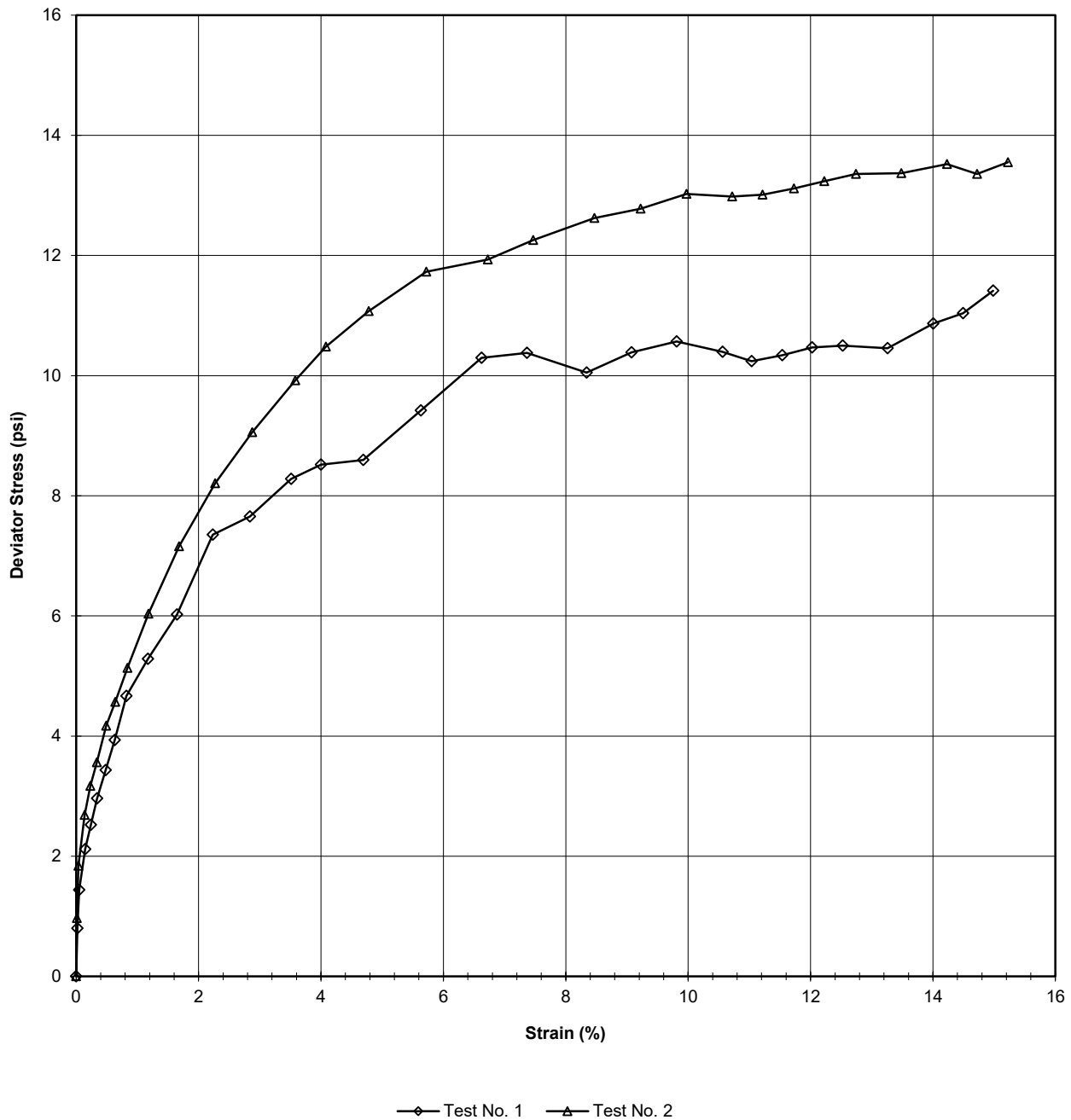
**VOLUME CHANGE**

|                                               |       |
|-----------------------------------------------|-------|
| Volume After Consolidation (in <sup>3</sup> ) | 38.69 |
| Length After Consolidation (in)               | 6.02  |
| Area After Consolidation (in <sup>2</sup> )   | 6.424 |

| Strain<br>(%) | Deviator<br>Stress<br>PSI | $\Delta U$ | $\bar{\sigma}_1$ | $\bar{\sigma}_3$ | Effective Principal<br>Stress Ratio | $\bar{A}$ | $\bar{P}$ | Q    |
|---------------|---------------------------|------------|------------------|------------------|-------------------------------------|-----------|-----------|------|
| 0.01          | 0.97                      | 0.27       | 2.70             | 1.7              | 1.559                               | 0.29      | 2.22      | 0.48 |
| 0.04          | 1.84                      | 0.54       | 3.30             | 1.5              | 2.260                               | 0.31      | 2.38      | 0.92 |
| 0.14          | 2.69                      | 1.10       | 3.58             | 0.9              | 3.990                               | 0.43      | 2.24      | 1.34 |
| 0.23          | 3.17                      | 1.41       | 3.76             | 0.6              | 6.381                               | 0.47      | 2.17      | 1.58 |
| 0.34          | 3.56                      | 1.62       | 3.94             | 0.4              | 10.303                              | 0.48      | 2.16      | 1.78 |
| 0.49          | 4.17                      | 1.81       | 4.36             | 0.2              | 22.733                              | 0.46      | 2.28      | 2.09 |
| 0.64          | 4.57                      | 1.91       | 4.66             | 0.1              | 50.637                              | 0.44      | 2.38      | 2.28 |
| 0.84          | 5.13                      | 1.90       | 5.23             | 0.1              | 52.340                              | 0.39      | 2.67      | 2.57 |
| 1.18          | 6.03                      | 1.99       | 6.04             | 0.0              | 604.422                             | 0.35      | 3.03      | 3.02 |
| 1.68          | 7.16                      | 1.90       | 7.26             | 0.1              | 72.578                              | 0.28      | 3.68      | 3.58 |
| 2.27          | 8.21                      | 1.89       | 8.32             | 0.1              | 73.654                              | 0.24      | 4.22      | 4.10 |
| 2.88          | 9.06                      | 1.68       | 9.38             | 0.3              | 29.257                              | 0.20      | 4.85      | 4.53 |
| 3.58          | 9.92                      | 1.38       | 10.54            | 0.6              | 17.034                              | 0.15      | 5.58      | 4.96 |
| 4.08          | 10.48                     | 1.14       | 11.34            | 0.9              | 13.250                              | 0.11      | 6.10      | 5.24 |
| 4.78          | 11.07                     | 0.78       | 12.30            | 1.2              | 10.040                              | 0.07      | 6.76      | 5.54 |
| 5.72          | 11.73                     | 0.31       | 13.42            | 1.7              | 7.924                               | 0.03      | 7.56      | 5.86 |
| 6.73          | 11.93                     | -0.11      | 14.04            | 2.1              | 6.651                               | -0.01     | 8.08      | 5.97 |
| 7.47          | 12.26                     | -0.39      | 14.64            | 2.4              | 6.131                               | -0.03     | 8.52      | 6.13 |
| 8.47          | 12.62                     | -0.73      | 15.35            | 2.7              | 5.627                               | -0.06     | 9.04      | 6.31 |
| 9.22          | 12.78                     | -0.96      | 15.74            | 3.0              | 5.316                               | -0.08     | 9.35      | 6.39 |
| 9.97          | 13.03                     | -1.19      | 16.22            | 3.2              | 5.082                               | -0.10     | 9.70      | 6.51 |
| 10.72         | 12.98                     | -1.37      | 16.36            | 3.4              | 4.846                               | -0.11     | 9.87      | 6.49 |
| 11.22         | 13.01                     | -1.51      | 16.52            | 3.5              | 4.704                               | -0.12     | 10.02     | 6.51 |
| 11.73         | 13.11                     | -1.65      | 16.77            | 3.7              | 4.592                               | -0.13     | 10.21     | 6.56 |
| 12.22         | 13.24                     | -1.78      | 17.02            | 3.8              | 4.500                               | -0.14     | 10.40     | 6.62 |
| 12.74         | 13.36                     | -1.92      | 17.28            | 3.9              | 4.406                               | -0.15     | 10.60     | 6.68 |
| 13.48         | 13.37                     | -2.11      | 17.48            | 4.1              | 4.252                               | -0.17     | 10.80     | 6.69 |
| 14.23         | 13.52                     | -2.29      | 17.82            | 4.3              | 4.148                               | -0.18     | 11.06     | 6.76 |
| 14.72         | 13.36                     | -2.42      | 17.78            | 4.4              | 4.021                               | -0.19     | 11.10     | 6.68 |
| 15.23         | 13.55                     | -2.54      | 18.09            | 4.5              | 3.986                               | -0.20     | 11.31     | 6.78 |

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS  
ASTM D4767-11**

|                     |                                              |             |         |
|---------------------|----------------------------------------------|-------------|---------|
| Client:             | Summit Design & Eng. Services                | Boring No.: | B-25-1  |
| Client Reference:   | Legion Pond                                  | Depth (ft): | 0.0-1.5 |
| Project No.:        | R-2025-143-001                               | Sample No.: | ST-1    |
| Lab ID:             | R-2025-143-001-001                           |             |         |
| Visual Description: | Brown Sand with Clay and Roots (UNDISTURBED) |             |         |



|            |    |       |        |              |     |       |        |
|------------|----|-------|--------|--------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Approved By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|--------------|-----|-------|--------|

page 7 of 8

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001      Specific Gravity (Assumed)      2.7

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

**SAMPLE CONDITION SUMMARY**

|                                |         |          |
|--------------------------------|---------|----------|
| Boring No.:                    | B-25-1  | B-25-1   |
| Depth (ft):                    | 0.0-1.5 | 9.9-10.4 |
| Sample No.:                    | ST-1    | ST-1     |
| Test No.                       | T1      | T2       |
| Deformation Rate (in/min)      | 0.001   | 0.001    |
| Back Pressure (psi)            | 60      | 60       |
| Consolidation Time (days)      | 1       | 1        |
| Moisture Content (%) (INITIAL) | 16.4    | 16.4     |
| Total Unit Weight (pcf)        | 119.6   | 125.4    |
| Dry Unit Weight (pcf)          | 102.8   | 107.7    |
| Moisture Content (%) (FINAL)   | 26.6    | 25.7     |
| Initial State Void Ratio, $e$  | 0.639   | 0.565    |
| Void Ratio at Shear, $e$       | 0.647   | 0.565    |



Tested By: DL      Date: 6/2/25      Input Checked By: MPS      Date: 6/6/25  
 page 8 of 8      DCN: CT-S28    DATE: 4/12/13    REVISION: 3

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-003

Boring No.: B-25-2

Depth (ft): 0.0-2.0

Sample No.: SS-1

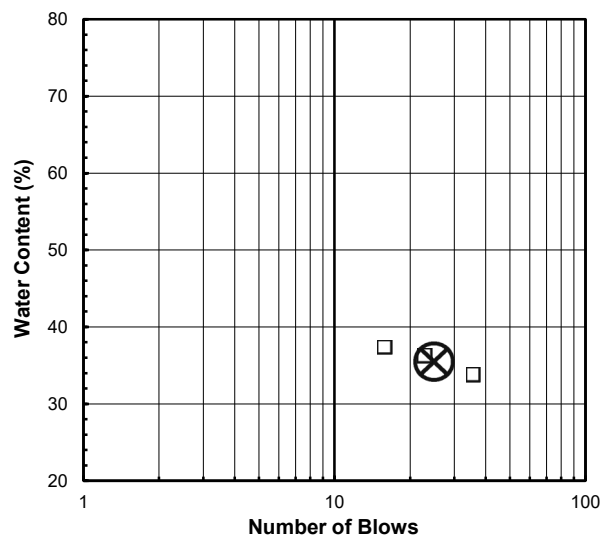
Soil Description: BROWN LEAN CLAY

**Note:** The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus #40 sieve material, Air dried)  
 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

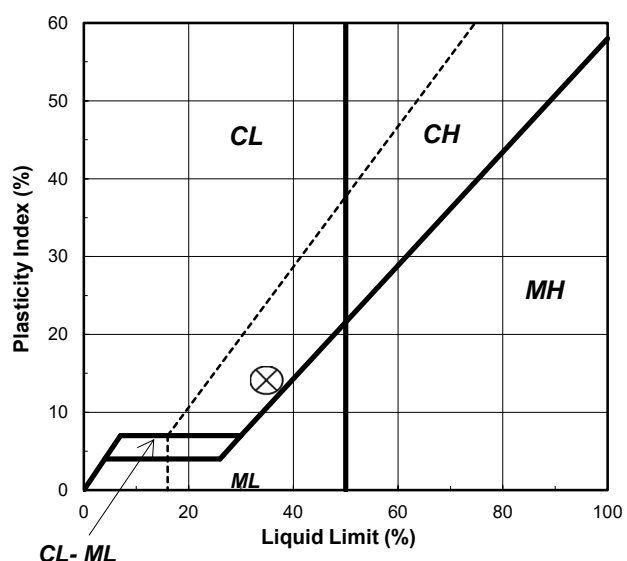
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |          |          |        |
|-----------------------------------------------|--------|-------------------|----------|----------|--------|
| Tare Number:                                  | 31-A   | 1<br>G            | 2<br>A-M | 3<br>I-7 | M<br>U |
| Wt. of Tare & Wet Sample (g):                 | 192.10 | 25.96             | 27.48    | 30.52    | L      |
| Wt. of Tare & Dry Sample (g):                 | 182.71 | 23.18             | 24.24    | 26.41    | T      |
| Weight of Tare (g):                           | 136.69 | 14.93             | 15.28    | 15.38    | I      |
| Weight of Water (g):                          | 9.4    | 2.8               | 3.2      | 4.1      | P      |
| Weight of Dry Sample (g):                     | 46.0   | 8.3               | 9.0      | 11.0     | O      |
| Was As Received MC Preserved:                 | Yes    |                   |          |          | I      |
| Moisture Content (%):                         | 20.4   | 33.7              | 36.2     | 37.3     | N      |
| Number of Blows:                              |        | 36                | 23       | 16       | T      |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | A-B   | X-9   |       | Liquid Limit (%): 35     |
| Wt. of Tare & Wet Sample (g):                                         | 27.43 | 26.52 |       | Plastic Limit (%): 21    |
| Wt. of Tare & Dry Sample (g):                                         | 25.40 | 24.64 |       | Plasticity Index (%): 14 |
| Weight of Tare (g):                                                   | 15.46 | 15.56 |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 2.0   | 1.9   |       |                          |
| Weight of Dry Sample (g):                                             | 9.9   | 9.1   |       |                          |
| Moisture Content (%):                                                 | 20.4  | 20.7  | -0.3  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 5/25/25 Checked By AES Date 5/28/25

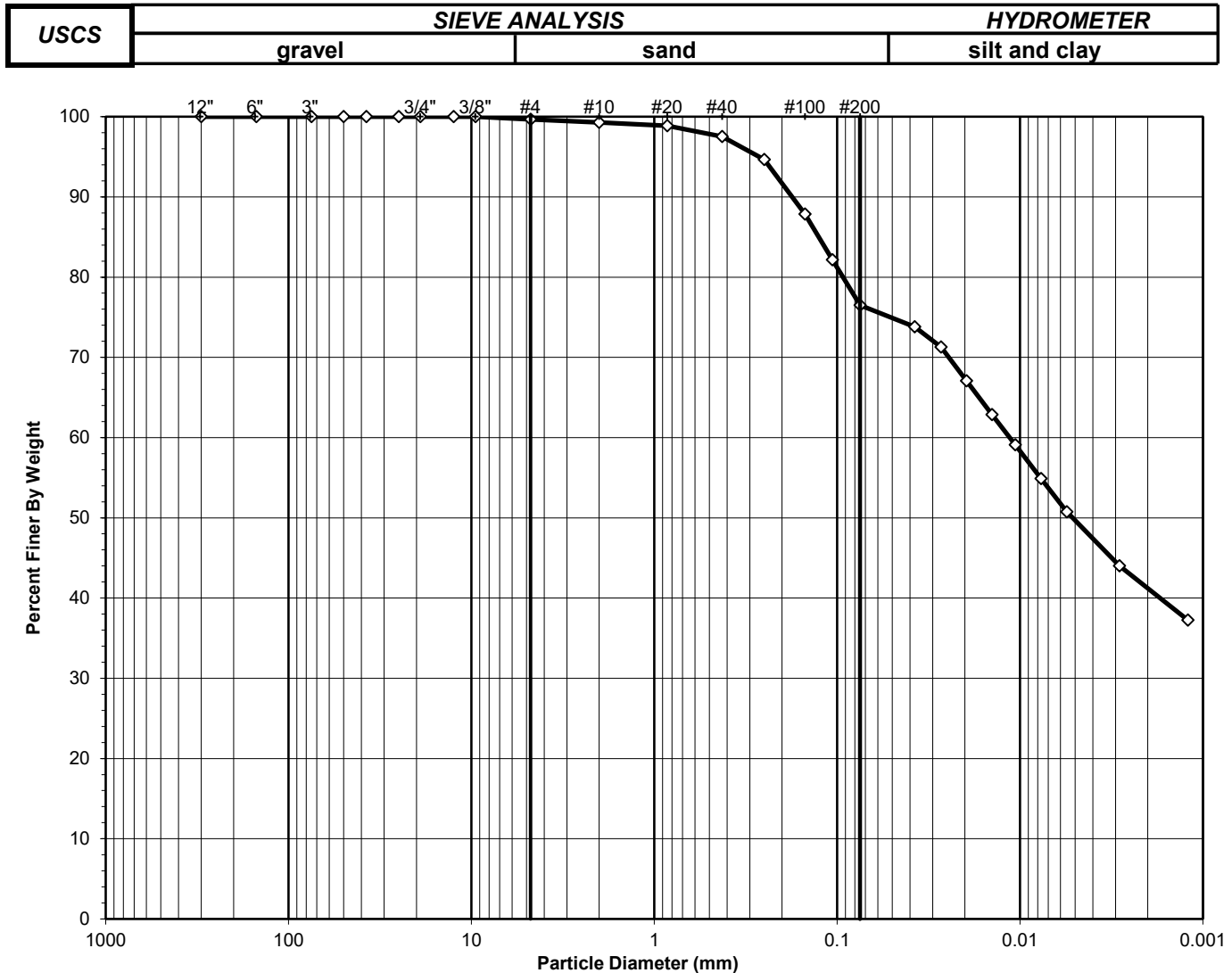


## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-004

Boring No.: B-25-3  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown



**USCS Symbol:**  
**CL, TESTED**

**USCS Classification:**  
**LEAN CLAY WITH SAND**

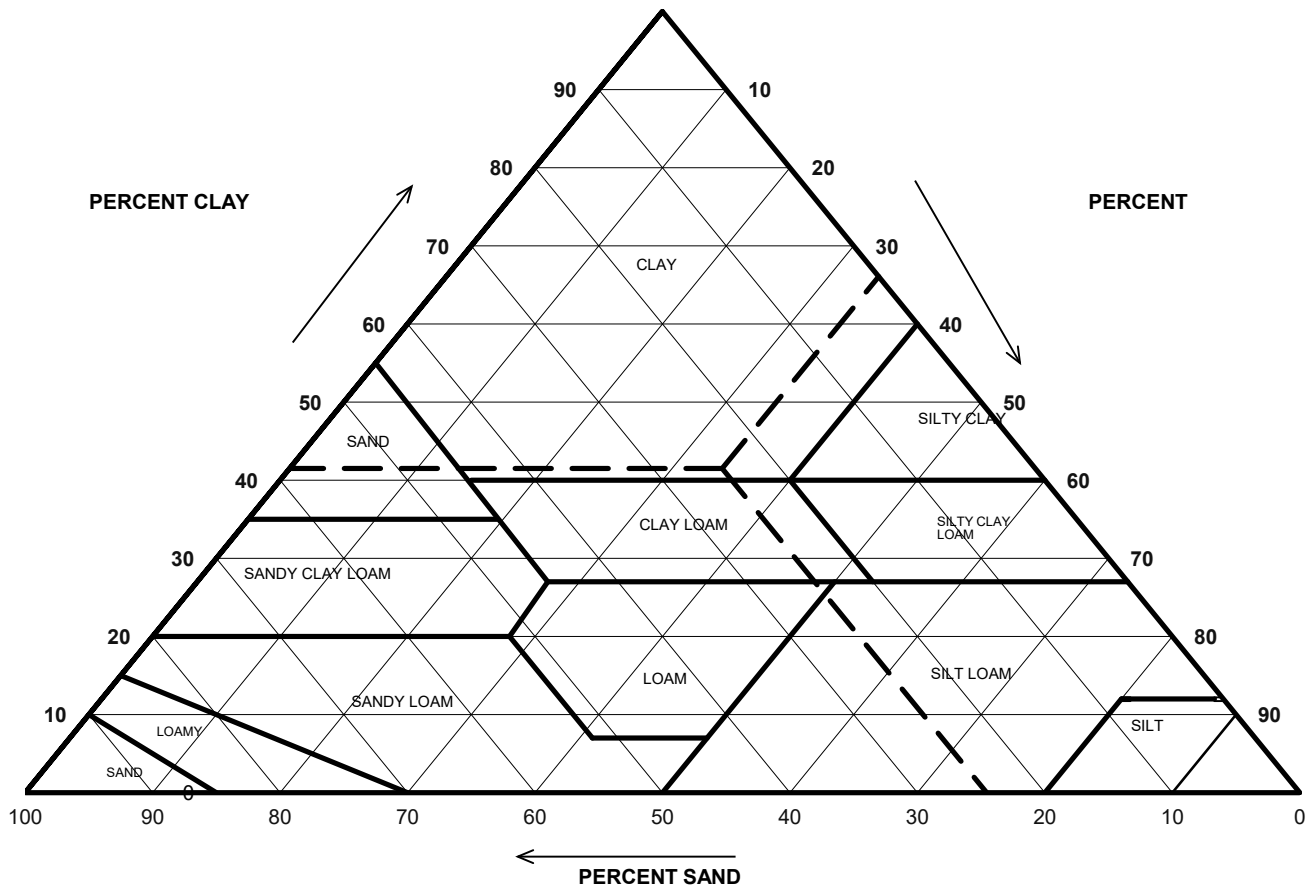
|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Tested By CB | Date 5/28/25 | Checked By AES | Date 5/28/25 |
|--------------|--------------|----------------|--------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-004

Boring No.: B-25-3  
Depth (ft): 2.0-4.0  
Sample No.: SS-2  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.70              |                                                              |
| 2                  | 99.30         | Sand   | 24.39             | 24.57                                                        |
| 0.05               | 74.90         | Silt   | 33.69             | 33.93                                                        |
| 0.002              | 41.21         | Clay   | 41.21             | 41.50                                                        |

USDA Classification: CLAY

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-004

Boring No.: B-25-3  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 455         | Tare No.:                          | NA         | Tare No.:                                  | 455        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 453.31      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 453.31     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 407.70      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 407.70     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 141.41      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 141.41     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 45.61       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 45.61      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 266.29      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 266.29     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>17.1</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 266.29     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 266.29     |
| Tare No. (Sub-Specimen)                   | 455         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 455        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 453.31      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 453.31     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 141.41      | Dry Weight of - 3/4" Sample (g):   | 266.29     | Weight of Tare (g):                        | 141.41     | Dry Weight of - 3/4" Sample (g):   | 266.29     |
| Sub-Specimen Wet Weight (g):              | 311.90      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 311.90     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 266.29     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 266.29     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.95                        | 0.36                 | 0.36                             | 99.64             | 99.6                          |
| #10        | 2                  | 0.92                        | 0.35                 | 0.70                             | 99.30             | 99.3                          |
| #20        | 0.85               | 1.18                        | ( ** ) 0.44          | 1.15                             | 98.85             | 98.9                          |
| #40        | 0.425              | 3.57                        | 1.34                 | 2.49                             | 97.51             | 97.5                          |
| #60        | 0.25               | 7.57                        | 2.84                 | 5.33                             | 94.67             | 94.7                          |
| #100       | 0.15               | 18.11                       | 6.80                 | 12.13                            | 87.87             | 87.9                          |
| #140       | 0.106              | 15.21                       | 5.71                 | 17.84                            | 82.16             | 82.2                          |
| #200       | 0.075              | 15.11                       | 5.67                 | 23.52                            | 76.48             | 76.5                          |
| Pan        | -                  | 203.67                      | 76.48                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 5/28/25 Checked By AES Date 5/28/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-3  |
| Client Reference: | Legion Pond                   | Depth (ft): | 2.0-4.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-2    |
| Lab ID:           | R-2025-143-001-004            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 46.5       | 22.9       | 2.60        | 8.2                      | 0.0377 | 96.5                       | 73.8                        |
| 2                  | 45.0       | 22.9       | 2.60        | 8.5                      | 0.0271 | 93.2                       | 71.3                        |
| 4                  | 42.5       | 22.9       | 2.60        | 8.9                      | 0.0196 | 87.7                       | 67.1                        |
| 8                  | 40.0       | 22.9       | 2.60        | 9.4                      | 0.0142 | 82.2                       | 62.9                        |
| 15                 | 37.8       | 22.9       | 2.60        | 9.8                      | 0.0106 | 77.3                       | 59.1                        |
| 30                 | 35.3       | 22.9       | 2.60        | 10.3                     | 0.0077 | 71.8                       | 54.9                        |
| 60                 | 32.8       | 23.0       | 2.56        | 10.7                     | 0.0055 | 66.4                       | 50.7                        |
| 240                | 28.8       | 23.0       | 2.56        | 11.4                     | 0.0029 | 57.6                       | 44.0                        |
| 1440               | 24.8       | 22.9       | 2.60        | 12.1                     | 0.0012 | 48.7                       | 37.2                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 200    | Percent Finer than # 200: | 76.48        |
| Wt. of Tare & Dry Material (g): | 221.21 |                           |              |
| Weight of Tare (g):             | 171.22 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 44.99  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 5/29/25 |
|-----------|----|------|---------|------------|-----|------|---------|

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## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-004

Boring No.: B-25-3

Depth (ft): 2.0-4.0

Sample No.: SS-2

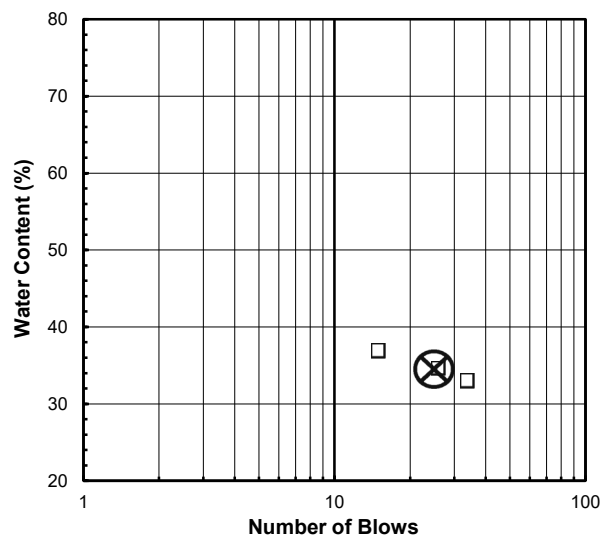
Soil Description: BROWN LEAN CLAY

**Note:** The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus #40 sieve material, Air dried)  
 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

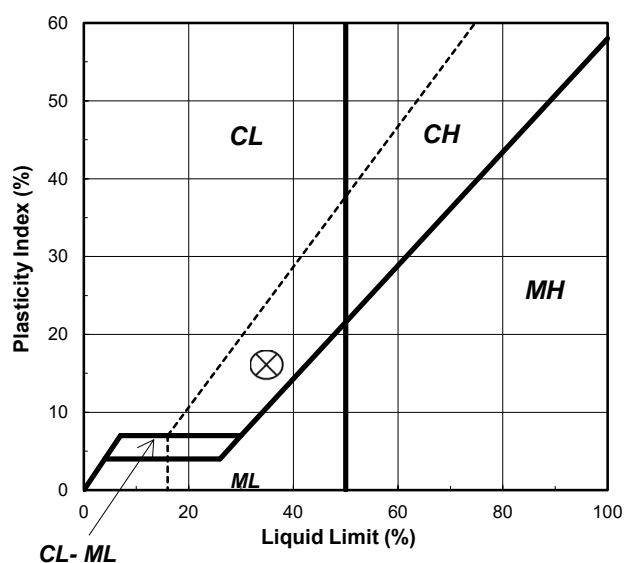
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |       |       |   |
|-----------------------------------------------|--------|-------------------|-------|-------|---|
|                                               |        | 1                 | 2     | 3     | M |
| Tare Number:                                  | 455    | A-C               | J     | AT    | U |
| Wt. of Tare & Wet Sample (g):                 | 453.31 | 32.95             | 37.20 | 33.17 | L |
| Wt. of Tare & Dry Sample (g):                 | 407.70 | 28.62             | 31.50 | 28.41 | T |
| Weight of Tare (g):                           | 141.41 | 15.46             | 15.01 | 15.48 | I |
| Weight of Water (g):                          | 45.6   | 4.3               | 5.7   | 4.8   | P |
| Weight of Dry Sample (g):                     | 266.3  | 13.2              | 16.5  | 12.9  | O |
| Was As Received MC Preserved:                 | Yes    |                   |       |       | I |
| Moisture Content (%):                         | 17.1   | 32.9              | 34.6  | 36.8  | N |
| Number of Blows:                              |        | 34                | 26    | 15    | T |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 10    | 16    |       | Liquid Limit (%): 35     |
| Wt. of Tare & Wet Sample (g):                                         | 17.26 | 17.76 |       | Plastic Limit (%): 19    |
| Wt. of Tare & Dry Sample (g):                                         | 15.62 | 16.06 |       | Plasticity Index (%): 16 |
| Weight of Tare (g):                                                   | 6.94  | 7.04  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 1.6   | 1.7   |       |                          |
| Weight of Dry Sample (g):                                             | 8.7   | 9.0   |       |                          |
| Moisture Content (%):                                                 | 18.9  | 18.8  | 0.0   |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 5/29/25 Checked By AES Date 6/2/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-005

Boring No.: B-25-3  
 Depth (ft): 6.0-8.0  
 Sample No.: SS-4  
 Soil Color: Brown



**USCS Symbol:**  
**CL, TESTED**

**USCS Classification:**  
**LEAN CLAY WITH SAND**

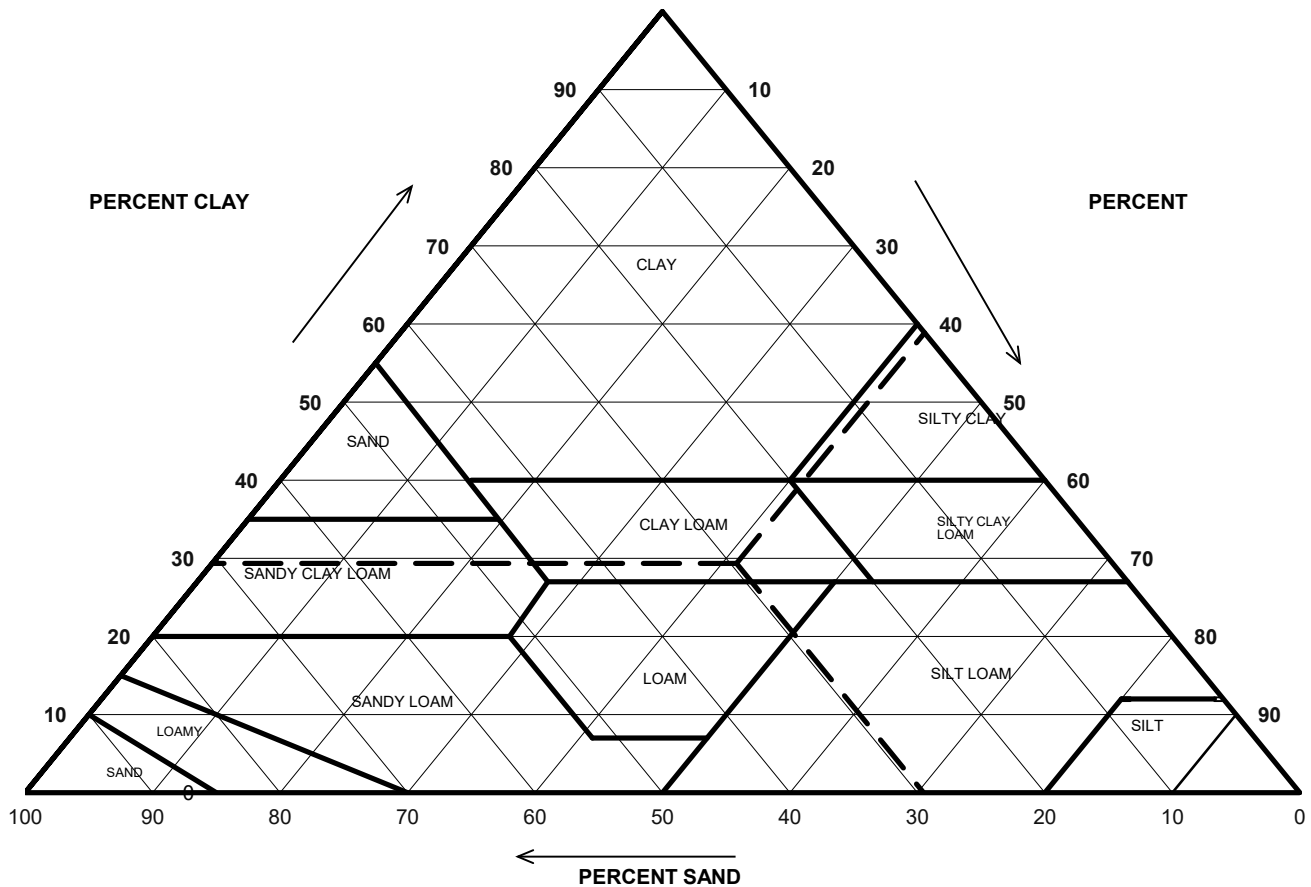
|              |             |                |             |
|--------------|-------------|----------------|-------------|
| Tested By CB | Date 6/6/25 | Checked By AES | Date 6/6/25 |
|--------------|-------------|----------------|-------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-005

Boring No.: B-25-3  
Depth (ft): 6.0-8.0  
Sample No.: SS-4  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.30              |                                                              |
| 2                  | 99.70         | Sand   | 29.43             | 29.52                                                        |
| 0.05               | 70.27         | Silt   | 41.01             | 41.13                                                        |
| 0.002              | 29.26         | Clay   | 29.26             | 29.35                                                        |

USDA Classification: CLAY LOAM

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-005

Boring No.: B-25-3  
 Depth (ft): 6.0-8.0  
 Sample No.: SS-4  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 450         | Tare No.:                          | NA         | Tare No.:                                  | 450        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 379.87      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 379.87     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 354.96      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 354.96     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 144.34      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 144.34     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 24.91       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 24.91      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 210.62      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 210.62     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>11.8</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 210.62     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 210.62     |
| Tare No. (Sub-Specimen)                   | 450         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 450        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 379.87      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 379.87     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 144.34      | Dry Weight of - 3/4" Sample (g):   | 210.62     | Weight of Tare (g):                        | 144.34     | Dry Weight of - 3/4" Sample (g):   | 210.62     |
| Sub-Specimen Wet Weight (g):              | 235.53      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 235.53     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 210.62     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 210.62     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.64                        | 0.30                 | 0.30                             | 99.70             | 99.7                          |
| #20        | 0.85               | 4.94                        | ( ** )               | 2.65                             | 97.35             | 97.4                          |
| #40        | 0.425              | 5.55                        | 2.64                 | 5.28                             | 94.72             | 94.7                          |
| #60        | 0.25               | 9.48                        | 4.50                 | 9.79                             | 90.21             | 90.2                          |
| #100       | 0.15               | 14.88                       | 7.06                 | 16.85                            | 83.15             | 83.1                          |
| #140       | 0.106              | 12.09                       | 5.74                 | 22.59                            | 77.41             | 77.4                          |
| #200       | 0.075              | 12.89                       | 6.12                 | 28.71                            | 71.29             | 71.3                          |
| Pan        | -                  | 150.15                      | 71.29                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/6/25 Checked By AES Date 6/6/25



## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-3  |
| Client Reference: | Legion Pond                   | Depth (ft): | 6.0-8.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-4    |
| Lab ID:           | R-2025-143-001-005            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 40.0       | 22.9       | 2.60        | 9.4                      | 0.0402 | 95.2                       | 67.9                        |
| 2                  | 38.5       | 22.9       | 2.60        | 9.7                      | 0.0289 | 91.4                       | 65.2                        |
| 4                  | 35.8       | 22.9       | 2.60        | 10.2                     | 0.0209 | 84.4                       | 60.2                        |
| 8                  | 32.5       | 22.9       | 2.60        | 10.7                     | 0.0152 | 76.1                       | 54.3                        |
| 15                 | 29.8       | 22.9       | 2.60        | 11.2                     | 0.0114 | 69.1                       | 49.3                        |
| 30                 | 27.3       | 23.0       | 2.56        | 11.7                     | 0.0082 | 62.9                       | 44.8                        |
| 60                 | 24.5       | 23.0       | 2.56        | 12.2                     | 0.0059 | 55.9                       | 39.8                        |
| 240                | 20.8       | 23.0       | 2.56        | 12.9                     | 0.0030 | 46.3                       | 33.0                        |
| 1440               | 16.5       | 22.9       | 2.60        | 13.6                     | 0.0013 | 35.4                       | 25.2                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 201    | Percent Finer than # 200: | 71.29        |
| Wt. of Tare & Dry Material (g): | 213.50 |                           |              |
| Weight of Tare (g):             | 169.66 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 38.84  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |        |
|-----------|----|------|---------|------------|-----|------|--------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 6/6/25 |
|-----------|----|------|---------|------------|-----|------|--------|

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## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-005

Boring No.: B-25-3

Depth (ft): 6.0-8.0

Sample No.: SS-4

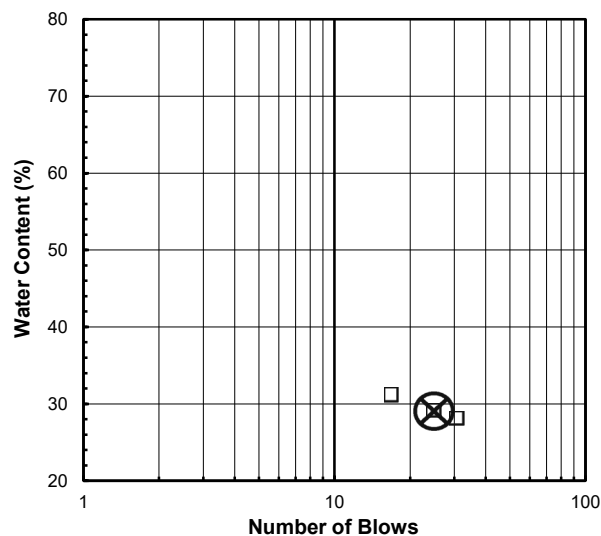
Soil Description: BROWN LEAN CLAY

**Note:** The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus #40 sieve material, Air dried)  
 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

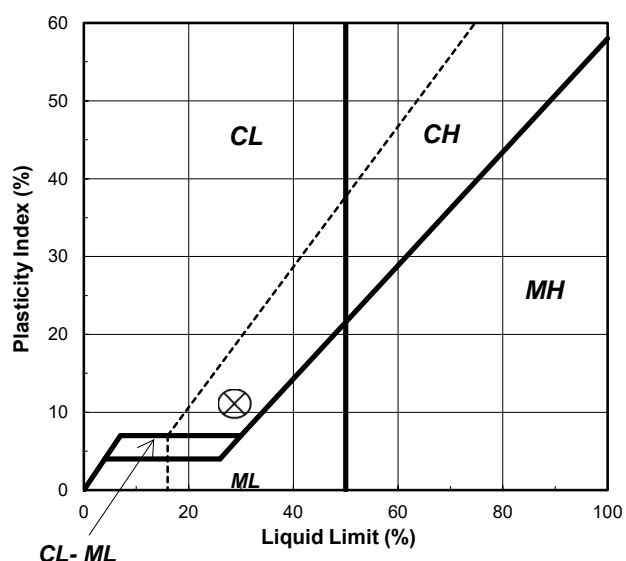
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |       |       |   |
|-----------------------------------------------|--------|-------------------|-------|-------|---|
| Tare Number:                                  | 450    | 1                 | 2     | 3     | M |
| Wt. of Tare & Wet Sample (g):                 | 379.87 | X-9               | A     | G     | U |
| Wt. of Tare & Dry Sample (g):                 | 354.96 | 36.14             | 34.07 | 33.27 | L |
| Weight of Tare (g):                           | 144.34 | 31.63             | 29.80 | 28.92 | T |
| Weight of Water (g):                          | 24.9   | 15.56             | 15.10 | 14.93 | I |
| Weight of Dry Sample (g):                     | 210.6  | 4.5               | 4.3   | 4.4   | P |
| Was As Received MC Preserved:                 | Yes    | 16.1              | 14.7  | 14.0  | O |
| Moisture Content (%):                         | 11.8   | 28.1              | 29.0  | 31.1  | N |
| Number of Blows:                              |        | 31                | 25    | 17    | T |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 12    | 34    |       | Liquid Limit (%): 29     |
| Wt. of Tare & Wet Sample (g):                                         | 20.18 | 17.20 |       | Plastic Limit (%): 18    |
| Wt. of Tare & Dry Sample (g):                                         | 18.20 | 15.67 |       | Plasticity Index (%): 11 |
| Weight of Tare (g):                                                   | 7.00  | 7.00  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 2.0   | 1.5   |       |                          |
| Weight of Dry Sample (g):                                             | 11.2  | 8.7   |       |                          |
| Moisture Content (%):                                                 | 17.7  | 17.6  | 0.0   |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 6/2/25 Checked By AES Date 6/3/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown



**USCS Symbol:**  
*ml, ASSUMED*

**USCS Classification:**  
**SILT**

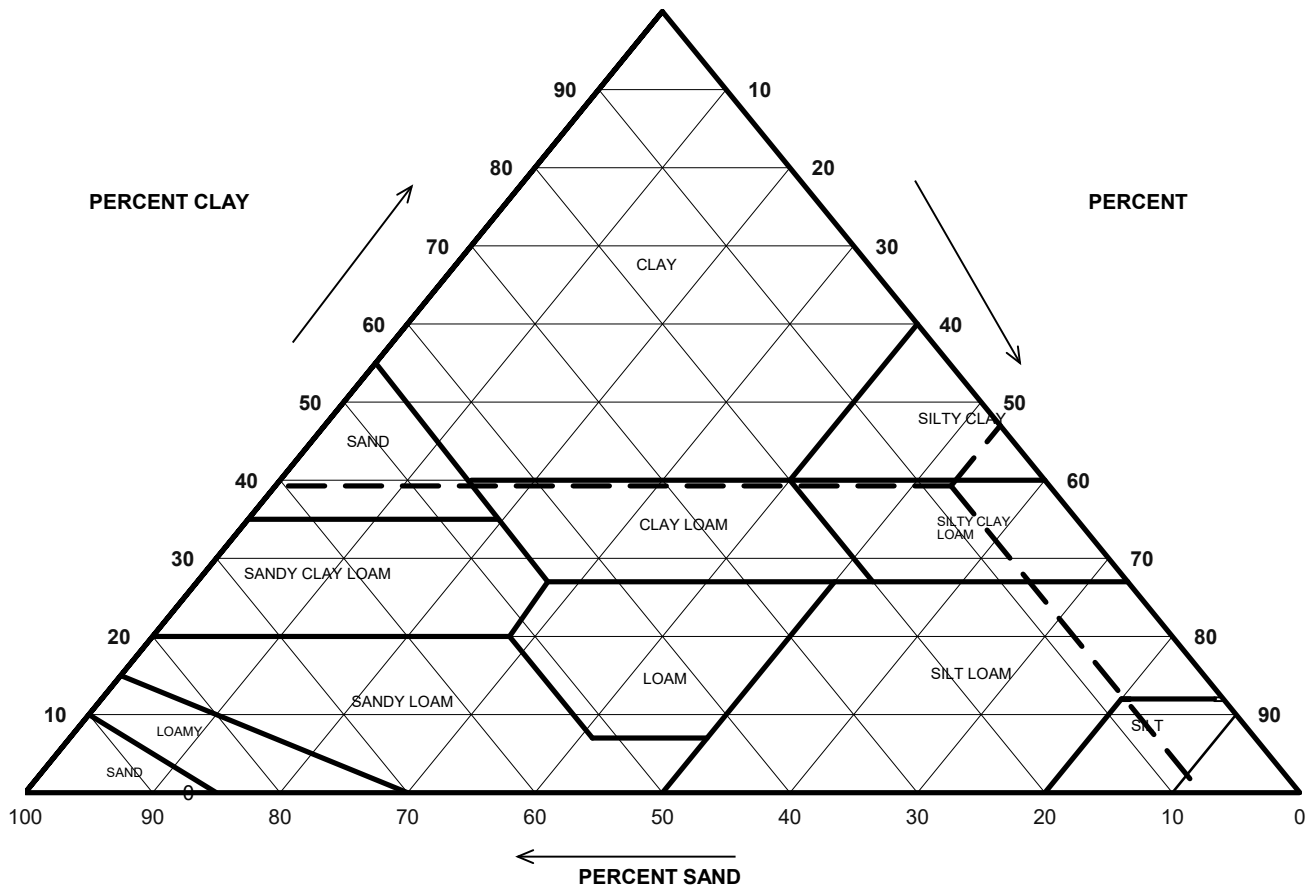
|              |             |                |             |
|--------------|-------------|----------------|-------------|
| Tested By CB | Date 6/2/25 | Checked By AES | Date 6/2/25 |
|--------------|-------------|----------------|-------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
Depth (ft): 12.0-14.0  
Sample No.: SS-7  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.27              |                                                              |
| 2                  | 99.73         | Sand   | 7.71              | 7.73                                                         |
| 0.05               | 92.02         | Silt   | 52.86             | 53.00                                                        |
| 0.002              | 39.16         | Clay   | 39.16             | 39.27                                                        |

USDA Classification: **SILTY CLAY LOAM**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 468         | Tare No.:                          | NA         | Tare No.:                                  | 468        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 280.44      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 280.44     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 256.34      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 256.34     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 137.50      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 137.50     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 24.10       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 24.10      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 118.84      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 118.84     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>20.3</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 118.84     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 118.84     |
| Tare No. (Sub-Specimen)                   | 468         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 468        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 280.44      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 280.44     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 137.50      | Dry Weight of - 3/4" Sample (g):   | 118.84     | Weight of Tare (g):                        | 137.50     | Dry Weight of - 3/4" Sample (g):   | 118.84     |
| Sub-Specimen Wet Weight (g):              | 142.94      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 142.94     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 118.84     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 118.84     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.32                        | 0.27                 | 0.27                             | 99.73             | 99.7                          |
| #20        | 0.85               | 0.38                        | ( ** )               | 0.59                             | 99.41             | 99.4                          |
| #40        | 0.425              | 0.59                        | 0.50                 | 1.09                             | 98.91             | 98.9                          |
| #60        | 0.25               | 1.07                        | 0.90                 | 1.99                             | 98.01             | 98.0                          |
| #100       | 0.15               | 1.75                        | 1.47                 | 3.46                             | 96.54             | 96.5                          |
| #140       | 0.106              | 1.59                        | 1.34                 | 4.80                             | 95.20             | 95.2                          |
| #200       | 0.075              | 1.83                        | 1.54                 | 6.34                             | 93.66             | 93.7                          |
| Pan        | -                  | 111.31                      | 93.66                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/2/25 Checked By AES Date 6/2/25

## HYDROMETER ANALYSIS

ASTM D7928-21

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 58.8       | 22.9       | 2.60        | 6.0                      | 0.0322 | 96.3                       | 90.2                        |
| 2                  | 56.0       | 22.9       | 2.60        | 6.5                      | 0.0237 | 91.5                       | 85.7                        |
| 4                  | 52.0       | 22.9       | 2.60        | 7.2                      | 0.0177 | 84.7                       | 79.3                        |
| 8                  | 47.8       | 22.9       | 2.60        | 8.0                      | 0.0131 | 77.4                       | 72.5                        |
| 15                 | 44.0       | 22.9       | 2.60        | 8.7                      | 0.0100 | 71.0                       | 66.5                        |
| 30                 | 39.5       | 23.0       | 2.56        | 9.5                      | 0.0074 | 63.3                       | 59.3                        |
| 60                 | 36.0       | 23.0       | 2.56        | 10.1                     | 0.0054 | 57.3                       | 53.7                        |
| 240                | 29.3       | 23.0       | 2.56        | 11.3                     | 0.0028 | 45.8                       | 42.9                        |
| 1440               | 23.8       | 22.9       | 2.60        | 12.3                     | 0.0012 | 36.3                       | 34.0                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 2010   | Percent Finer than # 200: | 93.66        |
| Wt. of Tare & Dry Material (g): | 231.37 |                           |              |
| Weight of Tare (g):             | 168.69 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 57.68  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |        |
|-----------|----|------|---------|------------|-----|------|--------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 6/2/25 |
|-----------|----|------|---------|------------|-----|------|--------|

page 4 of 4

## CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
 Depth (ft): 1.0-6.0  
 Sample No.: S-1  
 Description: Brown Clay  
 ( - # 10 Sieve material )

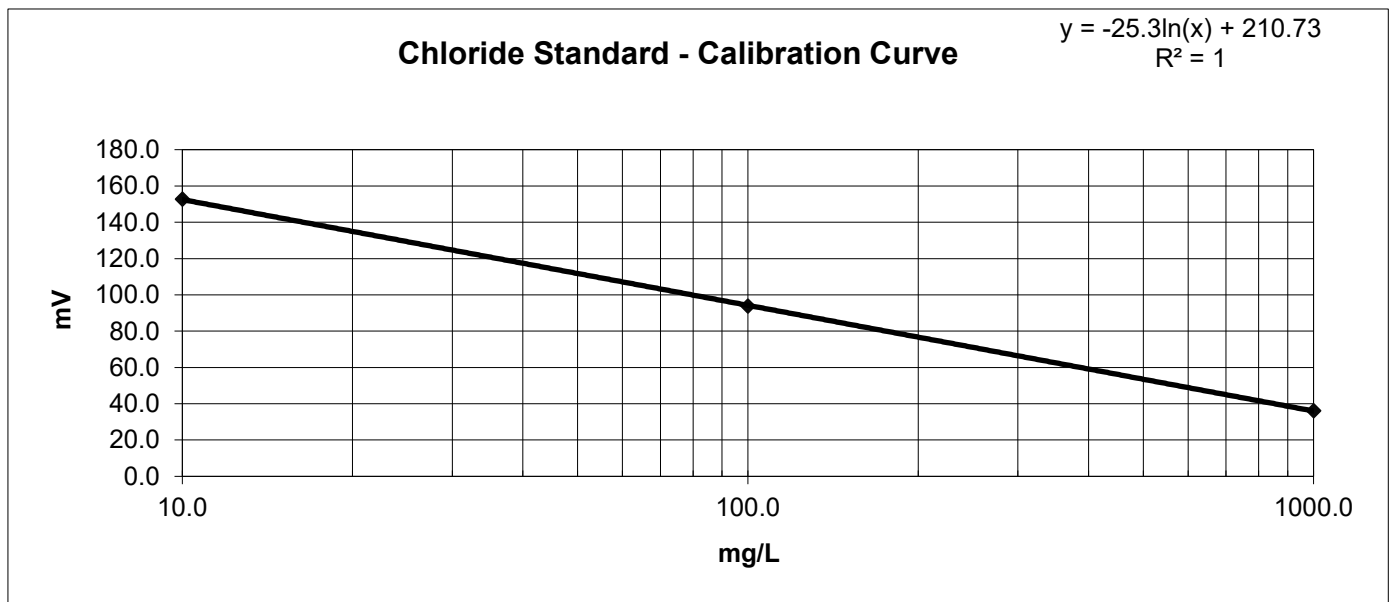
### CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD    | MILLIVOLTS<br>(mV) |
|-------------|--------------------|
| 10.0 mg/L   | 152.7              |
| 100.0 mg/L  | 93.8               |
| 1000.0 mg/L | 36.2               |

### MEASUREMENT OF CHLORIDES

|                              |       |               |               |
|------------------------------|-------|---------------|---------------|
| Sample Weight (g):           | 100.0 | CONCENTRATION | CONCENTRATION |
| Water added to Sample (ml):  | 100.0 | (mg/L)        | (mg/kg)       |
| Size of Sample Aliquot (ml): | 20.0  |               |               |
| Sample Reading (mV):         | 73.0  | 231.48        | 231.48        |

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO<sub>3</sub> solution (1:1 volume).  
 2) Samples were dried for a minimum of 12 hours at 110 ± 5°C.



Notes:

Tested By BS Date 6/10/25 Checked By AES Date 6/10/25

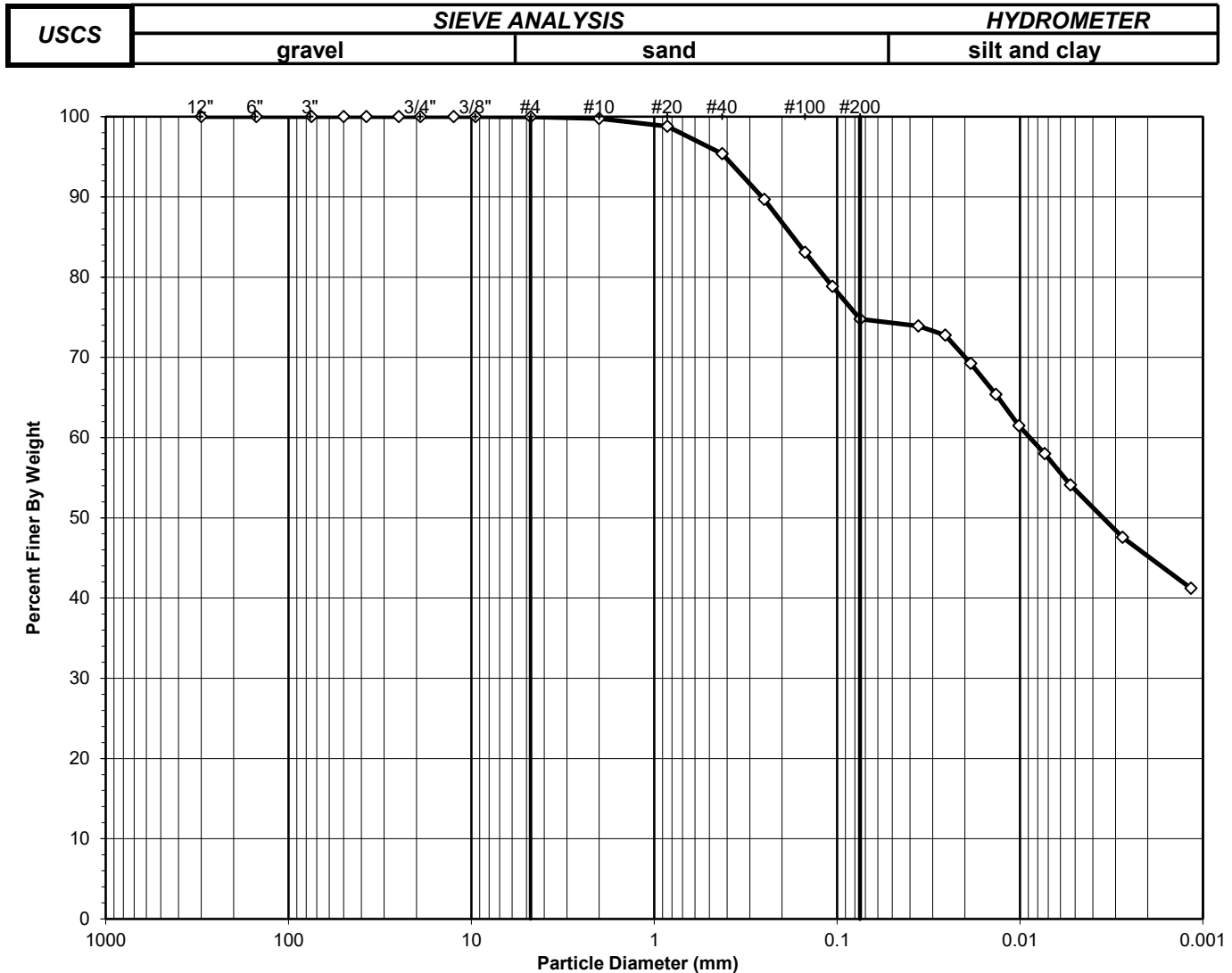
page 1 of 1 DCN: CT-S63A DATE: 6/2/14 REVISION: 1

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown



**USCS Symbol:**  
*ml, ASSUMED*

**USCS Classification:**  
**SILT WITH SAND**

|              |             |                |             |
|--------------|-------------|----------------|-------------|
| Tested By CB | Date 6/6/25 | Checked By AES | Date 6/9/25 |
|--------------|-------------|----------------|-------------|

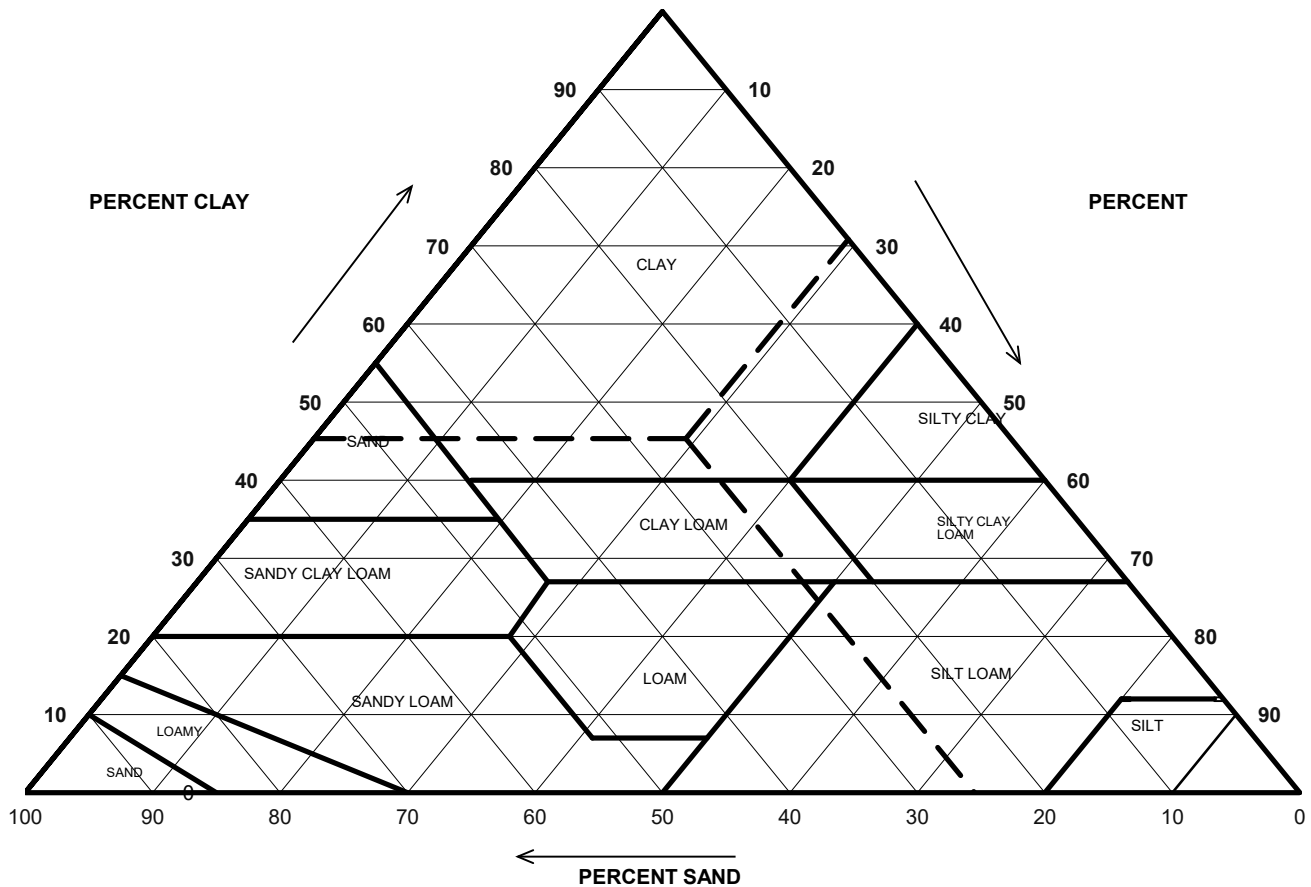
page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1



## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-008

|             |           |
|-------------|-----------|
| Boring No.: | B-25-3    |
| Depth (ft): | 12.0-14.0 |
| Sample No.: | SS-7      |
| Soil Color: | Brown     |



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.25              |                                                              |
| 2                  | 99.75         | Sand   | 25.45             | 25.51                                                        |
| 0.05               | 74.30         | Silt   | 29.09             | 29.17                                                        |
| 0.002              | 45.21         | Clay   | 45.21             | 45.32                                                        |

**USDA Classification: CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 458         | Tare No.:                          | NA         | Tare No.:                                  | 458        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 796.31      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 796.31     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 714.26      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 714.26     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 145.70      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 145.70     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 82.05       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 82.05      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 568.56      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 568.56     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>14.4</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 568.56     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 568.56     |
| Tare No. (Sub-Specimen)                   | 458         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 458        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 796.31      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 796.31     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 145.70      | Dry Weight of - 3/4" Sample (g):   | 568.56     | Weight of Tare (g):                        | 145.70     | Dry Weight of - 3/4" Sample (g):   | 568.56     |
| Sub-Specimen Wet Weight (g):              | 650.61      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 650.61     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 568.56     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 568.56     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.16                        | 0.03                 | 0.03                             | 99.97             | 100.0                         |
| #10        | 2                  | 1.27                        | 0.22                 | 0.25                             | 99.75             | 99.7                          |
| #20        | 0.85               | 5.48                        | ( ** ) 0.96          | 1.22                             | 98.78             | 98.8                          |
| #40        | 0.425              | 19.27                       | 3.39                 | 4.60                             | 95.40             | 95.4                          |
| #60        | 0.25               | 32.43                       | 5.70                 | 10.31                            | 89.69             | 89.7                          |
| #100       | 0.15               | 37.44                       | 6.59                 | 16.89                            | 83.11             | 83.1                          |
| #140       | 0.106              | 24.22                       | 4.26                 | 21.15                            | 78.85             | 78.8                          |
| #200       | 0.075              | 23.18                       | 4.08                 | 25.23                            | 74.77             | 74.8                          |
| Pan        | -                  | 425.11                      | 74.77                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/6/25 Checked By AES Date 6/9/25

## HYDROMETER ANALYSIS

ASTM D7928-21

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 50.0       | 23.3       | 2.45        | 7.6                      | 0.0360 | 98.9                       | 73.9                        |
| 2                  | 49.3       | 23.3       | 2.45        | 7.7                      | 0.0257 | 97.3                       | 72.8                        |
| 4                  | 47.0       | 23.3       | 2.45        | 8.1                      | 0.0186 | 92.6                       | 69.3                        |
| 8                  | 44.5       | 23.3       | 2.45        | 8.6                      | 0.0135 | 87.4                       | 65.4                        |
| 15                 | 42.0       | 23.3       | 2.45        | 9.0                      | 0.0101 | 82.2                       | 61.5                        |
| 30                 | 39.8       | 23.3       | 2.45        | 9.4                      | 0.0073 | 77.6                       | 58.0                        |
| 60                 | 37.3       | 23.3       | 2.45        | 9.9                      | 0.0053 | 72.4                       | 54.1                        |
| 240                | 33.0       | 23.4       | 2.41        | 10.7                     | 0.0028 | 63.6                       | 47.6                        |
| 1440               | 29.0       | 23.2       | 2.49        | 11.4                     | 0.0012 | 55.1                       | 41.2                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 201    | Percent Finer than # 200: | 74.77        |
| Wt. of Tare & Dry Material (g): | 222.16 |                           |              |
| Weight of Tare (g):             | 169.60 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 47.56  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |        |            |     |      |        |
|-----------|----|------|--------|------------|-----|------|--------|
| Tested By | CB | Date | 6/5/25 | Checked By | AES | Date | 6/9/25 |
|-----------|----|------|--------|------------|-----|------|--------|

page 4 of 4

# MOISTURE - DENSITY RELATIONSHIP

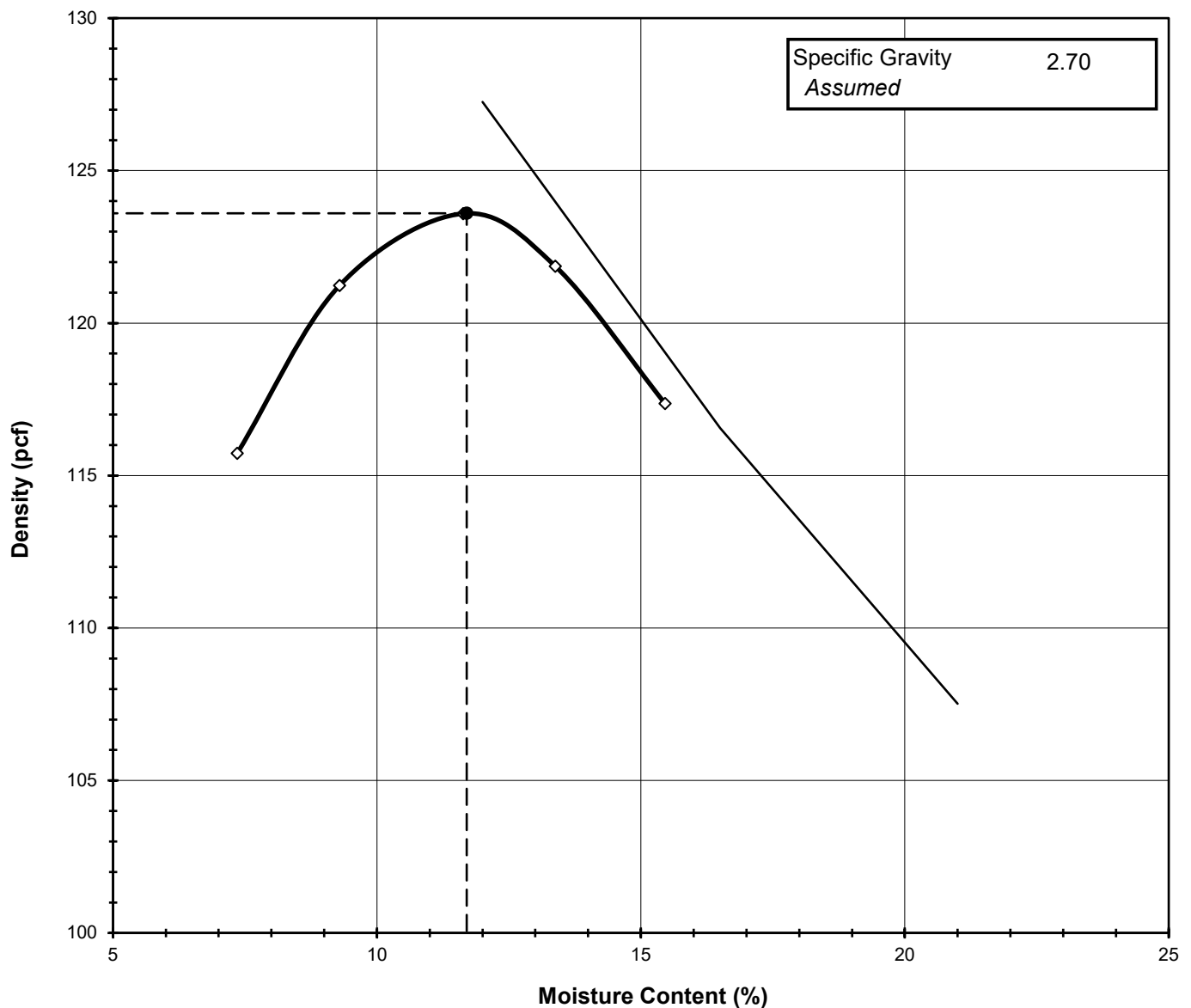
ASTM D1557-12

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
Depth (ft): 1.0-6.0  
Sample No.: S-1  
Test Method: **MODIFIED**

Visual Description: Brown Sandy Clay

**Optimum Moisture Content (%): 11.7**  
**Maximum Dry Density (pcf): 123.6**



Tested By CRW Date 6/2/25 Checked By AES Date 6/3/25

page 1 of 2 DCN:CT-S12 DATE: 4/21/23 REVISION: 17

## MOISTURE - DENSITY RELATIONSHIP

ASTM D1557-12

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
 Depth (ft): 1.0-6.0  
 Sample No.: S-1

Visual Description: Brown Sandy Clay

|                                 |              |
|---------------------------------|--------------|
| Total Weight of the Sample (g): | 28050        |
| As Received Water Content (%):  | NA           |
| Assumed Specific Gravity:       | 2.70         |
| Percent Retained on 3/4":       | NA           |
| Percent Retained on 3/8":       | NA           |
| Percent Retained on #4:         | NA           |
| Oversize Material:              | Not included |
| Procedure Used:                 | B            |

|                                        |                 |
|----------------------------------------|-----------------|
| Test Type:                             | <b>MODIFIED</b> |
| Rammer Weight (lb):                    | 10.0            |
| Rammer Drop (in):                      | 18              |
| Rammer Type:                           | MECHANICAL      |
| Machine ID:                            | R174            |
| Mold ID:                               | R607            |
| Mold diameter:                         | 4"              |
| Weight of the Mold (g):                | 4235            |
| Volume of the Mold (cm <sup>3</sup> ): | 943             |

### Mold / Specimen

| Point No.                        | 1    | 2    | 3    | 4    | 5    |
|----------------------------------|------|------|------|------|------|
| Weight of Mold & Wet Sample (g): | 6113 | 6238 | 6320 | 6323 | 6283 |
| Weight of Mold (g):              | 4235 | 4235 | 4235 | 4235 | 4235 |
| Weight of Wet Sample (g):        | 1878 | 2002 | 2085 | 2088 | 2048 |
| Mold Volume (cm <sup>3</sup> ):  | 943  | 943  | 943  | 943  | 943  |

### Moisture Content / Density

|                                  |        |        |        |        |        |
|----------------------------------|--------|--------|--------|--------|--------|
| Tare Number:                     | 444    | 482    | 426    | 705    | 719    |
| Weight of Tare & Wet Sample (g): | 351.80 | 360.00 | 365.20 | 387.90 | 354.70 |
| Weight of Tare & Dry Sample (g): | 334.49 | 337.68 | 337.52 | 352.89 | 319.46 |
| Weight of Tare (g):              | 99.10  | 97.50  | 99.50  | 91.20  | 91.50  |
| Weight of Water (g):             | 17.31  | 22.32  | 27.68  | 35.01  | 35.24  |
| Weight of Dry Sample (g):        | 235.39 | 240.18 | 238.02 | 261.69 | 227.96 |

|                                   |              |              |              |              |              |
|-----------------------------------|--------------|--------------|--------------|--------------|--------------|
| Wet Density (g/cm <sup>3</sup> ): | 1.99         | 2.12         | 2.21         | 2.21         | 2.17         |
| Wet Density (pcf):                | 124.2        | 132.5        | 138.0        | 138.2        | 135.5        |
| <b>Moisture Content (%)</b> :     | <b>7.4</b>   | <b>9.3</b>   | <b>11.6</b>  | <b>13.4</b>  | <b>15.5</b>  |
| <b>Dry Density (pcf)</b> :        | <b>115.7</b> | <b>121.2</b> | <b>123.6</b> | <b>121.9</b> | <b>117.4</b> |

### Zero Air Voids

|                                |       |       |       |
|--------------------------------|-------|-------|-------|
| <b>Moisture Content (%)</b> :  | 12.0  | 16.5  | 21.0  |
| <b>Dry Unit Weight (pcf)</b> : | 127.3 | 116.6 | 107.5 |

Tested By CRW Date 6/2/25 Checked By AES Date 6/3/25

# Minimum Resistivity

AASHTO T288-12



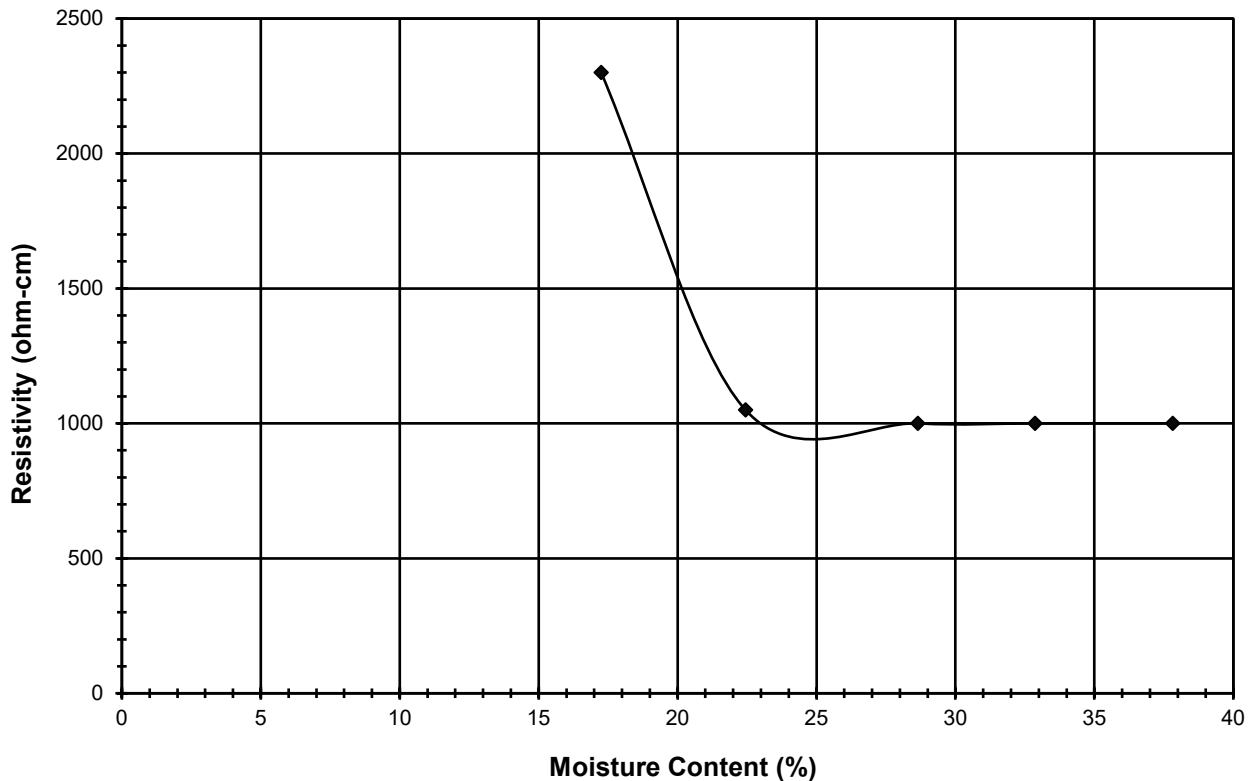
Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
 Depth (ft): 1.0-6.0  
 Sample No.: S-1  
 Visual Description: Brown Clay  
 ( - #10 Sieve material )

| Tare No.:                | Z     | 7     | B2    | B8    | B19   |
|--------------------------|-------|-------|-------|-------|-------|
| Tare & Wet Specimen (g): | 29.59 | 29.62 | 29.60 | 29.58 | 29.70 |
| Tare & Dry Specimen (g): | 27.52 | 27.03 | 26.44 | 26.10 | 25.82 |
| Tare Weight (g):         | 15.52 | 15.49 | 15.41 | 15.51 | 15.56 |

|                              |             |             |             |             |             |
|------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Moisture Content (%):</b> | <b>17.3</b> | <b>22.4</b> | <b>28.6</b> | <b>32.9</b> | <b>37.8</b> |
| <b>Resistance (ohm):</b>     | <b>2300</b> | <b>1050</b> | <b>1000</b> | <b>1000</b> | <b>1000</b> |
| <b>Resistivity (ohm-cm):</b> | <b>2300</b> | <b>1050</b> | <b>1000</b> | <b>1000</b> | <b>1000</b> |

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



| Soil Class | Corrosion Resistance | Specific Resistivity (ohm-cm) |
|------------|----------------------|-------------------------------|
| 1          | Excellent            | 10,000 - 6,000                |
| 2          | Good                 | 6,000 - 4,500                 |
| 3          | Fair                 | 4,500 - 2,000                 |
| 4          | Bad                  | 2,000 - 0                     |

Tested By BS Date 6/6/25 Checked By AES Date 6/9/25

## Water-Soluble Sulfate Ion Content in Soil

### AASHTO T 290-95 (2020)

|                   |                               |                              |
|-------------------|-------------------------------|------------------------------|
| Client:           | Summit Design & Eng. Services | Boring No.: B-25-4           |
| Client Reference: | Legion Pond                   | Depth (ft): 1.0-6.0          |
| Project No.:      | R-2025-143-001                | Sample No.: S-1              |
| Lab ID:           | R-2025-143-001-008            | Soil Description: Brown Clay |

#### Sulfate Standard - Calibration Curve Spectrophotometer Readings

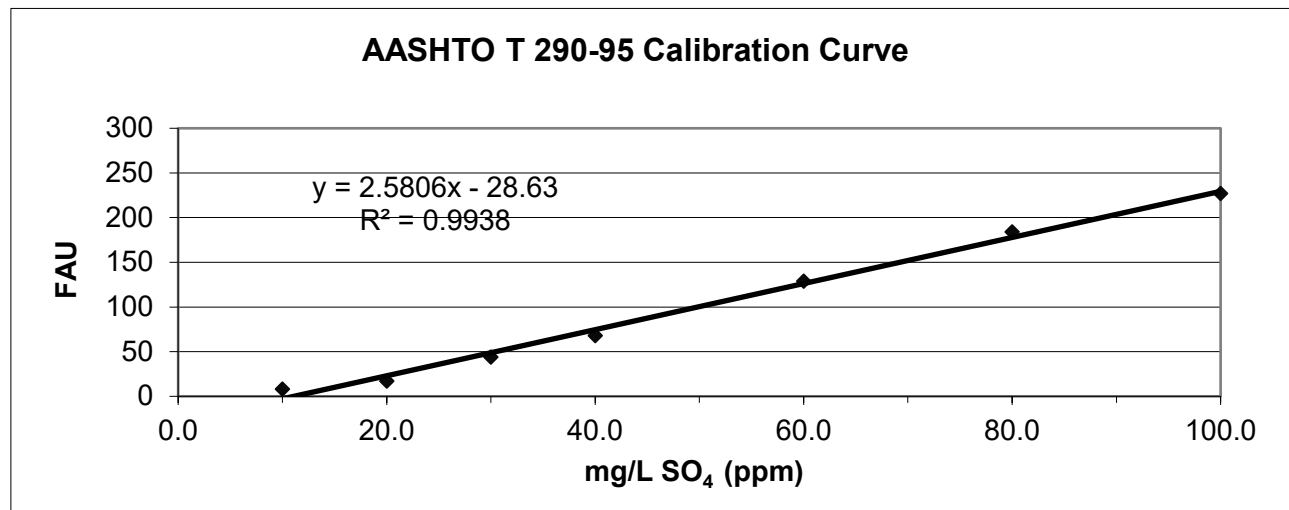
| <u>Sulfate Ion Concentrations (mg/L)</u> |            |      |      |      |      |      |      |       |
|------------------------------------------|------------|------|------|------|------|------|------|-------|
| 0.0                                      | 4.0        | 10.0 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 |
| <u>Spectrophotometer Readings (FAU)</u>  |            |      |      |      |      |      |      |       |
| Underrange                               | Underrange | 8    | 17   | 44   | 68   | 129  | 184  | 227   |

#### Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl<sub>2</sub>·2H<sub>2</sub>O)

|                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Sample Weight (g):</b> 100.0</p> <p><b>Water added to Sample (mL):</b> 300.0</p> <p><b>Size of Sample Aliquot (mL):</b> 50.0</p> <p><b>Sample Reading (FAU):</b> 10</p> <p><b>Sample Diluted:</b> No</p> <p><b>Sulfate Solution Added (ml):</b> 0</p> | <p><b><u>Sample Moisture Content</u></b></p> <p>Tare Number: 442</p> <p>Weight of Tare &amp; Wet Sample (g): 227.50</p> <p>Weight of Tare &amp; Dry Sample (g): 217.68</p> <p>Weight of Tare (g): 98.67</p> <p>Weight of Water (g): 9.82</p> <p>Weight of Dry Sample (g): 119.01</p> <p>Moisture Content (%): 8.25</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                          |       |                                                          |
|------------------------------------------|-------|----------------------------------------------------------|
| <b>Sample Sulfate Ion Concentration:</b> | 14.97 | <b>mg/L SO<sub>4</sub> (ppm)</b>                         |
| <b>Sample Sulfate Ion Content:</b>       | 44.9  | <b>mg/Kg SO<sub>4</sub> (not corrected for moisture)</b> |
| <b>Sample Sulfate Ion Content:</b>       | 48.9  | <b>mg/Kg SO<sub>4</sub> (corrected for moisture)</b>     |



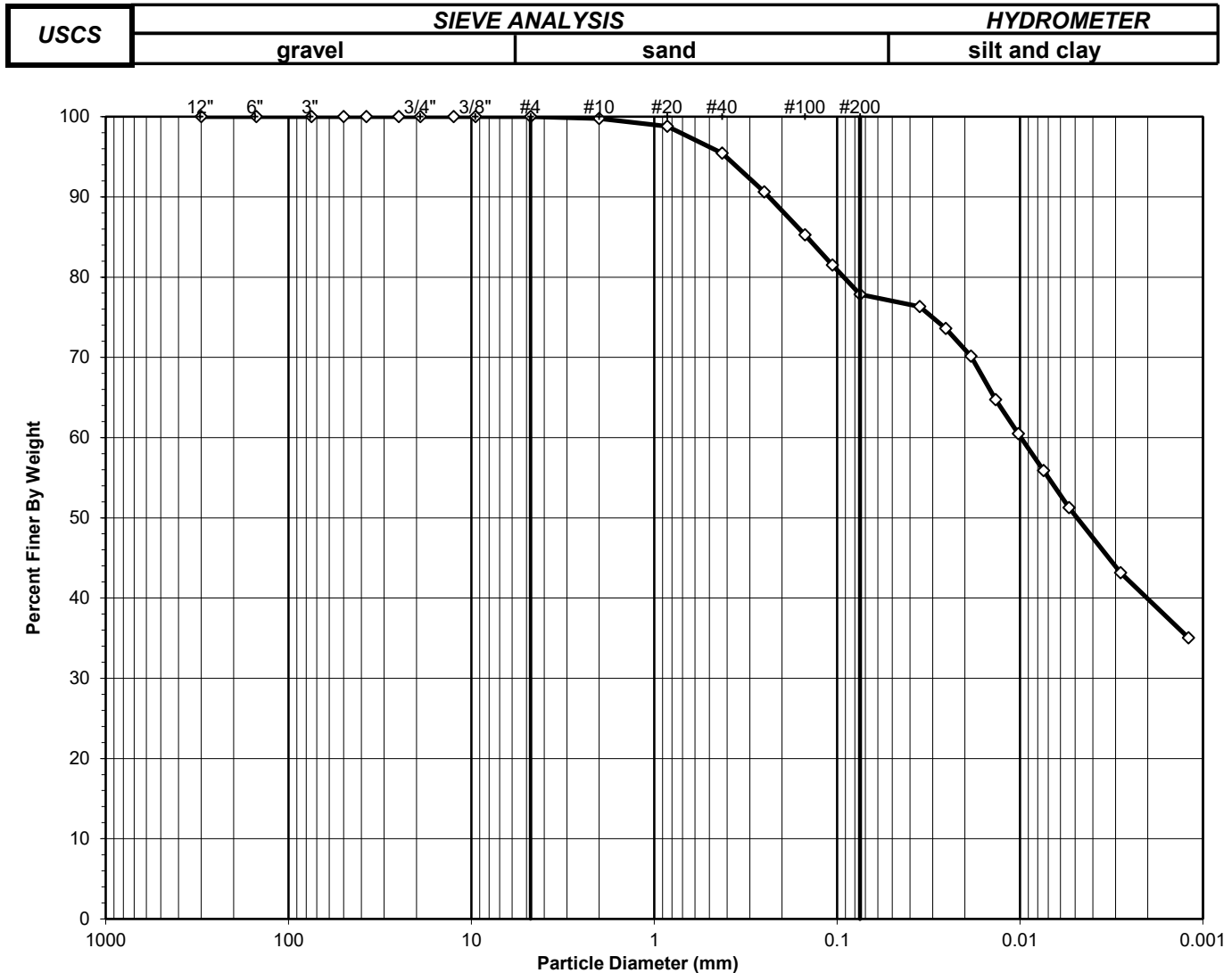
|               |               |                 |               |
|---------------|---------------|-----------------|---------------|
| Tested by: BS | Date: 6/11/25 | Checked by: AES | Date: 6/12/25 |
|---------------|---------------|-----------------|---------------|

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-009

Boring No.: B-25-4  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown



**USCS Symbol:**  
**CL, TESTED**

**USCS Classification:**  
**LEAN CLAY WITH SAND**

|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Tested By CB | Date 5/29/25 | Checked By AES | Date 5/29/25 |
|--------------|--------------|----------------|--------------|

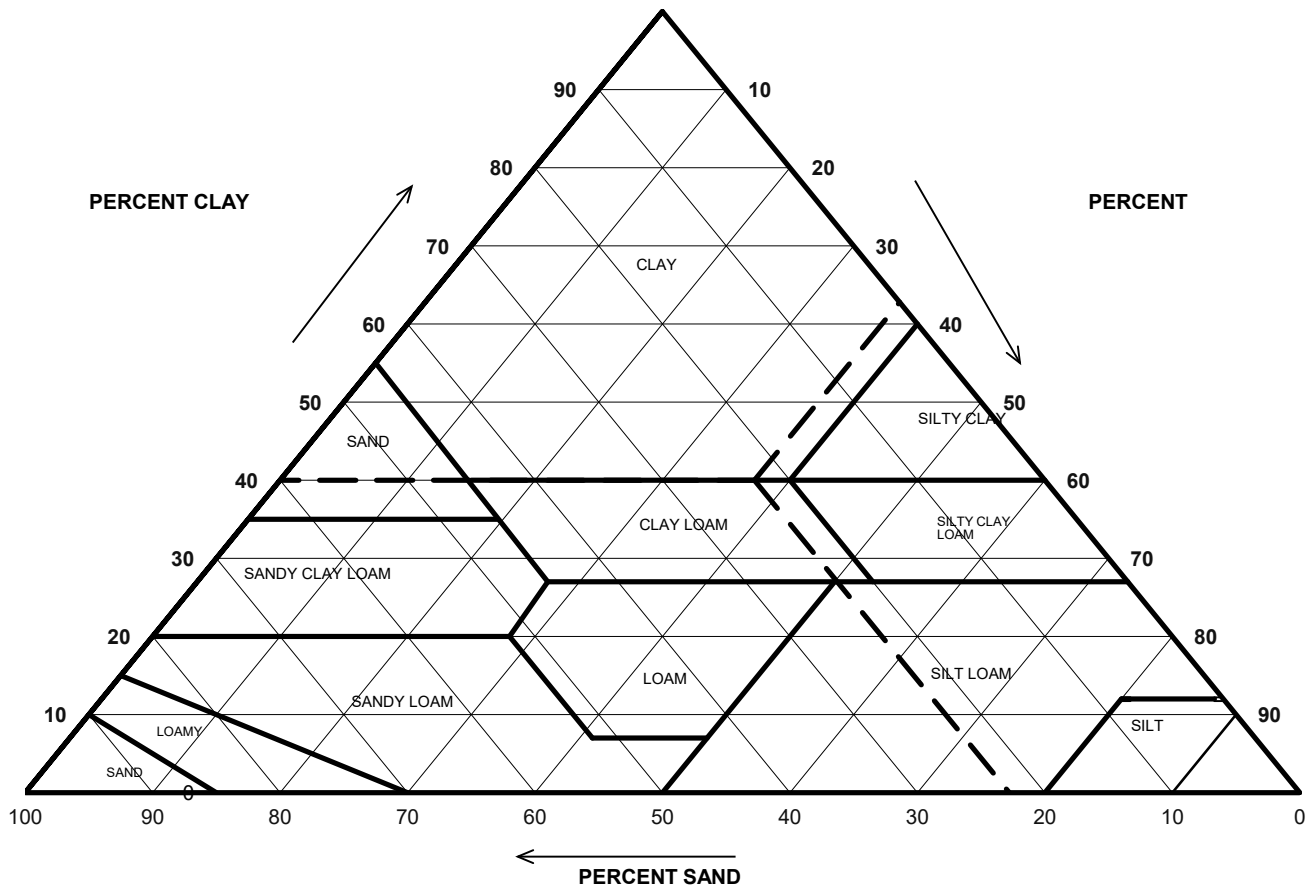
page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1



## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-009

Boring No.: B-25-4  
Depth (ft): 2.0-4.0  
Sample No.: SS-2  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.24              |                                                              |
| 2                  | 99.76         | Sand   | 22.73             | 22.79                                                        |
| 0.05               | 77.02         | Silt   | 37.12             | 37.22                                                        |
| 0.002              | 39.90         | Clay   | 39.90             | 39.99                                                        |

USDA Classification: CLAY LOAM

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-009

Boring No.: B-25-4  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 469         | Tare No.:                          | NA         | Tare No.:                                  | 469        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 498.63      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 498.63     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 452.42      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 452.42     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 146.07      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 146.07     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 46.21       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 46.21      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 306.35      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 306.35     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>15.1</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 306.35     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 306.35     |
| Tare No. (Sub-Specimen)                   | 469         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 469        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 498.63      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 498.63     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 146.07      | Dry Weight of - 3/4" Sample (g):   | 306.35     | Weight of Tare (g):                        | 146.07     | Dry Weight of - 3/4" Sample (g):   | 306.35     |
| Sub-Specimen Wet Weight (g):              | 352.56      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 352.56     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 306.35     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 306.35     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.75                        | 0.24                 | 0.24                             | 99.76             | 99.8                          |
| #20        | 0.85               | 2.89                        | ( ** )               | 1.19                             | 98.81             | 98.8                          |
| #40        | 0.425              | 10.33                       | 3.37                 | 4.56                             | 95.44             | 95.4                          |
| #60        | 0.25               | 14.73                       | 4.81                 | 9.37                             | 90.63             | 90.6                          |
| #100       | 0.15               | 16.41                       | 5.36                 | 14.72                            | 85.28             | 85.3                          |
| #140       | 0.106              | 11.55                       | 3.77                 | 18.50                            | 81.50             | 81.5                          |
| #200       | 0.075              | 11.21                       | 3.66                 | 22.15                            | 77.85             | 77.8                          |
| Pan        | -                  | 238.48                      | 77.85                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 5/29/25 Checked By AES Date 5/29/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-4  |
| Client Reference: | Legion Pond                   | Depth (ft): | 2.0-4.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-2    |
| Lab ID:           | R-2025-143-001-009            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 52.0       | 22.9       | 2.60        | 7.2                      | 0.0353 | 98.0                       | 76.3                        |
| 2                  | 50.3       | 22.9       | 2.60        | 7.6                      | 0.0255 | 94.6                       | 73.6                        |
| 4                  | 48.0       | 22.9       | 2.60        | 8.0                      | 0.0185 | 90.1                       | 70.1                        |
| 8                  | 44.5       | 22.9       | 2.60        | 8.6                      | 0.0136 | 83.1                       | 64.7                        |
| 15                 | 41.8       | 22.9       | 2.60        | 9.1                      | 0.0102 | 77.7                       | 60.5                        |
| 30                 | 38.8       | 23.0       | 2.56        | 9.6                      | 0.0074 | 71.8                       | 55.9                        |
| 60                 | 35.8       | 23.0       | 2.56        | 10.2                     | 0.0054 | 65.9                       | 51.3                        |
| 240                | 30.5       | 23.0       | 2.56        | 11.1                     | 0.0028 | 55.4                       | 43.2                        |
| 1440               | 25.3       | 23.0       | 2.56        | 12.1                     | 0.0012 | 45.0                       | 35.0                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 217    | Percent Finer than # 200: | 77.85        |
| Wt. of Tare & Dry Material (g): | 225.29 |                           |              |
| Weight of Tare (g):             | 170.46 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 49.83  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 5/29/25 |
|-----------|----|------|---------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-009

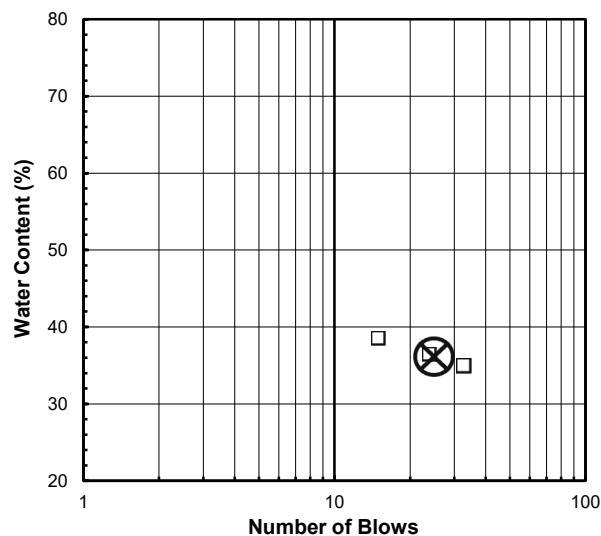
Boring No.: B-25-4  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40** (Minus #40 sieve material, Air dried)  
**sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.**

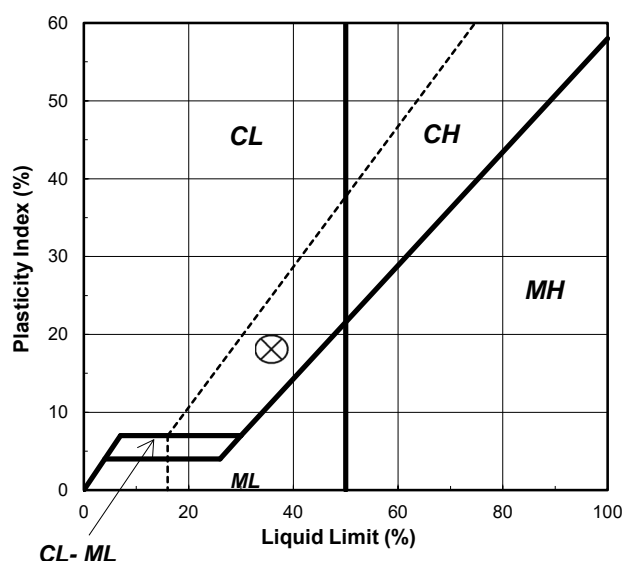
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |       |       |   |
|-----------------------------------------------|--------|-------------------|-------|-------|---|
|                                               |        | 1                 | 2     | 3     | M |
| Tare Number:                                  | 469    | A-D               | W-2   | A-N   | U |
| Wt. of Tare & Wet Sample (g):                 | 498.63 | 30.06             | 28.56 | 32.81 | L |
| Wt. of Tare & Dry Sample (g):                 | 452.42 | 26.24             | 25.14 | 27.95 | T |
| Weight of Tare (g):                           | 146.07 | 15.28             | 15.73 | 15.30 | I |
| Weight of Water (g):                          | 46.2   | 3.8               | 3.4   | 4.9   | P |
| Weight of Dry Sample (g):                     | 306.4  | 11.0              | 9.4   | 12.7  | O |
| Was As Received MC Preserved:                 | Yes    |                   |       |       | I |
| Moisture Content (%):                         | 15.1   | 34.9              | 36.3  | 38.4  | N |
| Number of Blows:                              |        | 33                | 24    | 15    | T |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 18    | 29    |       | Liquid Limit (%): 36     |
| Wt. of Tare & Wet Sample (g):                                         | 18.99 | 17.03 |       | Plastic Limit (%): 18    |
| Wt. of Tare & Dry Sample (g):                                         | 17.14 | 15.47 |       | Plasticity Index (%): 18 |
| Weight of Tare (g):                                                   | 6.98  | 7.00  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 1.9   | 1.6   |       |                          |
| Weight of Dry Sample (g):                                             | 10.2  | 8.5   |       |                          |
| Moisture Content (%):                                                 | 18.2  | 18.4  | -0.2  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 5/28/25 Checked By AES Date 5/29/25

## CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-010

Boring No.: B-25-4  
 Depth (ft): 8.0-14.0  
 Sample No.: SS-5, SS-6, SS-7  
 Description: Brown Clay

( - # 10 Sieve material )

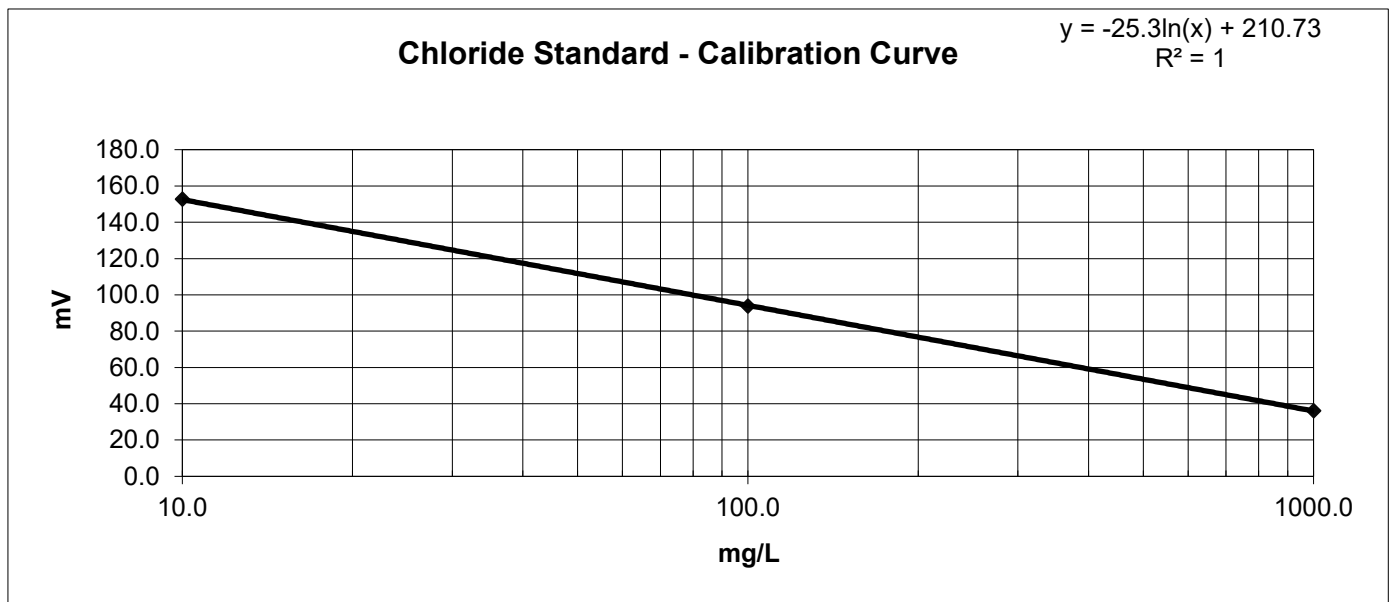
### CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD    | MILLIVOLTS<br>(mV) |
|-------------|--------------------|
| 10.0 mg/L   | 152.7              |
| 100.0 mg/L  | 93.8               |
| 1000.0 mg/L | 36.2               |

### MEASUREMENT OF CHLORIDES

|                              |       |               |               |
|------------------------------|-------|---------------|---------------|
| Sample Weight (g):           | 100.0 | CONCENTRATION | CONCENTRATION |
| Water added to Sample (ml):  | 100.0 | (mg/L)        | (mg/kg)       |
| Size of Sample Aliquot (ml): | 20.0  |               |               |
| Sample Reading (mV):         | 95.4  | 95.49         | 95.49         |

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO<sub>3</sub> solution (1:1 volume).  
 2) Samples were dried for a minimum of 12 hours at 110 ± 5°C.



Notes:

Tested By BS Date 6/10/25 Checked By AES Date 6/10/25

page 1 of 1 DCN: CT-S63A DATE: 6/2/14 REVISION: 1

# Minimum Resistivity

AASHTO T288-12



Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-010

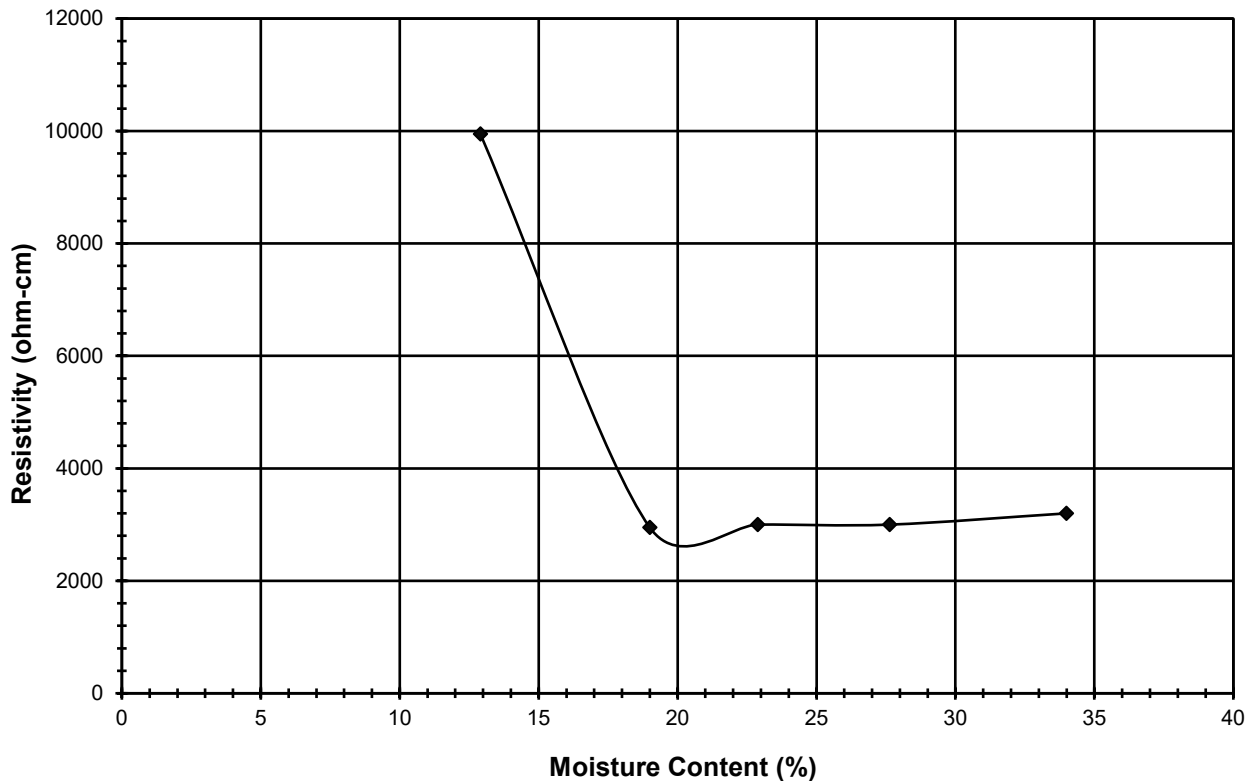
Boring No.: B-25-4  
 Depth (ft): 8.0-14.0  
 Sample No.: SS-5, SS-6, SS-7

Visual Description: Brown Clay  
 ( - #10 Sieve material )

| Tare No.:                | B5    | B11   | B12   | B16   | B18   |
|--------------------------|-------|-------|-------|-------|-------|
| Tare & Wet Specimen (g): | 29.61 | 29.36 | 29.69 | 29.95 | 29.67 |
| Tare & Dry Specimen (g): | 28.00 | 27.16 | 27.04 | 26.83 | 26.07 |
| Tare Weight (g):         | 15.52 | 15.58 | 15.46 | 15.54 | 15.48 |

|                              |             |             |             |             |             |
|------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Moisture Content (%):</b> | <b>12.9</b> | <b>19.0</b> | <b>22.9</b> | <b>27.6</b> | <b>34.0</b> |
| <b>Resistance (ohm):</b>     | <b>9950</b> | <b>2950</b> | <b>3000</b> | <b>3000</b> | <b>3200</b> |
| <b>Resistivity (ohm-cm):</b> | <b>9950</b> | <b>2950</b> | <b>3000</b> | <b>3000</b> | <b>3200</b> |

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



| Soil Class | Corrosion Resistance | Specific Resistivity (ohm-cm) |
|------------|----------------------|-------------------------------|
| 1          | Excellent            | 10,000 - 6,000                |
| 2          | Good                 | 6,000 - 4,500                 |
| 3          | Fair                 | 4,500 - 2,000                 |
| 4          | Bad                  | 2,000 - 0                     |

Tested By BS Date 6/4/25 Checked By AES Date 6/5/25

## Water-Soluble Sulfate Ion Content in Soil

### AASHTO T 290-95 (2020)

|                   |                               |                              |
|-------------------|-------------------------------|------------------------------|
| Client:           | Summit Design & Eng. Services | Boring No.: B-25-4           |
| Client Reference: | Legion Pond                   | Depth (ft): 8.0-14.0         |
| Project No.:      | R-2025-143-001                | Sample No.: SS-5, SS-6, SS-7 |
| Lab ID:           | R-2025-143-001-010            | Soil Description: Brown Clay |

#### Sulfate Standard - Calibration Curve Spectrophotometer Readings

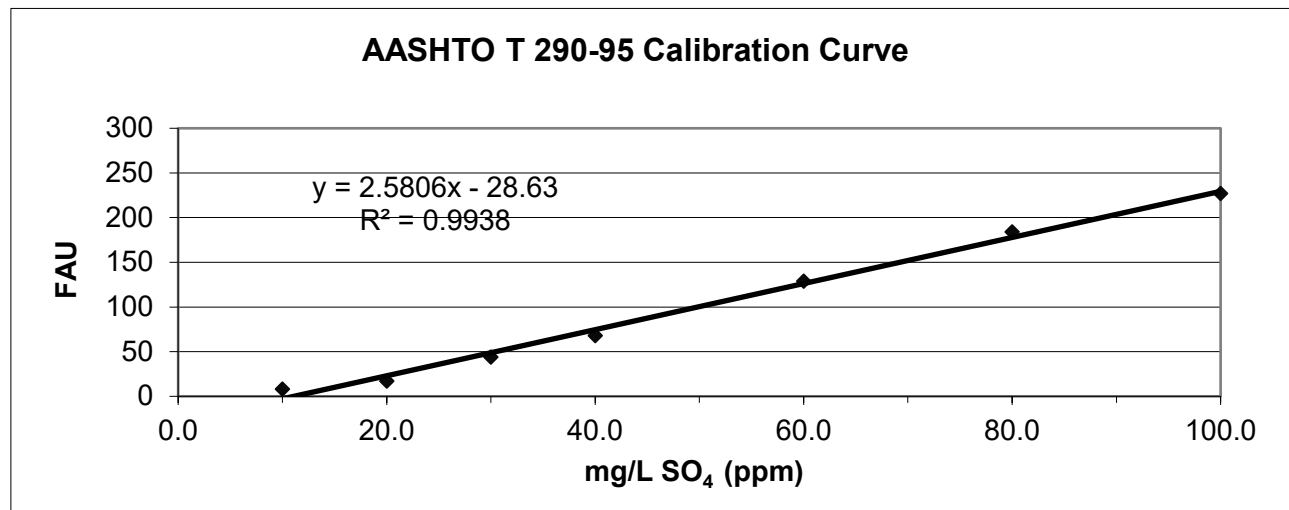
| <u>Sulfate Ion Concentrations (mg/L)</u> |            |      |      |      |      |      |      |       |
|------------------------------------------|------------|------|------|------|------|------|------|-------|
| 0.0                                      | 4.0        | 10.0 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 |
| <u>Spectrophotometer Readings (FAU)</u>  |            |      |      |      |      |      |      |       |
| Underrange                               | Underrange | 8    | 17   | 44   | 68   | 129  | 184  | 227   |

#### Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl<sub>2</sub>·2H<sub>2</sub>O)

|                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Sample Weight (g):</b> 100.0</p> <p><b>Water added to Sample (mL):</b> 300.0</p> <p><b>Size of Sample Aliquot (mL):</b> 50.0</p> <p><b>Sample Reading (FAU):</b> 9</p> <p><b>Sample Diluted:</b> No</p> <p><b>Sulfate Solution Added (ml):</b> 0</p> | <p><b><u>Sample Moisture Content</u></b></p> <p>Tare Number: 474</p> <p>Weight of Tare &amp; Wet Sample (g): 225.68</p> <p>Weight of Tare &amp; Dry Sample (g): 219.53</p> <p>Weight of Tare (g): 98.49</p> <p>Weight of Water (g): 6.15</p> <p>Weight of Dry Sample (g): 121.04</p> <p>Moisture Content (%): 5.08</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                   |       |                                                    |
|-----------------------------------|-------|----------------------------------------------------|
| Sample Sulfate Ion Concentration: | 14.58 | mg/L SO <sub>4</sub> (ppm)                         |
| Sample Sulfate Ion Content:       | 43.7  | mg/Kg SO <sub>4</sub> (not corrected for moisture) |
| Sample Sulfate Ion Content:       | 46.1  | mg/Kg SO <sub>4</sub> (corrected for moisture)     |



|               |               |                 |               |
|---------------|---------------|-----------------|---------------|
| Tested by: BS | Date: 6/11/25 | Checked by: AES | Date: 6/12/25 |
|---------------|---------------|-----------------|---------------|

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-011

Boring No.: B-25-4  
 Depth (ft): 19.0-22.0  
 Sample No.: S-2

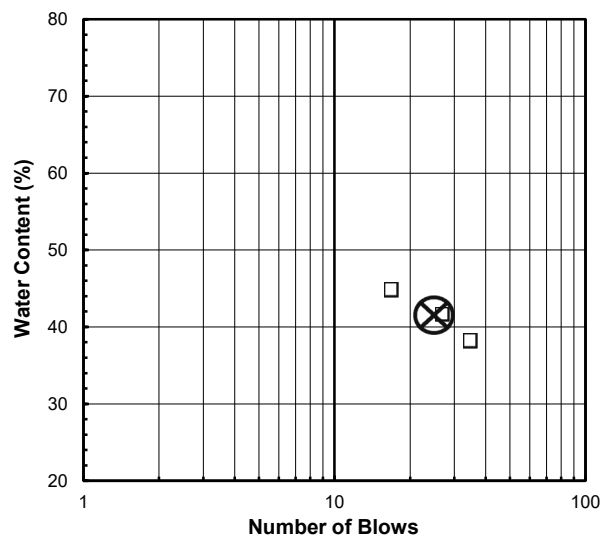
Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

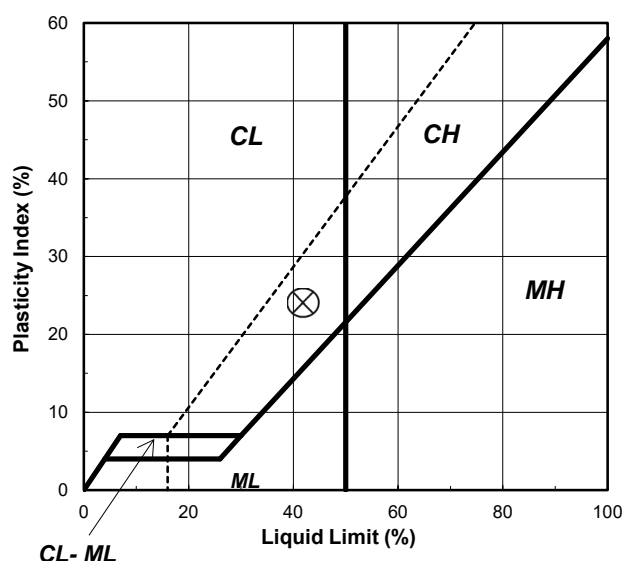
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |        |        |        |
|-----------------------------------------------|--------|-------------------|--------|--------|--------|
| Tare Number:                                  | 44-A   | 1<br>A-C          | 2<br>W | 3<br>E | M<br>U |
| Wt. of Tare & Wet Sample (g):                 | 442.83 | 29.70             | 29.45  | 29.12  | L      |
| Wt. of Tare & Dry Sample (g):                 | 392.56 | 25.77             | 25.22  | 24.80  | T      |
| Weight of Tare (g):                           | 128.33 | 15.46             | 15.03  | 15.15  | I      |
| Weight of Water (g):                          | 50.3   | 3.9               | 4.2    | 4.3    | P      |
| Weight of Dry Sample (g):                     | 264.2  | 10.3              | 10.2   | 9.7    | O      |
| Was As Received MC Preserved:                 | Yes    |                   |        |        | I      |
| Moisture Content (%):                         | 19.0   | 38.1              | 41.5   | 44.8   | N      |
| Number of Blows:                              |        | 35                | 27     | 17     | T      |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 10    | 17    |       | Liquid Limit (%): 42     |
| Wt. of Tare & Wet Sample (g):                                         | 14.20 | 14.30 |       | Plastic Limit (%): 18    |
| Wt. of Tare & Dry Sample (g):                                         | 13.10 | 13.18 |       | Plasticity Index (%): 24 |
| Weight of Tare (g):                                                   | 6.94  | 6.95  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 1.1   | 1.1   |       |                          |
| Weight of Dry Sample (g):                                             | 6.2   | 6.2   |       |                          |
| Moisture Content (%):                                                 | 17.9  | 18.0  | -0.1  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 6/12/25 Checked By AES Date 6/13/25



## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-012

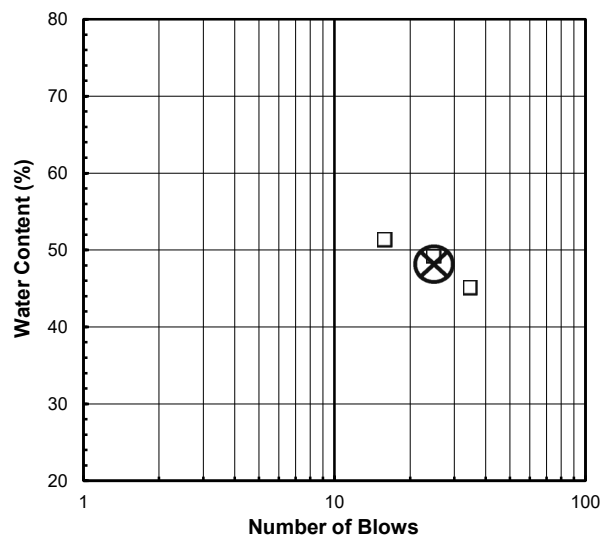
Boring No.: B-25-4  
 Depth (ft): 22.0-24.0  
 Sample No.: SS-12  
 Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

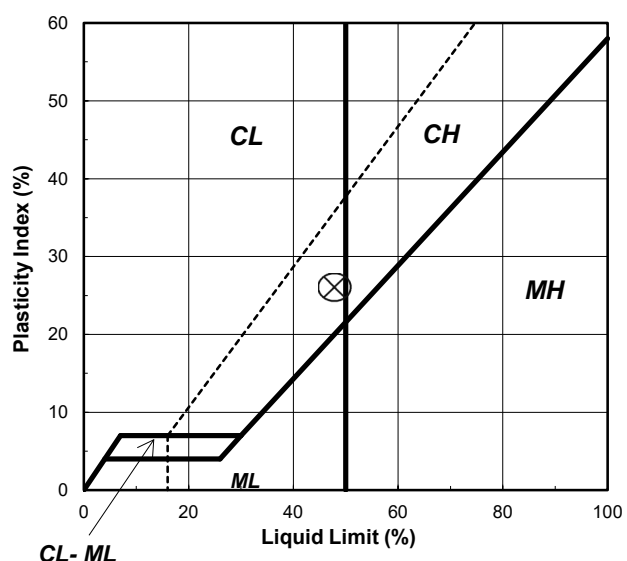
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |       |       |   |
|-----------------------------------------------|--------|-------------------|-------|-------|---|
| Tare Number:                                  | 746    | 1                 | 2     | 3     | M |
| Wt. of Tare & Wet Sample (g):                 | 448.05 | 1M                | KP    | L2    | U |
| Wt. of Tare & Dry Sample (g):                 | 392.53 | 29.53             | 30.69 | 29.23 | L |
| Weight of Tare (g):                           | 140.49 | 25.25             | 25.65 | 24.45 | T |
| Weight of Water (g):                          | 55.5   | 15.74             | 15.39 | 15.12 | I |
| Weight of Dry Sample (g):                     | 252.0  | 4.3               | 5.0   | 4.8   | P |
| Was As Received MC Preserved:                 | Yes    | 9.5               | 10.3  | 9.3   | O |
| Moisture Content (%):                         | 22.0   | 45.0              | 49.1  | 51.2  | N |
| Number of Blows:                              |        | 35                | 25    | 16    | T |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 6     | 33    |       | Liquid Limit (%): 48     |
| Wt. of Tare & Wet Sample (g):                                         | 17.09 | 16.12 |       | Plastic Limit (%): 22    |
| Wt. of Tare & Dry Sample (g):                                         | 15.30 | 14.48 |       | Plasticity Index (%): 26 |
| Weight of Tare (g):                                                   | 7.02  | 6.97  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 1.8   | 1.6   |       |                          |
| Weight of Dry Sample (g):                                             | 8.3   | 7.5   |       |                          |
| Moisture Content (%):                                                 | 21.6  | 21.8  | -0.2  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 5/29/25 Checked By AES Date 6/2/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-013

Boring No.: B-25-5  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown



**USCS Symbol:**  
**CH, TESTED**

**USCS Classification:**  
**FAT CLAY WITH SAND**

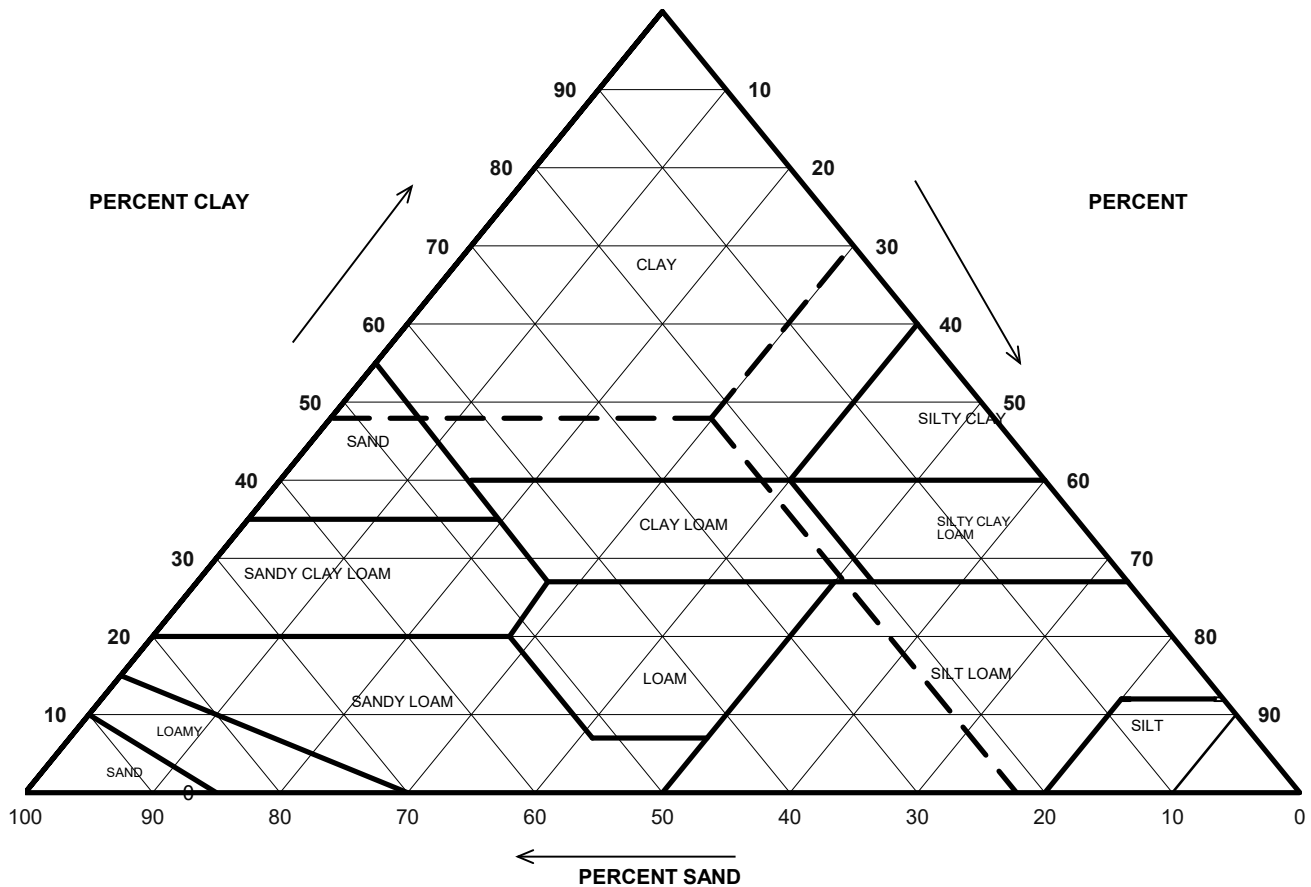
|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Tested By CB | Date 5/28/25 | Checked By AES | Date 5/28/25 |
|--------------|--------------|----------------|--------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-013

Boring No.: B-25-5  
Depth (ft): 2.0-4.0  
Sample No.: SS-2  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.22              |                                                              |
| 2                  | 99.78         | Sand   | 22.18             | 22.23                                                        |
| 0.05               | 77.60         | Silt   | 29.78             | 29.84                                                        |
| 0.002              | 47.82         | Clay   | 47.82             | 47.93                                                        |

USDA Classification: **CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-013

Boring No.: B-25-5  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 37-A        | Tare No.:                          | NA         | Tare No.:                                  | 37-A       | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 339.87      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 339.87     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 310.12      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 310.12     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 136.09      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 136.09     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 29.75       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 29.75      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 174.03      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 174.03     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>17.1</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 174.03     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 174.03     |
| Tare No. (Sub-Specimen)                   | 37-A        | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 37-A       | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 339.87      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 339.87     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 136.09      | Dry Weight of - 3/4" Sample (g):   | 174.03     | Weight of Tare (g):                        | 136.09     | Dry Weight of - 3/4" Sample (g):   | 174.03     |
| Sub-Specimen Wet Weight (g):              | 203.78      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 203.78     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 174.03     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 174.03     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.39                        | 0.22                 | 0.22                             | 99.78             | 99.8                          |
| #20        | 0.85               | 1.55                        | ( ** ) 0.89          | 1.11                             | 98.89             | 98.9                          |
| #40        | 0.425              | 5.13                        | 2.95                 | 4.06                             | 95.94             | 95.9                          |
| #60        | 0.25               | 8.33                        | 4.79                 | 8.85                             | 91.15             | 91.2                          |
| #100       | 0.15               | 9.91                        | 5.69                 | 14.54                            | 85.46             | 85.5                          |
| #140       | 0.106              | 6.49                        | 3.73                 | 18.27                            | 81.73             | 81.7                          |
| #200       | 0.075              | 6.29                        | 3.61                 | 21.89                            | 78.11             | 78.1                          |
| Pan        | -                  | 135.94                      | 78.11                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 5/28/25 Checked By AES Date 5/28/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-5  |
| Client Reference: | Legion Pond                   | Depth (ft): | 2.0-4.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-2    |
| Lab ID:           | R-2025-143-001-013            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 50.8       | 22.9       | 2.60        | 7.5                      | 0.0358 | 98.8                       | 77.2                        |
| 2                  | 49.0       | 22.9       | 2.60        | 7.8                      | 0.0259 | 95.1                       | 74.3                        |
| 4                  | 46.8       | 22.9       | 2.60        | 8.2                      | 0.0188 | 90.5                       | 70.7                        |
| 8                  | 44.5       | 22.9       | 2.60        | 8.6                      | 0.0136 | 85.9                       | 67.1                        |
| 15                 | 42.8       | 22.9       | 2.60        | 8.9                      | 0.0101 | 82.3                       | 64.3                        |
| 30                 | 40.3       | 22.9       | 2.60        | 9.4                      | 0.0073 | 77.2                       | 60.3                        |
| 60                 | 38.3       | 23.0       | 2.56        | 9.7                      | 0.0053 | 73.2                       | 57.1                        |
| 240                | 34.0       | 23.0       | 2.56        | 10.5                     | 0.0027 | 64.4                       | 50.3                        |
| 1440               | 29.8       | 22.9       | 2.60        | 11.2                     | 0.0012 | 55.7                       | 43.5                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 211    | Percent Finer than # 200: | 78.11        |
| Wt. of Tare & Dry Material (g): | 223.76 |                           |              |
| Weight of Tare (g):             | 170.52 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 48.24  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 5/29/25 |
|-----------|----|------|---------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-013

Boring No.: B-25-5

Depth (ft): 2.0-4.0

Sample No.: SS-2

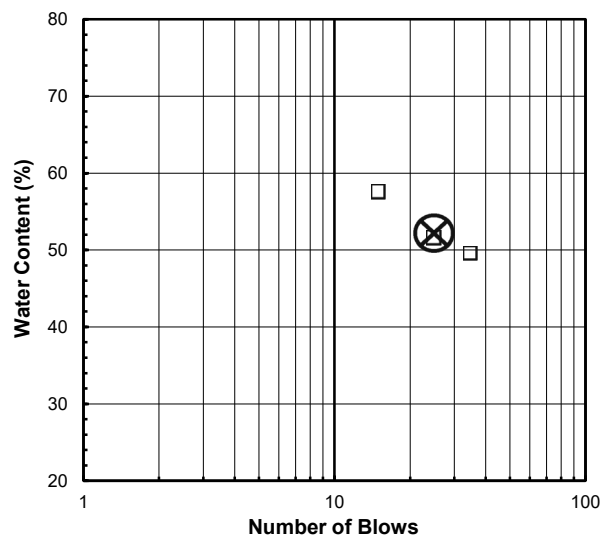
Soil Description: BROWN FAT CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

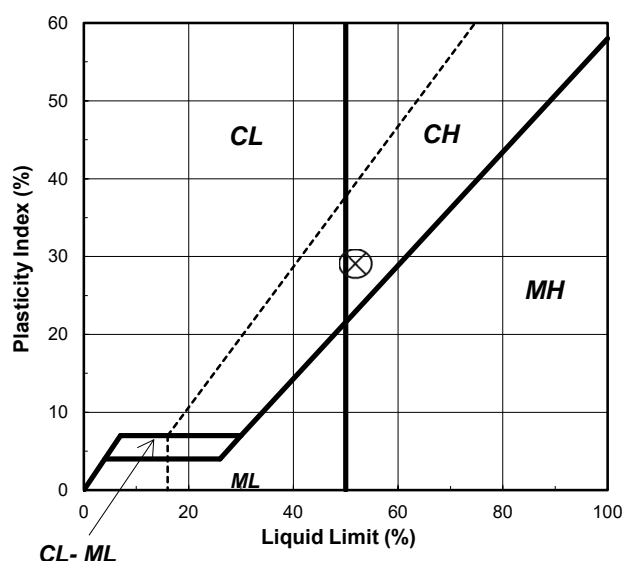
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |          |          |        |
|-----------------------------------------------|--------|-------------------|----------|----------|--------|
| Tare Number:                                  | 37-A   | 1<br>S            | 2<br>A-P | 3<br>W-5 | M<br>U |
| Wt. of Tare & Wet Sample (g):                 | 339.87 | 29.77             | 30.14    | 28.48    | L      |
| Wt. of Tare & Dry Sample (g):                 | 310.12 | 24.91             | 25.15    | 23.75    | T      |
| Weight of Tare (g):                           | 136.09 | 15.08             | 15.46    | 15.52    | I      |
| Weight of Water (g):                          | 29.8   | 4.9               | 5.0      | 4.7      | P      |
| Weight of Dry Sample (g):                     | 174.0  | 9.8               | 9.7      | 8.2      | O      |
| Was As Received MC Preserved:                 | Yes    |                   |          |          | I      |
| Moisture Content (%):                         | 17.1   | 49.4              | 51.5     | 57.5     | N      |
| Number of Blows:                              |        | 35                | 25       | 15       | T      |

| Plastic Limit Test                                                   | 1     | 2     | Range | Test Results             |
|----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                         | 12    | 21    |       | Liquid Limit (%): 52     |
| Wt. of Tare & Wet Sample (g):                                        | 13.43 | 13.01 |       | Plastic Limit (%): 23    |
| Wt. of Tare & Dry Sample (g):                                        | 12.23 | 11.88 |       | Plasticity Index (%): 29 |
| Weight of Tare (g):                                                  | 7.00  | 7.04  |       | USCS Symbol: CH          |
| Weight of Water (g):                                                 | 1.2   | 1.1   |       |                          |
| Weight of Dry Sample (g):                                            | 5.2   | 4.8   |       |                          |
| Moisture Content (%):                                                | 22.9  | 23.3  | -0.4  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm 1.4$ |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 6/12/25 Checked By AES Date 6/13/25

## CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-014

Boring No.: B-25-5  
 Depth (ft): 6.0-12.0  
 Sample No.: SS-4, SS-5, SS-6  
 Description: Brown Clay

( - # 10 Sieve material )

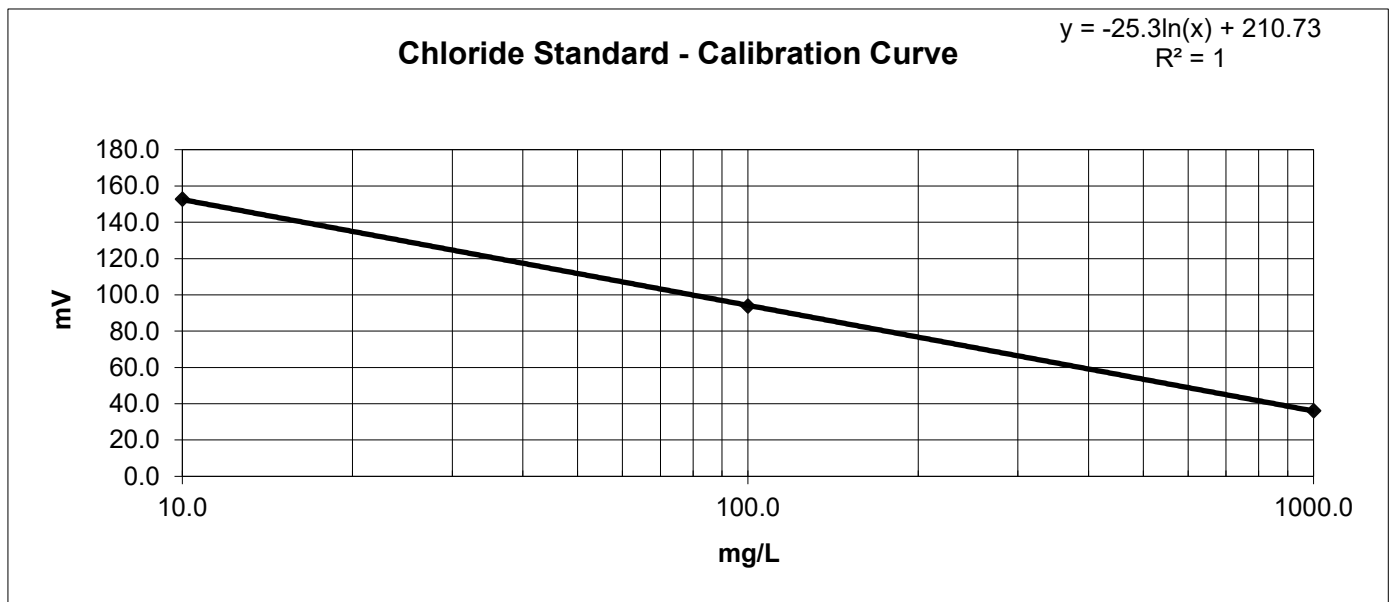
### CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD    | MILLIVOLTS<br>(mV) |
|-------------|--------------------|
| 10.0 mg/L   | 152.7              |
| 100.0 mg/L  | 93.8               |
| 1000.0 mg/L | 36.2               |

### MEASUREMENT OF CHLORIDES

|                              |       |               |               |
|------------------------------|-------|---------------|---------------|
| Sample Weight (g):           | 100.0 | CONCENTRATION | CONCENTRATION |
| Water added to Sample (ml):  | 100.0 | (mg/L)        | (mg/kg)       |
| Size of Sample Aliquot (ml): | 20.0  |               |               |
| Sample Reading (mV):         | 75.8  | 207.23        | 207.23        |

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO<sub>3</sub> solution (1:1 volume).  
 2) Samples were dried for a minimum of 12 hours at 110 ± 5°C.



Notes:

Tested By BS Date 6/10/25 Checked By AES Date 6/10/25

# Minimum Resistivity

AASHTO T288-12



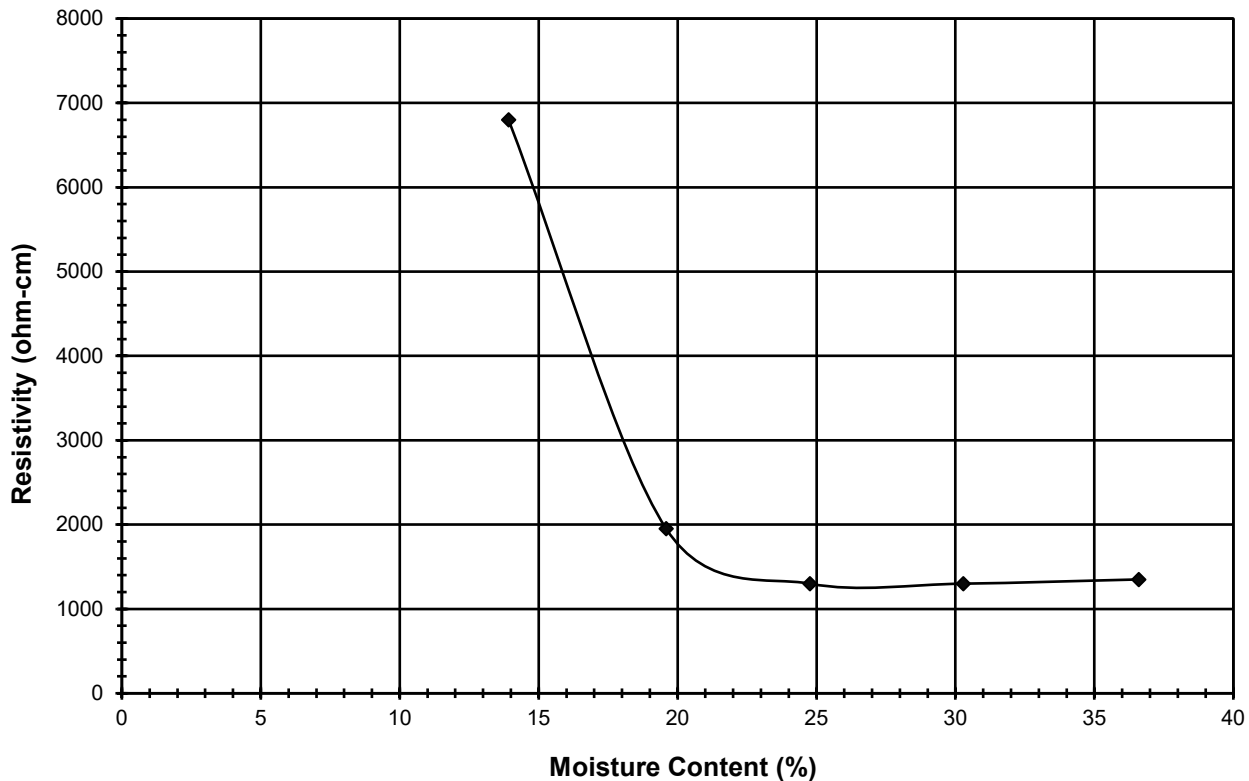
Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-014

Boring No.: B-25-5  
 Depth (ft): 6.0-12.0  
 Sample No.: SS-4, SS-5, SS-6  
 Visual Description: Brown Clay  
 ( - #10 Sieve material )

| Tare No.:                | B5    | B11   | B12   | B16   | B18   |
|--------------------------|-------|-------|-------|-------|-------|
| Tare & Wet Specimen (g): | 29.60 | 29.63 | 29.63 | 29.66 | 29.60 |
| Tare & Dry Specimen (g): | 27.88 | 27.33 | 26.82 | 26.38 | 25.82 |
| Tare Weight (g):         | 15.52 | 15.59 | 15.47 | 15.55 | 15.49 |

| Moisture Content (%): | 13.9 | 19.6 | 24.8 | 30.3 | 36.6 |
|-----------------------|------|------|------|------|------|
| Resistance (ohm):     | 6800 | 1950 | 1300 | 1300 | 1350 |
| Resistivity (ohm-cm): | 6800 | 1950 | 1300 | 1300 | 1350 |

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



| Soil Class | Corrosion Resistance | Specific Resistivity (ohm-cm) |
|------------|----------------------|-------------------------------|
| 1          | Excellent            | 10,000 - 6,000                |
| 2          | Good                 | 6,000 - 4,500                 |
| 3          | Fair                 | 4,500 - 2,000                 |
| 4          | Bad                  | 2,000 - 0                     |

Tested By BS Date 6/6/25 Checked By AES Date 6/9/25



## Water-Soluble Sulfate Ion Content in Soil

### AASHTO T 290-95 (2020)

|                   |                               |                   |                  |
|-------------------|-------------------------------|-------------------|------------------|
| Client:           | Summit Design & Eng. Services | Boring No.:       | B-25-5           |
| Client Reference: | Legion Pond                   | Depth (ft):       | 6.0-12.0         |
| Project No.:      | R-2025-143-001                | Sample No.:       | SS-4, SS-5, SS-6 |
| Lab ID:           | R-2025-143-001-014            | Soil Description: | Brown Clay       |

#### Sulfate Standard - Calibration Curve Spectrophotometer Readings

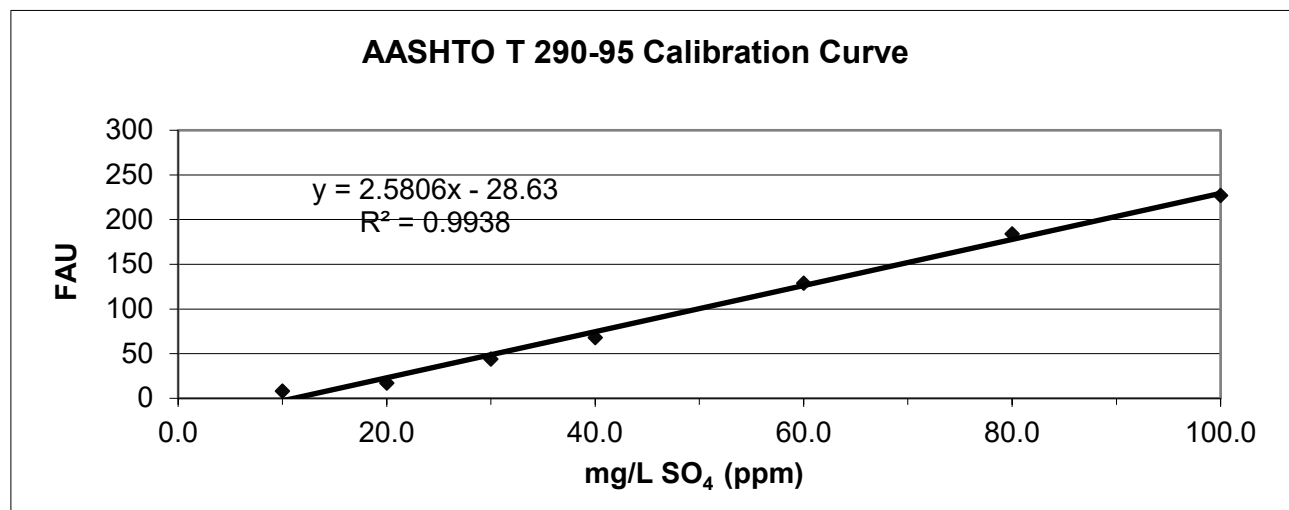
| <u>Sulfate Ion Concentrations (mg/L)</u> |            |      |      |      |      |      |      |       |
|------------------------------------------|------------|------|------|------|------|------|------|-------|
| 0.0                                      | 4.0        | 10.0 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 |
| <u>Spectrophotometer Readings (FAU)</u>  |            |      |      |      |      |      |      |       |
| Underrange                               | Underrange | 8    | 17   | 44   | 68   | 129  | 184  | 227   |

#### Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl<sub>2</sub>·2H<sub>2</sub>O)

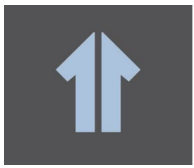
|                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Sample Weight (g):</b> 100.0</p> <p><b>Water added to Sample (mL):</b> 300.0</p> <p><b>Size of Sample Aliquot (mL):</b> 50.0</p> <p><b>Sample Reading (FAU):</b> 9</p> <p><b>Sample Diluted:</b> No</p> <p><b>Sulfate Solution Added (ml):</b> 0</p> | <p><b><u>Sample Moisture Content</u></b></p> <p>Tare Number: 491</p> <p>Weight of Tare &amp; Wet Sample (g): 228.89</p> <p>Weight of Tare &amp; Dry Sample (g): 221.90</p> <p>Weight of Tare (g): 100.40</p> <p>Weight of Water (g): 6.99</p> <p>Weight of Dry Sample (g): 121.50</p> <p>Moisture Content (%): 5.75</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                          |       |                                                          |
|------------------------------------------|-------|----------------------------------------------------------|
| <b>Sample Sulfate Ion Concentration:</b> | 14.58 | <b>mg/L SO<sub>4</sub> (ppm)</b>                         |
| <b>Sample Sulfate Ion Content:</b>       | 43.7  | <b>mg/Kg SO<sub>4</sub> (not corrected for moisture)</b> |
| <b>Sample Sulfate Ion Content:</b>       | 46.4  | <b>mg/Kg SO<sub>4</sub> (corrected for moisture)</b>     |



|               |               |                 |               |
|---------------|---------------|-----------------|---------------|
| Tested by: BS | Date: 6/11/25 | Checked by: AES | Date: 6/12/25 |
|---------------|---------------|-----------------|---------------|

**APPENDIX B**  
**REPORT OF SUBSURFACE INVESTIGATION**



**SUMMIT**  
DESIGN AND ENGINEERING SERVICES

## Report of Subsurface Investigation



### Legion Pond

Chapel Hill, North Carolina

### Prepared for:

Tetra Tech, Inc.

### Prepared by:

Summit Design and Engineering Services, Inc.

320 Executive Court  
Hillsborough, NC 27278

Summit Project No. 24-0050.208



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| Area Geology             | 2        |
| Subsurface Conditions    | 3        |
| Groundwater Conditions   | 3        |
| Laboratory Testing       | 4        |
| <b>CLOSURE</b>           | <b>4</b> |

### **FIGURES**

Figure 1 – Geologic Map of North Carolina – (North Carolina Geological Survey, 1985)

### **TABLES**

Table 1 – Soil Boring Summary

### **APPENDICES**

- Legend and Key Sheet
- Boring Location Plan
- Soil Boring Logs
- Laboratory Test Results





June 17, 2025

Ms. Holly Miller  
NC Operations Manager  
Tetra Tech, Inc.  
4000 Sancar Way, Suite 200  
RTP, NC 27709

**Reference: Report of Subsurface Investigation**  
Legion Pond  
Chapel Hill, North Carolina  
Summit Project No.: 24-0050.208

Dear Ms. Miller:

Summit Design and Engineering Services, Inc. (Summit) is pleased to present this report for a subsurface exploration for the referenced project located at 1714 Legion Road in Chapel Hill, North Carolina. Our services were provided in accordance with Summit's Proposal No. G23-0086 dated October 20, 2023. This report presents a review of the project information provided to us and a discussion of the site and subsurface conditions revealed during our field investigation. The Appendix of this report contains a boring location diagram, the soil test boring logs and the results of our laboratory testing.

## FIELD EXPLORATION

Our field exploration to evaluate the subsurface materials along the existing pond included the performance of five soil test borings at locations requested by Tetra Tech. The borings were taken to depths of between 14.3 feet and 28.9 feet below the existing ground surface. The borings were located in the field by personnel from Summit using a handheld GPS. Ground surface elevations shown on the boring logs were estimated using 1-foot contours on a site plan prepared by Tetra Tech; therefore, the elevations should be considered approximate.

The borings were drilled using 3¾-inch hollow stem augers with a CME-550X on a rubber-tired carrier. Standard Penetration Tests (SPT) were performed at selected intervals with a split spoon sampler to determine N-values and obtain representative soil samples. Soil samples were taken at 2-foot intervals as requested by Tetra Tech. Standard Penetration Testing was performed in general accordance with ASTM D1586. The N-values are used to estimate the in-situ relative density of cohesionless soils and the consistency of cohesive soils. Borings were logged by a geologist licensed in the state of North Carolina.

Representative samples were sealed and transported to our laboratory where select samples were tested. The laboratory testing schedule was prepared by Tetra Tech and testing was performed by Geotechnics. Final boring logs, included in the Appendix of this report, represent an interpretation of the geologist's field logs, the geologist's evaluation of the samples, standard penetration tests values, and results of our laboratory testing. Naturally, transitional changes in soil types are often gradual and cannot be defined at a particular depth.

## FINDINGS

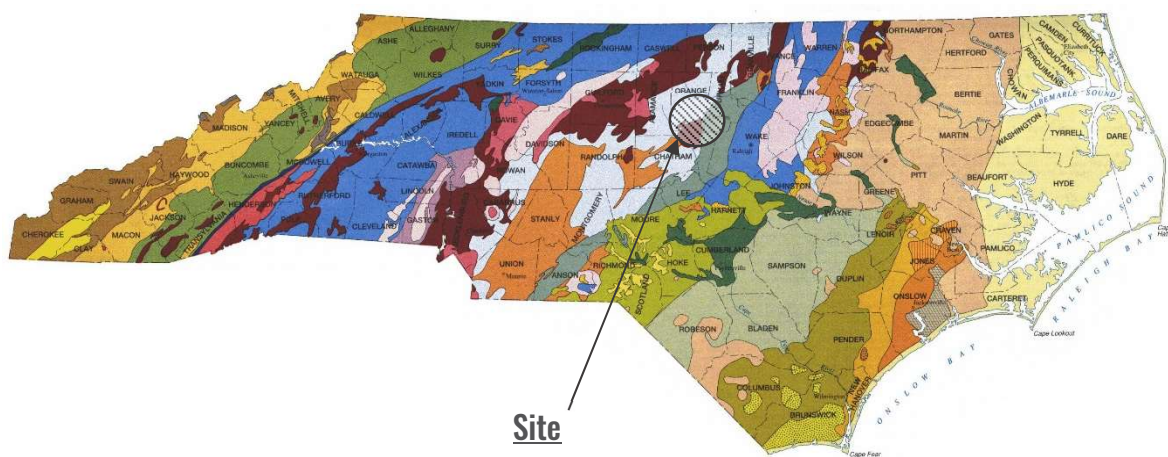
### Site Description

The site is located at 1714 Legion Road in Chapel Hill, North Carolina. The site has a mix of lawn, wooded areas, a pond, a vacant building, and a gravel access drive and parking lot area. It is assumed that the vacant building was historically used as an American Legion post. According to the topographic map provided by Tetra Tech, elevations at the boring locations range between approximately EL 316 to EL 322.

### Area Geology

The site is located in Orange County, North Carolina which is located within the Triassic Basin of the Piedmont Geologic Province. Sedimentary sandstone, siltstone, mudstone, and conglomerates are the predominant rock types within the Triassic Basin. Igneous intrusions (dikes and sills) are present within the sedimentary rocks in many areas. Near the ground surface, Triassic rocks and igneous intrusions are often discontinuous with depth. The Triassic rocks can be present as relatively thin layers and intrusions in the form of boulders. Typical soils within the Triassic Basin consist of silts, clays, and clayey/silty sands. Near the surface, the silts and clays are often moderately to highly plastic. Where present, residual soils formed by weathering of igneous intrusions can be of a softer/wetter consistency than surrounding Triassic sediments (silts and clays).

According to weathered rock samples encountered during the subsurface investigation, the site appears to be underlain by Mudstone and Sandstone. Mudstone tends to slake, or degrade to soil, when exposed to water.



**Figure 1: North Carolina Geological Survey, 1985**

### **Subsurface Conditions**

Details of soil conditions encountered during our field exploration are shown on the individual Soil Test Boring logs included in the Appendix. Stratification boundaries shown on the logs represent the approximate elevation of changes in soil type; however, the in-situ transition may be gradual. This section of the report provides a general discussion of subsurface conditions encountered at the site during our subsurface exploration.

From the ground surface, a layer of topsoil was encountered in two borings (B-25-1 and B-25-2) to a depth of 1-inch. In the remaining borings, fill material was encountered from the ground surface to depths of between 11.7 and 25.0 feet. This fill material was placed to create the dam embankment for the existing pond and generally consisted of Lean CLAY (CL) with variable amounts of Sand content. Fill material in boring B-25-5 contained a layer of Sandy Fat CLAY (CH) in addition to Lean CLAY.

Beneath the surficial layer of topsoil or fill material, residual soils were encountered in four of the borings. These residual soils consisted almost entirely of Lean CLAY, with Silty SAND (SM) also encountered in minor quantities. Residual soil was not encountered in boring B-25-5.

Underneath the fill material or residual soils, weathered rock was encountered in each of the five borings at depths ranging from 2.0 to 27.0 feet. The weathered rock consisted of Mudstone and Sandstone. Lenses of residual Lean CLAY were commonly found within the weathered rock strata. Non-crystalline bedrock was not encountered in any of the borings.

### **Groundwater Conditions**

After completion of the borings, a 1" PVC pipe was installed in the borehole to collect 24-hour groundwater levels. A summary of groundwater and cave depths can be found on Table 1. It should be noted that groundwater levels will vary with seasonal changes in climatic conditions.

**Table 1**  
**SOIL BORING SUMMARY**

| <b>Boring ID</b> | <b>Drilled Depth (feet)</b> | <b>0-hr Groundwater Depth (feet)</b> | <b>24-hr Groundwater Depth (feet)</b> | <b>Cave Depth (feet)</b> |
|------------------|-----------------------------|--------------------------------------|---------------------------------------|--------------------------|
| B-25-1           | 14.3                        | DRY                                  | 12.8                                  | 13.9                     |
| B-25-2           | 28.3                        | 27.8                                 | 9.3                                   | 26.9                     |
| B-25-3           | 28.9                        | DRY                                  | 24.3                                  | 27.2                     |
| B-25-4           | 28.8                        | DRY                                  | 21.4                                  | 24.0                     |
| B-25-5           | 14.9                        | DRY                                  | 13.3                                  | 13.5                     |



### **Laboratory Results**

Summit's laboratory testing included natural moisture content, passing No. 200 sieve, hydrometer particle size analysis, Atterberg Limits tests (plasticity index), modified proctor test, triaxial test and a suite of corrosivity tests. Laboratory tests were conducted on split spoon samples of the surface materials recovered from selected borings as well as Shelby Tube samples and bulk samples collected during the field investigation. The laboratory tests were performed by Geotechnics in their Raleigh laboratory. Results of the laboratory tests are listed on the boring logs as well as the laboratory results included in the appendix.

## **CLOSURE**

We appreciate the opportunity to submit this Report of Subsurface Exploration and look forward to working with you on this project. If you have any questions concerning this report, please contact us at your convenience at (919) 732-3883.

Sincerely,

SUMMIT DESIGN AND ENGINEERING SERVICES, INC  
Firm's NC License No. C-5176



Aaron Gross, P.G.  
Senior Geologist  
[Aaron.Gross@summitde.com](mailto:Aaron.Gross@summitde.com)



# APPENDIX

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- 1) Legend
- 2) Boring Location Plan
- 3) Boring Logs
- 4) Laboratory Results

# LEGEND

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# SYMBOLS AND TERMS USED ON BORING LOGS

## UNIFIED SOIL CLASSIFICATION (ASTM D 2487-06)

| MATERIAL TYPES                                             | CRITERIA FOR ASSIGNING SOIL GROUP NAMES                         |                                  |                                       | SOIL GROUP SYMBOL, NAME, AND LEGEND |                      |  |
|------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------|---------------------------------------|-------------------------------------|----------------------|--|
| COARSE-GRAINED SOILS<br>> 50% RETAINED ON<br>No. 200 SIEVE | GRAVELS<br><br>> 50% OF COARSE FRACTION RETAINED ON No. 4 SIEVE | CLEAN GRAVELS<br>< 5% FINES      | $Cu \geq 4$ AND $1 \leq Cc \leq 3$    | GW                                  | WELL-GRADED GRAVEL   |  |
|                                                            |                                                                 |                                  | $Cu < 4$ AND/OR $1 > Cc > 3$          | GP                                  | POORLY-GRADED GRAVEL |  |
|                                                            |                                                                 | GRAVEL WITH FINES<br>> 12% FINES | FINES CLASSIFY AS ML OR MH            | GM                                  | SILTY GRAVEL         |  |
|                                                            |                                                                 |                                  | FINES CLASSIFY AS CL OR CH            | GC                                  | CLAYEY GRAVEL        |  |
|                                                            | SANDS<br><br>≥ 50% OF COARSE FRACTION PASSING ON No. 4 SIEVE    | CLEAN SANDS<br>< 5% FINES        | $Cu \geq 6$ AND $1 \leq Cc \leq 3$    | SW                                  | WELL-GRADED SAND     |  |
|                                                            |                                                                 |                                  | $Cu < 6$ AND/OR $1 > Cc > 3$          | SP                                  | POORLY-GRADED SAND   |  |
|                                                            |                                                                 | SANDS AND FINES<br>> 12% FINES   | FINES CLASSIFY AS ML OR MH            | SM                                  | SILTY SAND           |  |
|                                                            |                                                                 |                                  | FINES CLASSIFY AS CL OR CH            | SC                                  | CLAYEY SAND          |  |
| FINE-GRAINED SOILS<br>≥ 50% PASSES<br>No. 200 SIEVE        | SILTS AND CLAYS<br><br>LIQUID LIMIT < 50                        | INORGANIC                        | PI > 7 AND PLOTS ON/ABOVE "A" LINE    | CL                                  | LEAN CLAY            |  |
|                                                            |                                                                 |                                  | PI < 4 OR PLOTS BELOW "A" LINE        | ML                                  | SILT                 |  |
|                                                            | SILTS AND CLAYS<br><br>LIQUID LIMIT ≥ 50                        | ORGANIC                          | LL(OVEN DRIED) / LL(NOT DRIED) < 0.75 | OL                                  | ORGANIC CLAY OR SILT |  |
|                                                            |                                                                 | INORGANIC                        | PI PLOTS ON OR ABOVE "A" LINE         | CH                                  | PLASTIC CLAY         |  |
|                                                            |                                                                 |                                  | PI PLOTS BELOW "A" LINE               | MH                                  | ELASTIC SILT         |  |
|                                                            |                                                                 | ORGANIC                          | LL(OVEN DRIED) / LL(NOT DRIED) < 0.75 | OH                                  | ORGANIC CLAY OR SILT |  |

| INFERRED ORIGIN OF SOIL |                                                               |
|-------------------------|---------------------------------------------------------------|
| RESIDUAL                | - SOIL DERIVED FROM IN-PLACE WEATHERING OF ROCK               |
| FILL                    | - SOIL TRANSPORTED AND DEPOSITED AT CURRENT LOCATION BY MAN   |
| ALLUVIAL                | - SOIL TRANSPORTED AND DEPOSITED AT CURRENT LOCATION BY WATER |

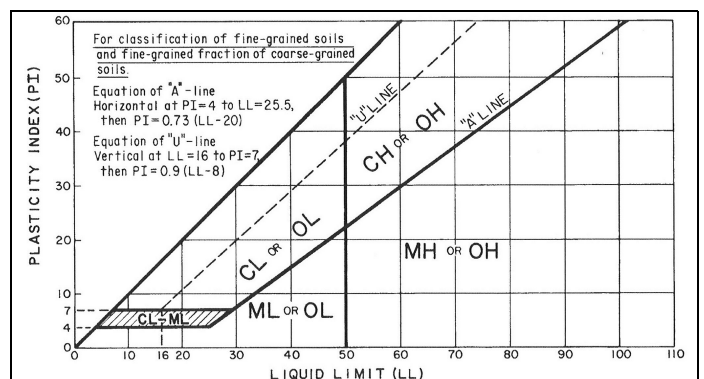
$$Cu = \frac{D_{60}}{D_{10}} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

| OTHER MATERIAL SYMBOLS |                    |
|------------------------|--------------------|
|                        | TOPSOIL            |
|                        | ASPHALT            |
|                        | CONCRETE           |
|                        | FILL (DUAL SYMBOL) |
|                        | WEATHERED ROCK     |
|                        | CRYSTALLINE ROCK   |
|                        | SEDIMENTARY ROCK   |
|                        | ABC                |

| COMPONENT MODIFIERS |                                     |                     |
|---------------------|-------------------------------------|---------------------|
| SOIL COMPONENTS     | DESCRIPTIVE TERM                    | COMPONENT           |
| MAJOR               | NOUN<br>(SAND, SILT, CLAY)          | > 50%               |
| SECONDARY           | ADJECTIVE<br>(SANDY, SILTY, CLAYEY) | 20 - 50%            |
| OTHERS              | WITH<br>TRACE                       | 10 - 20%<br>0 - 10% |

| SOIL GRAIN SIZE                |         |        |       |        |        |         |       |      |  |
|--------------------------------|---------|--------|-------|--------|--------|---------|-------|------|--|
| U.S. STANDARD SIEVE            |         |        |       |        |        |         |       |      |  |
| 12"                            | 3"      | 3/4"   | No. 4 | No. 10 | No. 40 | No. 200 |       |      |  |
| BOULDERS                       | COBBLES | GRAVEL |       | SAND   |        |         | SILT  | CLAY |  |
|                                |         | COARSE | FINE  | COARSE | MEDIUM | FINE    |       |      |  |
| 300                            | 76.2    | 19.1   | 4.76  | 2.00   | 0.420  | 0.075   | 0.005 |      |  |
| SOIL GRAIN SIZE IN MILLIMETERS |         |        |       |        |        |         |       |      |  |

| MOISTURE DESCRIPTION |                                                        |
|----------------------|--------------------------------------------------------|
| DRY                  | - REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE |
| MOIST                | - AT OR NEAR OPTIMUM MOISTURE                          |
| WET                  | - REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE           |
| SATURATED            | - VERY WET; USUALLY FROM BELOW THE GROUNDWATER TABLE.  |



# SYMBOLS AND TERMS USED ON BORING LOGS

## CONSISTANCY OF COHESIVE SOILS

THE FOLLOWING DESCRIPTIVE TERMS FOR CONSISTENCY APPLY TO COHESIVE SOILS SUCH AS FAT CLAYS AND LEAN CLAYS AS WELL AS SEMI-COHESIVE SOILS SUCH AS ELASTIC SILTS.

| UNCONFINED<br>COMPRESSIVE STRENGTH<br>(TSF) | CONSISTANCY  | TYPICAL SPT<br>"N" VALUE<br>RANGE |
|---------------------------------------------|--------------|-----------------------------------|
| LESS THAN 0.25                              | VERY SOFT    | 0 – 2                             |
| 0.25 TO 0.50                                | SOFT         | 3 – 4                             |
| 0.50 TO 1.00                                | MEDIUM STIFF | 5 – 8                             |
| 1.00 TO 2.00                                | STIFF        | 9 – 15                            |
| 2.00 TO 4.00                                | VERY STIFF   | 16 – 30                           |
| GREATER THAN 4.00                           | HARD         | 31 – 50                           |
| ---                                         | VERY HARD    | OVER 50                           |

## RELATIVE DENSITY OF COHESIONLESS & SEMI-COHESIONLESS SOIL

THE FOLLOWING DESCRIPTIVE TERMS FOR RELATIVE DENSITY APPLY TO COHESIONLESS SOILS SUCH AS GRAVELS, SILTY SANDS, AND SANDS AS WELL AS SEMI-COHESIONLESS SOILS SUCH AS SANDY SILTS AND SEMI-COHESIVE SOILS SUCH AS CLAYEY SANDS.

| RELATIVE DENSITY |  | TYPICAL SPT "N"<br>VALUE RANGE |
|------------------|--|--------------------------------|
| VERY LOOSE       |  | 0 – 4                          |
| LOOSE            |  | 5 – 10                         |
| MEDIUM DENSE     |  | 11 – 30                        |
| DENSE            |  | 31 – 50                        |
| VERY DENSE       |  | OVER 50                        |

## TERMS

ALLUVIUM - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

SAPROLITE - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

POCKET - INCLUSION OF MATERIAL OF DIFFERENT TEXTURE THAT IS SMALLER THAN THE DIAMETER OF THE SAMPLE.

SEAM - INCLUSION 1/8 INCH TO 3 INCHES THICK EXTENDING THROUGH SAMPLE.

LAYER - INCLUSION GREATER THAN 3 INCHES THICK EXTENDING THROUGH THE SAMPLE.

INTERLAYERED - SOIL SAMPLE COMPOSED OF ALTERNATING LAYERS OF DIFFERENT SOIL TYPES.

INTERMIXED - SOIL SAMPLE COMPOSED OF POCKETS OF DIFFERENT SOIL TYPES, LAYERED OR LAMINATED STRUCTURE IS NOT EVIDENT.

## NOTES

THE "N" VALUE IS THE NUMBER OF BLOWS FROM A 140-LB WEIGHT HAVING A FREE FALL OF 30-IN REQUIRED TO PENETRATE THE FINAL 12-IN OF AN 18-IN SAMPLE INTERVAL.

FIAD - DENOTES FILLED IN AFTER DRILLING

GRAVELS OR SANDS WITH 5 TO 12% FINES REQUIRE DUAL SYMBOLS.

SOILS WERE IDENTIFIED BASED ON IDENTIFICATION OF SOILS (VISUAL-MANUAL PROCEDURE) - ASTM D2488-06 UNLESS OTHERWISE NOTED IN THE LABORATORY SECTION OF THE GEOTECHNICAL REPORT.

REFUSAL AT THE SURFACE OF ROCK, BOULDER, OR OBSTRUCTION IS DEFINED AS A RESISTANCE OF 100 BLOWS FOR 2 INCHES PENETRATION OR LESS.

## CORING TERMS

REC - TOTAL LENGTH OF ROCK RECOVERED IN THE CORE BARREL DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.

RQD - TOTAL LENGTH OF SOUND ROCK SEGMENTS RECOVERED THAT ARE LONGER THAN OR EQUAL TO 4 INCHES (EXCLUDING MECHANICAL BREAKS) DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.

## SYMBOLS AND ABBREVIATIONS

ST - SHELBY TUBE SAMPLE

SS- SPLIT SPOON SAMPLE

S - GRAB SAMPLE

▽ 24 HR WATER LEVEL

▽ WATER LEVEL AFTER DRILLING

# BORING LOCATION PLAN

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# BORING LOGS

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# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-1**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.

G.S. ELEVATION (ft): 322.00

DATE STARTED: 5/8/25

LOCATION: SEE ATTACHED BORING LOCATION PLAN

▽ <24HR WATER TABLE (ft): DRY

DATE FINISHED: 5/8/25

REMARKS:

▼ >24HR WATER TABLE (ft): 12.8

DRILLED BY:

Michael B. Moseley

DATE OF READING:

TYPE OF SAMPLING: SPT, Hollow Stem  
Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T. | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                                          | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|------|----------------------------|--------------------------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |      |                            |                                                                                      |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            | 1-2-2-3                      | 4                    |      |                            | <b>TOPSOIL</b>                                                                       |             |           |                     |    |                    |                         |
|                | 320           |                            |                              |                      |      |                            | <b>RESIDUAL</b><br>Brown, loose, dry Silty SAND                                      | 1.5         | 42.1      | 19.3                | 24 | 2                  |                         |
|                |               |                            | 6-10-15-27                   | 25                   |      |                            | <b>RESIDUAL</b><br>Brown and Red-Brown, medium stiff to<br>very stiff, dry Lean CLAY | 89.1        | 9.3       |                     |    |                    |                         |
| 5              |               |                            | 6-26-50/3"                   | 50/3"                |      |                            | <b>CL</b>                                                                            | 5.5         |           |                     |    |                    |                         |
|                | 315           |                            | 34-50/4"                     | 50/4"                |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                    | 8.0         |           |                     |    |                    |                         |
|                |               |                            | 18-41-50/4"                  | 50/4"                |      |                            | <b>RESIDUAL</b><br>Red-Brown, hard, dry Sandy Lean CLAY                              | 9.0         |           |                     |    |                    |                         |
| 10             |               |                            | 50/6"                        | 50/6"                |      |                            | <b>CL</b>                                                                            |             |           |                     |    |                    |                         |
|                | 310           |                            | 50/6"                        | 50/6"                |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                    |             |           |                     |    |                    |                         |
|                |               |                            | 50/6"                        | 50/6"                |      |                            |                                                                                      |             |           |                     |    |                    |                         |
|                |               |                            |                              |                      | 12.8 |                            |                                                                                      |             |           |                     |    |                    |                         |
| 14.3           |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                                      | 14.3        |           |                     |    |                    |                         |
|                |               |                            |                              |                      |      |                            | Boring Terminated                                                                    |             |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND GPJ CHARLOTTE UES GDT 6/17/25



# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-2**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.

G.S. ELEVATION (ft): 320.00

DATE STARTED: 5/7/25

LOCATION: SEE ATTACHED BORING LOCATION PLAN

▽ <24HR WATER TABLE (ft): 27.8

DATE FINISHED: 5/7/25

REMARKS:

▼ >24HR WATER TABLE (ft): 9.3

DRILLED BY: Michael B. Moseley

DATE OF READING:

TYPE OF SAMPLING: SPT, Hollow Stem  
Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T. | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                           | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|------|----------------------------|-----------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |      |                            |                                                                       |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            | 2-3-5-18                     | 8                    |      |                            | <b>TOPSOIL</b>                                                        |             |           |                     |    |                    |                         |
|                |               |                            | 50/5"                        | 50/5"                |      |                            | <b>RESIDUAL</b><br>Brown, medium stiff, dry Sandy Lean<br><b>CLAY</b> | 1.7         |           |                     |    |                    |                         |
|                |               |                            | 50/5"                        | 50/5"                |      |                            | <b>CL</b>                                                             | 2.9         |           |                     |    |                    |                         |
|                |               |                            | 50/5"                        | 50/5"                |      |                            | <b>RESIDUAL</b><br>Gray, dense, dry Silty SAND                        |             |           |                     |    |                    |                         |
|                |               |                            |                              |                      |      |                            | <b>SM</b>                                                             |             |           |                     |    |                    |                         |
| 5              | 315           |                            | 50/4"                        | 50/4"                |      |                            | <b>WEATHERED ROCK</b><br>Sandstone                                    |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
| 10             | 310           |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
| 15             | 305           |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/2"                        | 50/2"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
| 20             | 300           |                            | 50/2"                        | 50/2"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 33-50/5"                     | 50/5"                |      |                            |                                                                       | 24.5        |           |                     |    |                    |                         |
| 25             | 295           |                            | 50/4"                        | 50/4"                |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                     |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
| 28.3           |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       | 28.3        |           |                     |    |                    |                         |
|                |               |                            |                              |                      |      |                            | Boring Terminated                                                     |             |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND.GPJ CHARLOTTE UES.GDT 6/17/25

# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-3**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.

G.S. ELEVATION (ft): 316.00

DATE STARTED: 5/7/25

LOCATION: SEE ATTACHED BORING LOCATION PLAN

▽ <24HR WATER TABLE (ft): DRY

DATE FINISHED: 5/7/25

REMARKS:

▼ >24HR WATER TABLE (ft): 24.3

DRILLED BY: Michael B. Moseley

DATE OF READING:

TYPE OF SAMPLING: SPT, Hollow Stem Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T. | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                                                       | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|------|----------------------------|---------------------------------------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |      |                            |                                                                                                   |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            |                              |                      |      |                            | <b>FILL</b><br>Brown and Tan, very stiff, dry to moist<br>Lean CLAY with Sand<br><b>CL</b>        |             |           |                     |    |                    |                         |
|                | 315           |                            | 4-6-10-15                    | 16                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
|                |               |                            | 9-9-9-11                     | 18                   |      |                            |                                                                                                   | 76.5        | 17.1      | 35                  | 16 |                    |                         |
| 5              |               |                            | 9-11-15-16                   | 26                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
|                | 310           |                            | 10-12-15-17                  | 27                   |      |                            |                                                                                                   | 71.3        | 11.8      | 29                  | 11 |                    |                         |
|                |               |                            | 7-10-13-15                   | 23                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
| 10             |               |                            | 11-14-13-12                  | 27                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
|                | 305           |                            | 3-5-5-7                      | 10                   |      |                            | <b>RESIDUAL</b><br>Tan and Red-Brown, stiff to very stiff, dry<br>to moist Lean CLAY<br><b>CL</b> | 93.7        | 20.3      |                     |    |                    |                         |
|                |               |                            | 6-9-12-17                    | 21                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
| 15             |               |                            | 18-25-22-18                  | 47                   |      |                            |                                                                                                   | 96.7        | 10.5      |                     |    |                    |                         |
|                | 300           |                            | 7-10-24-40                   | 34                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
| 20             |               |                            | 26-29-50/3"                  | 50/3"                |      |                            |                                                                                                   | 21.0        |           |                     |    |                    |                         |
|                | 295           |                            | 8-42-50/2"                   | 50/2"                |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                                 | 22.0        |           |                     |    |                    |                         |
|                |               |                            | 50/6"                        | 50/6"                |      |                            | <b>RESIDUAL</b><br>Red-Brown, hard, dry Sandy Lean CLAY<br><b>CL</b>                              | 23.0        |           |                     |    |                    |                         |
| 25             |               |                            |                              |                      |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                                 | 26.0        |           |                     |    |                    |                         |
|                | 290           |                            | 16-29-50/4"                  | 50/4"                |      |                            | <b>RESIDUAL</b><br>Red-Brown, hard, dry Sandy Lean CLAY<br><b>CL</b>                              | 27.0        |           |                     |    |                    |                         |
|                |               |                            | 30-50/5"                     | 50/5"                |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                                 | 28.9        |           |                     |    |                    |                         |
| 28.9           |               |                            |                              |                      |      |                            | Boring Terminated                                                                                 |             |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND GPJ CHARLOTTE UES GDT 6/17/25

# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-4**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.

G.S. ELEVATION (ft): 316.00

DATE STARTED: 5/8/25

LOCATION: SEE ATTACHED BORING LOCATION PLAN

▽ <24HR WATER TABLE (ft): DRY

DATE FINISHED: 5/8/25

REMARKS:

▼ >24HR WATER TABLE (ft): 21.4

DRILLED BY: Michael B. Moseley

DATE OF READING:

TYPE OF SAMPLING: SPT, Hollow Stem Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T. | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                                                                   | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|------|----------------------------|---------------------------------------------------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |      |                            |                                                                                                               |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            |                              |                      |      |                            | <b>FILL</b><br>Brown, Gray and Tan, medium stiff to very stiff, dry to moist Lean CLAY, with Sand to Sandy CL |             |           |                     |    |                    |                         |
|                | 315           |                            | 3-2-2-6                      | 4                    |      |                            |                                                                                                               |             |           |                     |    |                    |                         |
|                |               |                            | 9-10-14-15                   | 24                   |      |                            |                                                                                                               | 77.8        | 15.1      | 36                  | 18 |                    |                         |
| 5              |               |                            | 6-10-14-15                   | 24                   |      |                            |                                                                                                               | 74.8        | 14.4      |                     |    |                    |                         |
|                | 310           |                            | 9-12-12-10                   | 24                   |      |                            |                                                                                                               |             |           |                     |    |                    |                         |
|                |               |                            | 7-9-13-15                    | 22                   |      |                            |                                                                                                               |             |           |                     |    |                    |                         |
| 10             |               |                            | 4-7-8-10                     | 15                   |      |                            |                                                                                                               | 69.4        | 17.7      |                     |    |                    |                         |
|                | 305           |                            | 8-9-12-12                    | 21                   |      |                            |                                                                                                               |             |           |                     |    |                    |                         |
|                |               |                            | 3-4-6-6                      | 10                   |      |                            |                                                                                                               |             |           |                     |    |                    |                         |
| 15             |               |                            | 5-6-7-6                      | 13                   |      |                            |                                                                                                               |             |           |                     |    |                    |                         |
|                | 300           |                            | 3-4-5-6                      | 9                    |      |                            |                                                                                                               |             |           |                     |    |                    |                         |
| 20             |               |                            | 3-4-5-6                      | 9                    |      |                            |                                                                                                               |             | 19.0      | 42                  | 24 |                    |                         |
|                | 295           |                            | 2-4-6-8                      | 10                   |      |                            |                                                                                                               | 87.7        | 22.0      | 48                  | 26 |                    |                         |
|                |               |                            | 5-7-13-15                    | 20                   |      |                            |                                                                                                               | 25.0        |           |                     |    |                    |                         |
| 25             |               |                            | 13-31-50/3"                  | 50/3"                |      |                            | <b>RESIDUAL</b><br>Red-Brown, very stiff, dry Sandy Lean CLAY<br><b>CL</b>                                    | 27.0        |           |                     |    |                    |                         |
|                | 290           |                            | 35-50/3"                     | 50/3"                |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                                             | 28.8        |           |                     |    |                    |                         |
| 28.8           |               |                            |                              |                      |      |                            | Boring Terminated                                                                                             |             |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND.GPJ CHARLOTTE UES.GDT 6/17/25

# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-5**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.

G.S. ELEVATION (ft): 316.00

DATE STARTED: 5/8/25

LOCATION: SEE ATTACHED BORING LOCATION PLAN

▽ <24HR WATER TABLE (ft): DRY

DATE FINISHED: 5/8/25

REMARKS:

▼ >24HR WATER TABLE (ft): 13.3

DRILLED BY: Michael B. Moseley

DATE OF READING:

TYPE OF SAMPLING: SPT, Hollow Stem  
Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T.   | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                                           | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|--------|----------------------------|---------------------------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |        |                            |                                                                                       |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            |                              |                      |        |                            |                                                                                       |             |           |                     |    |                    |                         |
|                | 315           |                            | 4-4-5-7                      | 9                    |        |                            | FILL<br>Brown and Tan, stiff to very stiff, dry Fat<br>CLAY with Sand<br>CH           |             |           |                     |    |                    |                         |
|                |               |                            | 6-7-9-10                     | 16                   |        |                            |                                                                                       | 78.1        | 17.1      | 52                  | 29 |                    |                         |
|                |               |                            |                              |                      |        |                            | 4.0                                                                                   |             |           |                     |    |                    |                         |
| 5              |               |                            | 5-7-12-17                    | 19                   |        |                            | FILL<br>Brown and Tan, stiff to very stiff, dry to<br>moist Lean CLAY with Sand<br>CL |             |           |                     |    |                    |                         |
|                | 310           |                            | 9-11-14-16                   | 25                   |        |                            |                                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 8-11-11-10                   | 22                   |        |                            |                                                                                       | 75.5        | 20.4      |                     |    |                    |                         |
| 10             |               |                            |                              |                      |        |                            |                                                                                       |             |           |                     |    |                    |                         |
|                | 305           |                            | 4-4-5-5                      | 9                    |        |                            |                                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 5-4-26-50/6"                 | 50/6"                |        |                            |                                                                                       |             | 16.1      |                     |    |                    |                         |
|                |               |                            |                              |                      | ▼ 13.3 |                            |                                                                                       | 13.5        |           |                     |    |                    |                         |
|                |               |                            | 27-50/5"                     | 50/5"                |        |                            | WEATHERED ROCK<br>Sandstone                                                           | 14.9        |           |                     |    |                    |                         |
| 14.9           |               |                            |                              |                      |        |                            | Boring Terminated                                                                     |             |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND.GPJ CHARLOTTE UES.GDT 6/17/25

# LABORATORY RESULTS

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June 19, 2025



Project No. R-2025-143-001

Aaron Gross  
Summit Design & Eng. Services  
504 Meadowland Drive  
Hillsborough, NC 27278

[Aaron.gross@summitde.net](mailto:Aaron.gross@summitde.net)

**Transmittal**  
**Laboratory Test Results**  
**Legion Pond**

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,  
**Geotechnics, Inc.**

Michael P. Smith  
Regional Manager

***We understand that you have a choice in your laboratory services  
and we thank you for choosing Geotechnics.***

## MOISTURE CONTENT

ASTM D 2216-19

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001

|                              |             |            |             |             |             |
|------------------------------|-------------|------------|-------------|-------------|-------------|
| Lab ID:                      | 001         | 002        | 003         | 004         | 005         |
| Boring No.:                  | B-25-1      | B-25-1     | B-25-2      | B-25-3      | B-25-3      |
| Depth (ft):                  | 0.0-1.5     | 2.0-4.0    | 0.0-2.0     | 2.0-4.0     | 6.0-8.0     |
| Sample No.:                  | ST-1        | SS-2       | SS-1        | SS-2        | SS-4        |
| Tare Number                  | 4-a         | 453        | 31-A        | 455         | 450         |
| Wt. of Tare & Wet Sample (g) | 311.46      | 568.49     | 192.10      | 453.31      | 379.87      |
| Wt. of Tare & Dry Sample (g) | 275.45      | 532.58     | 182.71      | 407.70      | 354.96      |
| Weight of Tare (g)           | 88.53       | 146.30     | 136.69      | 141.41      | 144.34      |
| Weight of Water (g)          | 36.01       | 35.91      | 9.39        | 45.61       | 24.91       |
| Weight of Dry Sample (g)     | 186.92      | 386.28     | 46.02       | 266.29      | 210.62      |
| <b>Water Content (%)</b>     | <b>19.3</b> | <b>9.3</b> | <b>20.4</b> | <b>17.1</b> | <b>11.8</b> |

|                              |             |             |             |                |             |
|------------------------------|-------------|-------------|-------------|----------------|-------------|
| Lab ID                       | 006         | 007         | 009         | 010            | 012         |
| Boring No.                   | B-25-3      | B-25-3      | B-25-4      | B-25-4         | B-25-4      |
| Depth (ft)                   | 12.0-14.0   | 16.0-18.0   | 2.0-4.0     | 8.0-14.0       | 22.0-24.0   |
| Sample No.                   | SS-7        | SS-9        | SS-2        | SS-5,SS-6,SS-7 | SS-12       |
| Tare Number                  | 468         | 414         | 469         | 27-A           | 746         |
| Wt. of Tare & Wet Sample (g) | 240.09      | 363.80      | 498.83      | 481.24         | 448.05      |
| Wt. of Tare & Dry Sample (g) | 222.79      | 342.92      | 452.42      | 429.20         | 392.53      |
| Weight of Tare (g)           | 137.50      | 144.71      | 146.07      | 135.77         | 140.49      |
| Weight of Water (g)          | 17.30       | 20.88       | 46.41       | 52.04          | 55.52       |
| Weight of Dry Sample (g)     | 85.29       | 198.21      | 306.35      | 293.43         | 252.04      |
| <b>Water Content (%)</b>     | <b>20.3</b> | <b>10.5</b> | <b>15.1</b> | <b>17.7</b>    | <b>22.0</b> |

Notes :

Tested By BS Date 5/21/25 Checked By AES Date 5/22/25

## MOISTURE CONTENT

ASTM D 2216-19

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001

|                              |             |                  |             |
|------------------------------|-------------|------------------|-------------|
| Lab ID:                      | 013         | 014              | 015         |
| Boring No.:                  | B-25-5      | B-25-5           | B-25-5      |
| Depth (ft):                  | 2.0-4.0     | 6.0-12.0         | 12.0-14.0   |
| Sample No.:                  | SS-2        | SS-4, SS-5, SS-6 | SS-7        |
| Tare Number                  | 37-A        | 418              | TB-09       |
| Wt. of Tare & Wet Sample (g) | 339.87      | 429.39           | 355.79      |
| Wt. of Tare & Dry Sample (g) | 310.12      | 380.00           | 325.02      |
| Weight of Tare (g)           | 136.09      | 138.23           | 133.81      |
| Weight of Water (g)          | 29.75       | 49.39            | 30.77       |
| Weight of Dry Sample (g)     | 174.03      | 241.77           | 191.21      |
| <b>Water Content (%)</b>     | <b>17.1</b> | <b>20.4</b>      | <b>16.1</b> |

Notes :

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | BS | Date | 5/21/25 | Checked By | AES | Date | 5/22/25 |
|-----------|----|------|---------|------------|-----|------|---------|

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page 1 of 1 DCN: CT-S1 DATE: 3/18/13 REVISION: 4



**pH OF SOILS**  
AASHTO T 289-91 (2013)

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001

|                      |             |                |                |
|----------------------|-------------|----------------|----------------|
| Lab ID:              | 008         | 010            | 014            |
| Boring No.:          | B-25-4      | B-25-4         | B-25-5         |
| Depth (ft):          | 1.0-6.0     | 8.0-14.0       | 6.0-12.0       |
| Sample No.:          | S-1         | SS-5,SS-6,SS-7 | SS-4,SS-5,SS-6 |
| Drying Tare No.:     | X-1         | X-2            | X-3            |
| Testing Tare No.:    | 819         | 814            | 818            |
| Temperature (°C):    | 23.6        | 23.3           | 23.1           |
| <b>pH of Sample:</b> | <b>5.05</b> | <b>5.39</b>    | <b>5.39</b>    |

| Meter Calibration<br>(as used each day) |                       |                 |
|-----------------------------------------|-----------------------|-----------------|
| Buffer<br>pH                            | Meter<br>Reading      | Meter<br>Model  |
| 4.00<br>7.00<br>10.01                   | 4.01<br>7.00<br>10.01 | ORION Dual Star |

Tested By BS Date 6/10/25 Checked By AES Date 6/12/25

page 1 of 1 DCN: CT-S36B DATE 6/5/14 REVISION: 1

## PERCENT PASSING # 200 SIEVE

ASTM D 1140-17

|                  |                               |
|------------------|-------------------------------|
| Client           | Summit Design & Eng. Services |
| Client Reference | Legion Pond                   |
| Project No.      | R-2025-143-001                |

|                             |             |             |             |                |             |                  |
|-----------------------------|-------------|-------------|-------------|----------------|-------------|------------------|
| Lab Id.                     | 002         | 003         | 007         | 010            | 012         | 014              |
| Boring No.                  | B-25-1      | B-25-2      | B-25-3      | B-25-4         | B-25-4      | B-25-5           |
| Depth (ft)                  | 2.0-4.0     | 0.0-2.0     | 16.0-18.0   | 8.0-14.0       | 22.0-24.0   | 6.0-12.0         |
| Sample No.                  | SS-2        | SS-1        | SS-9        | SS-5,SS-6,SS-7 | SS-12       | SS-4, SS-5, SS-6 |
| Tare Number                 | 453         | 31-A        | 414         | 27-A           | 746         | 418              |
| Wt. of Tare & WS (gm)       | 568.49      | 440.66      | 363.8       | 481.24         | 448.05      | 429.39           |
| Wt. of Tare & DS (gm)       | 532.58      | 389.16      | 342.92      | 429.2          | 392.53      | 380              |
| Wt. of Tare (gm)            | 146.3       | 136.69      | 144.71      | 135.77         | 140.49      | 138.23           |
| Wt. of Water (gm)           | 35.91       | 51.5        | 20.88       | 52.04          | 55.52       | 49.39            |
| Wt. of DS (gm)              | 386.28      | 252.47      | 198.21      | 293.43         | 252.04      | 241.77           |
| <b>Water Content (%)</b>    | <b>9.3</b>  | <b>20.4</b> | <b>10.5</b> | <b>17.7</b>    | <b>22.0</b> | <b>20.4</b>      |
| Wt. of Washed Soil & Tare   | 188.57      | 245.47      | 151.33      | 225.7          | 171.38      | 197.39           |
| <b>Percent Passing #200</b> | <b>89.1</b> | <b>56.9</b> | <b>96.7</b> | <b>69.4</b>    | <b>87.7</b> | <b>75.5</b>      |

|                  |    |             |        |                   |     |             |        |
|------------------|----|-------------|--------|-------------------|-----|-------------|--------|
| <i>Tested By</i> | BS | <i>Date</i> | 6/5/25 | <i>Checked By</i> | AES | <i>Date</i> | 6/6/25 |
|------------------|----|-------------|--------|-------------------|-----|-------------|--------|

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001

Boring No.: B-25-1  
 Depth (ft): 0.0-1.5  
 Sample No.: ST-1  
 Soil Color: Brown



**USCS Symbol:**  
**SM, TESTED**

**D50 = 0.11**

**USCS Classification:**  
**SILTY SAND**

Tested By CB

Date 6/12/25

Checked By

AES

Date

6/12/25

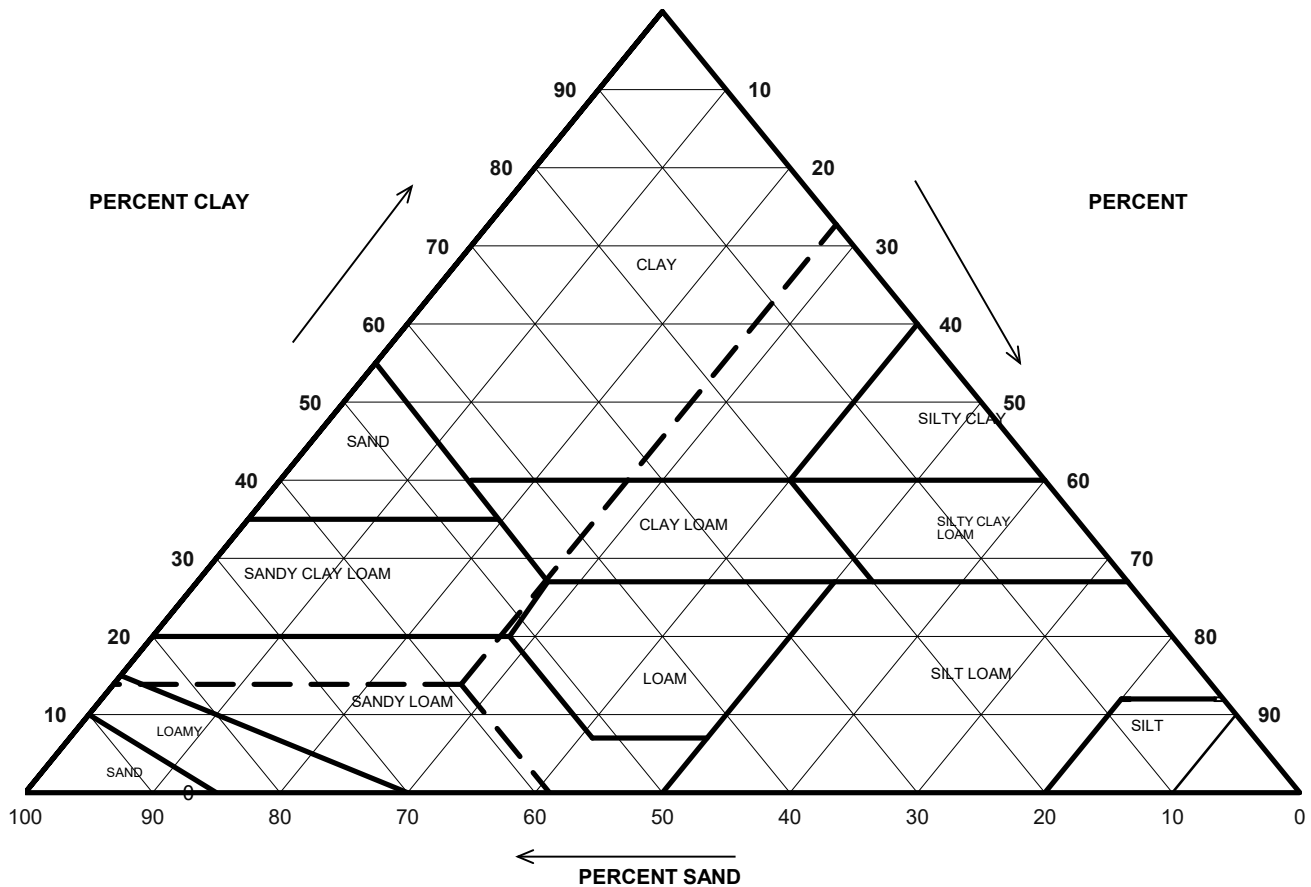
page 1 of 4

DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-001

Boring No.: B-25-1  
Depth (ft): 0.0-1.5  
Sample No.: ST-1  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.62              |                                                              |
| 2                  | 99.38         | Sand   | 58.50             | 58.86                                                        |
| 0.05               | 40.88         | Silt   | 27.10             | 27.27                                                        |
| 0.002              | 13.78         | Clay   | 13.78             | 13.87                                                        |

USDA Classification: **SANDY LOAM**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001

Boring No.: B-25-1  
 Depth (ft): 0.0-1.5  
 Sample No.: ST-1  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 4-a         | Tare No.:                          | NA         | Tare No.:                                  | 4-a        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 311.46      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 311.46     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 275.45      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 275.45     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 88.53       | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 88.53      | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 36.01       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 36.01      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 186.92      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 186.92     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>19.3</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 186.92     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 186.92     |
| Tare No. (Sub-Specimen)                   | 4-a         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 4-a        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 311.46      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 311.46     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 88.53       | Dry Weight of - 3/4" Sample (g):   | 186.92     | Weight of Tare (g):                        | 88.53      | Dry Weight of - 3/4" Sample (g):   | 186.92     |
| Sub-Specimen Wet Weight (g):              | 222.93      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 222.93     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 186.92     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 186.92     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.36                        | 0.19                 | 0.19                             | 99.81             | 99.8                          |
| #10        | 2                  | 0.80                        | 0.43                 | 0.62                             | 99.38             | 99.4                          |
| #20        | 0.85               | 8.01                        | ( ** )               | 4.91                             | 95.09             | 95.1                          |
| #40        | 0.425              | 21.76                       | 11.64                | 16.55                            | 83.45             | 83.5                          |
| #60        | 0.25               | 23.80                       | 12.73                | 29.28                            | 70.72             | 70.7                          |
| #100       | 0.15               | 25.60                       | 13.70                | 42.98                            | 57.02             | 57.0                          |
| #140       | 0.106              | 15.21                       | 8.14                 | 51.11                            | 48.89             | 48.9                          |
| #200       | 0.075              | 12.69                       | 6.79                 | 57.90                            | 42.10             | 42.1                          |
| Pan        | -                  | 78.69                       | 42.10                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/12/25 Checked By AES Date 6/12/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 30.8       | 23.3       | 2.45        | 11.1                     | 0.0435 | 96.1                       | 40.5                        |
| 2                  | 28.3       | 23.3       | 2.45        | 11.5                     | 0.0314 | 87.6                       | 36.9                        |
| 4                  | 25.8       | 23.3       | 2.45        | 12.0                     | 0.0226 | 79.1                       | 33.3                        |
| 8                  | 22.8       | 23.3       | 2.45        | 12.5                     | 0.0163 | 68.9                       | 29.0                        |
| 15                 | 20.5       | 23.3       | 2.45        | 12.9                     | 0.0121 | 61.3                       | 25.8                        |
| 30                 | 18.8       | 23.3       | 2.45        | 13.2                     | 0.0087 | 55.4                       | 23.3                        |
| 60                 | 16.3       | 23.4       | 2.41        | 13.7                     | 0.0062 | 47.0                       | 19.8                        |
| 240                | 12.8       | 23.4       | 2.41        | 14.3                     | 0.0032 | 35.1                       | 14.8                        |
| 1440               | 9.8        | 27.3       | 0.79        | 14.8                     | 0.0013 | 30.4                       | 12.8                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 211    | Percent Finer than # 200: | 42.10        |
| Wt. of Tare & Dry Material (g): | 204.58 |                           |              |
| Weight of Tare (g):             | 170.46 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 29.12  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |        |            |     |      |         |
|-----------|----|------|--------|------------|-----|------|---------|
| Tested By | CB | Date | 6/6/25 | Checked By | AES | Date | 6/12/25 |
|-----------|----|------|--------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001

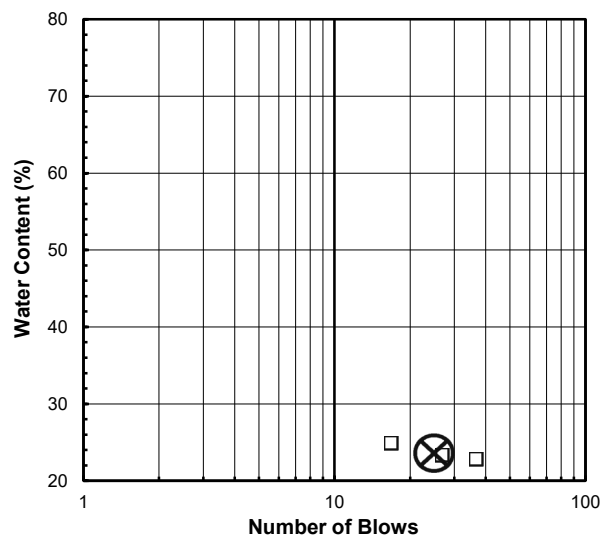
Boring No.: B-25-1  
 Depth (ft): 0.0-1.5  
 Sample No.: ST-1  
 Soil Description: BROWN SILT

**Note: The USCS symbol used with this test refers only to the minus No. 40** (Minus #40 sieve material, Air dried)  
**sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.**

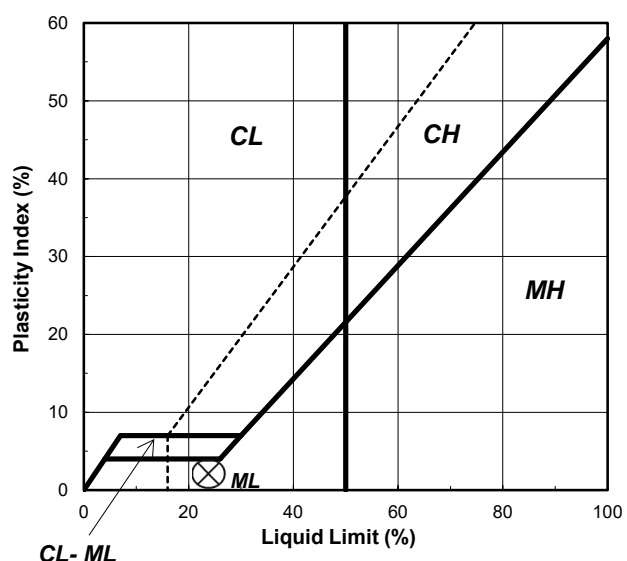
| As Received Moisture Content  |             | Liquid Limit Test |             |             |          |
|-------------------------------|-------------|-------------------|-------------|-------------|----------|
| ASTM D2216-19                 |             | <b>1</b>          | <b>2</b>    | <b>3</b>    | <b>M</b> |
| Tare Number:                  | 4-a         | A-B               | I           | V-2         | U        |
| Wt. of Tare & Wet Sample (g): | 311.46      | 32.72             | 30.83       | 32.36       | L        |
| Wt. of Tare & Dry Sample (g): | 275.45      | 29.53             | 27.87       | 29.02       | T        |
| Weight of Tare (g):           | 88.53       | 15.46             | 15.12       | 15.53       | I        |
| Weight of Water (g):          | 36.0        | 3.2               | 3.0         | 3.3         | P        |
| Weight of Dry Sample (g):     | 186.9       | 14.1              | 12.8        | 13.5        | O        |
| Was As Received MC Preserved: | Yes         |                   |             |             | I        |
| <b>Moisture Content (%):</b>  | <b>19.3</b> | <b>22.7</b>       | <b>23.2</b> | <b>24.8</b> | <b>N</b> |
| <b>Number of Blows:</b>       |             | <b>37</b>         | <b>27</b>   | <b>17</b>   | <b>T</b> |

| Plastic Limit Test                                                                      | 1           | 2           | Range      | Test Results                   |
|-----------------------------------------------------------------------------------------|-------------|-------------|------------|--------------------------------|
| Tare Number:                                                                            | 13          | 15          |            |                                |
| Wt. of Tare & Wet Sample (g):                                                           | 13.47       | 14.42       |            | <b>Liquid Limit (%): 24</b>    |
| Wt. of Tare & Dry Sample (g):                                                           | 12.32       | 13.10       |            | <b>Plastic Limit (%): 22</b>   |
| Weight of Tare (g):                                                                     | 7.02        | 6.98        |            | <b>Plasticity Index (%): 2</b> |
| Weight of Water (g):                                                                    | 1.2         | 1.3         |            | <b>USCS Symbol: ML</b>         |
| Weight of Dry Sample (g):                                                               | 5.3         | 6.1         |            |                                |
| <b>Moisture Content (%):</b>                                                            | <b>21.7</b> | <b>21.6</b> | <b>0.1</b> |                                |
| <i>Note: The acceptable range of the two Moisture Contents is <math>\pm</math> 0.84</i> |             |             |            |                                |

Flow Curve



Plasticity Chart

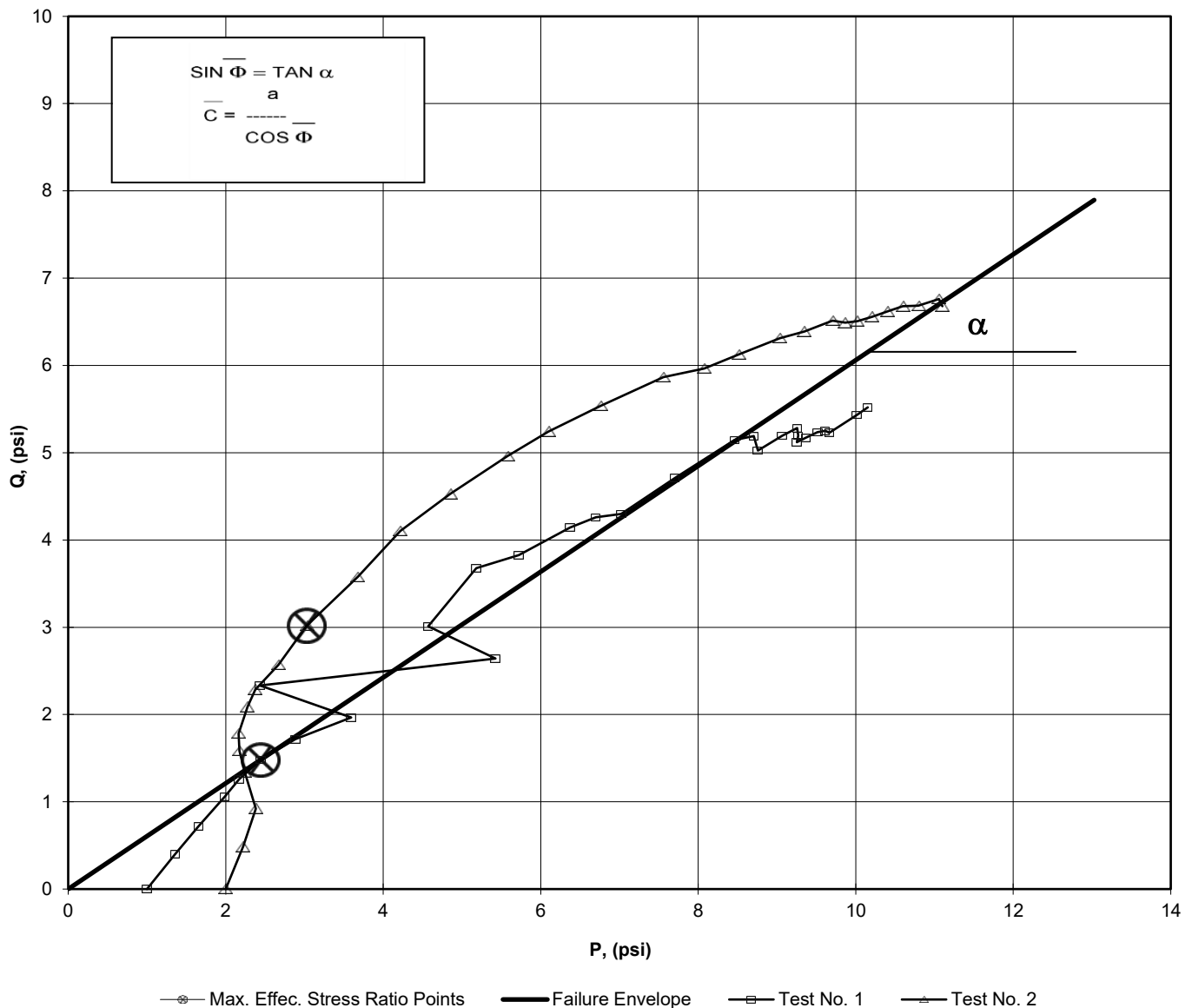


Tested By JCB IV Date 6/12/25 Checked By AES Date 6/13/25

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS  
ASTM D4767-11**

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            |             |         |

**Consolidated Undrained Triaxial Test with Pore Pressure**



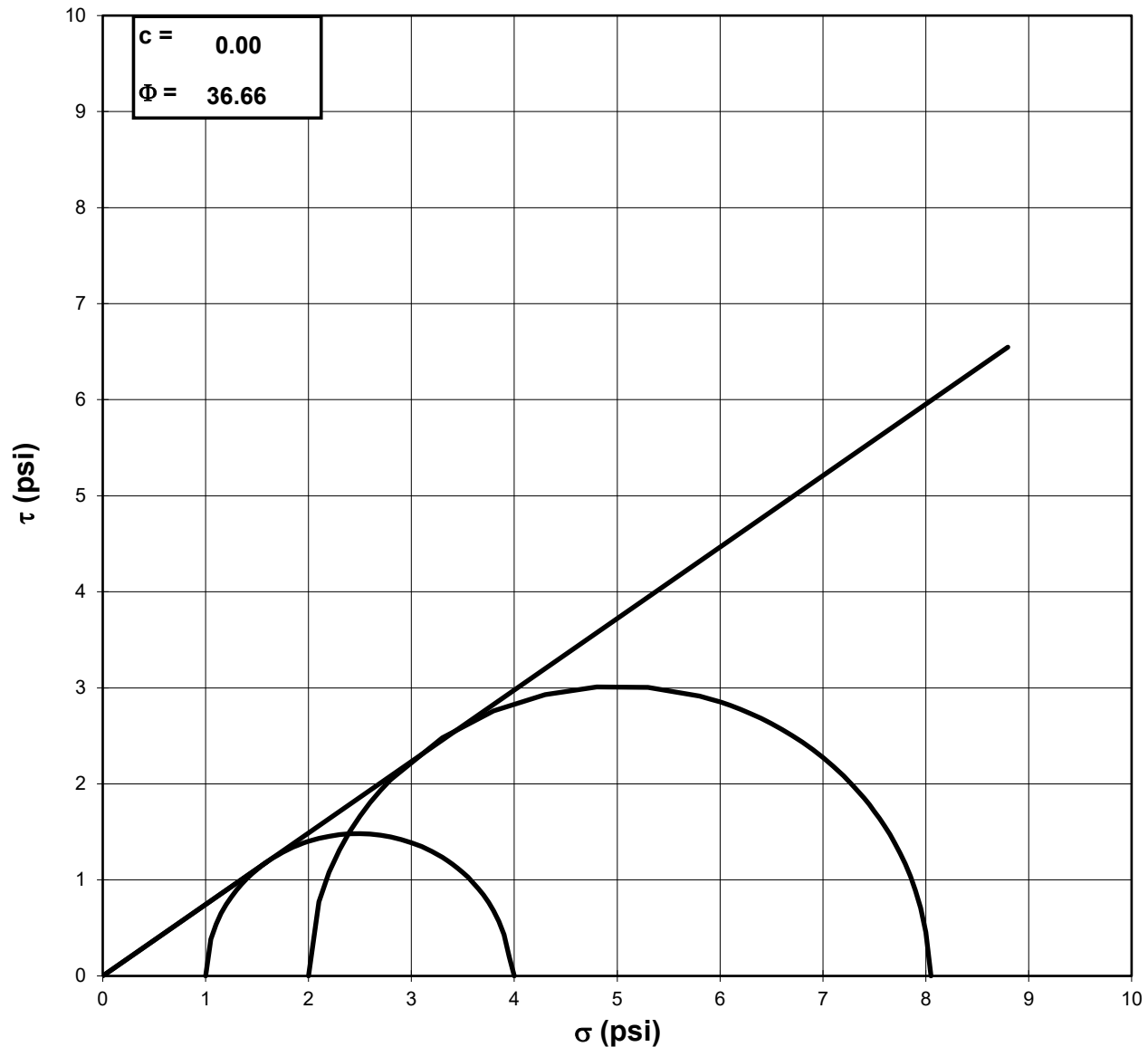
|          |          |             |          |          |              |
|----------|----------|-------------|----------|----------|--------------|
| <b>a</b> | <b>=</b> | <b>0.00</b> | <b>C</b> | <b>=</b> | <b>0.00</b>  |
| <b>α</b> | <b>=</b> | <b>31.2</b> | <b>Φ</b> | <b>=</b> | <b>37.31</b> |

|            |    |       |        |              |     |       |        |
|------------|----|-------|--------|--------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Approved By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|--------------|-----|-------|--------|



# **MOHR TOTAL STRENGTH ENVELOPE** ASTM D4767-11

|                     |                                              |             |         |
|---------------------|----------------------------------------------|-------------|---------|
| Client:             | Summit Design & Eng. Services                | Boring No.: | B-25-1  |
| Client Reference:   | Legion Pond                                  | Depth (ft): | 0.0-1.5 |
| Project No.:        | R-2025-143-001                               | Sample No.: | ST-1    |
| Lab ID:             | R-2025-143-001-001                           |             |         |
| Visual Description: | Brown Sand with Clay and Roots (UNDISTURBED) |             |         |



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

|            |    |       |        |              |     |       |        |
|------------|----|-------|--------|--------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Approved By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|--------------|-----|-------|--------|

page 2 of 8 DCN: CT-S28 DATE: 4/12/13 REVISION: 3

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11



|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            |             |         |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|           |   |
|-----------|---|
| Stage No. | 1 |
| Test No.  | 1 |

**INITIAL SAMPLE DIMENSIONS (in)**

|              |       |             |       |
|--------------|-------|-------------|-------|
| Length 1:    | 6.106 | Diameter 1: | 2.848 |
| Length 2:    | 6.065 | Diameter 2: | 2.865 |
| Length 3:    | 6.108 | Diameter 3: | 2.846 |
| Avg. Length: | 6.093 | Avg. Diam.: | 2.853 |

**PRESSURES (psi)**

|                           |      |
|---------------------------|------|
| Cell Pressure (psi)       | 61.0 |
| Back Pressure (psi)       | 60.0 |
| Eff. Conf. Pressure (psi) | 1.0  |
| Pore Pressure             |      |
| Response (%)              | 96   |

**VOLUME CHANGE**

|                              |      |
|------------------------------|------|
| Initial Burette Reading (ml) | 24.0 |
| Final Burette Reading (ml)   | 24.0 |
| Final Change (ml)            | 0.0  |

**MAXIMUM OBLIQUITY POINTS**

|   |   |      |
|---|---|------|
| P | = | 2.44 |
| Q | = | 1.48 |

|                                        |     |
|----------------------------------------|-----|
| Initial Dial Reading (mil)             | 243 |
| Dial Reading After Saturation (mil)    | 234 |
| Dial Reading After Consolidation (mil) | 234 |

| LOAD<br>(LB) | DEFORMATION<br>(IN) | PORE PRESSURE<br>(PSI) |
|--------------|---------------------|------------------------|
| 16.7         | 0.000               | 60.0                   |
| 21.9         | 0.001               | 60.0                   |
| 26.0         | 0.003               | 60.1                   |
| 30.3         | 0.009               | 60.1                   |
| 32.9         | 0.015               | 60.1                   |
| 35.8         | 0.021               | 60.0                   |
| 38.9         | 0.029               | 59.8                   |
| 42.1         | 0.039               | 59.4                   |
| 46.9         | 0.050               | 60.9                   |
| 51.0         | 0.072               | 58.2                   |
| 56.0         | 0.101               | 59.4                   |
| 65.0         | 0.136               | 59.5                   |
| 67.3         | 0.173               | 59.1                   |
| 71.8         | 0.214               | 58.8                   |
| 73.6         | 0.244               | 58.6                   |
| 74.6         | 0.286               | 58.3                   |
| 80.8         | 0.344               | 58.0                   |
| 87.4         | 0.404               | 57.7                   |
| 88.6         | 0.450               | 57.5                   |
| 87.1         | 0.509               | 57.3                   |
| 90.0         | 0.554               | 57.1                   |
| 91.9         | 0.599               | 57.0                   |
| 91.3         | 0.644               | 56.9                   |
| 90.6         | 0.674               | 56.9                   |
| 91.7         | 0.704               | 56.8                   |
| 93.0         | 0.734               | 56.7                   |
| 93.7         | 0.764               | 56.6                   |
| 94.0         | 0.809               | 56.6                   |
| 97.8         | 0.854               | 56.4                   |
| 99.5         | 0.884               | 56.4                   |
| 102.8        | 0.914               | 56.3                   |

|               |              |                       |              |
|---------------|--------------|-----------------------|--------------|
| Tested By: DL | Date: 6/2/25 | Input Checked By: MPS | Date: 6/6/25 |
|---------------|--------------|-----------------------|--------------|

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11



|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            |             |         |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|                                    |     |           |   |
|------------------------------------|-----|-----------|---|
| Effective Confining Pressure (psi) | 1.0 | Stage No. | 1 |
|                                    |     | Test No   | 1 |

**INITIAL DIMENSIONS**

|                                          |       |
|------------------------------------------|-------|
| Initial Sample Length (in)               | 6.09  |
| Initial Sample Diameter (in)             | 2.85  |
| Initial Sample Area (in <sup>2</sup> )   | 6.39  |
| Initial Sample Volume (in <sup>3</sup> ) | 38.95 |

**VOLUME CHANGE**

|                                               |       |
|-----------------------------------------------|-------|
| Volume After Consolidation (in <sup>3</sup> ) | 39.12 |
| Length After Consolidation (in)               | 6.10  |
| Area After Consolidation (in <sup>2</sup> )   | 6.412 |

| Strain (%) | Deviator Stress PSI | Δ U   | σ <sub>1</sub> | σ <sub>3</sub> | Effective Principal Stress Ratio | A     | P     | Q    |
|------------|---------------------|-------|----------------|----------------|----------------------------------|-------|-------|------|
| 0.02       | 0.80                | 0.04  | 1.76           | 1.0            | 1.837                            | 0.06  | 1.36  | 0.40 |
| 0.05       | 1.44                | 0.06  | 2.37           | 0.9            | 2.537                            | 0.05  | 1.65  | 0.72 |
| 0.15       | 2.12                | 0.07  | 3.05           | 0.9            | 3.280                            | 0.04  | 1.99  | 1.06 |
| 0.24       | 2.52                | 0.09  | 3.43           | 0.9            | 3.765                            | 0.04  | 2.17  | 1.26 |
| 0.34       | 2.96                | 0.04  | 3.93           | 1.0            | 4.077                            | 0.01  | 2.44  | 1.48 |
| 0.48       | 3.43                | -0.17 | 4.60           | 1.2            | 3.943                            | -0.05 | 2.88  | 1.72 |
| 0.63       | 3.93                | -0.63 | 5.56           | 1.6            | 3.420                            | -0.17 | 3.59  | 1.97 |
| 0.82       | 4.67                | 0.90  | 4.77           | 0.1            | 47.681                           | 0.20  | 2.43  | 2.33 |
| 1.17       | 5.28                | -1.78 | 8.07           | 2.8            | 2.899                            | -0.35 | 5.42  | 2.64 |
| 1.65       | 6.02                | -0.56 | 7.58           | 1.6            | 4.861                            | -0.10 | 4.57  | 3.01 |
| 2.23       | 7.35                | -0.50 | 8.86           | 1.5            | 5.890                            | -0.07 | 5.18  | 3.68 |
| 2.84       | 7.65                | -0.90 | 9.55           | 1.9            | 5.037                            | -0.12 | 5.72  | 3.83 |
| 3.51       | 8.28                | -1.23 | 10.51          | 2.2            | 4.712                            | -0.15 | 6.37  | 4.14 |
| 4.00       | 8.52                | -1.44 | 10.96          | 2.4            | 4.492                            | -0.18 | 6.70  | 4.26 |
| 4.69       | 8.60                | -1.72 | 11.32          | 2.7            | 4.157                            | -0.21 | 7.02  | 4.30 |
| 5.63       | 9.42                | -1.99 | 12.41          | 3.0            | 4.149                            | -0.22 | 7.70  | 4.71 |
| 6.62       | 10.30               | -2.31 | 13.61          | 3.3            | 4.106                            | -0.23 | 8.46  | 5.15 |
| 7.37       | 10.38               | -2.51 | 13.89          | 3.5            | 3.953                            | -0.25 | 8.70  | 5.19 |
| 8.34       | 10.05               | -2.73 | 13.78          | 3.7            | 3.695                            | -0.28 | 8.76  | 5.03 |
| 9.08       | 10.39               | -2.87 | 14.26          | 3.9            | 3.681                            | -0.29 | 9.07  | 5.19 |
| 9.81       | 10.57               | -2.97 | 14.54          | 4.0            | 3.659                            | -0.29 | 9.26  | 5.28 |
| 10.56      | 10.39               | -3.07 | 14.47          | 4.1            | 3.553                            | -0.31 | 9.27  | 5.20 |
| 11.04      | 10.24               | -3.13 | 14.37          | 4.1            | 3.478                            | -0.32 | 9.25  | 5.12 |
| 11.54      | 10.34               | -3.20 | 14.54          | 4.2            | 3.465                            | -0.32 | 9.37  | 5.17 |
| 12.02      | 10.47               | -3.28 | 14.75          | 4.3            | 3.446                            | -0.33 | 9.51  | 5.23 |
| 12.52      | 10.50               | -3.36 | 14.86          | 4.4            | 3.408                            | -0.33 | 9.61  | 5.25 |
| 13.26      | 10.45               | -3.44 | 14.89          | 4.4            | 3.355                            | -0.34 | 9.67  | 5.23 |
| 14.00      | 10.87               | -3.58 | 15.45          | 4.6            | 3.372                            | -0.34 | 10.02 | 5.43 |
| 14.49      | 11.04               | -3.63 | 15.67          | 4.6            | 3.383                            | -0.34 | 10.15 | 5.52 |
| 14.98      | 11.41               | -3.70 | 16.12          | 4.7            | 3.427                            | -0.34 | 10.41 | 5.71 |

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**

ASTM D4767-11

|                   |                               |             |          |
|-------------------|-------------------------------|-------------|----------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1   |
| Client Reference: | Legion Pond                   | Depth (ft): | 9.9-10.4 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1     |
| Lab ID:           | R-2025-143-001-001            |             |          |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|           |   |
|-----------|---|
| Stage No. | 1 |
| Test No.  | 2 |

**INITIAL SAMPLE DIMENSIONS (in)**

|              |       |             |       |
|--------------|-------|-------------|-------|
| Length 1:    | 6.134 | Diameter 1: | 2.864 |
| Length 2:    | 5.875 | Diameter 2: | 2.863 |
| Length 3:    | 6.060 | Diameter 3: | 2.853 |
| Avg. Length: | 6.023 | Avg. Diam.: | 2.860 |

**PRESSURES (psi)**

|                           |      |
|---------------------------|------|
| Cell Pressure (psi)       | 62.0 |
| Back Pressure (psi)       | 60.0 |
| Eff. Conf. Pressure (psi) | 2.0  |
| Pore Pressure             |      |
| Response (%)              | 95   |

**VOLUME CHANGE**

|                              |      |
|------------------------------|------|
| Initial Burette Reading (ml) | 24.0 |
| Final Burette Reading (ml)   | 23.6 |
| Final Change (ml)            | 0.4  |

**MAXIMUM OBLIQUITY POINTS**

|           |   |      |
|-----------|---|------|
| $\bar{P}$ | = | 3.03 |
| Q         | = | 3.02 |

|                                        |     |
|----------------------------------------|-----|
| Initial Dial Reading (mil)             | 170 |
| Dial Reading After Saturation (mil)    | 169 |
| Dial Reading After Consolidation (mil) | 171 |

| LOAD<br>(LB) | DEFORMATION<br>(IN) | PORE PRESSURE<br>(PSI) |
|--------------|---------------------|------------------------|
| 15.9         | 0.000               | 60.0                   |
| 22.1         | 0.001               | 60.3                   |
| 27.7         | 0.002               | 60.5                   |
| 33.2         | 0.008               | 61.1                   |
| 36.3         | 0.014               | 61.4                   |
| 38.9         | 0.020               | 61.6                   |
| 42.8         | 0.030               | 61.8                   |
| 45.4         | 0.038               | 61.9                   |
| 49.2         | 0.050               | 61.9                   |
| 55.1         | 0.071               | 62.0                   |
| 62.7         | 0.101               | 61.9                   |
| 69.9         | 0.137               | 61.9                   |
| 75.8         | 0.173               | 61.7                   |
| 82.0         | 0.216               | 61.4                   |
| 86.1         | 0.246               | 61.1                   |
| 90.6         | 0.288               | 60.8                   |
| 95.8         | 0.344               | 60.3                   |
| 98.1         | 0.405               | 59.9                   |
| 101.0        | 0.450               | 59.6                   |
| 104.5        | 0.510               | 59.3                   |
| 106.3        | 0.555               | 59.0                   |
| 108.9        | 0.601               | 58.8                   |
| 109.3        | 0.646               | 58.6                   |
| 110.0        | 0.675               | 58.5                   |
| 111.3        | 0.706               | 58.3                   |
| 112.8        | 0.736               | 58.2                   |
| 114.2        | 0.767               | 58.1                   |
| 115.2        | 0.812               | 57.9                   |
| 117.2        | 0.857               | 57.7                   |
| 116.5        | 0.887               | 57.6                   |
| 118.6        | 0.917               | 57.5                   |

|            |    |       |        |                   |     |       |        |
|------------|----|-------|--------|-------------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Input Checked By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|-------------------|-----|-------|--------|

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11

|                   |                               |             |          |
|-------------------|-------------------------------|-------------|----------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1   |
| Client Reference: | Legion Pond                   | Depth (ft): | 9.9-10.4 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1     |
| Lab ID:           | R-2025-143-001-001            |             |          |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|                                    |     |           |   |
|------------------------------------|-----|-----------|---|
| Effective Confining Pressure (psi) | 2.0 | Stage No. | 1 |
|                                    |     | Test No   | 2 |

**INITIAL DIMENSIONS**

|                                          |       |
|------------------------------------------|-------|
| Initial Sample Length (in)               | 6.02  |
| Initial Sample Diameter (in)             | 2.86  |
| Initial Sample Area (in <sup>2</sup> )   | 6.42  |
| Initial Sample Volume (in <sup>3</sup> ) | 38.69 |

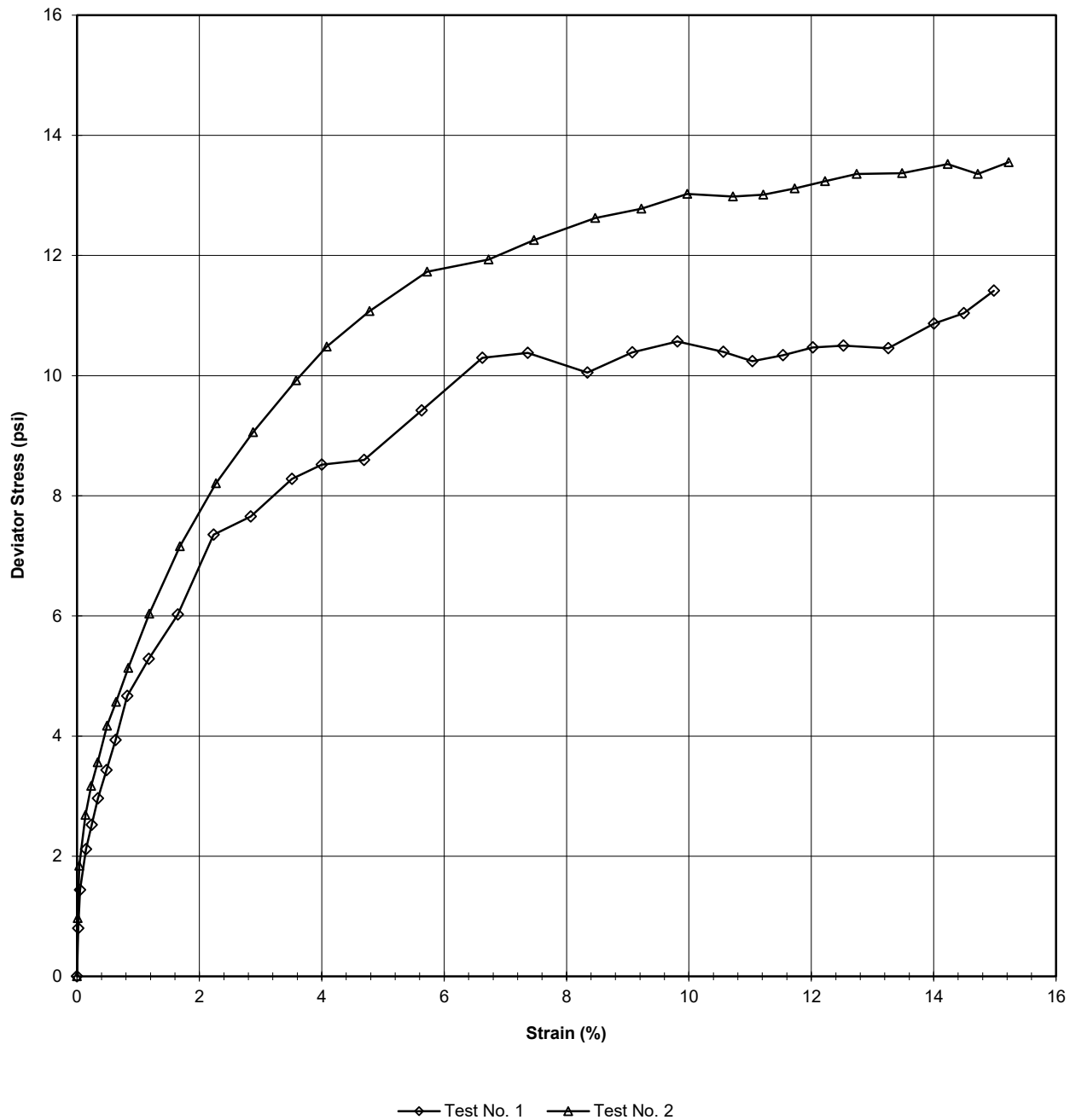
**VOLUME CHANGE**

|                                               |       |
|-----------------------------------------------|-------|
| Volume After Consolidation (in <sup>3</sup> ) | 38.69 |
| Length After Consolidation (in)               | 6.02  |
| Area After Consolidation (in <sup>2</sup> )   | 6.424 |

| Strain<br>(%) | Deviator<br>Stress<br>PSI | $\Delta U$ | $\bar{\sigma}_1$ | $\bar{\sigma}_3$ | Effective Principal<br>Stress Ratio | $\bar{A}$ | $\bar{P}$ | Q    |
|---------------|---------------------------|------------|------------------|------------------|-------------------------------------|-----------|-----------|------|
| 0.01          | 0.97                      | 0.27       | 2.70             | 1.7              | 1.559                               | 0.29      | 2.22      | 0.48 |
| 0.04          | 1.84                      | 0.54       | 3.30             | 1.5              | 2.260                               | 0.31      | 2.38      | 0.92 |
| 0.14          | 2.69                      | 1.10       | 3.58             | 0.9              | 3.990                               | 0.43      | 2.24      | 1.34 |
| 0.23          | 3.17                      | 1.41       | 3.76             | 0.6              | 6.381                               | 0.47      | 2.17      | 1.58 |
| 0.34          | 3.56                      | 1.62       | 3.94             | 0.4              | 10.303                              | 0.48      | 2.16      | 1.78 |
| 0.49          | 4.17                      | 1.81       | 4.36             | 0.2              | 22.733                              | 0.46      | 2.28      | 2.09 |
| 0.64          | 4.57                      | 1.91       | 4.66             | 0.1              | 50.637                              | 0.44      | 2.38      | 2.28 |
| 0.84          | 5.13                      | 1.90       | 5.23             | 0.1              | 52.340                              | 0.39      | 2.67      | 2.57 |
| 1.18          | 6.03                      | 1.99       | 6.04             | 0.0              | 604.422                             | 0.35      | 3.03      | 3.02 |
| 1.68          | 7.16                      | 1.90       | 7.26             | 0.1              | 72.578                              | 0.28      | 3.68      | 3.58 |
| 2.27          | 8.21                      | 1.89       | 8.32             | 0.1              | 73.654                              | 0.24      | 4.22      | 4.10 |
| 2.88          | 9.06                      | 1.68       | 9.38             | 0.3              | 29.257                              | 0.20      | 4.85      | 4.53 |
| 3.58          | 9.92                      | 1.38       | 10.54            | 0.6              | 17.034                              | 0.15      | 5.58      | 4.96 |
| 4.08          | 10.48                     | 1.14       | 11.34            | 0.9              | 13.250                              | 0.11      | 6.10      | 5.24 |
| 4.78          | 11.07                     | 0.78       | 12.30            | 1.2              | 10.040                              | 0.07      | 6.76      | 5.54 |
| 5.72          | 11.73                     | 0.31       | 13.42            | 1.7              | 7.924                               | 0.03      | 7.56      | 5.86 |
| 6.73          | 11.93                     | -0.11      | 14.04            | 2.1              | 6.651                               | -0.01     | 8.08      | 5.97 |
| 7.47          | 12.26                     | -0.39      | 14.64            | 2.4              | 6.131                               | -0.03     | 8.52      | 6.13 |
| 8.47          | 12.62                     | -0.73      | 15.35            | 2.7              | 5.627                               | -0.06     | 9.04      | 6.31 |
| 9.22          | 12.78                     | -0.96      | 15.74            | 3.0              | 5.316                               | -0.08     | 9.35      | 6.39 |
| 9.97          | 13.03                     | -1.19      | 16.22            | 3.2              | 5.082                               | -0.10     | 9.70      | 6.51 |
| 10.72         | 12.98                     | -1.37      | 16.36            | 3.4              | 4.846                               | -0.11     | 9.87      | 6.49 |
| 11.22         | 13.01                     | -1.51      | 16.52            | 3.5              | 4.704                               | -0.12     | 10.02     | 6.51 |
| 11.73         | 13.11                     | -1.65      | 16.77            | 3.7              | 4.592                               | -0.13     | 10.21     | 6.56 |
| 12.22         | 13.24                     | -1.78      | 17.02            | 3.8              | 4.500                               | -0.14     | 10.40     | 6.62 |
| 12.74         | 13.36                     | -1.92      | 17.28            | 3.9              | 4.406                               | -0.15     | 10.60     | 6.68 |
| 13.48         | 13.37                     | -2.11      | 17.48            | 4.1              | 4.252                               | -0.17     | 10.80     | 6.69 |
| 14.23         | 13.52                     | -2.29      | 17.82            | 4.3              | 4.148                               | -0.18     | 11.06     | 6.76 |
| 14.72         | 13.36                     | -2.42      | 17.78            | 4.4              | 4.021                               | -0.19     | 11.10     | 6.68 |
| 15.23         | 13.55                     | -2.54      | 18.09            | 4.5              | 3.986                               | -0.20     | 11.31     | 6.78 |

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS  
ASTM D4767-11**

|                     |                                              |             |         |
|---------------------|----------------------------------------------|-------------|---------|
| Client:             | Summit Design & Eng. Services                | Boring No.: | B-25-1  |
| Client Reference:   | Legion Pond                                  | Depth (ft): | 0.0-1.5 |
| Project No.:        | R-2025-143-001                               | Sample No.: | ST-1    |
| Lab ID:             | R-2025-143-001-001                           |             |         |
| Visual Description: | Brown Sand with Clay and Roots (UNDISTURBED) |             |         |



|            |    |       |        |              |     |       |        |
|------------|----|-------|--------|--------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Approved By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|--------------|-----|-------|--------|

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**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001      Specific Gravity (Assumed)      2.7

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

**SAMPLE CONDITION SUMMARY**

|                                |         |          |
|--------------------------------|---------|----------|
| Boring No.:                    | B-25-1  | B-25-1   |
| Depth (ft):                    | 0.0-1.5 | 9.9-10.4 |
| Sample No.:                    | ST-1    | ST-1     |
| Test No.                       | T1      | T2       |
| Deformation Rate (in/min)      | 0.001   | 0.001    |
| Back Pressure (psi)            | 60      | 60       |
| Consolidation Time (days)      | 1       | 1        |
| Moisture Content (%) (INITIAL) | 16.4    | 16.4     |
| Total Unit Weight (pcf)        | 119.6   | 125.4    |
| Dry Unit Weight (pcf)          | 102.8   | 107.7    |
| Moisture Content (%) (FINAL)   | 26.6    | 25.7     |
| Initial State Void Ratio, $e$  | 0.639   | 0.565    |
| Void Ratio at Shear, $e$       | 0.647   | 0.565    |



Tested By: DL      Date: 6/2/25      Input Checked By: MPS      Date: 6/6/25  
 page 8 of 8      DCN: CT-S28    DATE: 4/12/13    REVISION: 3

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-003

Boring No.: B-25-2

Depth (ft): 0.0-2.0

Sample No.: SS-1

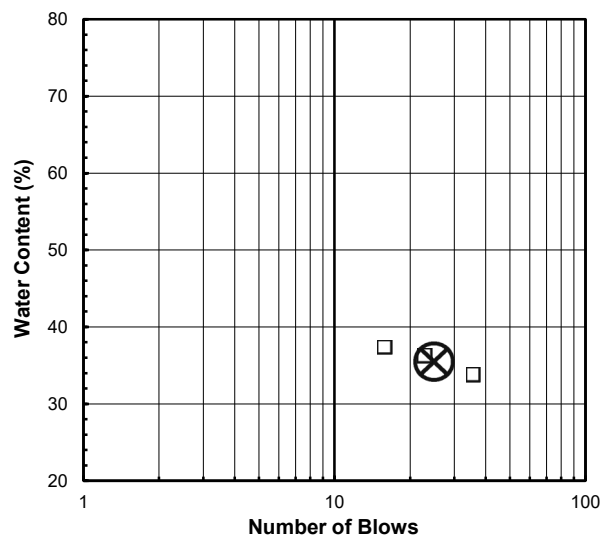
Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

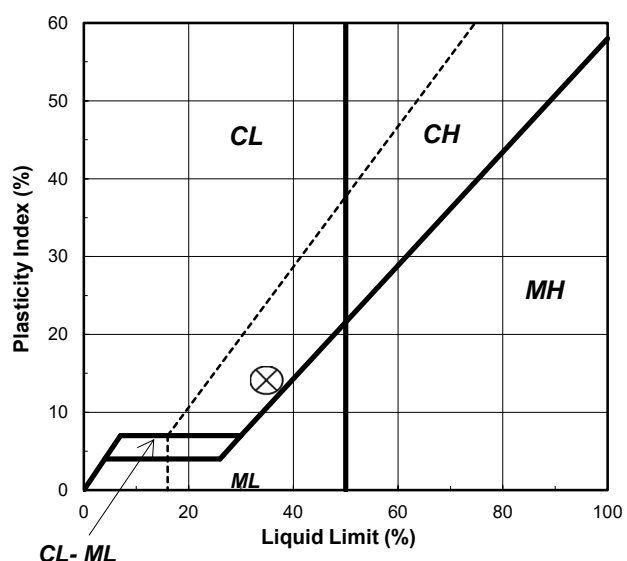
| As Received Moisture Content<br>ASTM D2216-19 |             | Liquid Limit Test |             |             |          |
|-----------------------------------------------|-------------|-------------------|-------------|-------------|----------|
|                                               |             | 1                 | 2           | 3           | M        |
| Tare Number:                                  | 31-A        | G                 | A-M         | I-7         | U        |
| Wt. of Tare & Wet Sample (g):                 | 192.10      | 25.96             | 27.48       | 30.52       | L        |
| Wt. of Tare & Dry Sample (g):                 | 182.71      | 23.18             | 24.24       | 26.41       | T        |
| Weight of Tare (g):                           | 136.69      | 14.93             | 15.28       | 15.38       | I        |
| Weight of Water (g):                          | 9.4         | 2.8               | 3.2         | 4.1         | P        |
| Weight of Dry Sample (g):                     | 46.0        | 8.3               | 9.0         | 11.0        | O        |
| Was As Received MC Preserved:                 | Yes         |                   |             |             | I        |
| <b>Moisture Content (%):</b>                  | <b>20.4</b> | <b>33.7</b>       | <b>36.2</b> | <b>37.3</b> | <b>N</b> |
| <b>Number of Blows:</b>                       |             | <b>36</b>         | <b>23</b>   | <b>16</b>   | <b>T</b> |

| Plastic Limit Test                                                                      | 1           | 2           | Range       | Test Results                    |
|-----------------------------------------------------------------------------------------|-------------|-------------|-------------|---------------------------------|
| Tare Number:                                                                            | A-B         | X-9         |             |                                 |
| Wt. of Tare & Wet Sample (g):                                                           | 27.43       | 26.52       |             |                                 |
| Wt. of Tare & Dry Sample (g):                                                           | 25.40       | 24.64       |             |                                 |
| Weight of Tare (g):                                                                     | 15.46       | 15.56       |             |                                 |
| Weight of Water (g):                                                                    | 2.0         | 1.9         |             |                                 |
| Weight of Dry Sample (g):                                                               | 9.9         | 9.1         |             |                                 |
| <b>Moisture Content (%):</b>                                                            | <b>20.4</b> | <b>20.7</b> | <b>-0.3</b> |                                 |
| <i>Note: The acceptable range of the two Moisture Contents is <math>\pm</math> 1.12</i> |             |             |             |                                 |
|                                                                                         |             |             |             | <b>Liquid Limit (%): 35</b>     |
|                                                                                         |             |             |             | <b>Plastic Limit (%): 21</b>    |
|                                                                                         |             |             |             | <b>Plasticity Index (%): 14</b> |
|                                                                                         |             |             |             | <b>USCS Symbol: CL</b>          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 5/25/25 Checked By AES Date 5/28/25

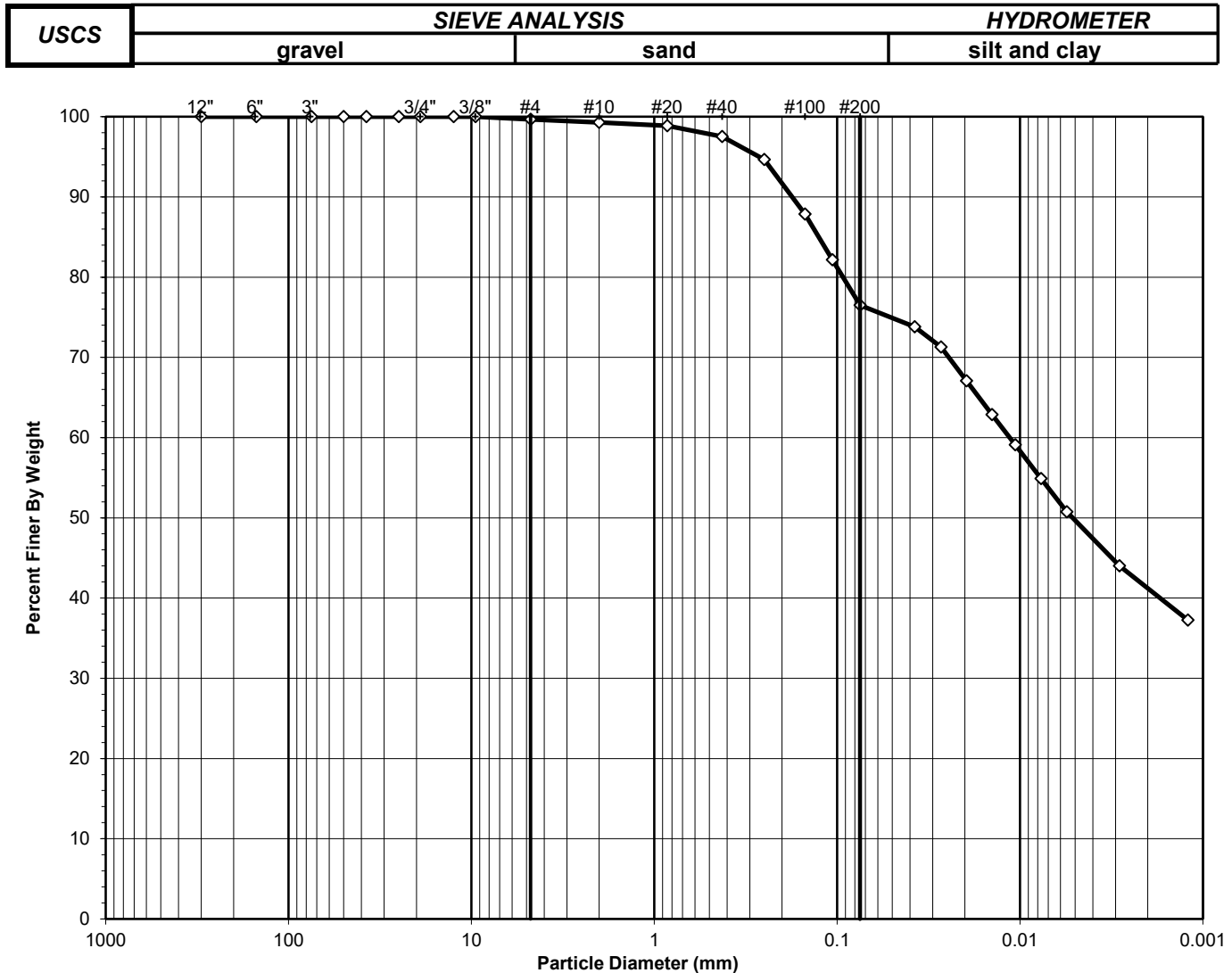


## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-004

Boring No.: B-25-3  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown



**USCS Symbol:**  
**CL, TESTED**

**USCS Classification:**  
**LEAN CLAY WITH SAND**

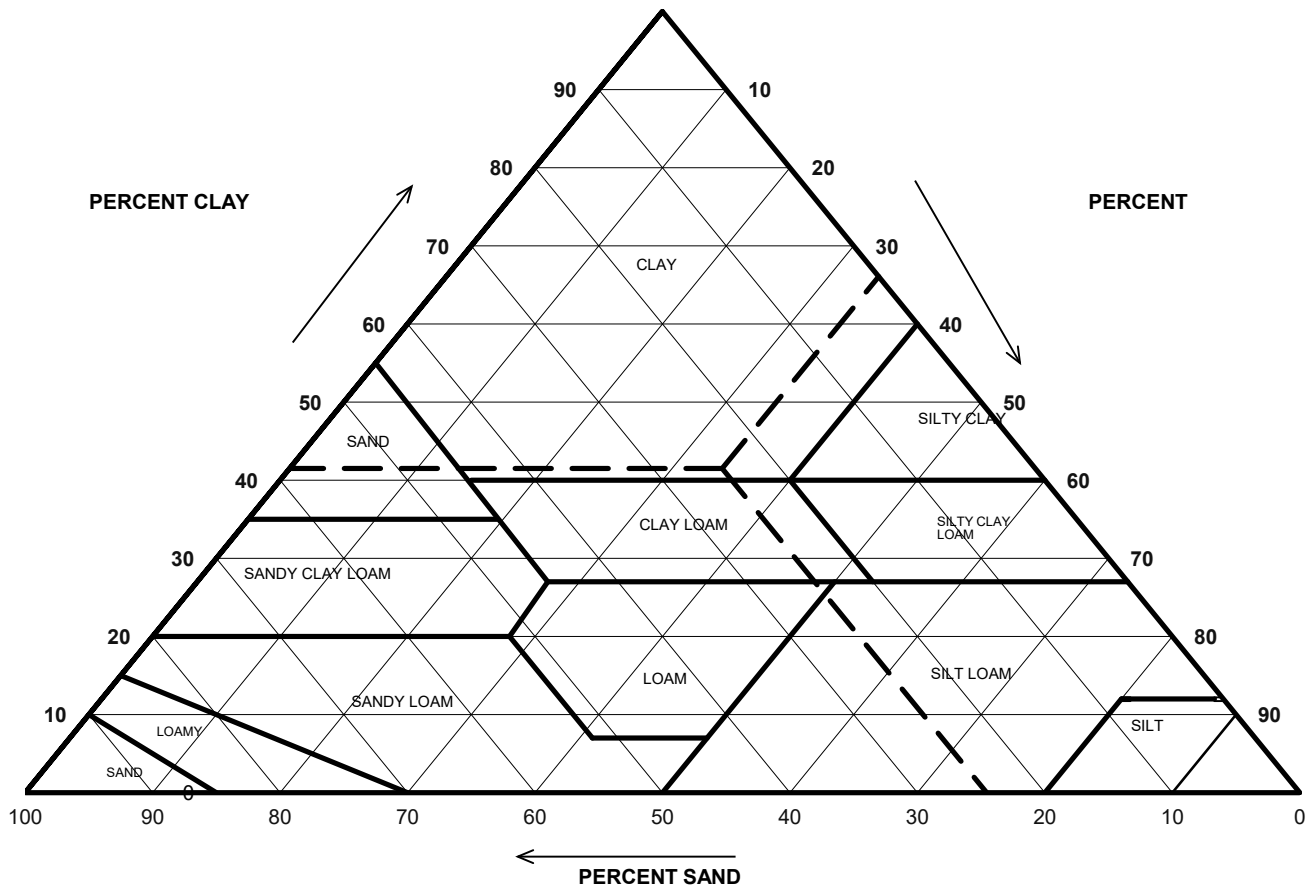
|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Tested By CB | Date 5/28/25 | Checked By AES | Date 5/28/25 |
|--------------|--------------|----------------|--------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-004

Boring No.: B-25-3  
Depth (ft): 2.0-4.0  
Sample No.: SS-2  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.70              |                                                              |
| 2                  | 99.30         | Sand   | 24.39             | 24.57                                                        |
| 0.05               | 74.90         | Silt   | 33.69             | 33.93                                                        |
| 0.002              | 41.21         | Clay   | 41.21             | 41.50                                                        |

USDA Classification: CLAY

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-004

Boring No.: B-25-3  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 455         | Tare No.:                          | NA         | Tare No.:                                  | 455        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 453.31      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 453.31     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 407.70      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 407.70     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 141.41      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 141.41     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 45.61       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 45.61      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 266.29      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 266.29     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>17.1</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 266.29     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 266.29     |
| Tare No. (Sub-Specimen)                   | 455         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 455        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 453.31      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 453.31     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 141.41      | Dry Weight of - 3/4" Sample (g):   | 266.29     | Weight of Tare (g):                        | 141.41     | Dry Weight of - 3/4" Sample (g):   | 266.29     |
| Sub-Specimen Wet Weight (g):              | 311.90      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 311.90     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 266.29     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 266.29     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.95                        | 0.36                 | 0.36                             | 99.64             | 99.6                          |
| #10        | 2                  | 0.92                        | 0.35                 | 0.70                             | 99.30             | 99.3                          |
| #20        | 0.85               | 1.18                        | ( ** ) 0.44          | 1.15                             | 98.85             | 98.9                          |
| #40        | 0.425              | 3.57                        | 1.34                 | 2.49                             | 97.51             | 97.5                          |
| #60        | 0.25               | 7.57                        | 2.84                 | 5.33                             | 94.67             | 94.7                          |
| #100       | 0.15               | 18.11                       | 6.80                 | 12.13                            | 87.87             | 87.9                          |
| #140       | 0.106              | 15.21                       | 5.71                 | 17.84                            | 82.16             | 82.2                          |
| #200       | 0.075              | 15.11                       | 5.67                 | 23.52                            | 76.48             | 76.5                          |
| Pan        | -                  | 203.67                      | 76.48                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 5/28/25 Checked By AES Date 5/28/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-3  |
| Client Reference: | Legion Pond                   | Depth (ft): | 2.0-4.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-2    |
| Lab ID:           | R-2025-143-001-004            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 46.5       | 22.9       | 2.60        | 8.2                      | 0.0377 | 96.5                       | 73.8                        |
| 2                  | 45.0       | 22.9       | 2.60        | 8.5                      | 0.0271 | 93.2                       | 71.3                        |
| 4                  | 42.5       | 22.9       | 2.60        | 8.9                      | 0.0196 | 87.7                       | 67.1                        |
| 8                  | 40.0       | 22.9       | 2.60        | 9.4                      | 0.0142 | 82.2                       | 62.9                        |
| 15                 | 37.8       | 22.9       | 2.60        | 9.8                      | 0.0106 | 77.3                       | 59.1                        |
| 30                 | 35.3       | 22.9       | 2.60        | 10.3                     | 0.0077 | 71.8                       | 54.9                        |
| 60                 | 32.8       | 23.0       | 2.56        | 10.7                     | 0.0055 | 66.4                       | 50.7                        |
| 240                | 28.8       | 23.0       | 2.56        | 11.4                     | 0.0029 | 57.6                       | 44.0                        |
| 1440               | 24.8       | 22.9       | 2.60        | 12.1                     | 0.0012 | 48.7                       | 37.2                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 200    | Percent Finer than # 200: | 76.48        |
| Wt. of Tare & Dry Material (g): | 221.21 |                           |              |
| Weight of Tare (g):             | 171.22 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 44.99  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 5/29/25 |
|-----------|----|------|---------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-004

Boring No.: B-25-3

Depth (ft): 2.0-4.0

Sample No.: SS-2

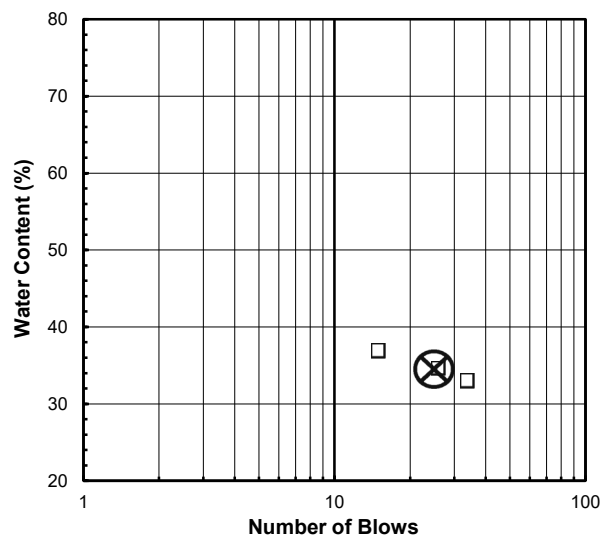
Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

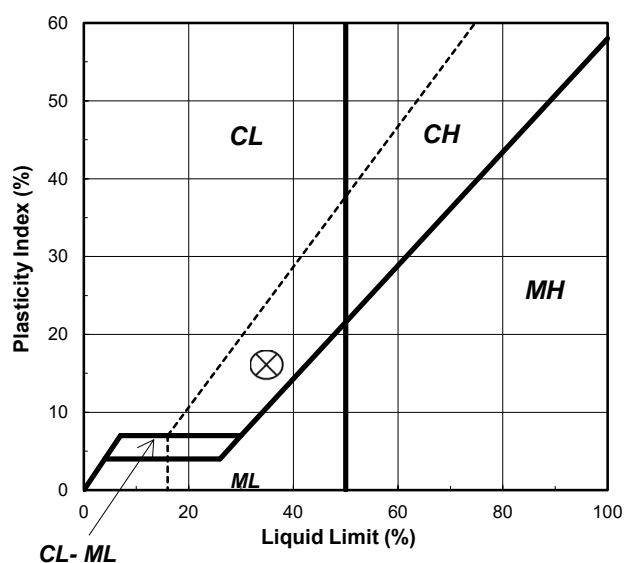
| As Received Moisture Content<br>ASTM D2216-19 |             | Liquid Limit Test |             |             |          |
|-----------------------------------------------|-------------|-------------------|-------------|-------------|----------|
|                                               |             | 1                 | 2           | 3           | M        |
| Tare Number:                                  | 455         | A-C               | J           | AT          | U        |
| Wt. of Tare & Wet Sample (g):                 | 453.31      | 32.95             | 37.20       | 33.17       | L        |
| Wt. of Tare & Dry Sample (g):                 | 407.70      | 28.62             | 31.50       | 28.41       | T        |
| Weight of Tare (g):                           | 141.41      | 15.46             | 15.01       | 15.48       | I        |
| Weight of Water (g):                          | 45.6        | 4.3               | 5.7         | 4.8         | P        |
| Weight of Dry Sample (g):                     | 266.3       | 13.2              | 16.5        | 12.9        | O        |
| Was As Received MC Preserved:                 | Yes         |                   |             |             | I        |
| <b>Moisture Content (%):</b>                  | <b>17.1</b> | <b>32.9</b>       | <b>34.6</b> | <b>36.8</b> | <b>N</b> |
| <b>Number of Blows:</b>                       |             | <b>34</b>         | <b>26</b>   | <b>15</b>   | <b>T</b> |

| Plastic Limit Test                                                                      | 1           | 2           | Range      | Test Results                    |
|-----------------------------------------------------------------------------------------|-------------|-------------|------------|---------------------------------|
| Tare Number:                                                                            | 10          | 16          |            | <b>Liquid Limit (%): 35</b>     |
| Wt. of Tare & Wet Sample (g):                                                           | 17.26       | 17.76       |            | <b>Plastic Limit (%): 19</b>    |
| Wt. of Tare & Dry Sample (g):                                                           | 15.62       | 16.06       |            | <b>Plasticity Index (%): 16</b> |
| Weight of Tare (g):                                                                     | 6.94        | 7.04        |            | <b>USCS Symbol: CL</b>          |
| Weight of Water (g):                                                                    | 1.6         | 1.7         |            |                                 |
| Weight of Dry Sample (g):                                                               | 8.7         | 9.0         |            |                                 |
| <b>Moisture Content (%):</b>                                                            | <b>18.9</b> | <b>18.8</b> | <b>0.0</b> |                                 |
| <i>Note: The acceptable range of the two Moisture Contents is <math>\pm</math> 1.12</i> |             |             |            |                                 |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 5/29/25 Checked By AES Date 6/2/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-005

Boring No.: B-25-3  
 Depth (ft): 6.0-8.0  
 Sample No.: SS-4  
 Soil Color: Brown



**USCS Symbol:**  
**CL, TESTED**

**USCS Classification:**  
**LEAN CLAY WITH SAND**

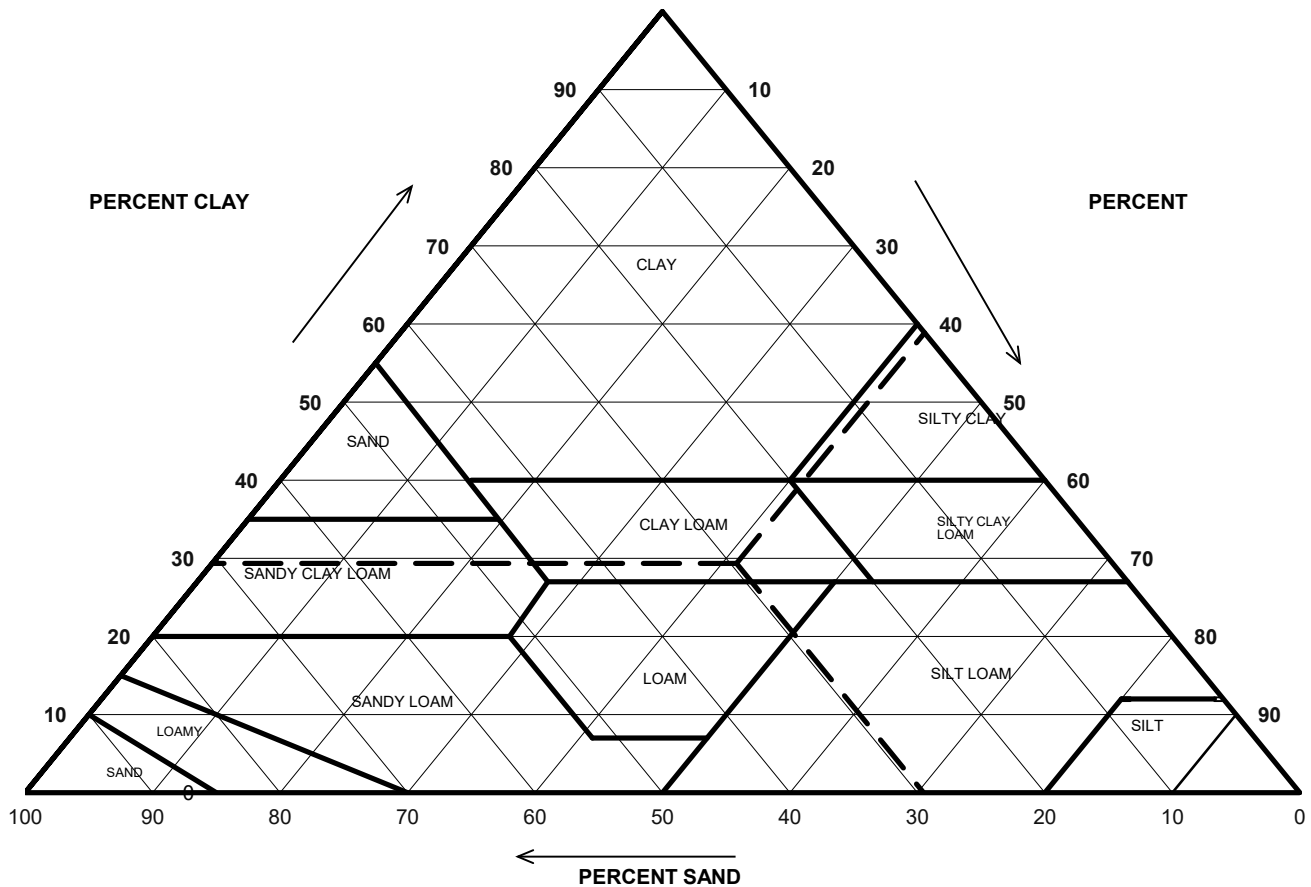
|              |             |                |             |
|--------------|-------------|----------------|-------------|
| Tested By CB | Date 6/6/25 | Checked By AES | Date 6/6/25 |
|--------------|-------------|----------------|-------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-005

Boring No.: B-25-3  
Depth (ft): 6.0-8.0  
Sample No.: SS-4  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.30              |                                                              |
| 2                  | 99.70         | Sand   | 29.43             | 29.52                                                        |
| 0.05               | 70.27         | Silt   | 41.01             | 41.13                                                        |
| 0.002              | 29.26         | Clay   | 29.26             | 29.35                                                        |

USDA Classification: CLAY LOAM

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-005

Boring No.: B-25-3  
 Depth (ft): 6.0-8.0  
 Sample No.: SS-4  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 450         | Tare No.:                          | NA         | Tare No.:                                  | 450        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 379.87      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 379.87     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 354.96      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 354.96     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 144.34      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 144.34     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 24.91       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 24.91      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 210.62      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 210.62     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>11.8</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 210.62     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 210.62     |
| Tare No. (Sub-Specimen)                   | 450         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 450        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 379.87      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 379.87     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 144.34      | Dry Weight of - 3/4" Sample (g):   | 210.62     | Weight of Tare (g):                        | 144.34     | Dry Weight of - 3/4" Sample (g):   | 210.62     |
| Sub-Specimen Wet Weight (g):              | 235.53      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 235.53     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 210.62     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 210.62     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.64                        | 0.30                 | 0.30                             | 99.70             | 99.7                          |
| #20        | 0.85               | 4.94                        | ( ** ) 2.35          | 2.65                             | 97.35             | 97.4                          |
| #40        | 0.425              | 5.55                        | 2.64                 | 5.28                             | 94.72             | 94.7                          |
| #60        | 0.25               | 9.48                        | 4.50                 | 9.79                             | 90.21             | 90.2                          |
| #100       | 0.15               | 14.88                       | 7.06                 | 16.85                            | 83.15             | 83.1                          |
| #140       | 0.106              | 12.09                       | 5.74                 | 22.59                            | 77.41             | 77.4                          |
| #200       | 0.075              | 12.89                       | 6.12                 | 28.71                            | 71.29             | 71.3                          |
| Pan        | -                  | 150.15                      | 71.29                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/6/25 Checked By AES Date 6/6/25



## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-3  |
| Client Reference: | Legion Pond                   | Depth (ft): | 6.0-8.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-4    |
| Lab ID:           | R-2025-143-001-005            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 40.0       | 22.9       | 2.60        | 9.4                      | 0.0402 | 95.2                       | 67.9                        |
| 2                  | 38.5       | 22.9       | 2.60        | 9.7                      | 0.0289 | 91.4                       | 65.2                        |
| 4                  | 35.8       | 22.9       | 2.60        | 10.2                     | 0.0209 | 84.4                       | 60.2                        |
| 8                  | 32.5       | 22.9       | 2.60        | 10.7                     | 0.0152 | 76.1                       | 54.3                        |
| 15                 | 29.8       | 22.9       | 2.60        | 11.2                     | 0.0114 | 69.1                       | 49.3                        |
| 30                 | 27.3       | 23.0       | 2.56        | 11.7                     | 0.0082 | 62.9                       | 44.8                        |
| 60                 | 24.5       | 23.0       | 2.56        | 12.2                     | 0.0059 | 55.9                       | 39.8                        |
| 240                | 20.8       | 23.0       | 2.56        | 12.9                     | 0.0030 | 46.3                       | 33.0                        |
| 1440               | 16.5       | 22.9       | 2.60        | 13.6                     | 0.0013 | 35.4                       | 25.2                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 201    | Percent Finer than # 200: | 71.29        |
| Wt. of Tare & Dry Material (g): | 213.50 |                           |              |
| Weight of Tare (g):             | 169.66 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 38.84  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |        |
|-----------|----|------|---------|------------|-----|------|--------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 6/6/25 |
|-----------|----|------|---------|------------|-----|------|--------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-005

Boring No.: B-25-3

Depth (ft): 6.0-8.0

Sample No.: SS-4

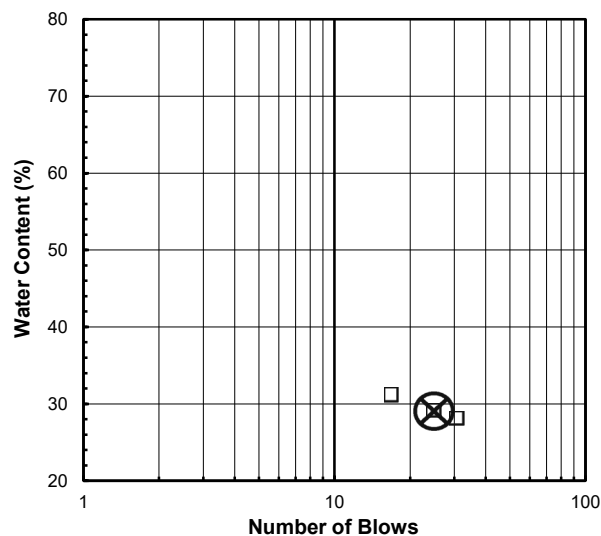
Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

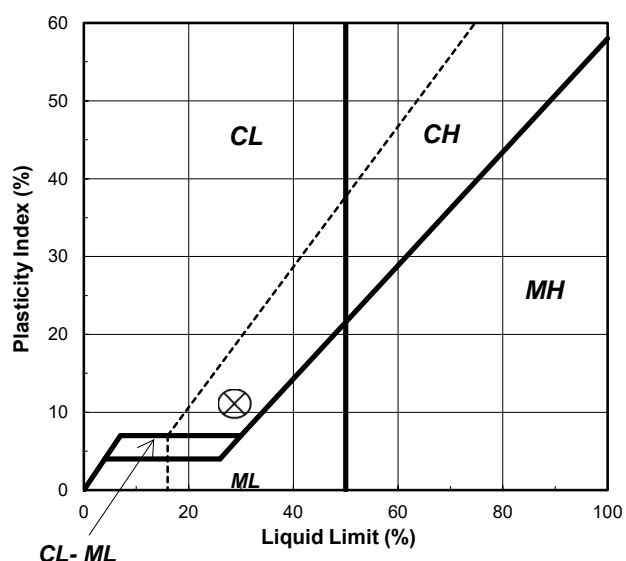
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |       |       |   |
|-----------------------------------------------|--------|-------------------|-------|-------|---|
| Tare Number:                                  | 450    | 1                 | 2     | 3     | M |
| Wt. of Tare & Wet Sample (g):                 | 379.87 | X-9               | A     | G     | U |
| Wt. of Tare & Dry Sample (g):                 | 354.96 | 36.14             | 34.07 | 33.27 | L |
| Weight of Tare (g):                           | 144.34 | 31.63             | 29.80 | 28.92 | T |
| Weight of Water (g):                          | 24.9   | 15.56             | 15.10 | 14.93 | I |
| Weight of Dry Sample (g):                     | 210.6  | 4.5               | 4.3   | 4.4   | P |
| Was As Received MC Preserved:                 | Yes    | 16.1              | 14.7  | 14.0  | O |
| Moisture Content (%):                         | 11.8   | 28.1              | 29.0  | 31.1  | N |
| Number of Blows:                              |        | 31                | 25    | 17    | T |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 12    | 34    |       | Liquid Limit (%): 29     |
| Wt. of Tare & Wet Sample (g):                                         | 20.18 | 17.20 |       | Plastic Limit (%): 18    |
| Wt. of Tare & Dry Sample (g):                                         | 18.20 | 15.67 |       | Plasticity Index (%): 11 |
| Weight of Tare (g):                                                   | 7.00  | 7.00  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 2.0   | 1.5   |       |                          |
| Weight of Dry Sample (g):                                             | 11.2  | 8.7   |       |                          |
| Moisture Content (%):                                                 | 17.7  | 17.6  | 0.0   |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 6/2/25 Checked By AES Date 6/3/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown



**USCS Symbol:**  
*ml, ASSUMED*

**USCS Classification:**  
**SILT**

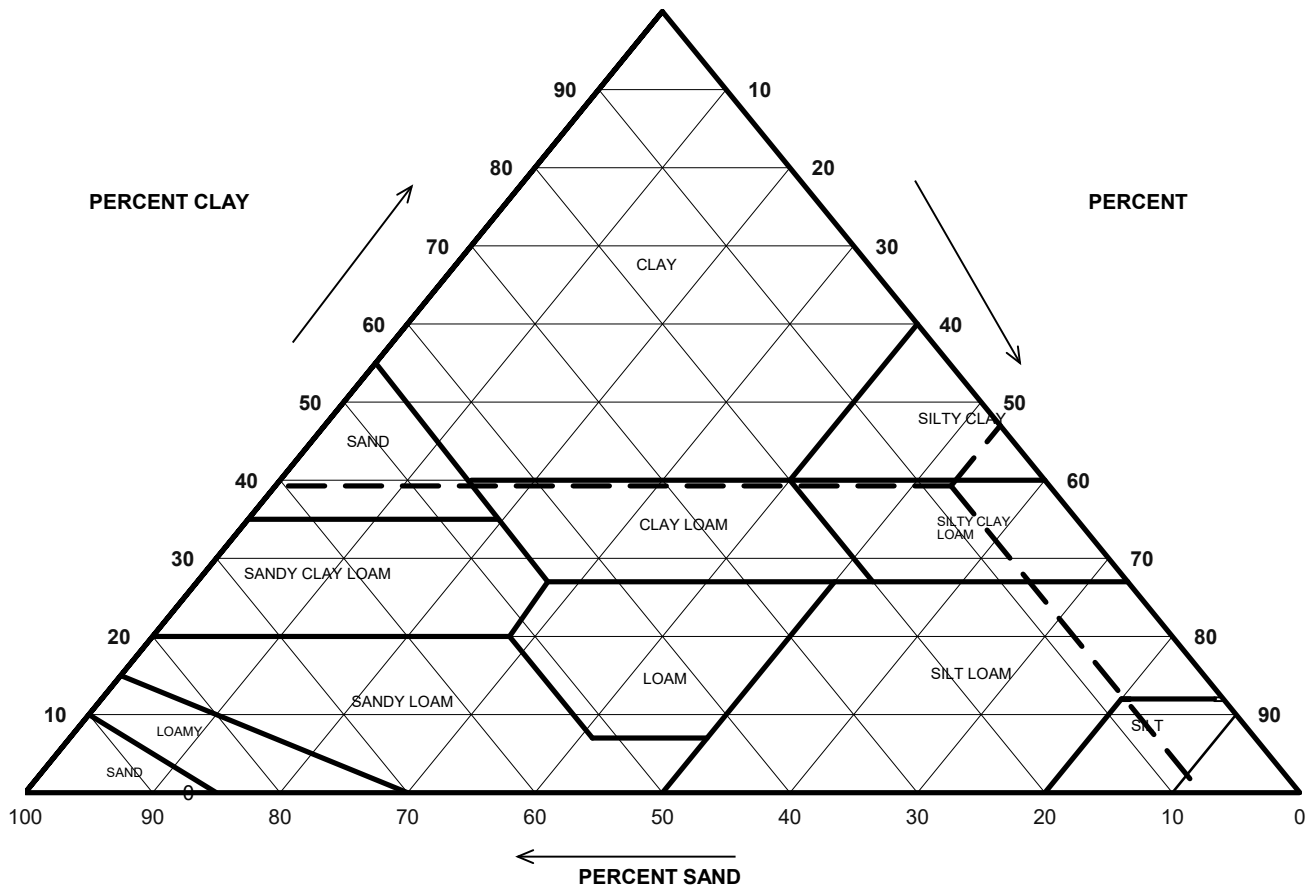
|              |             |                |             |
|--------------|-------------|----------------|-------------|
| Tested By CB | Date 6/2/25 | Checked By AES | Date 6/2/25 |
|--------------|-------------|----------------|-------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
Depth (ft): 12.0-14.0  
Sample No.: SS-7  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.27              |                                                              |
| 2                  | 99.73         | Sand   | 7.71              | 7.73                                                         |
| 0.05               | 92.02         | Silt   | 52.86             | 53.00                                                        |
| 0.002              | 39.16         | Clay   | 39.16             | 39.27                                                        |

USDA Classification: **SILTY CLAY LOAM**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 468         | Tare No.:                          | NA         | Tare No.:                                  | 468        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 280.44      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 280.44     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 256.34      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 256.34     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 137.50      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 137.50     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 24.10       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 24.10      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 118.84      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 118.84     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>20.3</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 118.84     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 118.84     |
| Tare No. (Sub-Specimen)                   | 468         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 468        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 280.44      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 280.44     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 137.50      | Dry Weight of - 3/4" Sample (g):   | 118.84     | Weight of Tare (g):                        | 137.50     | Dry Weight of - 3/4" Sample (g):   | 118.84     |
| Sub-Specimen Wet Weight (g):              | 142.94      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 142.94     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 118.84     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 118.84     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.32                        | 0.27                 | 0.27                             | 99.73             | 99.7                          |
| #20        | 0.85               | 0.38                        | ( ** ) 0.32          | 0.59                             | 99.41             | 99.4                          |
| #40        | 0.425              | 0.59                        | 0.50                 | 1.09                             | 98.91             | 98.9                          |
| #60        | 0.25               | 1.07                        | 0.90                 | 1.99                             | 98.01             | 98.0                          |
| #100       | 0.15               | 1.75                        | 1.47                 | 3.46                             | 96.54             | 96.5                          |
| #140       | 0.106              | 1.59                        | 1.34                 | 4.80                             | 95.20             | 95.2                          |
| #200       | 0.075              | 1.83                        | 1.54                 | 6.34                             | 93.66             | 93.7                          |
| Pan        | -                  | 111.31                      | 93.66                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/2/25 Checked By AES Date 6/2/25

## HYDROMETER ANALYSIS

ASTM D7928-21

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 58.8       | 22.9       | 2.60        | 6.0                      | 0.0322 | 96.3                       | 90.2                        |
| 2                  | 56.0       | 22.9       | 2.60        | 6.5                      | 0.0237 | 91.5                       | 85.7                        |
| 4                  | 52.0       | 22.9       | 2.60        | 7.2                      | 0.0177 | 84.7                       | 79.3                        |
| 8                  | 47.8       | 22.9       | 2.60        | 8.0                      | 0.0131 | 77.4                       | 72.5                        |
| 15                 | 44.0       | 22.9       | 2.60        | 8.7                      | 0.0100 | 71.0                       | 66.5                        |
| 30                 | 39.5       | 23.0       | 2.56        | 9.5                      | 0.0074 | 63.3                       | 59.3                        |
| 60                 | 36.0       | 23.0       | 2.56        | 10.1                     | 0.0054 | 57.3                       | 53.7                        |
| 240                | 29.3       | 23.0       | 2.56        | 11.3                     | 0.0028 | 45.8                       | 42.9                        |
| 1440               | 23.8       | 22.9       | 2.60        | 12.3                     | 0.0012 | 36.3                       | 34.0                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 2010   | Percent Finer than # 200: | 93.66        |
| Wt. of Tare & Dry Material (g): | 231.37 |                           |              |
| Weight of Tare (g):             | 168.69 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 57.68  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |        |
|-----------|----|------|---------|------------|-----|------|--------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 6/2/25 |
|-----------|----|------|---------|------------|-----|------|--------|

page 4 of 4

## CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
 Depth (ft): 1.0-6.0  
 Sample No.: S-1  
 Description: Brown Clay  
 ( - # 10 Sieve material )

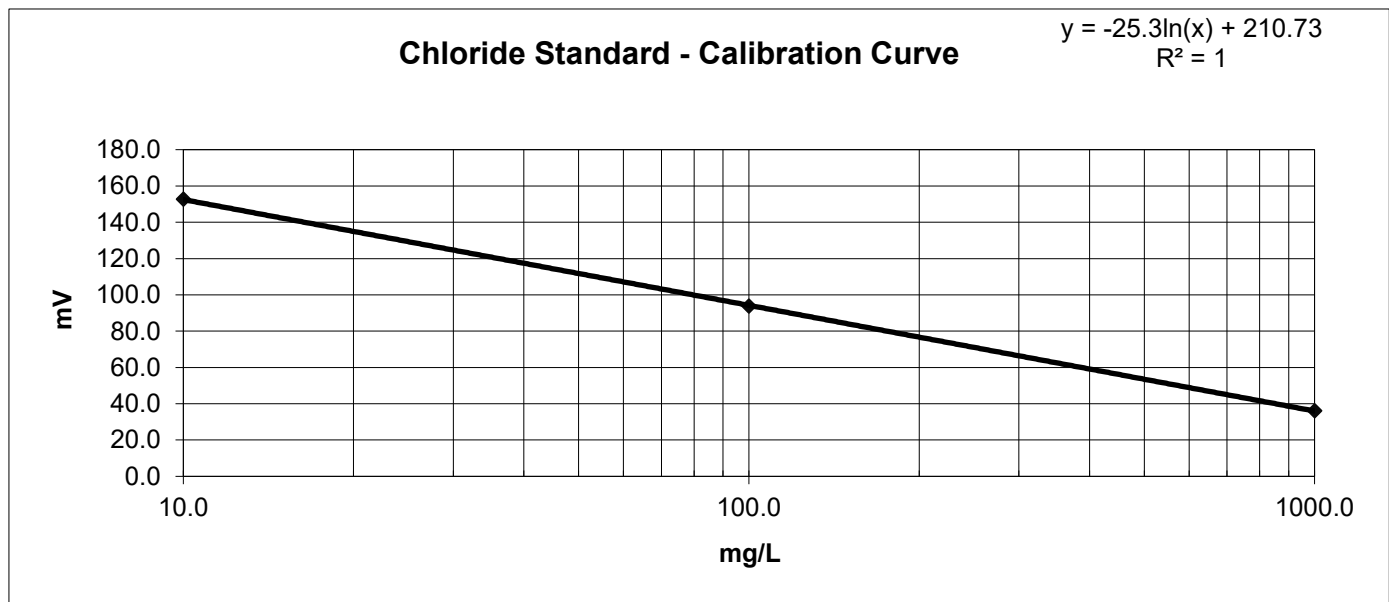
### CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD    | MILLIVOLTS<br>(mV) |
|-------------|--------------------|
| 10.0 mg/L   | 152.7              |
| 100.0 mg/L  | 93.8               |
| 1000.0 mg/L | 36.2               |

### MEASUREMENT OF CHLORIDES

|                              |       |               |               |
|------------------------------|-------|---------------|---------------|
| Sample Weight (g):           | 100.0 | CONCENTRATION | CONCENTRATION |
| Water added to Sample (ml):  | 100.0 | (mg/L)        | (mg/kg)       |
| Size of Sample Aliquot (ml): | 20.0  |               |               |
| Sample Reading (mV):         | 73.0  | 231.48        | 231.48        |

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO<sub>3</sub> solution (1:1 volume).  
 2) Samples were dried for a minimum of 12 hours at 110 ± 5°C.



Notes:

Tested By BS Date 6/10/25 Checked By AES Date 6/10/25

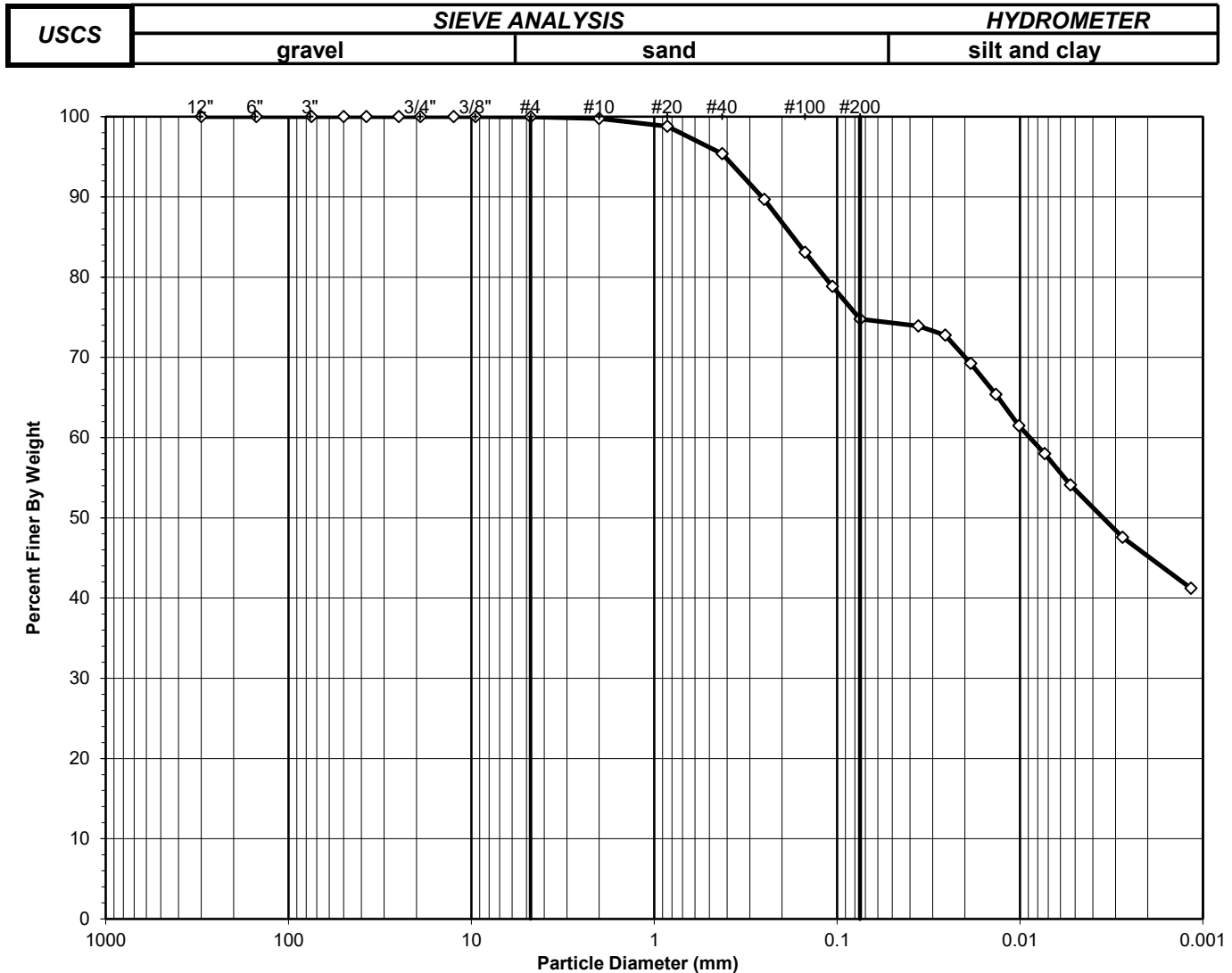
page 1 of 1 DCN: CT-S63A DATE: 6/2/14 REVISION: 1

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown



**USCS Symbol:**  
*ml, ASSUMED*

**USCS Classification:**  
**SILT WITH SAND**

|              |             |                |             |
|--------------|-------------|----------------|-------------|
| Tested By CB | Date 6/6/25 | Checked By AES | Date 6/9/25 |
|--------------|-------------|----------------|-------------|

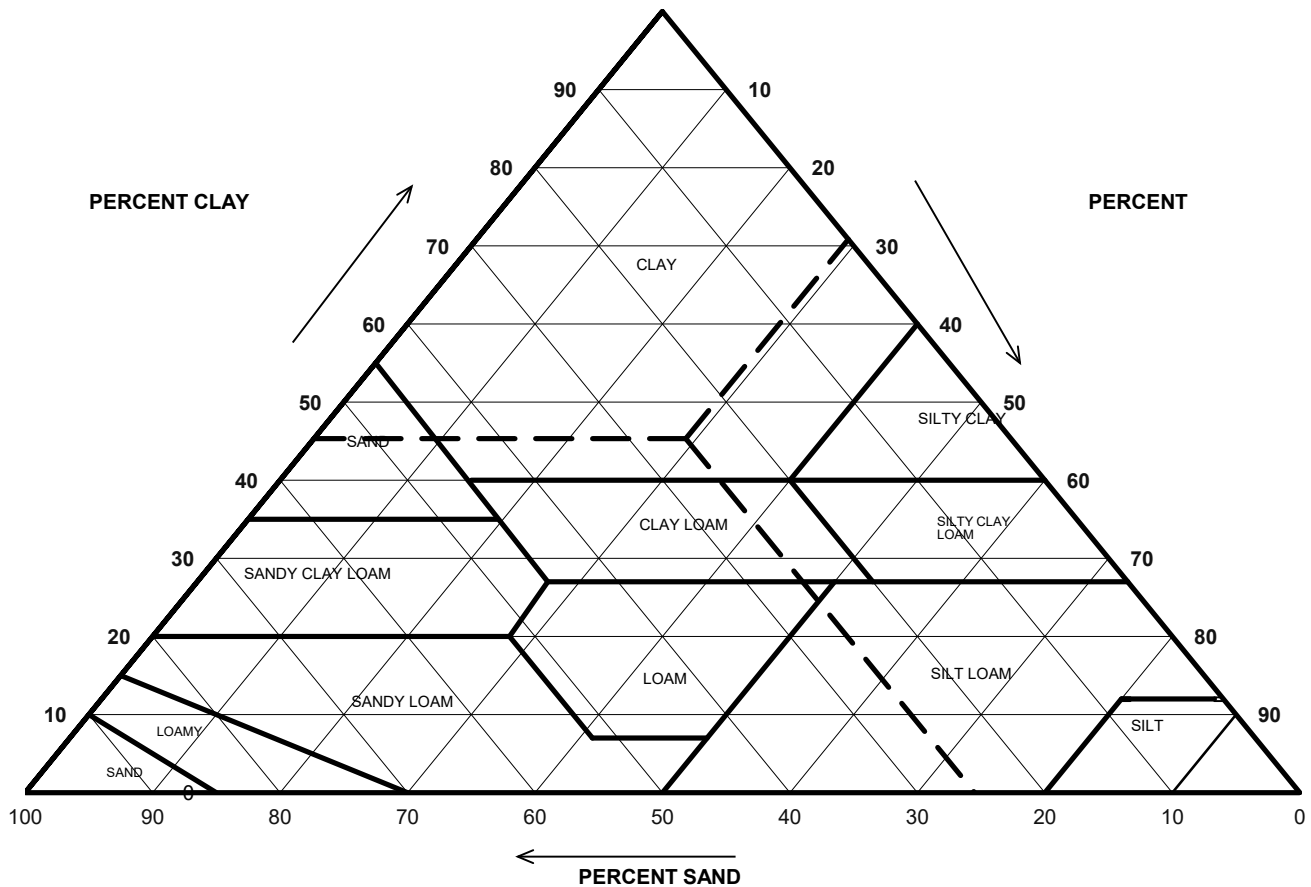
page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1



## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
Depth (ft): 12.0-14.0  
Sample No.: SS-7  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.25              |                                                              |
| 2                  | 99.75         | Sand   | 25.45             | 25.51                                                        |
| 0.05               | 74.30         | Silt   | 29.09             | 29.17                                                        |
| 0.002              | 45.21         | Clay   | 45.21             | 45.32                                                        |

USDA Classification: **CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 458         | Tare No.:                          | NA         | Tare No.:                                  | 458        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 796.31      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 796.31     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 714.26      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 714.26     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 145.70      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 145.70     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 82.05       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 82.05      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 568.56      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 568.56     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>14.4</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 568.56     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 568.56     |
| Tare No. (Sub-Specimen)                   | 458         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 458        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 796.31      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 796.31     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 145.70      | Dry Weight of - 3/4" Sample (g):   | 568.56     | Weight of Tare (g):                        | 145.70     | Dry Weight of - 3/4" Sample (g):   | 568.56     |
| Sub-Specimen Wet Weight (g):              | 650.61      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 650.61     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 568.56     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 568.56     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.16                        | 0.03                 | 0.03                             | 99.97             | 100.0                         |
| #10        | 2                  | 1.27                        | 0.22                 | 0.25                             | 99.75             | 99.7                          |
| #20        | 0.85               | 5.48                        | ( ** ) 0.96          | 1.22                             | 98.78             | 98.8                          |
| #40        | 0.425              | 19.27                       | 3.39                 | 4.60                             | 95.40             | 95.4                          |
| #60        | 0.25               | 32.43                       | 5.70                 | 10.31                            | 89.69             | 89.7                          |
| #100       | 0.15               | 37.44                       | 6.59                 | 16.89                            | 83.11             | 83.1                          |
| #140       | 0.106              | 24.22                       | 4.26                 | 21.15                            | 78.85             | 78.8                          |
| #200       | 0.075              | 23.18                       | 4.08                 | 25.23                            | 74.77             | 74.8                          |
| Pan        | -                  | 425.11                      | 74.77                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/6/25 Checked By AES Date 6/9/25

## HYDROMETER ANALYSIS

ASTM D7928-21

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 50.0       | 23.3       | 2.45        | 7.6                      | 0.0360 | 98.9                       | 73.9                        |
| 2                  | 49.3       | 23.3       | 2.45        | 7.7                      | 0.0257 | 97.3                       | 72.8                        |
| 4                  | 47.0       | 23.3       | 2.45        | 8.1                      | 0.0186 | 92.6                       | 69.3                        |
| 8                  | 44.5       | 23.3       | 2.45        | 8.6                      | 0.0135 | 87.4                       | 65.4                        |
| 15                 | 42.0       | 23.3       | 2.45        | 9.0                      | 0.0101 | 82.2                       | 61.5                        |
| 30                 | 39.8       | 23.3       | 2.45        | 9.4                      | 0.0073 | 77.6                       | 58.0                        |
| 60                 | 37.3       | 23.3       | 2.45        | 9.9                      | 0.0053 | 72.4                       | 54.1                        |
| 240                | 33.0       | 23.4       | 2.41        | 10.7                     | 0.0028 | 63.6                       | 47.6                        |
| 1440               | 29.0       | 23.2       | 2.49        | 11.4                     | 0.0012 | 55.1                       | 41.2                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 201    | Percent Finer than # 200: | 74.77        |
| Wt. of Tare & Dry Material (g): | 222.16 |                           |              |
| Weight of Tare (g):             | 169.60 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 47.56  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |        |            |     |      |        |
|-----------|----|------|--------|------------|-----|------|--------|
| Tested By | CB | Date | 6/5/25 | Checked By | AES | Date | 6/9/25 |
|-----------|----|------|--------|------------|-----|------|--------|

page 4 of 4

## MOISTURE - DENSITY RELATIONSHIP

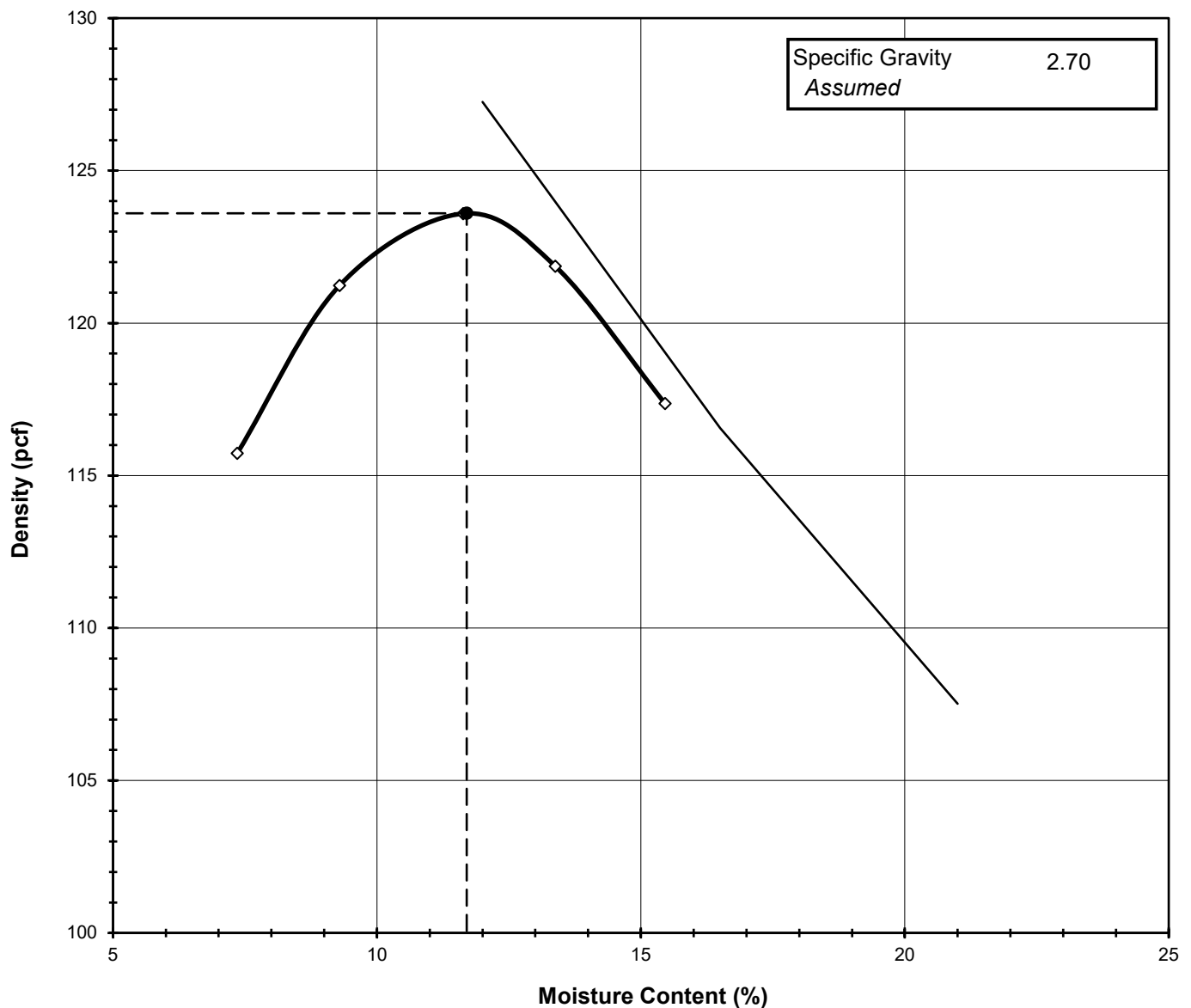
ASTM D1557-12

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
Depth (ft): 1.0-6.0  
Sample No.: S-1  
Test Method: **MODIFIED**

Visual Description: Brown Sandy Clay

**Optimum Moisture Content (%): 11.7**  
**Maximum Dry Density (pcf): 123.6**



Tested By CRW Date 6/2/25 Checked By AES Date 6/3/25

page 1 of 2 DCN:CT-S12 DATE: 4/21/23 REVISION: 17

## MOISTURE - DENSITY RELATIONSHIP

ASTM D1557-12

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
 Depth (ft): 1.0-6.0  
 Sample No.: S-1

Visual Description: Brown Sandy Clay

|                                 |              |
|---------------------------------|--------------|
| Total Weight of the Sample (g): | 28050        |
| As Received Water Content (%):  | NA           |
| Assumed Specific Gravity:       | 2.70         |
| Percent Retained on 3/4":       | NA           |
| Percent Retained on 3/8":       | NA           |
| Percent Retained on #4:         | NA           |
| Oversize Material:              | Not included |
| Procedure Used:                 | B            |

|                                        |                 |
|----------------------------------------|-----------------|
| Test Type:                             | <b>MODIFIED</b> |
| Rammer Weight (lb):                    | 10.0            |
| Rammer Drop (in):                      | 18              |
| Rammer Type:                           | MECHANICAL      |
| Machine ID:                            | R174            |
| Mold ID:                               | R607            |
| Mold diameter:                         | 4"              |
| Weight of the Mold (g):                | 4235            |
| Volume of the Mold (cm <sup>3</sup> ): | 943             |

### Mold / Specimen

| Point No.                        | 1    | 2    | 3    | 4    | 5    |
|----------------------------------|------|------|------|------|------|
| Weight of Mold & Wet Sample (g): | 6113 | 6238 | 6320 | 6323 | 6283 |
| Weight of Mold (g):              | 4235 | 4235 | 4235 | 4235 | 4235 |
| Weight of Wet Sample (g):        | 1878 | 2002 | 2085 | 2088 | 2048 |
| Mold Volume (cm <sup>3</sup> ):  | 943  | 943  | 943  | 943  | 943  |

### Moisture Content / Density

|                                  |        |        |        |        |        |
|----------------------------------|--------|--------|--------|--------|--------|
| Tare Number:                     | 444    | 482    | 426    | 705    | 719    |
| Weight of Tare & Wet Sample (g): | 351.80 | 360.00 | 365.20 | 387.90 | 354.70 |
| Weight of Tare & Dry Sample (g): | 334.49 | 337.68 | 337.52 | 352.89 | 319.46 |
| Weight of Tare (g):              | 99.10  | 97.50  | 99.50  | 91.20  | 91.50  |
| Weight of Water (g):             | 17.31  | 22.32  | 27.68  | 35.01  | 35.24  |
| Weight of Dry Sample (g):        | 235.39 | 240.18 | 238.02 | 261.69 | 227.96 |

|                                   |              |              |              |              |              |
|-----------------------------------|--------------|--------------|--------------|--------------|--------------|
| Wet Density (g/cm <sup>3</sup> ): | 1.99         | 2.12         | 2.21         | 2.21         | 2.17         |
| Wet Density (pcf):                | 124.2        | 132.5        | 138.0        | 138.2        | 135.5        |
| <b>Moisture Content (%)</b> :     | <b>7.4</b>   | <b>9.3</b>   | <b>11.6</b>  | <b>13.4</b>  | <b>15.5</b>  |
| <b>Dry Density (pcf)</b> :        | <b>115.7</b> | <b>121.2</b> | <b>123.6</b> | <b>121.9</b> | <b>117.4</b> |

### Zero Air Voids

|                                |       |       |       |
|--------------------------------|-------|-------|-------|
| <b>Moisture Content (%)</b> :  | 12.0  | 16.5  | 21.0  |
| <b>Dry Unit Weight (pcf)</b> : | 127.3 | 116.6 | 107.5 |

Tested By CRW Date 6/2/25 Checked By AES Date 6/3/25

# Minimum Resistivity

AASHTO T288-12



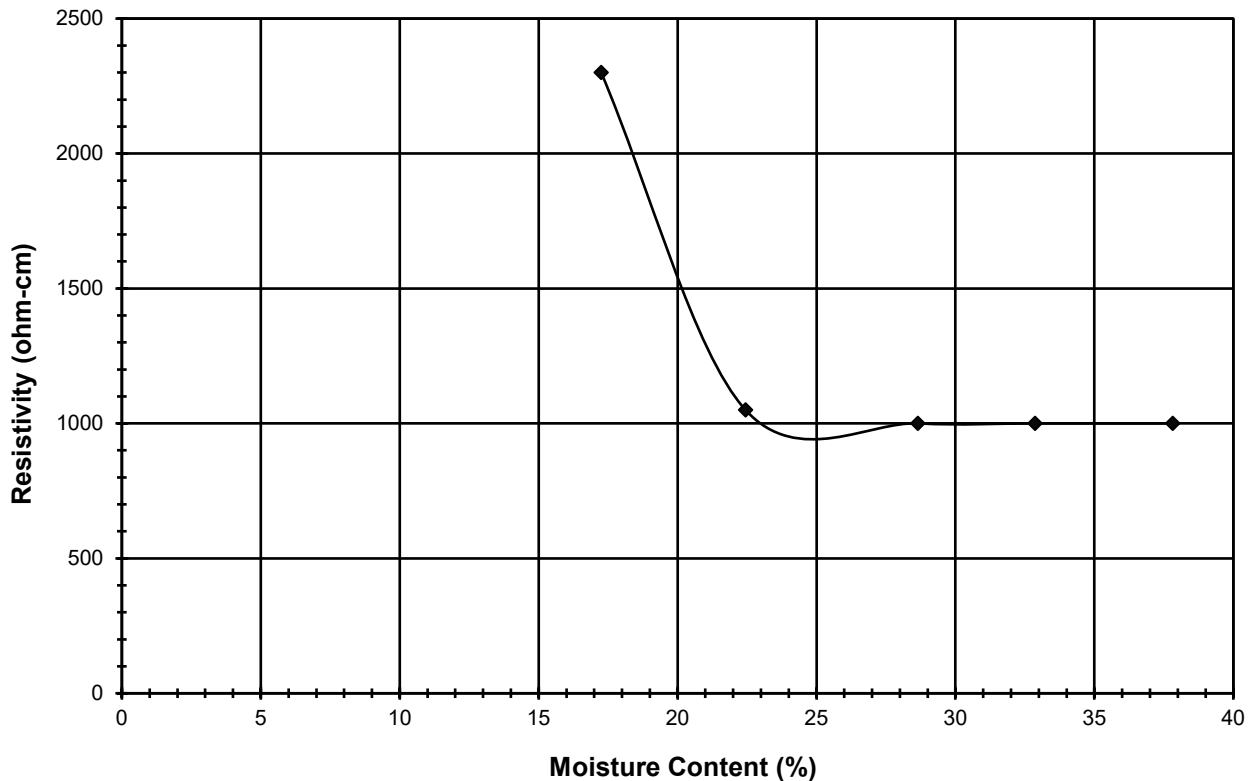
Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
 Depth (ft): 1.0-6.0  
 Sample No.: S-1  
 Visual Description: Brown Clay  
 ( - #10 Sieve material )

| Tare No.:                | Z     | 7     | B2    | B8    | B19   |
|--------------------------|-------|-------|-------|-------|-------|
| Tare & Wet Specimen (g): | 29.59 | 29.62 | 29.60 | 29.58 | 29.70 |
| Tare & Dry Specimen (g): | 27.52 | 27.03 | 26.44 | 26.10 | 25.82 |
| Tare Weight (g):         | 15.52 | 15.49 | 15.41 | 15.51 | 15.56 |

|                              |             |             |             |             |             |
|------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Moisture Content (%):</b> | <b>17.3</b> | <b>22.4</b> | <b>28.6</b> | <b>32.9</b> | <b>37.8</b> |
| <b>Resistance (ohm):</b>     | <b>2300</b> | <b>1050</b> | <b>1000</b> | <b>1000</b> | <b>1000</b> |
| <b>Resistivity (ohm-cm):</b> | <b>2300</b> | <b>1050</b> | <b>1000</b> | <b>1000</b> | <b>1000</b> |

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



| Soil Class | Corrosion Resistance | Specific Resistivity (ohm-cm) |
|------------|----------------------|-------------------------------|
| 1          | Excellent            | 10,000 - 6,000                |
| 2          | Good                 | 6,000 - 4,500                 |
| 3          | Fair                 | 4,500 - 2,000                 |
| 4          | Bad                  | 2,000 - 0                     |

Tested By BS Date 6/6/25 Checked By AES Date 6/9/25

## Water-Soluble Sulfate Ion Content in Soil

### AASHTO T 290-95 (2020)

|                   |                               |                              |
|-------------------|-------------------------------|------------------------------|
| Client:           | Summit Design & Eng. Services | Boring No.: B-25-4           |
| Client Reference: | Legion Pond                   | Depth (ft): 1.0-6.0          |
| Project No.:      | R-2025-143-001                | Sample No.: S-1              |
| Lab ID:           | R-2025-143-001-008            | Soil Description: Brown Clay |

#### Sulfate Standard - Calibration Curve Spectrophotometer Readings

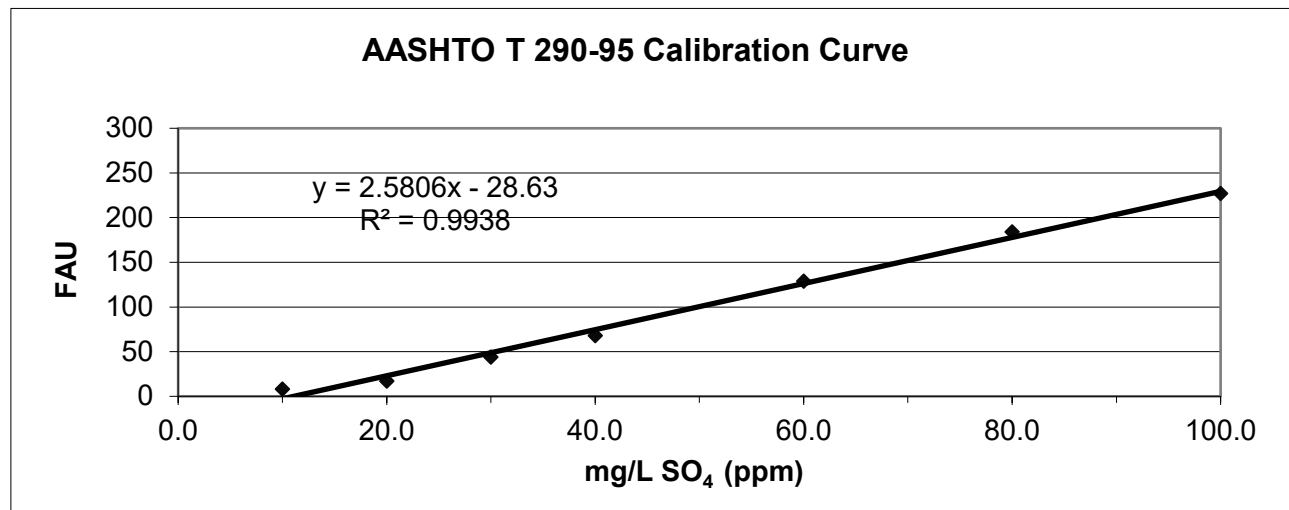
| <u>Sulfate Ion Concentrations (mg/L)</u> |            |      |      |      |      |      |      |       |
|------------------------------------------|------------|------|------|------|------|------|------|-------|
| 0.0                                      | 4.0        | 10.0 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 |
| <u>Spectrophotometer Readings (FAU)</u>  |            |      |      |      |      |      |      |       |
| Underrange                               | Underrange | 8    | 17   | 44   | 68   | 129  | 184  | 227   |

#### Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl<sub>2</sub>·2H<sub>2</sub>O)

|                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Sample Weight (g):</b> 100.0</p> <p><b>Water added to Sample (mL):</b> 300.0</p> <p><b>Size of Sample Aliquot (mL):</b> 50.0</p> <p><b>Sample Reading (FAU):</b> 10</p> <p><b>Sample Diluted:</b> No</p> <p><b>Sulfate Solution Added (ml):</b> 0</p> | <p><b><u>Sample Moisture Content</u></b></p> <p>Tare Number: 442</p> <p>Weight of Tare &amp; Wet Sample (g): 227.50</p> <p>Weight of Tare &amp; Dry Sample (g): 217.68</p> <p>Weight of Tare (g): 98.67</p> <p>Weight of Water (g): 9.82</p> <p>Weight of Dry Sample (g): 119.01</p> <p>Moisture Content (%): 8.25</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                          |       |                                                    |
|------------------------------------------|-------|----------------------------------------------------|
| <b>Sample Sulfate Ion Concentration:</b> | 14.97 | mg/L SO <sub>4</sub> (ppm)                         |
| <b>Sample Sulfate Ion Content:</b>       | 44.9  | mg/Kg SO <sub>4</sub> (not corrected for moisture) |
| <b>Sample Sulfate Ion Content:</b>       | 48.9  | mg/Kg SO <sub>4</sub> (corrected for moisture)     |



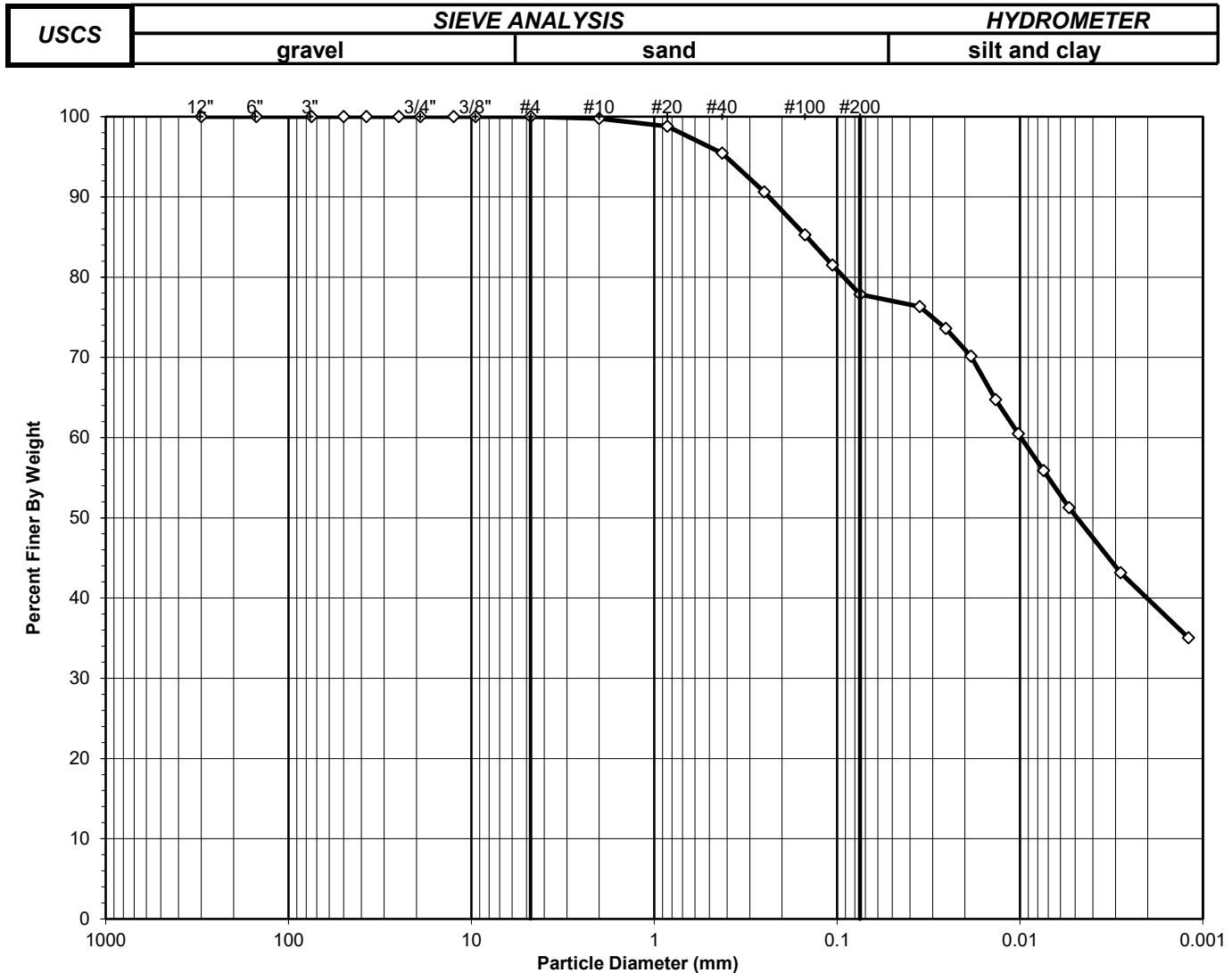
|               |               |                 |               |
|---------------|---------------|-----------------|---------------|
| Tested by: BS | Date: 6/11/25 | Checked by: AES | Date: 6/12/25 |
|---------------|---------------|-----------------|---------------|

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-009

Boring No.: B-25-4  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown



**USCS Symbol:**  
**CL, TESTED**

**USCS Classification:**  
**LEAN CLAY WITH SAND**

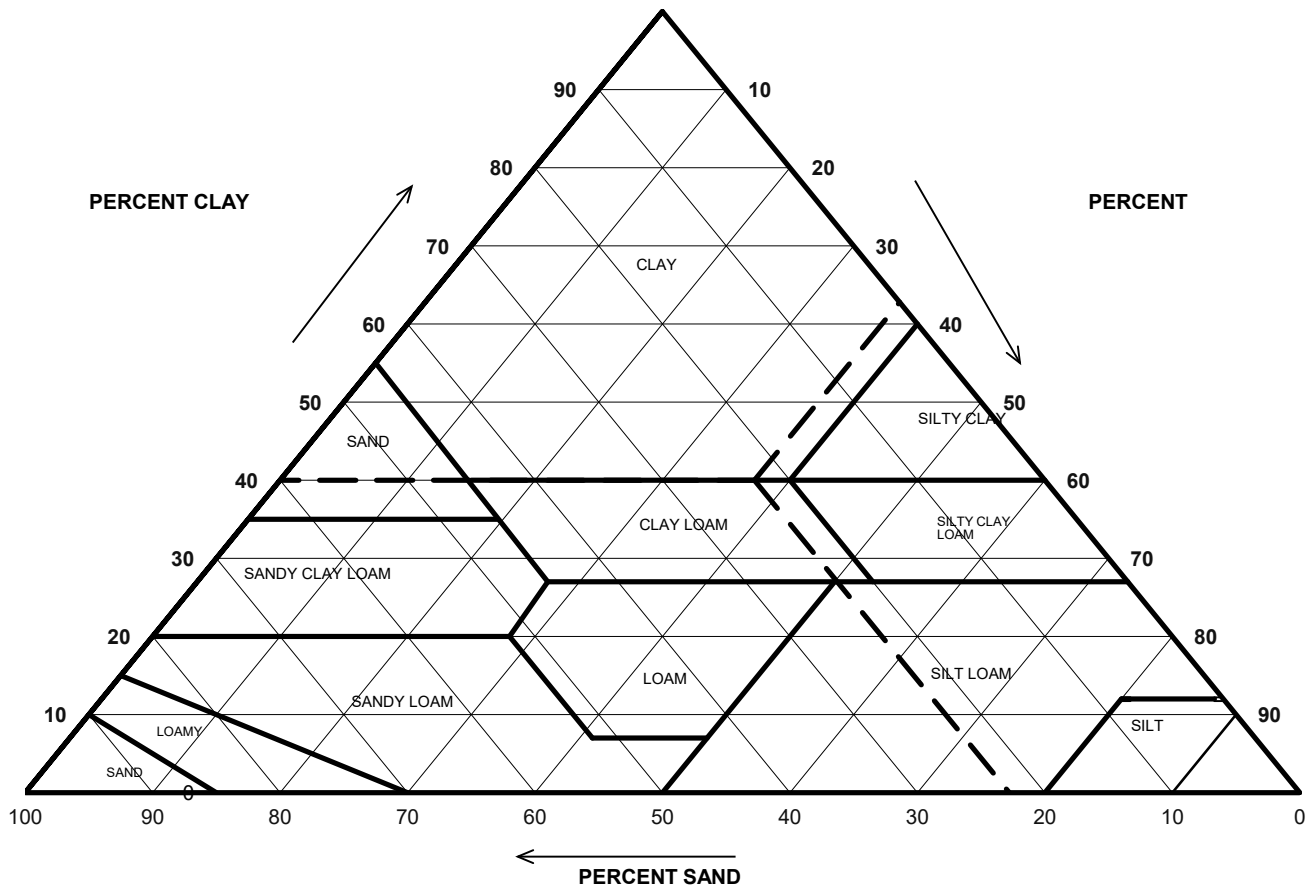
Tested By CB Date 5/29/25 Checked By AES Date 5/29/25  
 page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1



## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-009

Boring No.: B-25-4  
Depth (ft): 2.0-4.0  
Sample No.: SS-2  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.24              |                                                              |
| 2                  | 99.76         | Sand   | 22.73             | 22.79                                                        |
| 0.05               | 77.02         | Silt   | 37.12             | 37.22                                                        |
| 0.002              | 39.90         | Clay   | 39.90             | 39.99                                                        |

USDA Classification: CLAY LOAM

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-009

Boring No.: B-25-4  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 469         | Tare No.:                          | NA         | Tare No.:                                  | 469        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 498.63      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 498.63     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 452.42      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 452.42     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 146.07      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 146.07     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 46.21       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 46.21      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 306.35      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 306.35     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>15.1</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 306.35     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 306.35     |
| Tare No. (Sub-Specimen)                   | 469         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 469        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 498.63      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 498.63     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 146.07      | Dry Weight of - 3/4" Sample (g):   | 306.35     | Weight of Tare (g):                        | 146.07     | Dry Weight of - 3/4" Sample (g):   | 306.35     |
| Sub-Specimen Wet Weight (g):              | 352.56      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 352.56     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 306.35     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 306.35     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.75                        | 0.24                 | 0.24                             | 99.76             | 99.8                          |
| #20        | 0.85               | 2.89                        | ( ** ) 0.94          | 1.19                             | 98.81             | 98.8                          |
| #40        | 0.425              | 10.33                       | 3.37                 | 4.56                             | 95.44             | 95.4                          |
| #60        | 0.25               | 14.73                       | 4.81                 | 9.37                             | 90.63             | 90.6                          |
| #100       | 0.15               | 16.41                       | 5.36                 | 14.72                            | 85.28             | 85.3                          |
| #140       | 0.106              | 11.55                       | 3.77                 | 18.50                            | 81.50             | 81.5                          |
| #200       | 0.075              | 11.21                       | 3.66                 | 22.15                            | 77.85             | 77.8                          |
| Pan        | -                  | 238.48                      | 77.85                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 5/29/25 Checked By AES Date 5/29/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-4  |
| Client Reference: | Legion Pond                   | Depth (ft): | 2.0-4.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-2    |
| Lab ID:           | R-2025-143-001-009            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 52.0       | 22.9       | 2.60        | 7.2                      | 0.0353 | 98.0                       | 76.3                        |
| 2                  | 50.3       | 22.9       | 2.60        | 7.6                      | 0.0255 | 94.6                       | 73.6                        |
| 4                  | 48.0       | 22.9       | 2.60        | 8.0                      | 0.0185 | 90.1                       | 70.1                        |
| 8                  | 44.5       | 22.9       | 2.60        | 8.6                      | 0.0136 | 83.1                       | 64.7                        |
| 15                 | 41.8       | 22.9       | 2.60        | 9.1                      | 0.0102 | 77.7                       | 60.5                        |
| 30                 | 38.8       | 23.0       | 2.56        | 9.6                      | 0.0074 | 71.8                       | 55.9                        |
| 60                 | 35.8       | 23.0       | 2.56        | 10.2                     | 0.0054 | 65.9                       | 51.3                        |
| 240                | 30.5       | 23.0       | 2.56        | 11.1                     | 0.0028 | 55.4                       | 43.2                        |
| 1440               | 25.3       | 23.0       | 2.56        | 12.1                     | 0.0012 | 45.0                       | 35.0                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 217    | Percent Finer than # 200: | 77.85        |
| Wt. of Tare & Dry Material (g): | 225.29 |                           |              |
| Weight of Tare (g):             | 170.46 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 49.83  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 5/29/25 |
|-----------|----|------|---------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-009

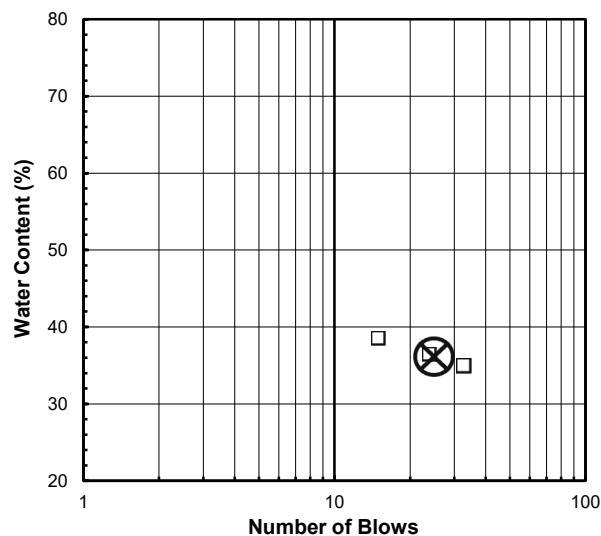
Boring No.: B-25-4  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40** (Minus #40 sieve material, Air dried)  
**sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.**

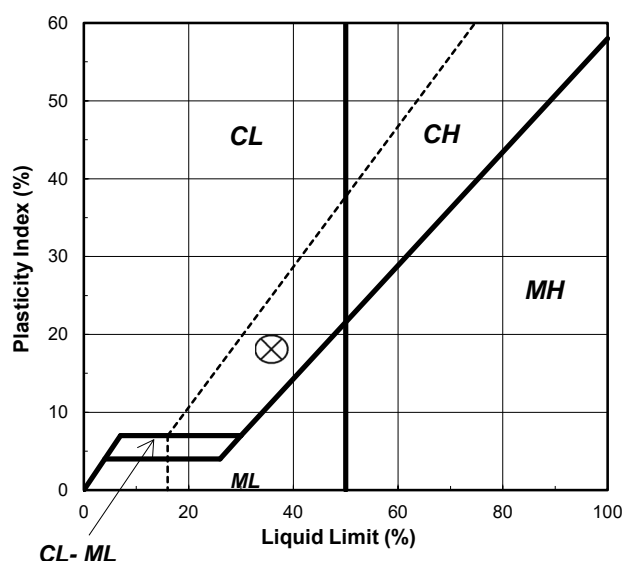
| As Received Moisture Content  |             | Liquid Limit Test |             |             |          |
|-------------------------------|-------------|-------------------|-------------|-------------|----------|
| ASTM D2216-19                 |             | <b>1</b>          | <b>2</b>    | <b>3</b>    | <b>M</b> |
| Tare Number:                  | 469         | A-D               | W-2         | A-N         | U        |
| Wt. of Tare & Wet Sample (g): | 498.63      | 30.06             | 28.56       | 32.81       | L        |
| Wt. of Tare & Dry Sample (g): | 452.42      | 26.24             | 25.14       | 27.95       | T        |
| Weight of Tare (g):           | 146.07      | 15.28             | 15.73       | 15.30       | I        |
| Weight of Water (g):          | 46.2        | 3.8               | 3.4         | 4.9         | P        |
| Weight of Dry Sample (g):     | 306.4       | 11.0              | 9.4         | 12.7        | O        |
| Was As Received MC Preserved: | <b>Yes</b>  |                   |             |             | I        |
| <b>Moisture Content (%):</b>  | <b>15.1</b> | <b>34.9</b>       | <b>36.3</b> | <b>38.4</b> | <b>N</b> |
| <b>Number of Blows:</b>       |             | <b>33</b>         | <b>24</b>   | <b>15</b>   | <b>T</b> |

| Plastic Limit Test                                                                      | 1           | 2           | Range       | Test Results                    |
|-----------------------------------------------------------------------------------------|-------------|-------------|-------------|---------------------------------|
| Tare Number:                                                                            | 18          | 29          |             | <b>Liquid Limit (%): 36</b>     |
| Wt. of Tare & Wet Sample (g):                                                           | 18.99       | 17.03       |             | <b>Plastic Limit (%): 18</b>    |
| Wt. of Tare & Dry Sample (g):                                                           | 17.14       | 15.47       |             | <b>Plasticity Index (%): 18</b> |
| Weight of Tare (g):                                                                     | 6.98        | 7.00        |             | <b>USCS Symbol: CL</b>          |
| Weight of Water (g):                                                                    | 1.9         | 1.6         |             |                                 |
| Weight of Dry Sample (g):                                                               | 10.2        | 8.5         |             |                                 |
| <b>Moisture Content (%):</b>                                                            | <b>18.2</b> | <b>18.4</b> | <b>-0.2</b> |                                 |
| <i>Note: The acceptable range of the two Moisture Contents is <math>\pm</math> 1.12</i> |             |             |             |                                 |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 5/28/25 Checked By AES Date 5/29/25

## CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-010

Boring No.: B-25-4  
 Depth (ft): 8.0-14.0  
 Sample No.: SS-5, SS-6, SS-7  
 Description: Brown Clay

( - # 10 Sieve material )

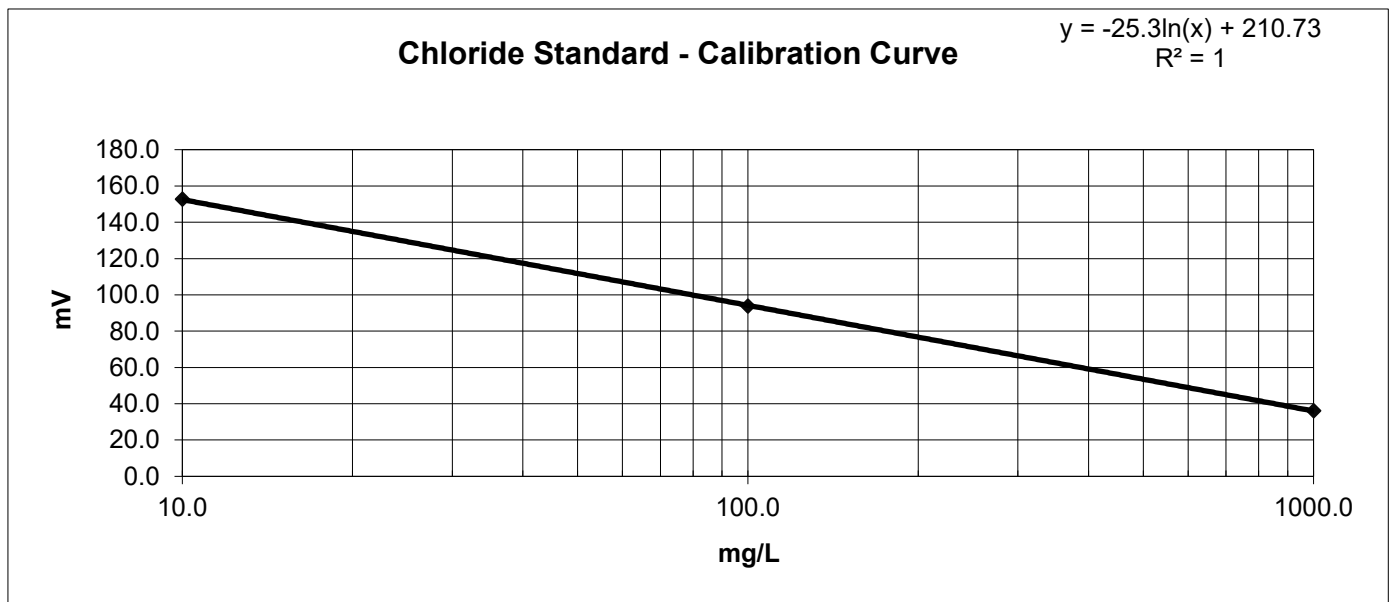
### CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD    | MILLIVOLTS<br>(mV) |
|-------------|--------------------|
| 10.0 mg/L   | 152.7              |
| 100.0 mg/L  | 93.8               |
| 1000.0 mg/L | 36.2               |

### MEASUREMENT OF CHLORIDES

|                              |       |               |               |
|------------------------------|-------|---------------|---------------|
| Sample Weight (g):           | 100.0 | CONCENTRATION | CONCENTRATION |
| Water added to Sample (ml):  | 100.0 | (mg/L)        | (mg/kg)       |
| Size of Sample Aliquot (ml): | 20.0  |               |               |
| Sample Reading (mV):         | 95.4  | 95.49         | 95.49         |

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO<sub>3</sub> solution (1:1 volume).  
 2) Samples were dried for a minimum of 12 hours at 110 ± 5°C.



Notes:

Tested By BS Date 6/10/25 Checked By AES Date 6/10/25

page 1 of 1 DCN: CT-S63A DATE: 6/2/14 REVISION: 1

# Minimum Resistivity

AASHTO T288-12



Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-010

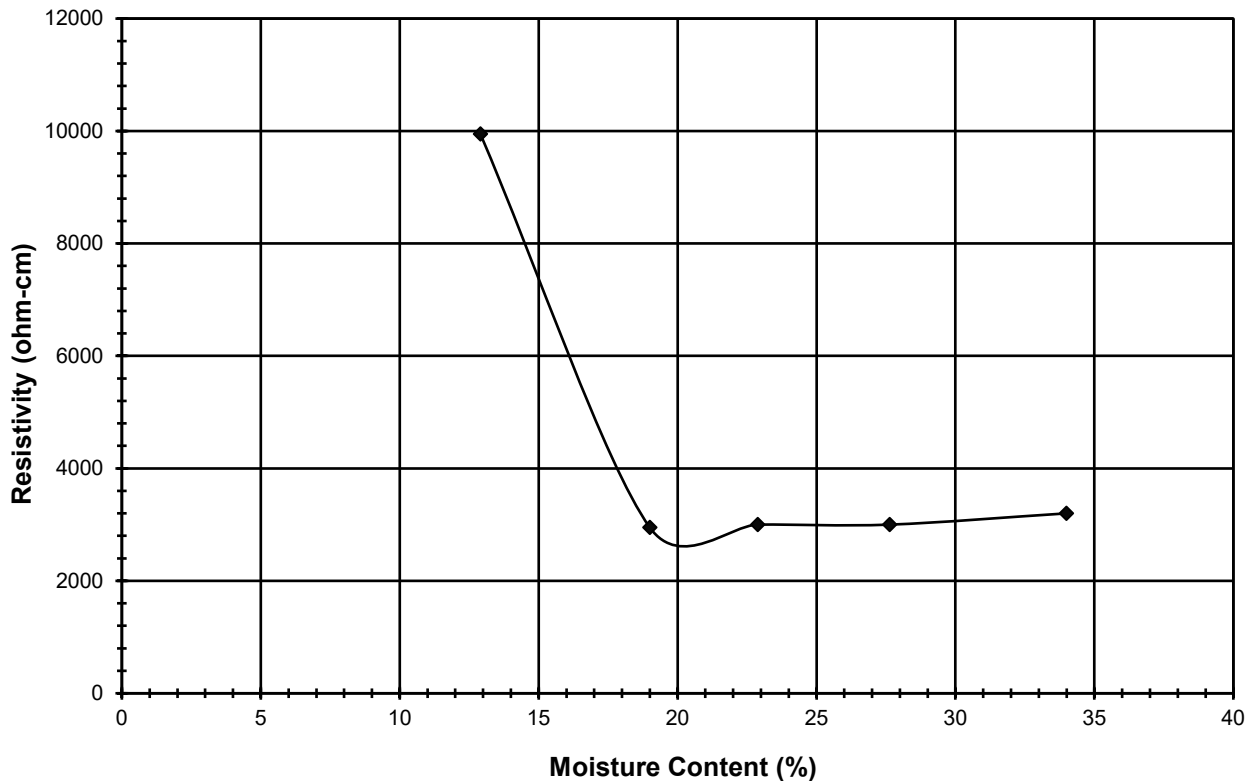
Boring No.: B-25-4  
 Depth (ft): 8.0-14.0  
 Sample No.: SS-5, SS-6, SS-7

Visual Description: Brown Clay  
 ( - #10 Sieve material )

| Tare No.:                | B5    | B11   | B12   | B16   | B18   |
|--------------------------|-------|-------|-------|-------|-------|
| Tare & Wet Specimen (g): | 29.61 | 29.36 | 29.69 | 29.95 | 29.67 |
| Tare & Dry Specimen (g): | 28.00 | 27.16 | 27.04 | 26.83 | 26.07 |
| Tare Weight (g):         | 15.52 | 15.58 | 15.46 | 15.54 | 15.48 |

|                              |             |             |             |             |             |
|------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Moisture Content (%):</b> | <b>12.9</b> | <b>19.0</b> | <b>22.9</b> | <b>27.6</b> | <b>34.0</b> |
| <b>Resistance (ohm):</b>     | <b>9950</b> | <b>2950</b> | <b>3000</b> | <b>3000</b> | <b>3200</b> |
| <b>Resistivity (ohm-cm):</b> | <b>9950</b> | <b>2950</b> | <b>3000</b> | <b>3000</b> | <b>3200</b> |

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



| Soil Class | Corrosion Resistance | Specific Resistivity (ohm-cm) |
|------------|----------------------|-------------------------------|
| 1          | Excellent            | 10,000 - 6,000                |
| 2          | Good                 | 6,000 - 4,500                 |
| 3          | Fair                 | 4,500 - 2,000                 |
| 4          | Bad                  | 2,000 - 0                     |

Tested By BS Date 6/4/25 Checked By AES Date 6/5/25

## Water-Soluble Sulfate Ion Content in Soil

### AASHTO T 290-95 (2020)

|                   |                               |                              |
|-------------------|-------------------------------|------------------------------|
| Client:           | Summit Design & Eng. Services | Boring No.: B-25-4           |
| Client Reference: | Legion Pond                   | Depth (ft): 8.0-14.0         |
| Project No.:      | R-2025-143-001                | Sample No.: SS-5, SS-6, SS-7 |
| Lab ID:           | R-2025-143-001-010            | Soil Description: Brown Clay |

#### Sulfate Standard - Calibration Curve Spectrophotometer Readings

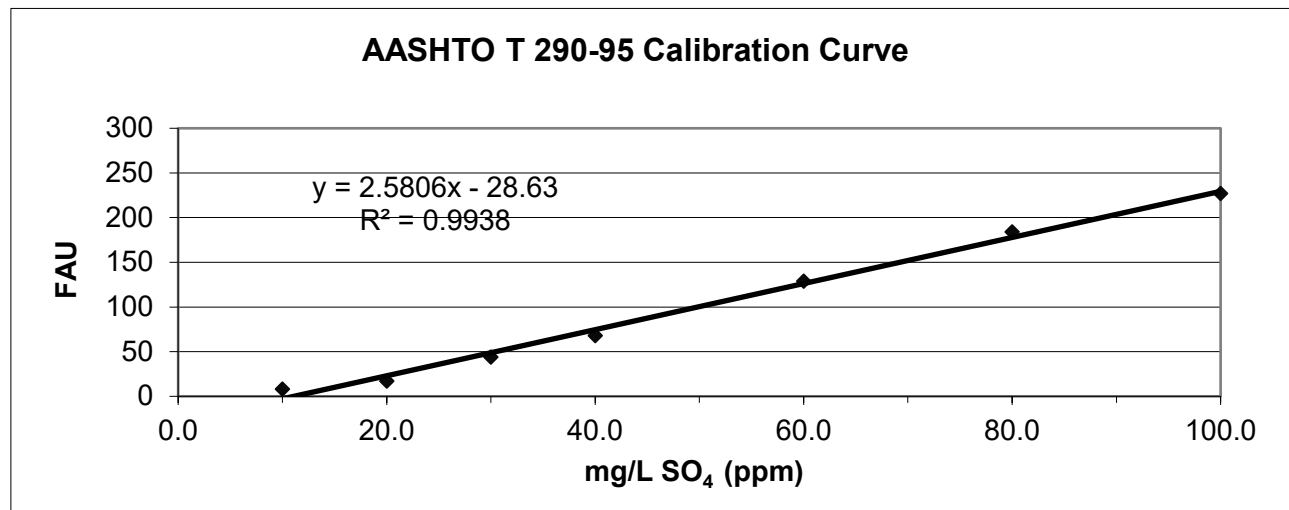
| Sulfate Ion Concentrations (mg/L) |            |      |      |      |      |      |      |       |
|-----------------------------------|------------|------|------|------|------|------|------|-------|
| 0.0                               | 4.0        | 10.0 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 |
| Spectrophotometer Readings (FAU)  |            |      |      |      |      |      |      |       |
| Underrange                        | Underrange | 8    | 17   | 44   | 68   | 129  | 184  | 227   |

#### Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl<sub>2</sub>·2H<sub>2</sub>O)

|                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Sample Weight (g):</b> 100.0</p> <p><b>Water added to Sample (mL):</b> 300.0</p> <p><b>Size of Sample Aliquot (mL):</b> 50.0</p> <p><b>Sample Reading (FAU):</b> 9</p> <p><b>Sample Diluted:</b> No</p> <p><b>Sulfate Solution Added (ml):</b> 0</p> | <p><b>Sample Moisture Content</b></p> <p>Tare Number: 474</p> <p>Weight of Tare &amp; Wet Sample (g): 225.68</p> <p>Weight of Tare &amp; Dry Sample (g): 219.53</p> <p>Weight of Tare (g): 98.49</p> <p>Weight of Water (g): 6.15</p> <p>Weight of Dry Sample (g): 121.04</p> <p>Moisture Content (%): 5.08</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                   |       |                                                    |
|-----------------------------------|-------|----------------------------------------------------|
| Sample Sulfate Ion Concentration: | 14.58 | mg/L SO <sub>4</sub> (ppm)                         |
| Sample Sulfate Ion Content:       | 43.7  | mg/Kg SO <sub>4</sub> (not corrected for moisture) |
| Sample Sulfate Ion Content:       | 46.1  | mg/Kg SO <sub>4</sub> (corrected for moisture)     |



|               |               |                 |               |
|---------------|---------------|-----------------|---------------|
| Tested by: BS | Date: 6/11/25 | Checked by: AES | Date: 6/12/25 |
|---------------|---------------|-----------------|---------------|

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-011

Boring No.: B-25-4  
 Depth (ft): 19.0-22.0  
 Sample No.: S-2

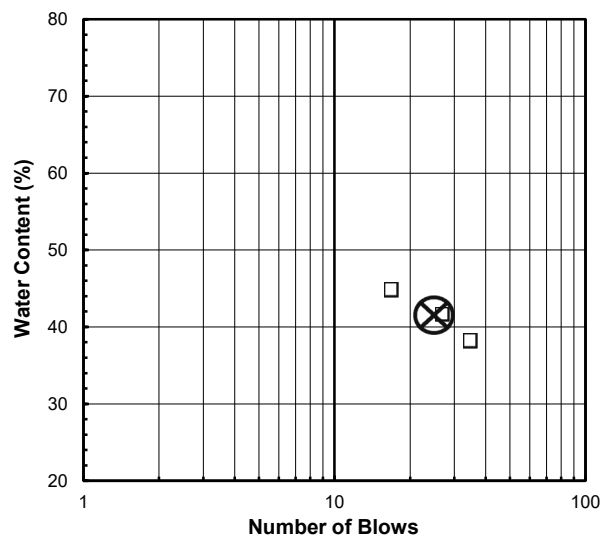
Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

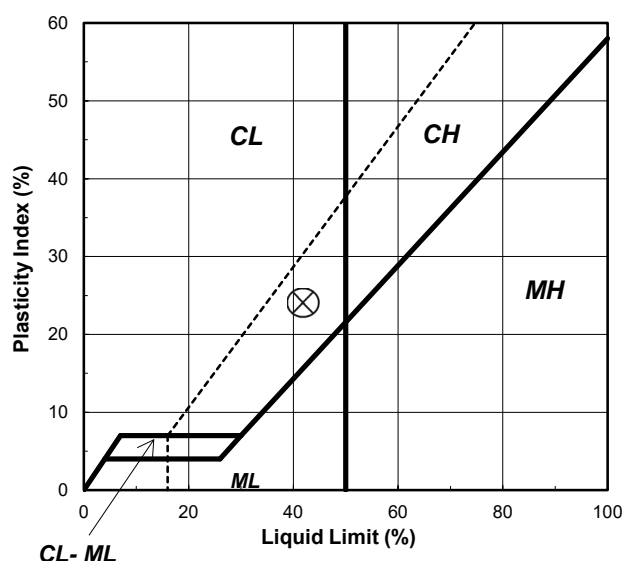
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |        |        |        |
|-----------------------------------------------|--------|-------------------|--------|--------|--------|
| Tare Number:                                  | 44-A   | 1<br>A-C          | 2<br>W | 3<br>E | M<br>U |
| Wt. of Tare & Wet Sample (g):                 | 442.83 | 29.70             | 29.45  | 29.12  | L      |
| Wt. of Tare & Dry Sample (g):                 | 392.56 | 25.77             | 25.22  | 24.80  | T      |
| Weight of Tare (g):                           | 128.33 | 15.46             | 15.03  | 15.15  | I      |
| Weight of Water (g):                          | 50.3   | 3.9               | 4.2    | 4.3    | P      |
| Weight of Dry Sample (g):                     | 264.2  | 10.3              | 10.2   | 9.7    | O      |
| Was As Received MC Preserved:                 | Yes    |                   |        |        | I      |
| Moisture Content (%):                         | 19.0   | 38.1              | 41.5   | 44.8   | N      |
| Number of Blows:                              |        | 35                | 27     | 17     | T      |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 10    | 17    |       | Liquid Limit (%): 42     |
| Wt. of Tare & Wet Sample (g):                                         | 14.20 | 14.30 |       | Plastic Limit (%): 18    |
| Wt. of Tare & Dry Sample (g):                                         | 13.10 | 13.18 |       | Plasticity Index (%): 24 |
| Weight of Tare (g):                                                   | 6.94  | 6.95  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 1.1   | 1.1   |       |                          |
| Weight of Dry Sample (g):                                             | 6.2   | 6.2   |       |                          |
| Moisture Content (%):                                                 | 17.9  | 18.0  | -0.1  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 6/12/25 Checked By AES Date 6/13/25



## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-012

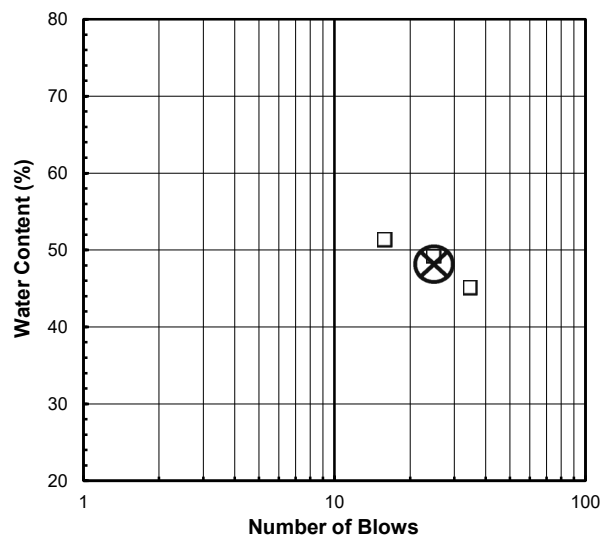
Boring No.: B-25-4  
 Depth (ft): 22.0-24.0  
 Sample No.: SS-12  
 Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

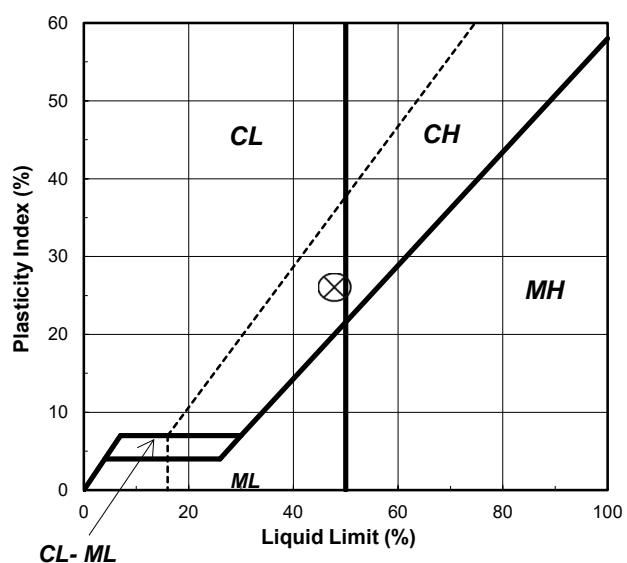
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |       |       |   |
|-----------------------------------------------|--------|-------------------|-------|-------|---|
| Tare Number:                                  | 746    | 1                 | 2     | 3     | M |
| Wt. of Tare & Wet Sample (g):                 | 448.05 | 1M                | KP    | L2    | U |
| Wt. of Tare & Dry Sample (g):                 | 392.53 | 29.53             | 30.69 | 29.23 | L |
| Weight of Tare (g):                           | 140.49 | 25.25             | 25.65 | 24.45 | T |
| Weight of Water (g):                          | 55.5   | 15.74             | 15.39 | 15.12 | I |
| Weight of Dry Sample (g):                     | 252.0  | 4.3               | 5.0   | 4.8   | P |
| Was As Received MC Preserved:                 | Yes    | 9.5               | 10.3  | 9.3   | O |
| Moisture Content (%):                         | 22.0   | 45.0              | 49.1  | 51.2  | N |
| Number of Blows:                              |        | 35                | 25    | 16    | T |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 6     | 33    |       | Liquid Limit (%): 48     |
| Wt. of Tare & Wet Sample (g):                                         | 17.09 | 16.12 |       | Plastic Limit (%): 22    |
| Wt. of Tare & Dry Sample (g):                                         | 15.30 | 14.48 |       | Plasticity Index (%): 26 |
| Weight of Tare (g):                                                   | 7.02  | 6.97  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 1.8   | 1.6   |       |                          |
| Weight of Dry Sample (g):                                             | 8.3   | 7.5   |       |                          |
| Moisture Content (%):                                                 | 21.6  | 21.8  | -0.2  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



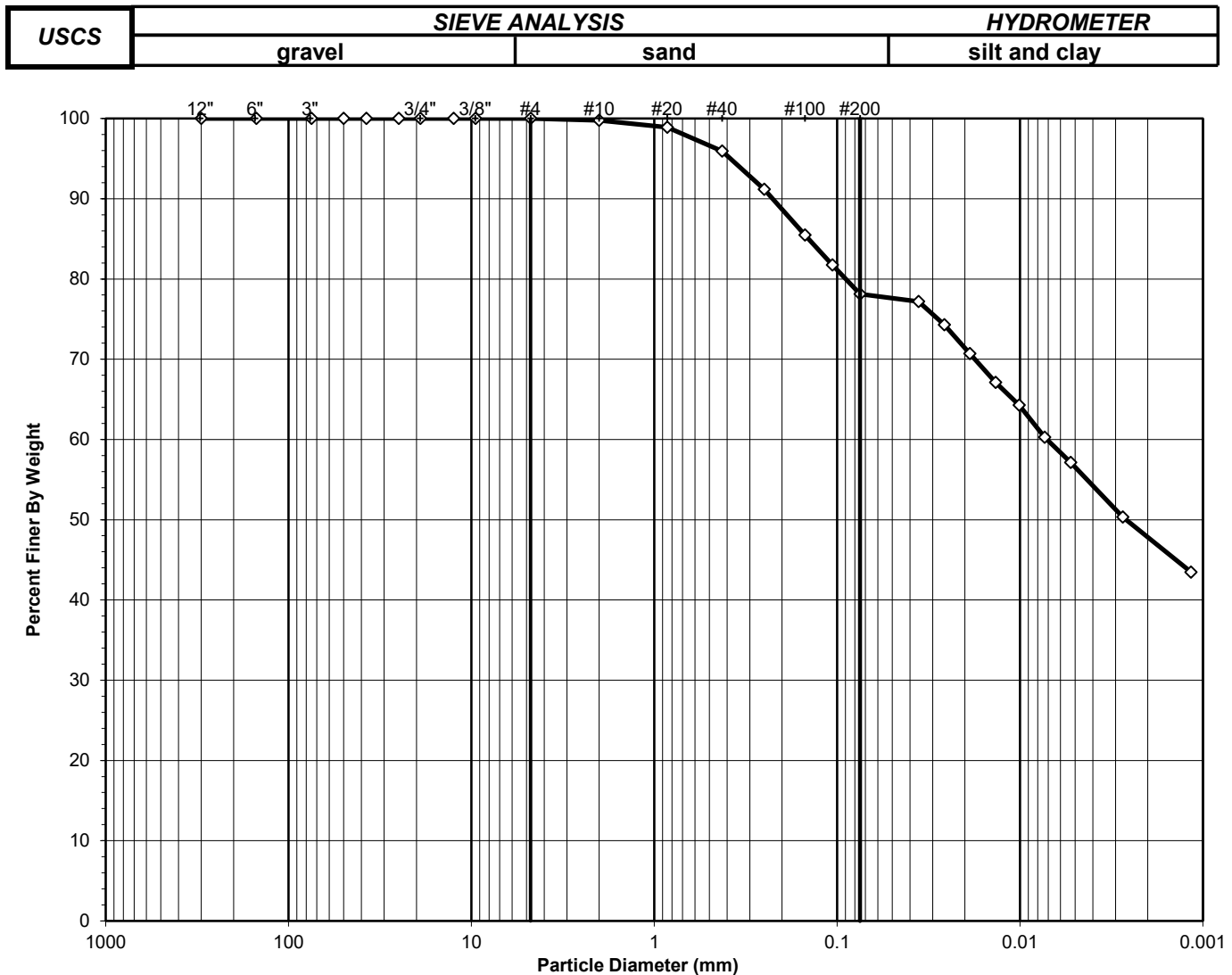
Tested By JCB IV Date 5/29/25 Checked By AES Date 6/2/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-013

Boring No.: B-25-5  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown



**USCS Symbol:**  
**CH, TESTED**

**USCS Classification:**  
**FAT CLAY WITH SAND**

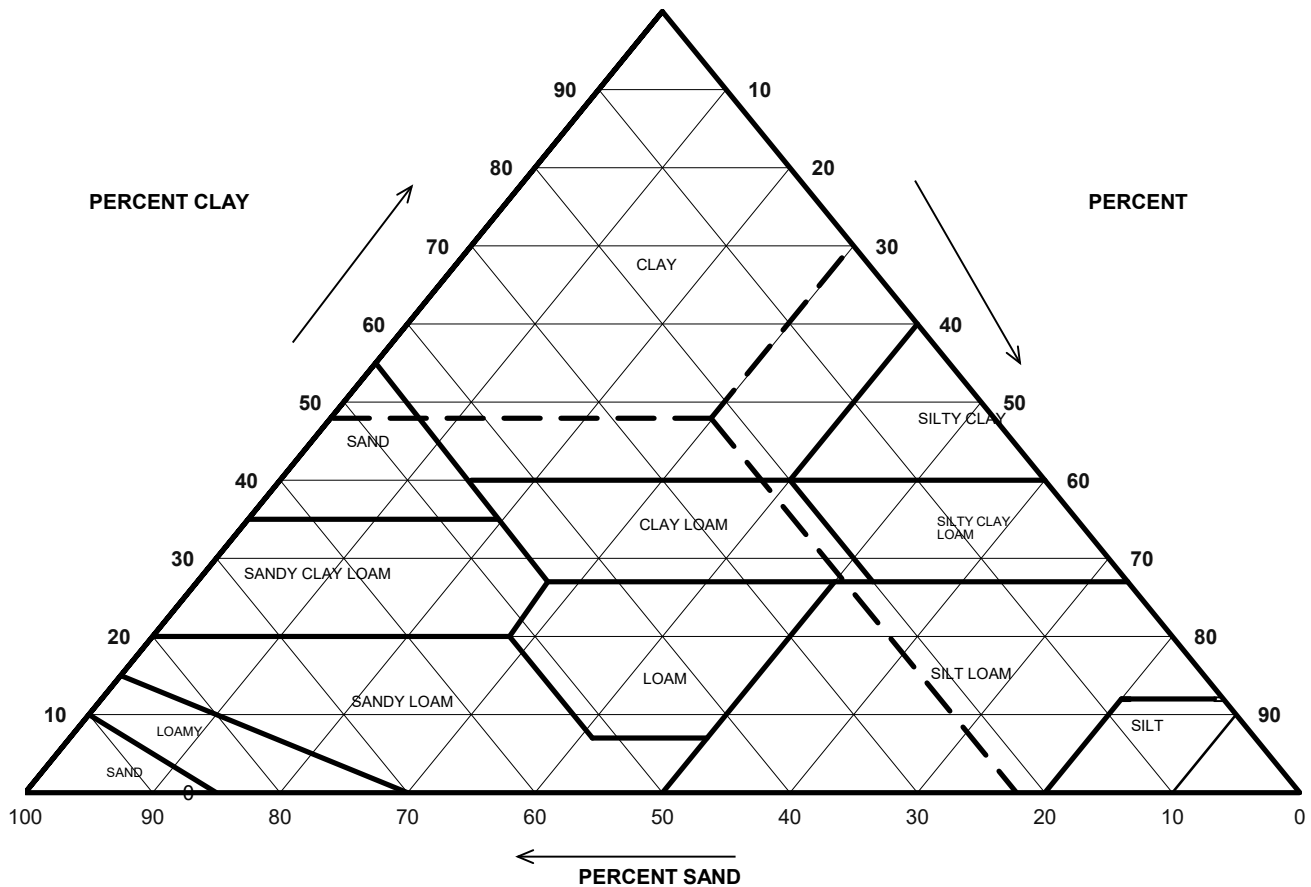
|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Tested By CB | Date 5/28/25 | Checked By AES | Date 5/28/25 |
|--------------|--------------|----------------|--------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-013

Boring No.: B-25-5  
Depth (ft): 2.0-4.0  
Sample No.: SS-2  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.22              |                                                              |
| 2                  | 99.78         | Sand   | 22.18             | 22.23                                                        |
| 0.05               | 77.60         | Silt   | 29.78             | 29.84                                                        |
| 0.002              | 47.82         | Clay   | 47.82             | 47.93                                                        |

USDA Classification: **CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-013

Boring No.: B-25-5  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 37-A        | Tare No.:                          | NA         | Tare No.:                                  | 37-A       | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 339.87      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 339.87     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 310.12      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 310.12     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 136.09      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 136.09     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 29.75       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 29.75      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 174.03      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 174.03     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>17.1</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 174.03     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 174.03     |
| Tare No. (Sub-Specimen)                   | 37-A        | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 37-A       | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 339.87      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 339.87     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 136.09      | Dry Weight of - 3/4" Sample (g):   | 174.03     | Weight of Tare (g):                        | 136.09     | Dry Weight of - 3/4" Sample (g):   | 174.03     |
| Sub-Specimen Wet Weight (g):              | 203.78      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 203.78     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 174.03     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 174.03     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.39                        | 0.22                 | 0.22                             | 99.78             | 99.8                          |
| #20        | 0.85               | 1.55                        | ( ** )               | 1.11                             | 98.89             | 98.9                          |
| #40        | 0.425              | 5.13                        | 2.95                 | 4.06                             | 95.94             | 95.9                          |
| #60        | 0.25               | 8.33                        | 4.79                 | 8.85                             | 91.15             | 91.2                          |
| #100       | 0.15               | 9.91                        | 5.69                 | 14.54                            | 85.46             | 85.5                          |
| #140       | 0.106              | 6.49                        | 3.73                 | 18.27                            | 81.73             | 81.7                          |
| #200       | 0.075              | 6.29                        | 3.61                 | 21.89                            | 78.11             | 78.1                          |
| Pan        | -                  | 135.94                      | 78.11                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 5/28/25 Checked By AES Date 5/28/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-5  |
| Client Reference: | Legion Pond                   | Depth (ft): | 2.0-4.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-2    |
| Lab ID:           | R-2025-143-001-013            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 50.8       | 22.9       | 2.60        | 7.5                      | 0.0358 | 98.8                       | 77.2                        |
| 2                  | 49.0       | 22.9       | 2.60        | 7.8                      | 0.0259 | 95.1                       | 74.3                        |
| 4                  | 46.8       | 22.9       | 2.60        | 8.2                      | 0.0188 | 90.5                       | 70.7                        |
| 8                  | 44.5       | 22.9       | 2.60        | 8.6                      | 0.0136 | 85.9                       | 67.1                        |
| 15                 | 42.8       | 22.9       | 2.60        | 8.9                      | 0.0101 | 82.3                       | 64.3                        |
| 30                 | 40.3       | 22.9       | 2.60        | 9.4                      | 0.0073 | 77.2                       | 60.3                        |
| 60                 | 38.3       | 23.0       | 2.56        | 9.7                      | 0.0053 | 73.2                       | 57.1                        |
| 240                | 34.0       | 23.0       | 2.56        | 10.5                     | 0.0027 | 64.4                       | 50.3                        |
| 1440               | 29.8       | 22.9       | 2.60        | 11.2                     | 0.0012 | 55.7                       | 43.5                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 211    | Percent Finer than # 200: | 78.11        |
| Wt. of Tare & Dry Material (g): | 223.76 |                           |              |
| Weight of Tare (g):             | 170.52 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 48.24  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 5/29/25 |
|-----------|----|------|---------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-013

Boring No.: B-25-5

Depth (ft): 2.0-4.0

Sample No.: SS-2

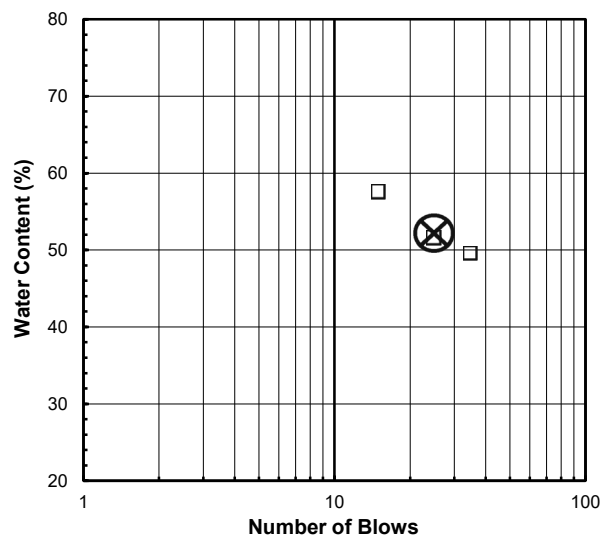
Soil Description: BROWN FAT CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

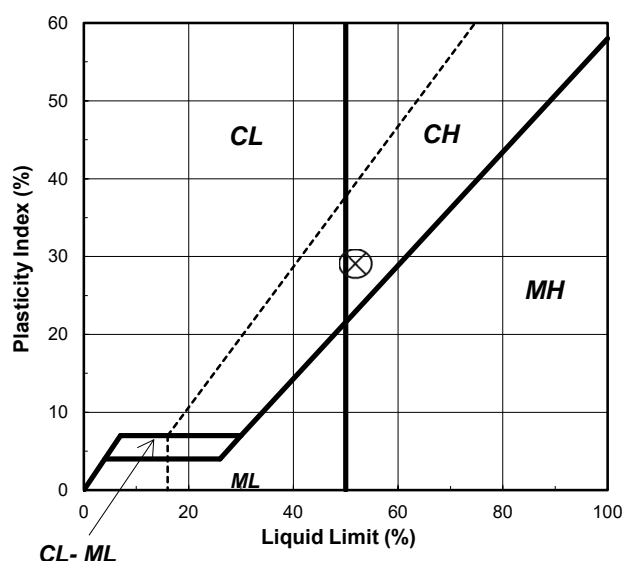
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |          |          |        |
|-----------------------------------------------|--------|-------------------|----------|----------|--------|
| Tare Number:                                  | 37-A   | 1<br>S            | 2<br>A-P | 3<br>W-5 | M<br>U |
| Wt. of Tare & Wet Sample (g):                 | 339.87 | 29.77             | 30.14    | 28.48    | L      |
| Wt. of Tare & Dry Sample (g):                 | 310.12 | 24.91             | 25.15    | 23.75    | T      |
| Weight of Tare (g):                           | 136.09 | 15.08             | 15.46    | 15.52    | I      |
| Weight of Water (g):                          | 29.8   | 4.9               | 5.0      | 4.7      | P      |
| Weight of Dry Sample (g):                     | 174.0  | 9.8               | 9.7      | 8.2      | O      |
| Was As Received MC Preserved:                 | Yes    |                   |          |          | I      |
| Moisture Content (%):                         | 17.1   | 49.4              | 51.5     | 57.5     | N      |
| Number of Blows:                              |        | 35                | 25       | 15       | T      |

| Plastic Limit Test                                                   | 1     | 2     | Range | Test Results             |
|----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                         | 12    | 21    |       | Liquid Limit (%): 52     |
| Wt. of Tare & Wet Sample (g):                                        | 13.43 | 13.01 |       | Plastic Limit (%): 23    |
| Wt. of Tare & Dry Sample (g):                                        | 12.23 | 11.88 |       | Plasticity Index (%): 29 |
| Weight of Tare (g):                                                  | 7.00  | 7.04  |       | USCS Symbol: CH          |
| Weight of Water (g):                                                 | 1.2   | 1.1   |       |                          |
| Weight of Dry Sample (g):                                            | 5.2   | 4.8   |       |                          |
| Moisture Content (%):                                                | 22.9  | 23.3  | -0.4  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm 1.4$ |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 6/12/25 Checked By AES Date 6/13/25

## CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-014

Boring No.: B-25-5  
 Depth (ft): 6.0-12.0  
 Sample No.: SS-4, SS-5, SS-6  
 Description: Brown Clay

( - # 10 Sieve material )

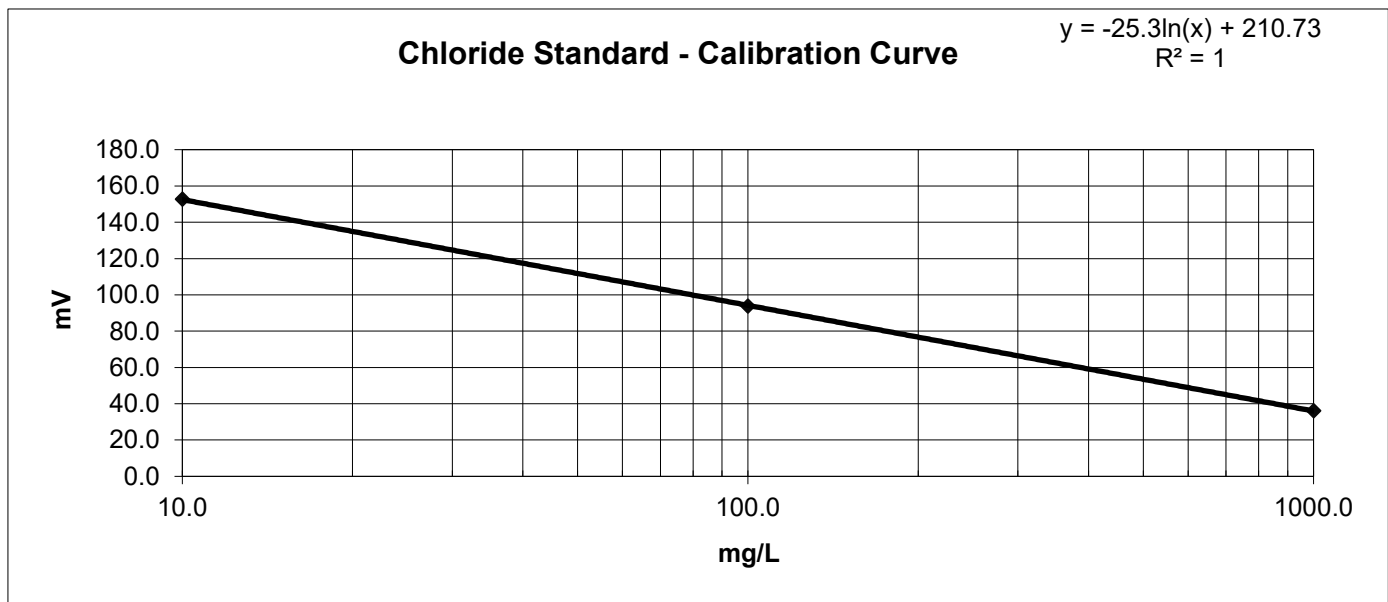
### CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD    | MILLIVOLTS<br>(mV) |
|-------------|--------------------|
| 10.0 mg/L   | 152.7              |
| 100.0 mg/L  | 93.8               |
| 1000.0 mg/L | 36.2               |

### MEASUREMENT OF CHLORIDES

|                              |       |               |               |
|------------------------------|-------|---------------|---------------|
| Sample Weight (g):           | 100.0 | CONCENTRATION | CONCENTRATION |
| Water added to Sample (ml):  | 100.0 | (mg/L)        | (mg/kg)       |
| Size of Sample Aliquot (ml): | 20.0  |               |               |
| Sample Reading (mV):         | 75.8  | 207.23        | 207.23        |

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO<sub>3</sub> solution (1:1 volume).  
 2) Samples were dried for a minimum of 12 hours at 110 ± 5°C.



Notes:

Tested By BS Date 6/10/25 Checked By AES Date 6/10/25

# Minimum Resistivity

AASHTO T288-12



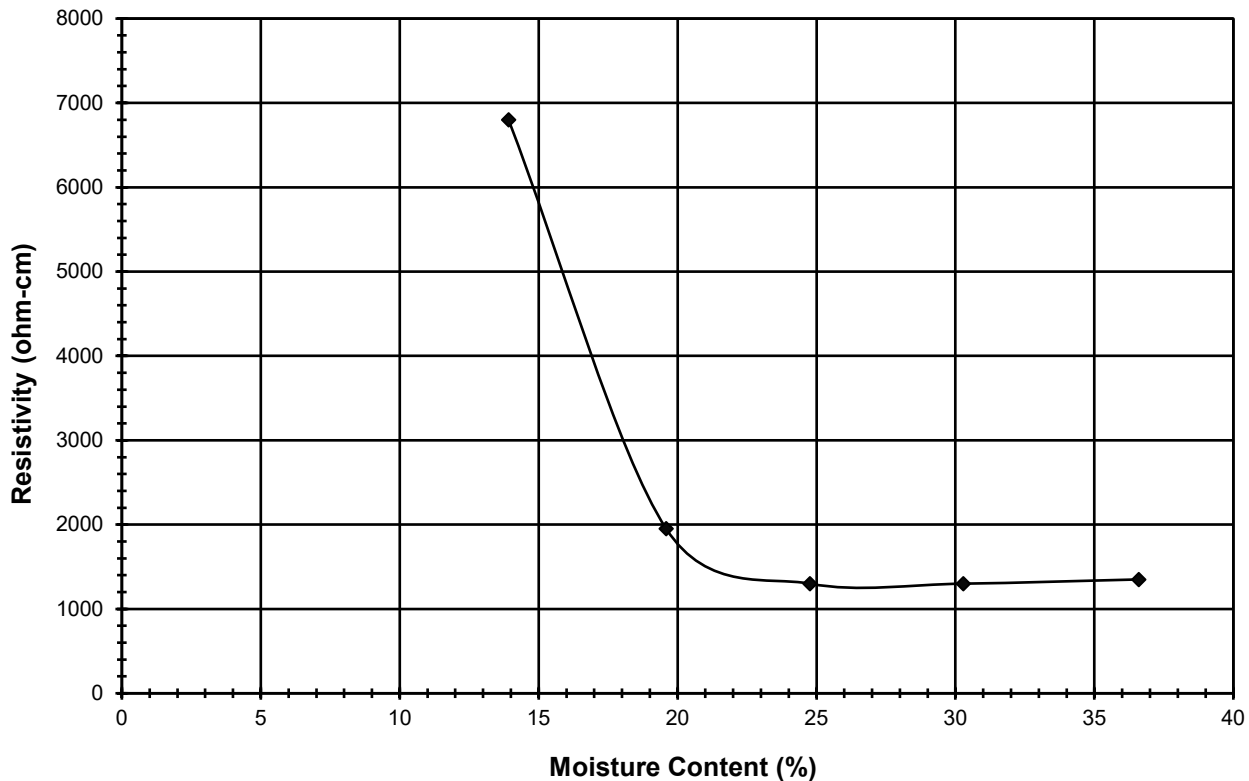
Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-014

Boring No.: B-25-5  
 Depth (ft): 6.0-12.0  
 Sample No.: SS-4, SS-5, SS-6  
 Visual Description: Brown Clay  
 ( - #10 Sieve material )

| Tare No.:                | B5    | B11   | B12   | B16   | B18   |
|--------------------------|-------|-------|-------|-------|-------|
| Tare & Wet Specimen (g): | 29.60 | 29.63 | 29.63 | 29.66 | 29.60 |
| Tare & Dry Specimen (g): | 27.88 | 27.33 | 26.82 | 26.38 | 25.82 |
| Tare Weight (g):         | 15.52 | 15.59 | 15.47 | 15.55 | 15.49 |

| Moisture Content (%): | 13.9 | 19.6 | 24.8 | 30.3 | 36.6 |
|-----------------------|------|------|------|------|------|
| Resistance (ohm):     | 6800 | 1950 | 1300 | 1300 | 1350 |
| Resistivity (ohm-cm): | 6800 | 1950 | 1300 | 1300 | 1350 |

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



| Soil Class | Corrosion Resistance | Specific Resistivity (ohm-cm) |
|------------|----------------------|-------------------------------|
| 1          | Excellent            | 10,000 - 6,000                |
| 2          | Good                 | 6,000 - 4,500                 |
| 3          | Fair                 | 4,500 - 2,000                 |
| 4          | Bad                  | 2,000 - 0                     |

Tested By BS Date 6/6/25 Checked By AES Date 6/9/25



## Water-Soluble Sulfate Ion Content in Soil

### AASHTO T 290-95 (2020)

|                   |                               |                   |                  |
|-------------------|-------------------------------|-------------------|------------------|
| Client:           | Summit Design & Eng. Services | Boring No.:       | B-25-5           |
| Client Reference: | Legion Pond                   | Depth (ft):       | 6.0-12.0         |
| Project No.:      | R-2025-143-001                | Sample No.:       | SS-4, SS-5, SS-6 |
| Lab ID:           | R-2025-143-001-014            | Soil Description: | Brown Clay       |

#### Sulfate Standard - Calibration Curve Spectrophotometer Readings

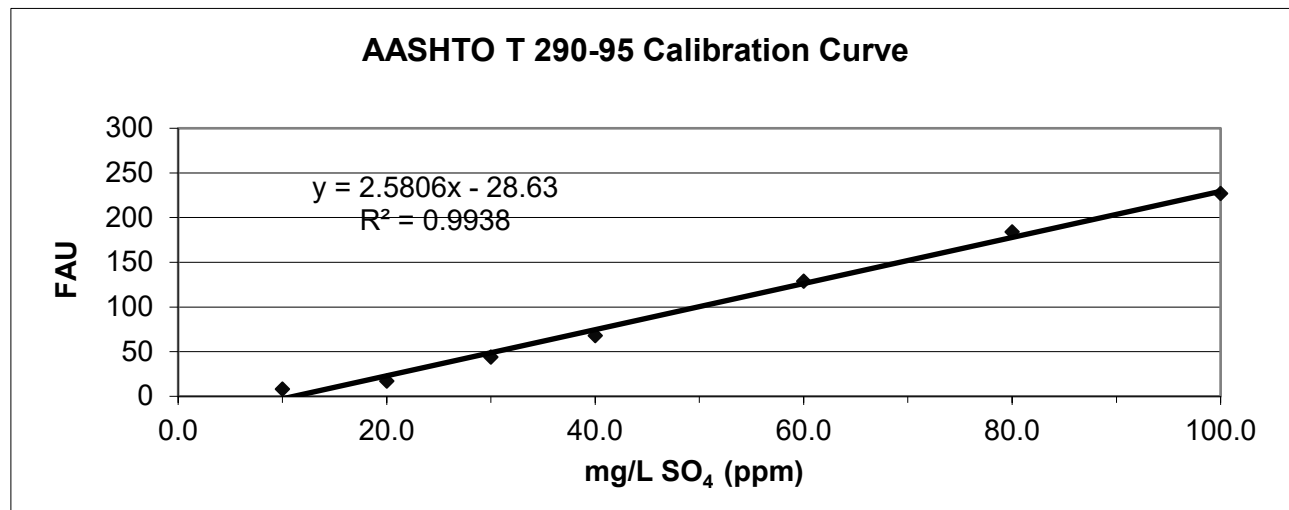
| <u>Sulfate Ion Concentrations (mg/L)</u> |            |      |      |      |      |      |      |       |
|------------------------------------------|------------|------|------|------|------|------|------|-------|
| 0.0                                      | 4.0        | 10.0 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 |
| <u>Spectrophotometer Readings (FAU)</u>  |            |      |      |      |      |      |      |       |
| Underrange                               | Underrange | 8    | 17   | 44   | 68   | 129  | 184  | 227   |

#### Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl<sub>2</sub>·2H<sub>2</sub>O)

|                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Sample Weight (g):</b> 100.0</p> <p><b>Water added to Sample (mL):</b> 300.0</p> <p><b>Size of Sample Aliquot (mL):</b> 50.0</p> <p><b>Sample Reading (FAU):</b> 9</p> <p><b>Sample Diluted:</b> No</p> <p><b>Sulfate Solution Added (ml):</b> 0</p> | <p><b><u>Sample Moisture Content</u></b></p> <p>Tare Number: 491</p> <p>Weight of Tare &amp; Wet Sample (g): 228.89</p> <p>Weight of Tare &amp; Dry Sample (g): 221.90</p> <p>Weight of Tare (g): 100.40</p> <p>Weight of Water (g): 6.99</p> <p>Weight of Dry Sample (g): 121.50</p> <p>Moisture Content (%): 5.75</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                          |       |                                                          |
|------------------------------------------|-------|----------------------------------------------------------|
| <b>Sample Sulfate Ion Concentration:</b> | 14.58 | <b>mg/L SO<sub>4</sub> (ppm)</b>                         |
| <b>Sample Sulfate Ion Content:</b>       | 43.7  | <b>mg/Kg SO<sub>4</sub> (not corrected for moisture)</b> |
| <b>Sample Sulfate Ion Content:</b>       | 46.4  | <b>mg/Kg SO<sub>4</sub> (corrected for moisture)</b>     |



|               |               |                 |               |
|---------------|---------------|-----------------|---------------|
| Tested by: BS | Date: 6/11/25 | Checked by: AES | Date: 6/12/25 |
|---------------|---------------|-----------------|---------------|

## **APPENDIX C**

### **GEOTECHNICAL REPORT – LEGION POND DAM REPAIR AND DEWATERING POND – CHAPEL HILL, NORTH CAROLINA**

September 15, 2025

Holly Miller, PE, CFM, CPESC  
Tetra Tech  
4000 Sancar Way  
Research Triangle Park, NC 27709

Subject: Geotechnical Report  
Legion Pond Dam Repair and Dewatering Pond  
Chapel Hill, North Carolina

Dear Holly:

The following is a geotechnical report supporting the design of and recommendations for the Legion Pond Dam Repair. This report contains a summary of subsurface conditions and laboratory tests from Summit Engineering, our embankment slope stability, seepage, and settlement analyses, and geotechnical design recommendations for the proposed dam repair.

Let us know if you have any questions or require additional information.

Sincerely,



Brian K. Lawrence, P.E.  
Senior Geotechnical Engineer



Michael A. Brown, P.E.  
Dam & Levee National Practice Lead

|      |                                                      |    |
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## 1. INTRODUCTION

This report presents results of our geotechnical evaluations for the construction of a dam repair and pond dewatering. The Town of Chapel Hill seeks to implement an affordable housing development on a 33.6-acre lot owned by the Town located at 1714 Legion Road in Chapel Hill. The parcel contains a 3-acre pond and dam, originally implemented as a farm pond more than 60 years ago as well as the former headquarters of the local chapter of the American Legion. The Town seeks to breach the existing pond dam, remove the pond, and rebuild in its place a Stormwater Control Measure (SCM) in the form of a constructed wetland which incorporates additional stormwater detention function. The purpose of the resulting SCM is to meet a portion of water quantity and quality targets for the planned affordable housing development on the project site while providing habitat and wildlife benefits.

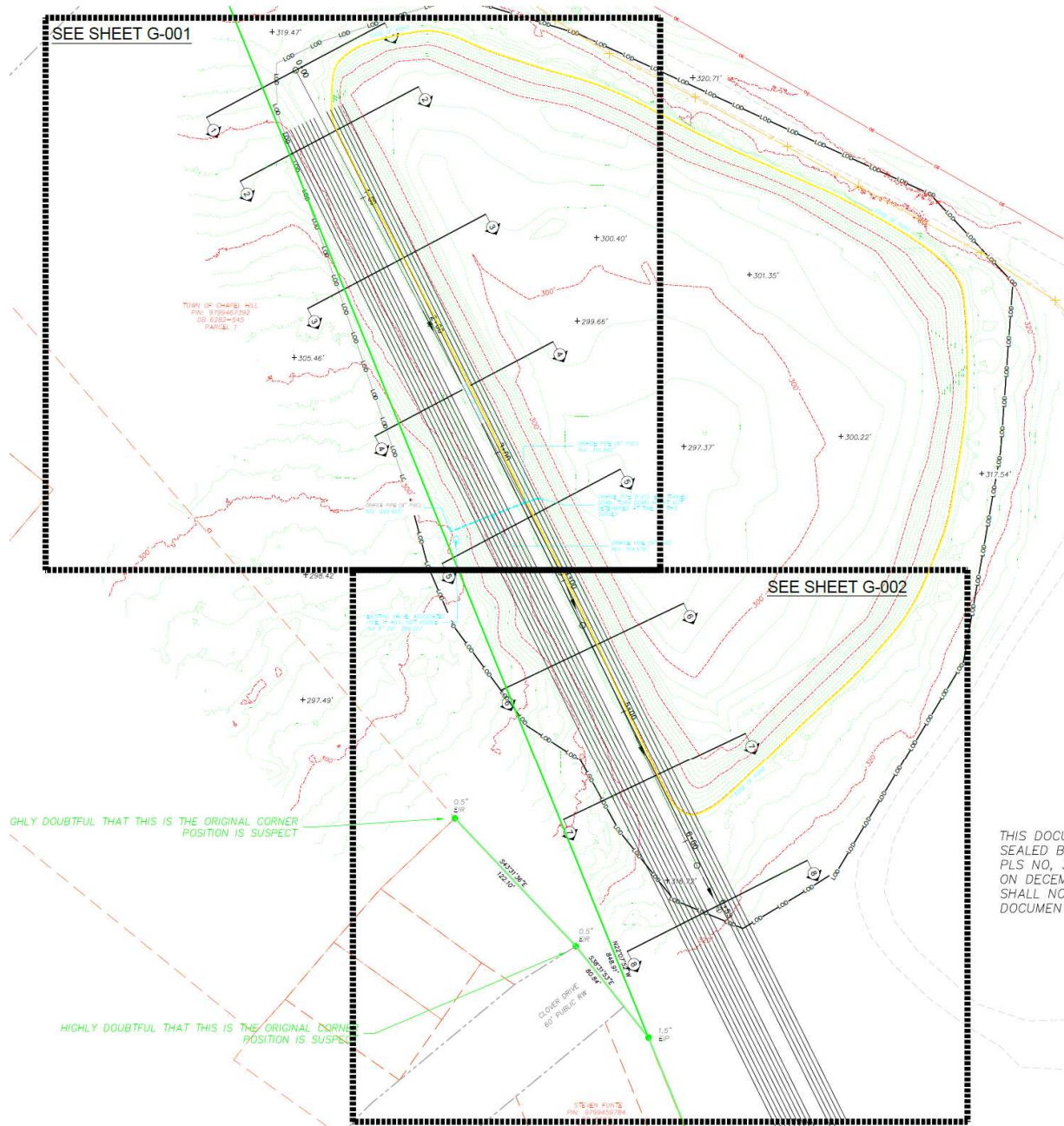
The pond was originally designed as a farm pond prior to the development of the surrounding area. Therefore, it is believed the pond was not designed to provide any stormwater runoff peak management function. The area that drains to the pond includes the Legion Park parcel and extends slightly into the adjoining northern parcel and a small portion of Legion Road.

## 2. EXISTING CONDITIONS AND PROPOSED FEATURES

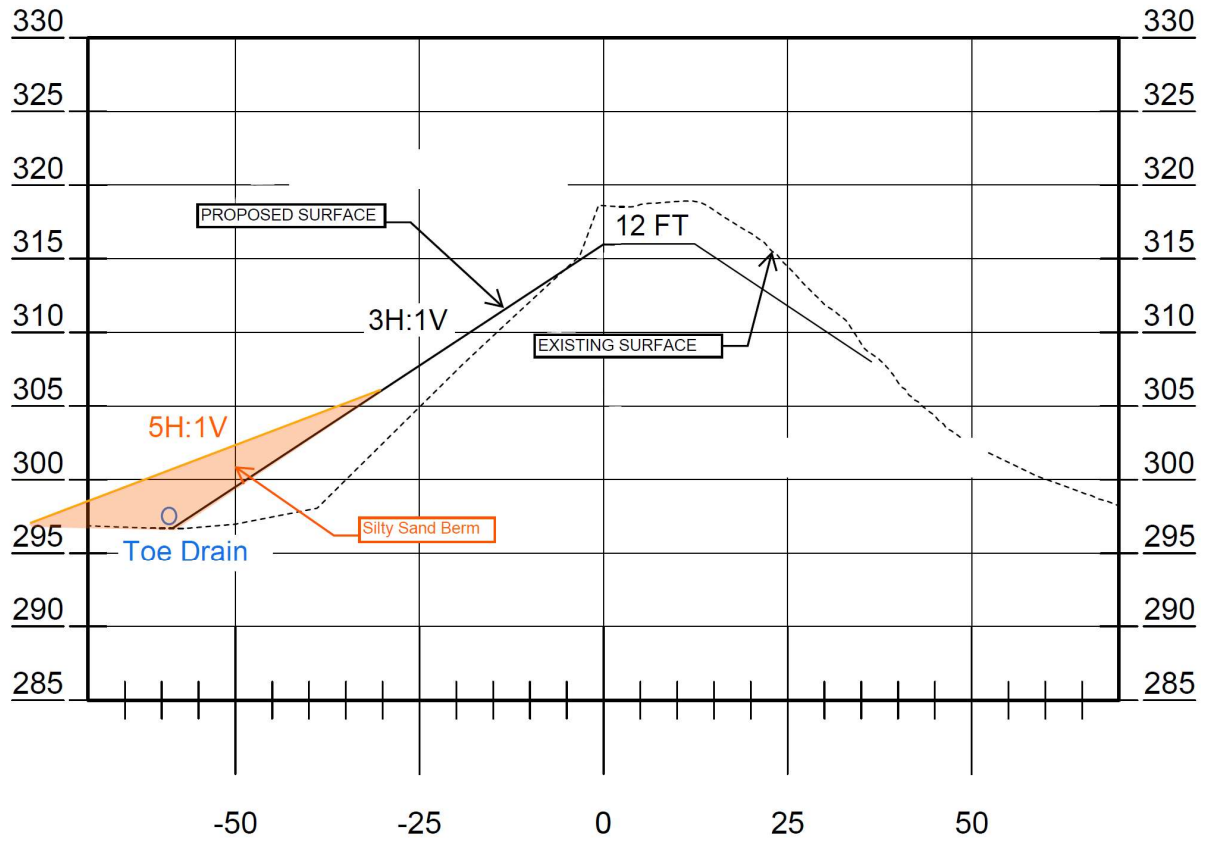
The existing embankment is heavily forested, with a walking path along the top crest of the dam. The dam crest width is approximately 10 feet.

The proposed embankment will extend approximately 600 feet in length along the southwest edge of the existing pond, with a finished crest width of 12 feet. As designed and planned, the embankment will be constructed with 3H:1V side slopes, and a 5H:1V seepage control berm on the downstream slope, starting at Elevation 306 feet and terminating at approximately Elevation 297 feet. The maximum height of the dam is approximately 19 feet. The bulk of the existing embankment will remain in place, with relatively minor cut and fill applied to the dam. An approximate plan and cross section of the designed embankment configuration are presented in **Figure 1** and **Figure 2**, respectively.

A seepage control berm will be installed on the downstream slope to control seepage and prevent it from exiting the face of the dam. A filter diaphragm will be installed around the primary spillway conduit to prevent propagation of internal erosion along the conduit/soil interfaces.



**Figure 1: Plan View**



**Figure 2: Proposed Cross Section at Station 3+50**

### 3. GEOLOGIC SETTING

As referenced in the Summit Design and Engineering Services (Summit) Report of Subsurface Investigation, sedimentary sandstone, siltstone, mudstone, and conglomerates are the predominant rock types within the Triassic Basin that is mapped at the site. The rocks can be present as relatively thin layers and intrusions in the form of boulders. Typical soils within the Triassic Basin consist of silts, clays, and clayey/silty sands. Near the surface, the silts and clays are often moderately to highly plastic. Residual soils can be of a softer/wetter consistency than surrounding Triassic sediments (silts and clays). Weathered rock samples encountered during the subsurface investigation consisted of Mudstone and Sandstone.

### 4. SUBSURFACE INVESTIGATIONS

#### 4.1 Subsurface Exploration

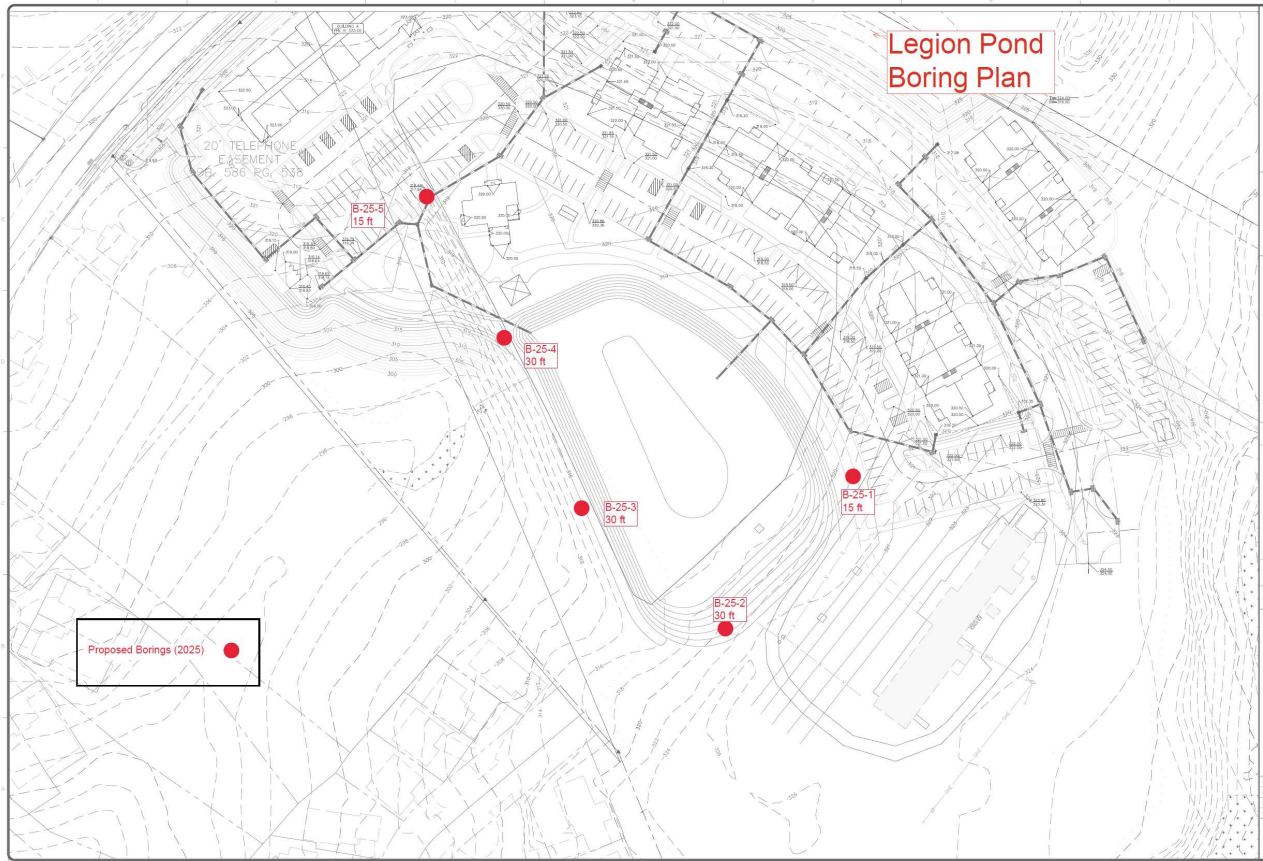
Summit drilled and logged five (5) hollow stem auger borings (B-25-1, B-25-2, B-25-3, B-25-4, and B-25-5) along the general alignment of the embankment from May 7 to 8, 2025. The explorations included drilling, logging, and sampling of borings to depths of 14.3 to 28.9 feet below existing grade.

Summit supervised drilling, visually logged borings, and performed laboratory testing on samples. Standard Penetration Testing (SPT) was performed using a 140-pound hammer with a drop of 30 inches in general accordance with ASTM D1586. Tetra Tech assigned samples for specific laboratory tests. **Table 1** summarizes the completed geotechnical borings and **Figure 3** shows the approximate boring locations. Summit's report, which includes final soil boring logs and laboratory test results, is presented in **Appendix A**.

**Table 1: Borehole Summary**

| Borehole | G.S. Elevation (ft) | Total Depth (ft) | Date Completed | Latitude      | Longitude     |
|----------|---------------------|------------------|----------------|---------------|---------------|
| B-25-1   | 322                 | 14.3             | 5/8/25         | 35°56'15.26"N | 79° 0'56.96"W |
| B-25-2   | 320                 | 28.3             | 5/7/25         | 35°56'13.31"N | 79° 0'58.97"W |
| B-25-3   | 316                 | 28.9             | 5/7/25         | 35°56'14.01"N | 79° 1'0.61"W  |
| B-25-4   | 316                 | 28.8             | 5/8/25         | 35°56'15.99"N | 79° 1'1.89"W  |
| B-25-5   | 316                 | 14.9             | 5/8/25         | 35°56'17.58"N | 79° 1'2.70"W  |





**Figure 3: Boring Locations.**

## 4.2 Laboratory Testing

A laboratory testing program was completed on recovered soil samples. The laboratory testing program included the following tests:

- Moisture Content, ASTM D2216
- Grain Size Distribution, Sieve and hydrometer, ASTM D6913 and ASTM D7928
- Tube Sample Unit Weight, ASTM D7263
- Atterberg Limits, ASTM D4318
- Finer than #200 Sieve, ASTM D1140
- Consolidated Undrained (CU) Triaxial Test, ASTM D4767
- Laboratory Compaction with Modified Effort, ASTM D1557
- Soil Corrosivity (Resistivity, Chloride Content, Sulfate Content)

The subsequent **Table 2 through Table 6** summarize the laboratory testing results on the recovered foundation soils. The corresponding laboratory test reports are presented in **Appendix A**.

**Table 2: Shelby-tube “Undisturbed” Sample Data**

| Location | Depth Interval (ft) | Sample Moisture Content (%) | Natural Dry Density (pcf) | Total Unit Weight (pcf) | Void Ratio |
|----------|---------------------|-----------------------------|---------------------------|-------------------------|------------|
| B-25-1   | 0.0 – 1.5           | 16.4                        | 102.8                     | 119.6                   | 0.639      |
| B-25-1   | 9.9 – 10.4          | 16.4                        | 107.7                     | 125.4                   | 0.565      |

**Table 3: Soil Index and Gradation Data**

| Location | Depth Interval (ft) | %-Passing #4 Sieve (%) | %-Passing #200 Sieve (%) | Water Content (%) | LL | PI | Description                                            |
|----------|---------------------|------------------------|--------------------------|-------------------|----|----|--------------------------------------------------------|
| B-25-1   | 0.0 – 1.5           | 99.8                   | 42.1                     | 19.3              | 24 | 2  | Brown silty SAND (SM)                                  |
| B-25-1   | 2.0 - 4.0           | -                      | 89.1                     | 9.3               | -  | -  | Brown and red-brown lean CLAY (CL)                     |
| B-25-2   | 0.0 – 2.0           | -                      | 56.9                     | 20.4              | 35 | 14 | Brown sandy lean CLAY (CL)                             |
| B-25-3   | 2.0 – 4.0           | 99.6                   | 76.5                     | 17.1              | 35 | 16 | Brown and tan lean CLAY with sand (CL)                 |
| B-25-3   | 6.0 – 8.0           | 100.0                  | 71.3                     | 11.8              | 29 | 11 | Brown and tan lean CLAY with sand (CL)                 |
| B-25-3   | 12.0 – 14.0         | 100.0                  | 93.7                     | 20.3              | -  | -  | Tan and red-brown lean CLAY (CL)                       |
| B-25-3   | 16.0 – 18.0         | -                      | 96.7                     | 10.5              | -  | -  | Tan and red-brown lean CLAY (CL)                       |
| B-25-4   | 1.0 – 6.0           | 100.0                  | 74.8                     | 14.4              | -  | -  | Brown, gray, and tan lean CLAY (CL) with sand to sandy |
| B-25-4   | 2.0 – 4.0           | 100.0                  | 77.8                     | 15.1              | 36 | 18 | Brown, gray, and tan lean CLAY (CL) with sand to sandy |
| B-25-4   | 8.0 – 14.0          | -                      | 69.4                     | 17.7              | -  | -  | Brown, gray, and tan lean CLAY (CL) with sand to sandy |
| B-25-4   | 19.0 – 22.0         | -                      | -                        | 19.0              | 42 | 24 | Brown, gray, and tan lean CLAY (CL) with sand to sandy |
| B-25-4   | 22.0 – 24.0         | -                      | 87.7                     | 22.0              | 48 | 26 | Brown, gray, and tan lean CLAY (CL) with sand to sandy |
| B-25-5   | 2.0 – 4.0           | 100.0                  | 78.1                     | 17.1              | 52 | 29 | Brown and tan fat CLAY (CH) with sand                  |
| B-25-5   | 6.0 – 12.0          | -                      | 75.5                     | 20.4              | -  | -  | Brown and tan lean CLAY (CL) with sand                 |

**Table 4: Moisture-Density (Modified Effort)**

| Location | Depth Interval (ft) | Maximum Dry Density (pcf) | Optimum Moisture Content (%) |
|----------|---------------------|---------------------------|------------------------------|
| B-25-4   | 1.0 – 6.0           | 123.6                     | 11.7                         |

**Table 5: Shear Strengths**

| Location | Depth Interval (ft)    | CU Triaxial Effective Friction Angle (deg) | CU Triaxial Effective Cohesion (psf) | CU Triaxial Total Friction Angle (deg) | CU Triaxial Total Cohesion (psf) |
|----------|------------------------|--------------------------------------------|--------------------------------------|----------------------------------------|----------------------------------|
| B-25-1   | 0.0 – 1.5 / 9.9 – 10.4 | 37.3                                       | 0                                    | 36.7                                   | 0                                |

NOTE: A limited number of data points were obtained due to sample limitations.

**Table 6: Corrosivity Tests**

| Location | Depth Interval (ft) | pH   | Chloride Content (mg/L) | Resistivity          |                      | Sulfate Ion Content in Soil (mg/L) |
|----------|---------------------|------|-------------------------|----------------------|----------------------|------------------------------------|
|          |                     |      |                         | Resistivity (ohm-cm) | Moisture Content (%) |                                    |
| B-25-4   | 1.0 – 6.0           | 5.05 | 231.48                  | 2,300                | 17.3                 | 48.9                               |
|          |                     |      |                         | 1,050                | 22.4                 |                                    |
|          |                     |      |                         | 1,000                | 28.6                 |                                    |
|          |                     |      |                         | 1,000                | 32.9                 |                                    |
|          |                     |      |                         | 1,000                | 37.8                 |                                    |
| B-25-4   | 8.0 – 14.0          | 5.39 | 95.49                   | 9,950                | 12.9                 | 46.1                               |
|          |                     |      |                         | 2,950                | 19.0                 |                                    |
|          |                     |      |                         | 3,000                | 22.9                 |                                    |
|          |                     |      |                         | 3,000                | 27.6                 |                                    |
|          |                     |      |                         | 3,200                | 34.0                 |                                    |
| B-25-5   | 6.0 – 12.0          | 5.39 | 207.23                  | 6,800                | 13.9                 | 46.4                               |
|          |                     |      |                         | 1,950                | 19.6                 |                                    |
|          |                     |      |                         | 1,300                | 24.8                 |                                    |

| Location | Depth Interval (ft) | pH | Chloride Content (mg/L) | Resistivity          |                      | Sulfate Ion Content in Soil (mg/L) |
|----------|---------------------|----|-------------------------|----------------------|----------------------|------------------------------------|
|          |                     |    |                         | Resistivity (ohm-cm) | Moisture Content (%) |                                    |
|          |                     |    |                         | 1,300                | 30.3                 |                                    |
|          |                     |    |                         | 1,350                | 36.6                 |                                    |

### 4.3 Stratigraphy

Tetra Tech developed a section of generalized subsurface conditions from the Summit boring logs and laboratory tests. General stratigraphy is described as:

**Topsoil** – Encountered in borings B-25-1 and B-25-2. Topsoil was encountered at the ground surface at a thickness of 1 inch.

**Fill** – Encountered in B-25-3, B-25-4, and B-25-5. Fill consists of Lean Clay (CL) with variable amounts of sand content. Fill in boring B-25-5 contained a layer of sandy Fat Clay (CH). Fill was encountered at the ground surface to depths of 11.7 to 25.0 feet.

**Residual Soils** – Encountered in borings B-25-1, B-25-2, B-25-3, B-25-4. Residual soils consist primarily of lean Clay (CL). Top of residual soils were encountered at depths ranging from 0.1 to 25.0 feet below ground surface, and at thicknesses ranging from 1.0 to 9.3 feet. Some residual soils were layered between weathered rock.

**Weathered Rock** – Encountered in all borings at depths ranging from 2.0 to 27.0 feet. Weathered rock consisted of Mudstone and Sandstone.

### 4.4 Groundwater Conditions at Time of Investigation

Temporary 1-inch diameter PVC pipes were installed in boreholes to collect 24-hour groundwater levels. The water level depths measured in the borings ranged from 9.3 feet to 24.3 feet. **Table 7** summarizes the Summit's observed groundwater depths 24 hours after drilling. Groundwater fluctuations are expected in response to changes in weather, seasonal changes, and other activities.

### 4.5 Water Levels

The normal pool elevation is Elevation 310 feet. The 100-year flood Elevation is 314.5 feet.

**Table 7: Observed Groundwater After 24 Hours**

| Borehole | Observed Depth to Groundwater (ft) | Observed Groundwater Elevation (ft) |
|----------|------------------------------------|-------------------------------------|
| B-25-1   | 12.8                               | 309.2                               |
| B-25-2   | 9.3                                | 310.7                               |
| B-25-3   | 24.3                               | 291.7                               |
| B-25-4   | 21.4                               | 294.6                               |
| B-25-5   | 13.3                               | 302.7                               |

## 5. ENGINEERING ANALYSES AND RESULTS

### 5.1 Strength Parameters and Unit Weight

The shear strength values of the embankment and foundation materials were evaluated based on the available laboratory test data, recorded field data, presumptive values for similarly classified engineered fills, and Tetra Tech's experience and professional judgement. **Table 8** summarizes the material properties that were assigned in our embankment slope stability assessments using the SEEP/W and SLOPE/W modeling program.

### 5.2 Seismicity

The stability of the dam embankment under earthquake loading was evaluated using a pseudo-static analysis. The screening horizontal seismic coefficient,  $k_h$  was estimated using the procedures outlined by Bray and Macedo (2019) based on the allowable seismic displacement of 6 inches for the upstream and downstream slopes. If this value of  $k_h$  is used in a pseudo-static slope stability analysis and the calculated Factor of Safety is greater than 1, the seismic displacement is "screened" to be less than the allowable seismic displacement. A seismic return period of 10,000-years based on a high hazard dam was used for this analysis. The screening  $k_h$  was estimated to be about 0.04g based on a predominant earthquake magnitude of about 6.5.

Analyses were performed for both upstream and downstream proposed slopes. Groundwater levels were assumed to be at Elevation 297. No flood loading was included because of the low probability of an earthquake coinciding with a period of high-water levels. Liquefaction of the foundation soils is not anticipated, as addressed in the following section.

A minimum Factor of Safety of 1.0 is required for earthquake conditions.

The results indicate that the proposed upstream and downstream dam embankments meet the requirements for stability during earthquakes with seismic slope displacement of less than 6 inches.

**Table 8: Summary of Material Properties**

| Material                                      | USCS      | Total Unit Wt (pcf) | Effective Stress (Drained) |                | Total Stress (Undrained) |                | $k_h \times 10^{-6}$ cm/s) | $k_h/k_v$ |
|-----------------------------------------------|-----------|---------------------|----------------------------|----------------|--------------------------|----------------|----------------------------|-----------|
|                                               |           |                     | Friction Angle (deg)       | Cohesion (psf) | Friction Angle (deg)     | Cohesion (psf) |                            |           |
| Sandy Lean Clay (New FILL)                    | CL        | 126                 | 33                         | 200            | 0                        | 900*<br>630**  | $3.0 \times 10^{-6}$       | 5         |
| Lean Clay with Sand (FILL)                    | CL        | 126                 | 33                         | 200            | 0                        | 900*<br>630**  | $3.0 \times 10^{-6}$       | 5         |
| Stiff Lean Clay to Sandy Lean Clay (RESIDUAL) | CL/<br>SM | 124                 | 33                         | 200            | 0                        | 900*<br>630**  | $3.0 \times 10^{-6}$       | 3         |
| Mudstone and Sandstone (Bedrock)              | -         | 135                 | 0                          | 5,000          | 0                        | 5,000          | $5.0 \times 10^{-6}$       | 10        |
| Silty Sand Berm                               | SM        | 125                 | 33                         | 0              | 33                       | 0              | $1.5 \times 10^{-3}$       | 5         |
| Toe Drain                                     | SP/GP     | 125                 | 36                         | 0              | 36                       | 0              | $1.0 \times 10^{-1}$       | 1         |

\*Undrained shear strength (USS)

\*\* Reduced USS for RDD analyses

### 5.3 Liquefaction

Soils in the existing embankment and residual foundation soils are typically lean clay with varying amounts of sand. As shown in **Table 3**, percent passing #200 sieve for CL soils ranges from 56.9 to 96.7 percent fines, and the one silty sand (SM) sample in boring B-25-1 contained 42.1 percent fines. Results of liquefaction analysis are in Appendix B. Factors of safety for liquefaction were not applicable since the condition of the material was unsaturated or clay-like behavior. Therefore, liquefaction is not likely to occur at this site. Liquefaction analysis is included in **Appendix B**.

### 5.4 Seepage and Slope Stability Analysis

Seepage analysis was performed with SEEP/W, a finite element program. Boundary conditions were applied to reflect the normal pool and phreatic surface at the ground surface beyond the toe of slope. The first scenario was the initial proposed geometry of 3H:1V side slopes and 12-foot-

wide crest, which resulted in an unacceptable exit gradient of 0.47 and seepage exiting the downstream slope. To remedy this, a silty sand (SM) seepage berm and drainage piping was added to the toe of slope to intercept seepage and divert it from the downstream face. The resulting exit gradient after inclusion of the seepage berm is 0.13 and no seepage exiting the downstream slope, which is acceptable. Results of the seepage analysis are shown in **Table 9**.

**Table 9: Seepage Analysis Results**

| Analysis Case                 | Water Level ELs (feet)          | Maximum Allowable Gradient | Calculated Gradient | Seepage at DS Face? |
|-------------------------------|---------------------------------|----------------------------|---------------------|---------------------|
| Steady State w/out Berm       | US: NP EL 310 to DS: GWT EL 297 | 0.25                       | 0.47                | Y                   |
| Steady State w/Berm and Drain | US: NP EL 310 to DS: GWT EL 297 | 0.25                       | 0.13                | N                   |

The stability of the embankment slopes was evaluated using the computer program SLOPE/W. The Spencer Method of analysis in SLOPE/W was used as it considers both shear and normal interslice forces and satisfies both moment and force equilibrium. One (1) representative cross-section was selected for analysis. The section at STA 3+50 was selected as the maximum height section for analysis. This critical geometric section is displayed in **Figure 1**.

Slope stability analyses were performed for end of construction, long-term steady state (“static”), flood, rapid drawdown, and pseudostatic stability. The 100-year flood level at EL 314.5 was prescribed for the flood surcharge case and the maximum water level for the rapid drawdown (RDD) case. For the RDD analysis, we assumed drawdown to EL 310, which is the normal pool, and applied reduced undrained shear strengths (VandenBerge, Duncan, & Brandon, 2013) that were conservatively assumed to saturate and experience undrained behavior.

Although the phreatic surface within the embankment would not change significantly during a flood event due to the low permeability of the embankment (primarily CL), the analysis for flood and rapid drawdown cases conservatively assumed steady state phreatic surfaces based on the 100-year flood. If factors of safety are acceptable with a conservative steady state assumption, stability can be considered acceptable. If steady state resulted in unacceptable factors of safety, a transient analysis could be performed to determine if the factor of safety could be increased with a less conservative analysis. The results of the stability analyses are presented in **Table 10**.



**Table 10: Slope Stability Analysis Cases and Results**

| Analysis Case                        | Embankment Side | Water Level ELs (feet)                        | Effective (Drained) or Total (Undrained)                       | Required Minimum Factor of Safety | Computed Minimum Factor of Safety |
|--------------------------------------|-----------------|-----------------------------------------------|----------------------------------------------------------------|-----------------------------------|-----------------------------------|
| Normal Pool Steady State (Long-Term) | Downstream      | US: NP EL 310<br>DS: GWT EL 297               | Effective                                                      | 1.5                               | 3.2                               |
| Flood Pool (Long-Term)               | Downstream      | US: NP EL 314.5<br>DS: GWT EL 297             | Effective                                                      | 1.4                               | 3.0                               |
| Rapid Drawdown (RDD)                 | Upstream        | US: Flood EL 314.5 to NP EL 310<br>DS: EL 297 | Reduced USS Methodology (VandenBerge, Duncan, & Brandon, 2013) | 1.1                               | 3.0                               |
| Seismic ( $k_y = 0.04$ )             | Upstream        | US: NP EL 310<br>DS: GWT EL 297               | Free Draining: Effective<br>Low Perm: Total                    | 1.0                               | 3.3                               |
|                                      | Downstream      |                                               |                                                                |                                   | 2.8                               |

### 5.5 Settlement and Bearing Capacity

Although the crest and upstream slope will be excavated, resulting in a lower applied stress, the downstream will be raised with embankment fill and a silty sand berm. We estimated immediate/short-term and long-term settlements of the embankment fill and underlying foundation soils.

Settlement of the embankment material was calculated based on an interpolated percent compression from published empirical relationships (Mine Safety and Health Administration, 2010). The primary consolidation settlement of finer-grained foundation soils (residual silty clays) was calculated using Terzaghi's one-dimensional theory of consolidation (Das & Sivakugan, 2017). Settlement of the embankment under its self-weight and of the cohesionless foundation soils is assumed to primarily occur within the timeframe of construction. Consolidation settlement of the finer-grained foundation soils will primarily occur after constructing the embankment. Because the residual clays are stiff to very stiff consistency, they were assumed to be overconsolidated and a preconsolidation stress was determined by adding 400 psf to the existing vertical stress. The foundation settlement is calculated to be less than 1 inch at the downstream toe. The crest and upstream slopes will be primarily cut sections, so settlement is not anticipated at those locations. Results of the settlement calculations are shown in **Table 11**. Calculations are included in **Appendix B**.



**Table 11: Estimated Settlements**

| Settlement Case                                  | Settlement (in) |
|--------------------------------------------------|-----------------|
| Embankment Compression (inches)                  | 0.2             |
| Post-Construction Primary Consolidation (inches) | 0.9             |

The allowable bearing capacity of the foundation soils beneath the riser structure was estimated in accordance with USACE EM 1110-2-1905. A minimum Factor of Safety of 3 is required for bearing capacity stability for usual loading condition. The purpose of the USACE requirement for bearing capacity is to limit the wall settlement to a tolerable amount. Per USACE EM 1110-2-2502, minimum Factor of Safety for a well-defined critical structure is 3. The recommended allowable bearing capacity for the riser is 2,400 psf.

## 5.6 Earth Pressures

Horizontal earth pressure coefficients were calculated for the wingwall, for active, passive, and at-rest conditions and are shown in **Table 12**. The calculations are included in **Appendix B**.

**Table 12: Horizontal Earth Pressures**

| Condition      | Coefficient  | Equivalent Fluid Density (pcf) |
|----------------|--------------|--------------------------------|
| Active         | $K_a = 0.29$ | 37                             |
| At-rest: $K_0$ | $K_0 = 0.46$ | 57                             |
| Passive: $K_p$ | $K_p = 3.4$  | 427                            |

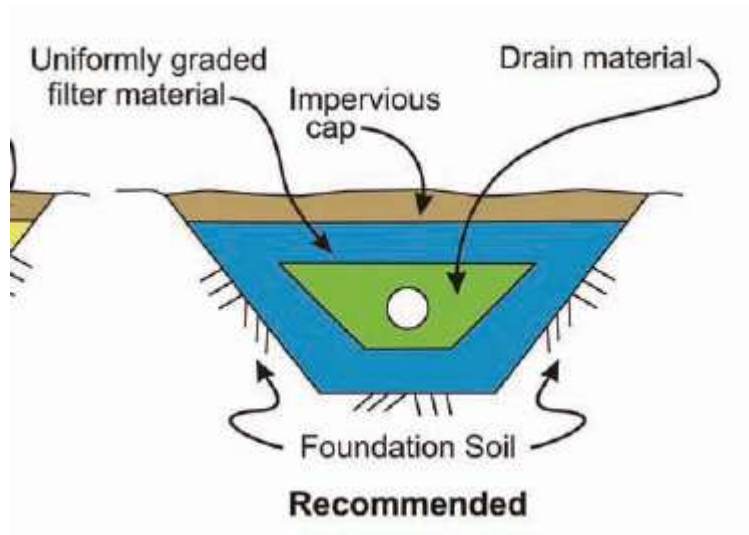
## 5.7 Berm and Toe Drain

Under normal pool conditions (Elevation 310 feet) and with an embankment configuration consisting of a 12-foot-wide crest and 3H:1V upstream and downstream side slopes, analysis shows seepage exiting the downstream slope and an exit gradient of 0.47. The high exit gradient and the seepage at the face are unacceptable, so a pervious silty sand (SM) berm was applied to the downstream at a 5H:1V slope, along with a toe drain. These additions resulted in a reduction in exit gradient of 0.13 and eliminated seepage at the downstream face.

The berm should be built from silty sand material with a gradation consisting of Silty Sand (USCS SM) with a fines content ranging from 12 to 30 percent and a maximum PI of fines of 8.

We recommend a toe drain that is a double stage with a perforated pipe as shown in **Figure 4**. The gravel drain should be a ASTM C33 No. 57 stone, surrounded by ASTM C33 Fine Aggregate with

additional limitations on the No. 200 sieve as shown in **Figure 5**. The pipe should be a minimum 6-inch diameter perforated pipe with a maximum perforation dimension of 0.40 inches.



**Figure 4: Double Stage Drainpipe Configuration**

**Table 12.**—Gradation of ASTM C 33 fine aggregate with additional requirement<sup>1</sup>

| Sieve size           | Percent passing, by weight |
|----------------------|----------------------------|
| ¾-inch               | 100                        |
| No. 4                | 95-100                     |
| No. 8                | 80-100                     |
| No. 16               | 50-85                      |
| No. 30               | 25-60                      |
| No. 50               | 5-30                       |
| No. 100              | 0-10                       |
| No. 200 <sup>1</sup> | 0-2 <sup>2</sup>           |

<sup>1</sup> Note qualifications of No. 200 sieve.

<sup>2</sup> 2% stockpile, 5% in-place. For discussion of material breakdown, see section 4.3.2.

**Figure 5: Gradation of ASTM C33 Fine Aggregate with No. 200 Sieve Requirements**

## 5.8 Filter Diaphragm for Conduit

A filter diaphragm should be constructed around the spillway conduit. Filter diaphragms should be dimensioned in accordance with FEMA Technical Manual: Conduits through Embankment Dams. These criteria are listed below and depicted in **Figure 6**. Filter diaphragm compatibility calculations are included in **Appendix C**.

1. Configuration
  - a. The filter diaphragm is a rectangular or trapezoidal shaped zone of filter sand that is about 3 feet wide in a direction perpendicular to the conduit.
2. Location
  - a. Downstream of the centerline of the embankment dam when no cutoff trench is used.
  - b. Upstream of a point where the top of the filter diaphragm has at least a thickness of soil overlying it that is a minimum of one-half of the difference in elevation between the top of the diaphragm and the maximum potential reservoir water level.
3. Vertical/horizontal limits
  - a. The filter diaphragm should extend below and to either side of the conduit far enough to intercept potential flow along excavation/embankment interfaces. Usually, the filter diaphragm extends into the foundation a dimension equal to at least 1.5 times the diameter of the conduit, unless bedrock is encountered at a shallower depth.
4. Lateral Limits
  - a. The filter diaphragm usually extends laterally a distance at least equal to 3 times the diameter of the conduit or a minimum of 10 feet from the sides of the conduit. In some situations, the filter diaphragm may need to be wider than these minimum suggested dimensions. For instance, if an excavation has been made for the conduit, the filter diaphragm should notch into the excavation slopes by at least 2 feet.

Filter material should consist of ASTM C33 Fine Aggregate, adjusted for No. 200 content (**Figure 5**).

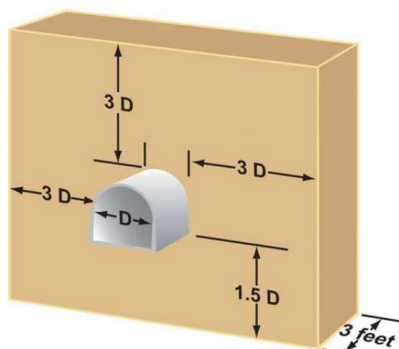


Figure 91.—Typical configuration for filter diaphragm used in the design of an embankment dam.

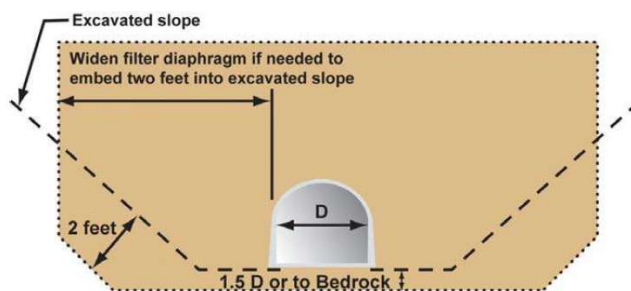


Figure 92.—Typical configuration for filter diaphragm used in design of an embankment dam. The filter diaphragm should extend into the foundation soils, where an excavation is made for the conduit.

## Figure 6: Filter Diaphragm Dimensions

### 5.9 Channel Protection

The outlet of the principal spillway will likely require stone protection. The material anticipated at the spillway outlet location is anticipated to be weathered rock or residual sandy clay, after removal of any potential surficial organic or alluvial materials (cohesionless sands). For very soft rocks or silty clay, USACE EM 1110-2-1601 Hydraulic Design of Flood Control Channels (**Figure 7**) recommends a maximum permissible mean channel velocity of 3.5 feet per second (fps). Therefore, if outlet velocities are less than 3.5 fps riprap protection will be required. A preliminary outlet velocity of 7 fps was used to size the riprap protection. Using this velocity, an assumed unit weight of 160 pcf, and a factor of safety of 1.1 on the velocity,  $D_{50}$  ranges from 8 to 10 inches, and  $D_{100}$  ranges from 10 to 14 inches. Therefore, we recommend NCDOT Riprap Class 1, with a maximum stone size of 17 inches. Riprap calculations are included in **Appendix C**.

Filter compatibility has been verified between the foundation soil or rock and AASHTO M288 Class 1 geotextile with maximum AOS sieve size of #70. A bedding stone between the riprap and geotextile should consist of a minimum thickness of 6 inches of ASTM C33 No. 57 stone. Geotextile to base soil filter compatibility calculations are provided in **Appendix C**.

## 5.10 Corrosion

Corrosivity tests were performed on selected samples (**Table 6**). Florida DOT Structures Manual (2025) defines environmental classifications for steel and concrete based on values obtained from water and soil tests. For comparison to concrete classifications, soil samples would be categorized as slightly aggressive for chlorides (< 500 ppm) and sulfates (<150 ppm). Resistivity and pH would fall into a moderately aggressive category.

| Channel Material                                     | Mean Channel Velocity, fps |
|------------------------------------------------------|----------------------------|
| Fine Sand                                            | 2.0                        |
| Coarse Sand                                          | 4.0                        |
| Fine Gravel <sup>1</sup>                             | 6.0                        |
| Earth                                                |                            |
| Sandy Silt                                           | 2.0                        |
| Silt Clay                                            | 3.5                        |
| Clay                                                 | 6.0                        |
| Grass-lined Earth (slopes less than 5%) <sup>2</sup> |                            |
| Bermuda Grass                                        | 6.0                        |
| Sandy Silt                                           | 8.0                        |
| Silt Clay                                            |                            |
| Kentucky Blue Grass                                  |                            |
| Sandy Silt                                           | 5.0                        |
| Silt Clay                                            | 7.0                        |
| Poor Rock (usually sedimentary)                      | 10.0                       |
| Soft Sandstone                                       | 8.0                        |
| Soft Shale                                           | 3.5                        |
| Good Rock (usually igneous or hard metamorphic)      | 20.0                       |

Notes:  
1. For particles larger than fine gravel (about 20 millimetres (mm) = 3/4 in.), see Plates 29 and 30.  
2. Keep velocities less than 5.0 fps unless good cover and proper maintenance can be obtained.

**Figure 7: Maximum Permissible Channel Velocities**

## 6. RECOMMENDATIONS

The subsequent sections outline geotechnical-related recommendations for embankment fill construction, CCS, toe filter, and construction quality assurance and control (CQA/CQC). Tetra Tech recommends that all aspects of the embankment construction be monitored full-time by a qualified “geotechnical” technician or engineer.

Tetra Tech was not contracted to provide a post-construction inspection and maintenance plan, though such a plan might be advisable based on the potential frequency of flooding. As the

embankment will be more vulnerable to flood damage until a dense cover of permanent vegetation has been established, Tetra Tech recommends that the construction contract include an extended warranty & maintenance period.

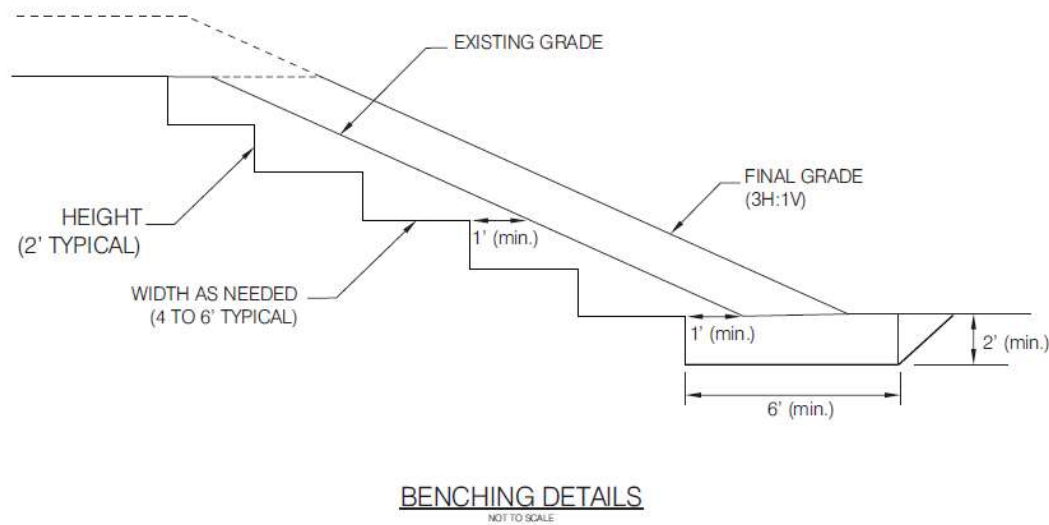
## 6.1 Embankment Construction

Fill for the embankment construction that is not considered the toe berm should have a USCS classification of CL (Lean Clay), ML (Silt), CL-ML (Lean Silty Clay), SM (silty sand), or SC (Clayey Sand) with a minimum of 40 percent fines (less than #200 sieve).

The existing embankment should be benched as shown in **Figure 8**. Embankment fill construction should commence over subgrade soils free of organics and foreign materials promptly upon approval of the subgrade. The subgrade should be approved by an experienced “geotechnical” technician or engineer based on observed performance during proofrolling, and in-place moisture-density testing of the prepared subgrade if required. Organic materials may be encountered beyond the existing downstream toe of embankment. Where encountered, organic materials should be removed and replaced with compacted embankment fill. The fill shall be placed in maximum 8-inch-thick “loose” lifts and compacted to at least 95% relative compaction when within minus 1% to plus 3% of the optimum moisture content determined per ASTM D698 (Standard Proctor). Each lift of fill should be integrated (e.g., benched or keyed) into adjacent slopes and the underlying lift of fill (e.g., via scarification or roughening of the surface).

As part of the Quality Assurance/Quality Control requirements, testing, construction monitoring, and report submissions will be required to:

1. Detail the prequalification of borrow materials, aggregates & riprap, geosynthetics, and paving materials for embankment construction and the trail surface;
2. Baseline laboratory moisture-density relationships of accepted/approved borrow soils and agronomic characteristics of planned seedbed soils (“topsoil”), respectively;
3. Document foundation preparation and the bases for subgrade acceptance/approval; and
4. Regularly distribute in-place moisture-density testing to demonstrate compliant fill construction.



**Figure 8: Benching Detail**

## 6.2 Berm and Toe Drain

The berm should consist of a silty sand (USCS SM) with fines content ranging from 12 to 30 percent and a maximum PI of 8. The toe drain should be a double stage and 6-inch plastic perforated pipe. The two stages should be a gravel drain AASHTO No. 57 stone immediately surrounding the 6-inch diameter perforated pipe, and an ASTM C33 Fine Aggregate filter surrounding the gravel drain. The ASTM C33 Fine Aggregate should be revised with restrictions to the No. 200 sieve as shown in **Figure 5**. The perforated pipe should have maximum perforation size of 0.40 inches.

## 6.3 Filter Diaphragm and Conduit

A filter diaphragm should be constructed around the spillway conduit, following the configuration, location, vertical/horizontal limits, and lateral limits as described in **Section 5.8**. The filter material should consist of ASTM C33 Fine Aggregate, adjusted for No. 200 content (**Figure 5**).

## 6.4 Channel Protection

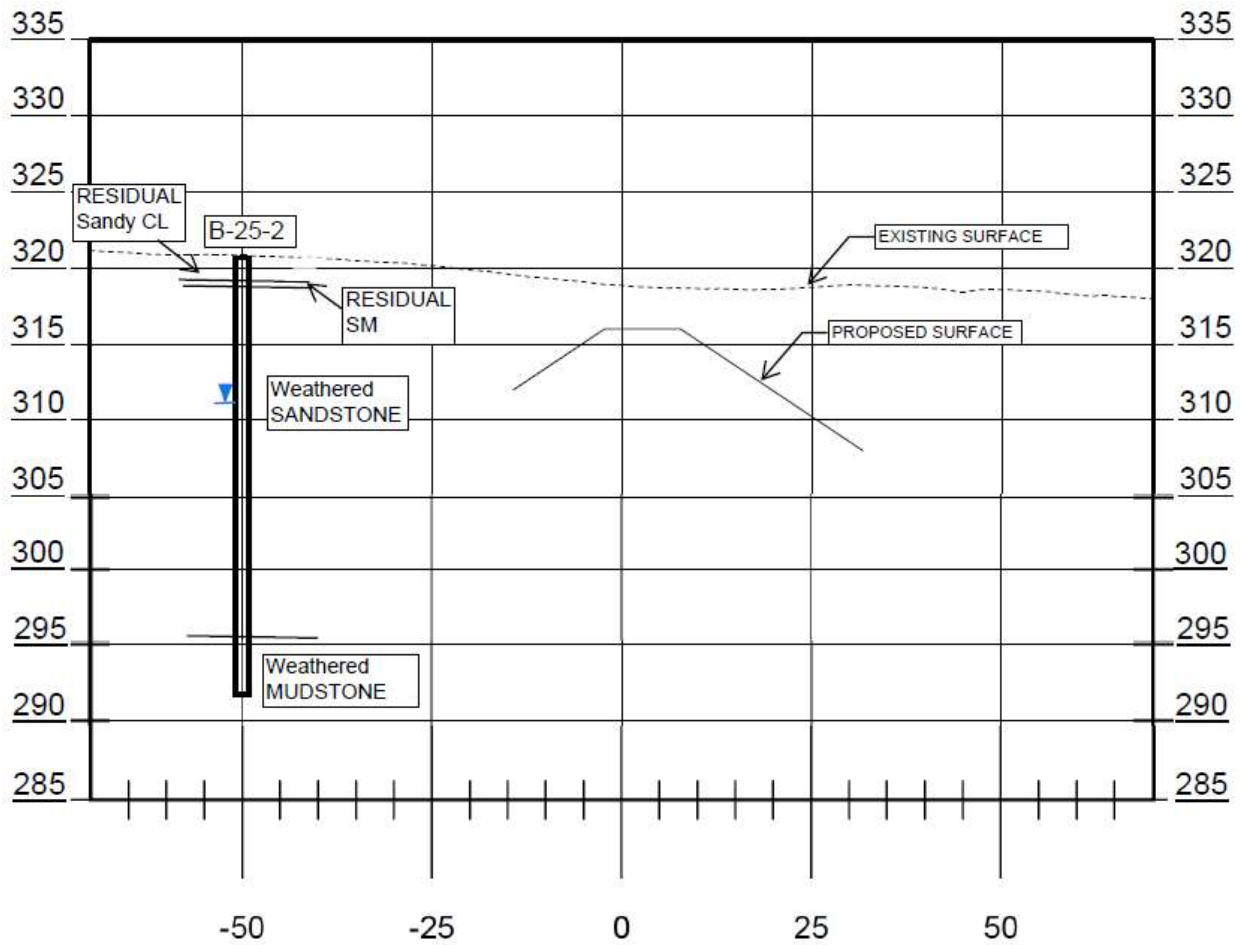
Channel protection should be NCDOT Riprap Class 1, placed a minimum of 18 inches thick. ASTM C33 No. 57 stone should be placed beneath the riprap as a bedding layer. Between the bedding and foundation soil there should be a Class 1 geotextile with a maximum AOS of #70 and permittivity of  $0.1 \text{ sec}^{-1}$ .

## 6.5 Rock Excavation

Shallow weathered bedrock was encountered in borings B-25-1 (5.5 feet below ground surface) and B-25-2 (2 feet below ground surface). Boring B-25-2 is near Station 6+50, where the proposed geometry includes a cut of approximately 4 feet (see **Figure 9**). Therefore, weathered rock is likely



to be encountered in excavation for this part of the site. However, the weathered sandstones and mudstones were able to be penetrated by the hollow stem augers to depths of approximately 28 feet. The upper weathered rock is layered with residual sandy clays. Therefore, this cut of up to 4 feet should be possible with standard excavation equipment (hydraulic excavators and bulldozers).



**Figure 9: Cross Section at Station 6+50 Showing Excavation Relative to Weathered Rock**

## 6.6 Tree Stump Removal

The existing slopes are covered by mature trees with diameters up to approximately 24 inches diameter at breast height (dbh). For slope preparation, trees should be cut, and the entire root ball should be removed from the existing embankment. We recommend showing a minimum 3-foot depth of excavation into the existing embankment to account for tree root ball removal, but the root balls should be removed so that all roots one-half inch and larger in diameter are removed.

Excavations made for removal of trees should follow excavation, compaction, and benching details described in this report.



## 7. LIMITATIONS

This report presents Tetra Tech's geotechnical evaluations and recommendations for construction of the Legion Pond Dam Repair and Dewatering Pond in Chapel Hill, North Carolina. The professional opinions and recommendations expressed in this report are based on geotechnical subsurface information and laboratory testing results provided by Summit, and Tetra Tech's review of background documents applicable to this project. Our study did not evaluate the possible presence of hazardous materials on any portion of the site.

Site conditions, including groundwater level, can change with time as a result of natural processes or the activities of man at the subject site or at nearby sites. Changes to the applicable laws, regulations, codes, and standards of practice may occur as a result of government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Tetra Tech has no control.

This report is only intended to be used in its entirety with the corresponding Issued for Construction (IFC) documents. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Tetra Tech should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. Reliance by others on the data presented herein or for purposes other than those stated is authorized only if so permitted in writing by Tetra Tech. Such an authorization may incur additional charges.

Tetra Tech has endeavored to perform its evaluation using the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical professionals with experience in this area in similar soil conditions. No guarantee or warranty of any kind, expressed or implied, is made as to Tetra Tech's expressed opinions, conclusions and recommendations.

## 8. REFERENCES

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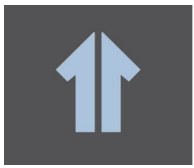
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# **APPENDIX A**

## **Subsurface Exploration Report**



**SUMMIT**  
DESIGN AND ENGINEERING SERVICES

## Report of Subsurface Investigation



### Legion Pond

Chapel Hill, North Carolina

### Prepared for:

Tetra Tech, Inc.

### Prepared by:

Summit Design and Engineering Services, Inc.

320 Executive Court  
Hillsborough, NC 27278

Summit Project No. 24-0050.208



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- Boring Location Plan
- Soil Boring Logs
- Laboratory Test Results





June 17, 2025

Ms. Holly Miller  
NC Operations Manager  
Tetra Tech, Inc.  
4000 Sancar Way, Suite 200  
RTP, NC 27709

**Reference: Report of Subsurface Investigation**  
Legion Pond  
Chapel Hill, North Carolina  
Summit Project No.: 24-0050.208

Dear Ms. Miller:

Summit Design and Engineering Services, Inc. (Summit) is pleased to present this report for a subsurface exploration for the referenced project located at 1714 Legion Road in Chapel Hill, North Carolina. Our services were provided in accordance with Summit's Proposal No. G23-0086 dated October 20, 2023. This report presents a review of the project information provided to us and a discussion of the site and subsurface conditions revealed during our field investigation. The Appendix of this report contains a boring location diagram, the soil test boring logs and the results of our laboratory testing.

## FIELD EXPLORATION

Our field exploration to evaluate the subsurface materials along the existing pond included the performance of five soil test borings at locations requested by Tetra Tech. The borings were taken to depths of between 14.3 feet and 28.9 feet below the existing ground surface. The borings were located in the field by personnel from Summit using a handheld GPS. Ground surface elevations shown on the boring logs were estimated using 1-foot contours on a site plan prepared by Tetra Tech; therefore, the elevations should be considered approximate.

The borings were drilled using 3¾-inch hollow stem augers with a CME-550X on a rubber-tired carrier. Standard Penetration Tests (SPT) were performed at selected intervals with a split spoon sampler to determine N-values and obtain representative soil samples. Soil samples were taken at 2-foot intervals as requested by Tetra Tech. Standard Penetration Testing was performed in general accordance with ASTM D1586. The N-values are used to estimate the in-situ relative density of cohesionless soils and the consistency of cohesive soils. Borings were logged by a geologist licensed in the state of North Carolina.

Representative samples were sealed and transported to our laboratory where select samples were tested. The laboratory testing schedule was prepared by Tetra Tech and testing was performed by Geotechnics. Final boring logs, included in the Appendix of this report, represent an interpretation of the geologist's field logs, the geologist's evaluation of the samples, standard penetration tests values, and results of our laboratory testing. Naturally, transitional changes in soil types are often gradual and cannot be defined at a particular depth.

## FINDINGS

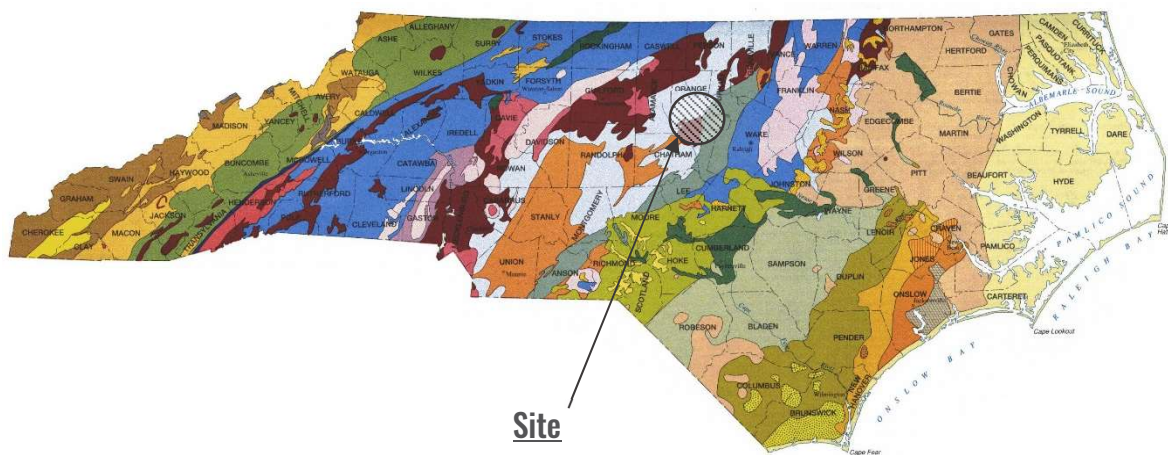
### Site Description

The site is located at 1714 Legion Road in Chapel Hill, North Carolina. The site has a mix of lawn, wooded areas, a pond, a vacant building, and a gravel access drive and parking lot area. It is assumed that the vacant building was historically used as an American Legion post. According to the topographic map provided by Tetra Tech, elevations at the boring locations range between approximately EL 316 to EL 322.

### Area Geology

The site is located in Orange County, North Carolina which is located within the Triassic Basin of the Piedmont Geologic Province. Sedimentary sandstone, siltstone, mudstone, and conglomerates are the predominant rock types within the Triassic Basin. Igneous intrusions (dikes and sills) are present within the sedimentary rocks in many areas. Near the ground surface, Triassic rocks and igneous intrusions are often discontinuous with depth. The Triassic rocks can be present as relatively thin layers and intrusions in the form of boulders. Typical soils within the Triassic Basin consist of silts, clays, and clayey/silty sands. Near the surface, the silts and clays are often moderately to highly plastic. Where present, residual soils formed by weathering of igneous intrusions can be of a softer/wetter consistency than surrounding Triassic sediments (silts and clays).

According to weathered rock samples encountered during the subsurface investigation, the site appears to be underlain by Mudstone and Sandstone. Mudstone tends to slake, or degrade to soil, when exposed to water.



**Figure 1: North Carolina Geological Survey, 1985**



### **Subsurface Conditions**

Details of soil conditions encountered during our field exploration are shown on the individual Soil Test Boring logs included in the Appendix. Stratification boundaries shown on the logs represent the approximate elevation of changes in soil type; however, the in-situ transition may be gradual. This section of the report provides a general discussion of subsurface conditions encountered at the site during our subsurface exploration.

From the ground surface, a layer of topsoil was encountered in two borings (B-25-1 and B-25-2) to a depth of 1-inch. In the remaining borings, fill material was encountered from the ground surface to depths of between 11.7 and 25.0 feet. This fill material was placed to create the dam embankment for the existing pond and generally consisted of Lean CLAY (CL) with variable amounts of Sand content. Fill material in boring B-25-5 contained a layer of Sandy Fat CLAY (CH) in addition to Lean CLAY.

Beneath the surficial layer of topsoil or fill material, residual soils were encountered in four of the borings. These residual soils consisted almost entirely of Lean CLAY, with Silty SAND (SM) also encountered in minor quantities. Residual soil was not encountered in boring B-25-5.

Underneath the fill material or residual soils, weathered rock was encountered in each of the five borings at depths ranging from 2.0 to 27.0 feet. The weathered rock consisted of Mudstone and Sandstone. Lenses of residual Lean CLAY were commonly found within the weathered rock strata. Non-crystalline bedrock was not encountered in any of the borings.

### **Groundwater Conditions**

After completion of the borings, a 1" PVC pipe was installed in the borehole to collect 24-hour groundwater levels. A summary of groundwater and cave depths can be found on Table 1. It should be noted that groundwater levels will vary with seasonal changes in climatic conditions.

**Table 1**  
**SOIL BORING SUMMARY**

| <b>Boring ID</b> | <b>Drilled Depth (feet)</b> | <b>0-hr Groundwater Depth (feet)</b> | <b>24-hr Groundwater Depth (feet)</b> | <b>Cave Depth (feet)</b> |
|------------------|-----------------------------|--------------------------------------|---------------------------------------|--------------------------|
| B-25-1           | 14.3                        | DRY                                  | 12.8                                  | 13.9                     |
| B-25-2           | 28.3                        | 27.8                                 | 9.3                                   | 26.9                     |
| B-25-3           | 28.9                        | DRY                                  | 24.3                                  | 27.2                     |
| B-25-4           | 28.8                        | DRY                                  | 21.4                                  | 24.0                     |
| B-25-5           | 14.9                        | DRY                                  | 13.3                                  | 13.5                     |



### **Laboratory Results**

Summit's laboratory testing included natural moisture content, passing No. 200 sieve, hydrometer particle size analysis, Atterberg Limits tests (plasticity index), modified proctor test, triaxial test and a suite of corrosivity tests. Laboratory tests were conducted on split spoon samples of the surface materials recovered from selected borings as well as Shelby Tube samples and bulk samples collected during the field investigation. The laboratory tests were performed by Geotechnics in their Raleigh laboratory. Results of the laboratory tests are listed on the boring logs as well as the laboratory results included in the appendix.

## **CLOSURE**

We appreciate the opportunity to submit this Report of Subsurface Exploration and look forward to working with you on this project. If you have any questions concerning this report, please contact us at your convenience at (919) 732-3883.

Sincerely,

SUMMIT DESIGN AND ENGINEERING SERVICES, INC  
Firm's NC License No. C-5176



Aaron Gross, P.G.  
Senior Geologist  
[Aaron.Gross@summitde.com](mailto:Aaron.Gross@summitde.com)

# APPENDIX

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- 1) Legend
- 2) Boring Location Plan
- 3) Boring Logs
- 4) Laboratory Results

# LEGEND

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# SYMBOLS AND TERMS USED ON BORING LOGS

## UNIFIED SOIL CLASSIFICATION (ASTM D 2487-06)

| MATERIAL TYPES                                             | CRITERIA FOR ASSIGNING SOIL GROUP NAMES                                  |                                  |                                           | SOIL GROUP SYMBOL, NAME, AND LEGEND |                      |  |
|------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------|-------------------------------------------|-------------------------------------|----------------------|--|
| COARSE-GRAINED SOILS<br>> 50% RETAINED ON<br>No. 200 SIEVE | GRAVELS<br><br>> 50% OF COARSE<br>FRACTION RETAINED<br>ON No. 4 SIEVE    | CLEAN GRAVELS<br>< 5% FINES      | $Cu \geq 4$ AND $1 \leq Cc \leq 3$        | GW                                  | WELL-GRADED GRAVEL   |  |
|                                                            |                                                                          |                                  | $Cu < 4$ AND/OR $1 > Cc > 3$              | GP                                  | POORLY-GRADED GRAVEL |  |
|                                                            |                                                                          | GRAVEL WITH FINES<br>> 12% FINES | FINES CLASSIFY AS ML OR MH                | GM                                  | SILTY GRAVEL         |  |
|                                                            |                                                                          |                                  | FINES CLASSIFY AS CL OR CH                | GC                                  | CLAYEY GRAVEL        |  |
|                                                            | SANDS<br><br>$\geq 50\%$ OF COARSE<br>FRACTION PASSING<br>ON No. 4 SIEVE | CLEAN SANDS<br>< 5% FINES        | $Cu \geq 6$ AND $1 \leq Cc \leq 3$        | SW                                  | WELL-GRADED SAND     |  |
|                                                            |                                                                          |                                  | $Cu < 6$ AND/OR $1 > Cc > 3$              | SP                                  | POORLY-GRADED SAND   |  |
|                                                            |                                                                          | SANDS AND FINES<br>> 12% FINES   | FINES CLASSIFY AS ML OR MH                | SM                                  | SILTY SAND           |  |
|                                                            |                                                                          |                                  | FINES CLASSIFY AS CL OR CH                | SC                                  | CLAYEY SAND          |  |
| FINE-GRAINED SOILS<br>$\geq 50\%$ PASSES<br>No. 200 SIEVE  | SILTS AND CLAYS<br><br>LIQUID LIMIT < 50                                 | INORGANIC                        | $PI > 7$ AND PLOTS ON/ABOVE "A" LINE      | CL                                  | LEAN CLAY            |  |
|                                                            |                                                                          |                                  | $PI < 4$ OR PLOTS BELOW "A" LINE          | ML                                  | SILT                 |  |
|                                                            | SILTS AND CLAYS<br><br>LIQUID LIMIT $\geq 50$                            | ORGANIC                          | $LL(oven\ dried) / LL(not\ dried) < 0.75$ | OL                                  | ORGANIC CLAY OR SILT |  |
|                                                            |                                                                          |                                  |                                           |                                     |                      |  |
|                                                            |                                                                          | INORGANIC                        | $PI$ PLOTS ON OR ABOVE "A" LINE           | CH                                  | PLASTIC CLAY         |  |
|                                                            |                                                                          |                                  | $PI$ PLOTS BELOW "A" LINE                 | MH                                  | ELASTIC SILT         |  |
|                                                            |                                                                          | ORGANIC                          | $LL(oven\ dried) / LL(not\ dried) < 0.75$ | OH                                  | ORGANIC CLAY OR SILT |  |
|                                                            |                                                                          |                                  |                                           |                                     |                      |  |

| INFERRED ORIGIN OF SOIL |                                                               |
|-------------------------|---------------------------------------------------------------|
| RESIDUAL                | - SOIL DERIVED FROM IN-PLACE WEATHERING OF ROCK               |
| FILL                    | - SOIL TRANSPORTED AND DEPOSITED AT CURRENT LOCATION BY MAN   |
| ALLUVIAL                | - SOIL TRANSPORTED AND DEPOSITED AT CURRENT LOCATION BY WATER |

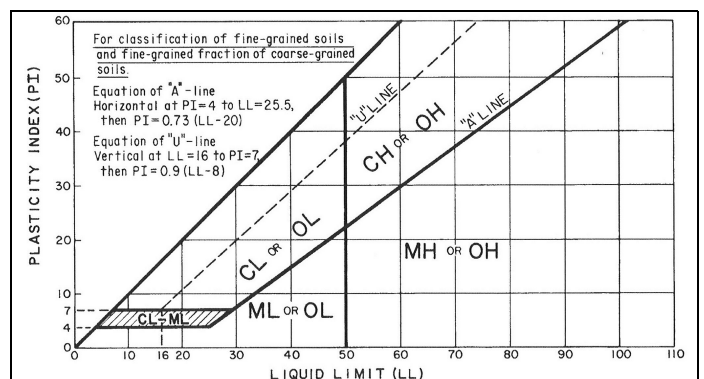
$$Cu = \frac{D_{60}}{D_{10}} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

| OTHER MATERIAL SYMBOLS |                    |
|------------------------|--------------------|
|                        | TOPSOIL            |
|                        | ASPHALT            |
|                        | CONCRETE           |
|                        | FILL (DUAL SYMBOL) |
|                        | WEATHERED ROCK     |
|                        | CRYSTALLINE ROCK   |
|                        | SEDIMENTARY ROCK   |
|                        | ABC                |

| COMPONENT MODIFIERS |                                     |                     |
|---------------------|-------------------------------------|---------------------|
| SOIL COMPONENTS     | DESCRIPTIVE TERM                    | COMPONENT           |
| MAJOR               | NOUN<br>(SAND, SILT, CLAY)          | > 50%               |
| SECONDARY           | ADJECTIVE<br>(SANDY, SILTY, CLAYEY) | 20 - 50%            |
| OTHERS              | WITH<br>TRACE                       | 10 - 20%<br>0 - 10% |

| SOIL GRAIN SIZE                |         |        |       |        |        |         |       |       |  |
|--------------------------------|---------|--------|-------|--------|--------|---------|-------|-------|--|
| U.S. STANDARD SIEVE            |         |        |       |        |        |         |       |       |  |
| 12"                            | 3"      | 3/4"   | No. 4 | No. 10 | No. 40 | No. 200 |       |       |  |
| BOULDERS                       | COBBLES | GRAVEL |       | SAND   |        |         | SILT  | CLAY  |  |
|                                |         | COARSE | FINE  | COARSE | MEDIUM | FINE    |       |       |  |
| 300                            | 76.2    | 19.1   | 4.76  | 2.00   | 0.420  | 0.075   | 0.075 | 0.005 |  |
| SOIL GRAIN SIZE IN MILLIMETERS |         |        |       |        |        |         |       |       |  |

| MOISTURE DESCRIPTION |                                                        |
|----------------------|--------------------------------------------------------|
| DRY                  | - REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE |
| MOIST                | - AT OR NEAR OPTIMUM MOISTURE                          |
| WET                  | - REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE           |
| SATURATED            | - VERY WET; USUALLY FROM BELOW THE GROUNDWATER TABLE.  |



# SYMBOLS AND TERMS USED ON BORING LOGS

## CONSISTANCY OF COHESIVE SOILS

THE FOLLOWING DESCRIPTIVE TERMS FOR CONSISTENCY APPLY TO COHESIVE SOILS SUCH AS FAT CLAYS AND LEAN CLAYS AS WELL AS SEMI-COHESIVE SOILS SUCH AS ELASTIC SILTS.

| UNCONFINED<br>COMPRESSIVE STRENGTH<br>(TSF) | CONSISTANCY  | TYPICAL SPT<br>"N" VALUE<br>RANGE |
|---------------------------------------------|--------------|-----------------------------------|
| LESS THAN 0.25                              | VERY SOFT    | 0 – 2                             |
| 0.25 TO 0.50                                | SOFT         | 3 – 4                             |
| 0.50 TO 1.00                                | MEDIUM STIFF | 5 – 8                             |
| 1.00 TO 2.00                                | STIFF        | 9 – 15                            |
| 2.00 TO 4.00                                | VERY STIFF   | 16 – 30                           |
| GREATER THAN 4.00                           | HARD         | 31 – 50                           |
| ---                                         | VERY HARD    | OVER 50                           |

## RELATIVE DENSITY OF COHESIONLESS & SEMI-COHESIONLESS SOIL

THE FOLLOWING DESCRIPTIVE TERMS FOR RELATIVE DENSITY APPLY TO COHESIONLESS SOILS SUCH AS GRAVELS, SILTY SANDS, AND SANDS AS WELL AS SEMI-COHESIONLESS SOILS SUCH AS SANDY SILTS AND SEMI-COHESIVE SOILS SUCH AS CLAYEY SANDS.

| RELATIVE DENSITY |  | TYPICAL SPT "N"<br>VALUE RANGE |
|------------------|--|--------------------------------|
| VERY LOOSE       |  | 0 – 4                          |
| LOOSE            |  | 5 – 10                         |
| MEDIUM DENSE     |  | 11 – 30                        |
| DENSE            |  | 31 – 50                        |
| VERY DENSE       |  | OVER 50                        |

## TERMS

ALLUVIUM - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

SAPROLITE - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

POCKET - INCLUSION OF MATERIAL OF DIFFERENT TEXTURE THAT IS SMALLER THAN THE DIAMETER OF THE SAMPLE.

SEAM - INCLUSION 1/8 INCH TO 3 INCHES THICK EXTENDING THROUGH SAMPLE.

LAYER - INCLUSION GREATER THAN 3 INCHES THICK EXTENDING THROUGH THE SAMPLE.

INTERLAYERED - SOIL SAMPLE COMPOSED OF ALTERNATING LAYERS OF DIFFERENT SOIL TYPES.

INTERMIXED - SOIL SAMPLE COMPOSED OF POCKETS OF DIFFERENT SOIL TYPES, LAYERED OR LAMINATED STRUCTURE IS NOT EVIDENT.

## NOTES

THE "N" VALUE IS THE NUMBER OF BLOWS FROM A 140-LB WEIGHT HAVING A FREE FALL OF 30-IN REQUIRED TO PENETRATE THE FINAL 12-IN OF AN 18-IN SAMPLE INTERVAL.

FIAD - DENOTES FILLED IN AFTER DRILLING

GRAVELS OR SANDS WITH 5 TO 12% FINES REQUIRE DUAL SYMBOLS.

SOILS WERE IDENTIFIED BASED ON IDENTIFICATION OF SOILS (VISUAL-MANUAL PROCEDURE) - ASTM D2488-06 UNLESS OTHERWISE NOTED IN THE LABORATORY SECTION OF THE GEOTECHNICAL REPORT.

REFUSAL AT THE SURFACE OF ROCK, BOULDER, OR OBSTRUCTION IS DEFINED AS A RESISTANCE OF 100 BLOWS FOR 2 INCHES PENETRATION OR LESS.

## CORING TERMS

REC - TOTAL LENGTH OF ROCK RECOVERED IN THE CORE BARREL DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.

RQD - TOTAL LENGTH OF SOUND ROCK SEGMENTS RECOVERED THAT ARE LONGER THAN OR EQUAL TO 4 INCHES (EXCLUDING MECHANICAL BREAKS) DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.

## SYMBOLS AND ABBREVIATIONS

ST - SHELBY TUBE SAMPLE

SS- SPLIT SPOON SAMPLE

S - GRAB SAMPLE

▽ 24 HR WATER LEVEL

▽ WATER LEVEL AFTER DRILLING

# BORING LOCATION PLAN

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# BORING LOGS

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# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-1**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.

G.S. ELEVATION (ft): 322.00

DATE STARTED: 5/8/25

LOCATION: SEE ATTACHED BORING LOCATION PLAN

▽ <24HR WATER TABLE (ft): DRY

DATE FINISHED: 5/8/25

REMARKS:

▼ >24HR WATER TABLE (ft): 12.8

DRILLED BY: Michael B. Moseley

DATE OF READING:

TYPE OF SAMPLING: SPT, Hollow Stem  
Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T.   | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                                          | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|--------|----------------------------|--------------------------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |        |                            |                                                                                      |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            | 1-2-2-3                      | 4                    |        |                            | <b>TOPSOIL</b>                                                                       |             |           |                     |    |                    |                         |
|                | 320           |                            |                              |                      |        |                            | <b>RESIDUAL</b><br>Brown, loose, dry Silty SAND                                      | 1.5         | 42.1      | 19.3                | 24 | 2                  |                         |
|                |               |                            | 6-10-15-27                   | 25                   |        |                            | <b>RESIDUAL</b><br>Brown and Red-Brown, medium stiff to<br>very stiff, dry Lean CLAY | 89.1        | 9.3       |                     |    |                    |                         |
| 5              |               |                            | 6-26-50/3"                   | 50/3"                |        |                            | <b>CL</b>                                                                            | 5.5         |           |                     |    |                    |                         |
|                | 315           |                            | 34-50/4"                     | 50/4"                |        |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                    |             |           |                     |    |                    |                         |
|                |               |                            |                              |                      |        |                            |                                                                                      | 8.0         |           |                     |    |                    |                         |
|                |               |                            | 18-41-50/4"                  | 50/4"                |        |                            | <b>RESIDUAL</b><br>Red-Brown, hard, dry Sandy Lean CLAY                              | 9.0         |           |                     |    |                    |                         |
| 10             |               |                            | 50/6"                        | 50/6"                |        |                            | <b>CL</b>                                                                            |             |           |                     |    |                    |                         |
|                | 310           |                            | 50/6"                        | 50/6"                |        |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                    |             |           |                     |    |                    |                         |
|                |               |                            |                              |                      | ▼ 12.8 |                            |                                                                                      |             |           |                     |    |                    |                         |
| 14.3           |               |                            | 50/4"                        | 50/4"                |        |                            |                                                                                      | 14.3        |           |                     |    |                    |                         |
|                |               |                            |                              |                      |        |                            | Boring Terminated                                                                    |             |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND GPJ CHARLOTTE UES GDT 6/17/25

# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-2**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.

G.S. ELEVATION (ft): 320.00

DATE STARTED: 5/7/25

LOCATION: SEE ATTACHED BORING LOCATION PLAN

▽ <24HR WATER TABLE (ft): 27.8

DATE FINISHED: 5/7/25

REMARKS:

▼ >24HR WATER TABLE (ft): 9.3

DRILLED BY: Michael B. Moseley

DATE OF READING:

TYPE OF SAMPLING: SPT, Hollow Stem  
Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T. | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                           | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|------|----------------------------|-----------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |      |                            |                                                                       |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            | 2-3-5-18                     | 8                    |      |                            | <b>TOPSOIL</b>                                                        |             |           |                     |    |                    |                         |
|                |               |                            | 50/5"                        | 50/5"                |      |                            | <b>RESIDUAL</b><br>Brown, medium stiff, dry Sandy Lean<br><b>CLAY</b> | 1.7         |           |                     |    |                    |                         |
|                |               |                            | 50/5"                        | 50/5"                |      |                            | <b>CL</b>                                                             | 2.9         |           |                     |    |                    |                         |
|                |               |                            | 50/5"                        | 50/5"                |      |                            | <b>RESIDUAL</b><br>Gray, dense, dry Silty SAND<br><b>SM</b>           |             |           |                     |    |                    |                         |
| 5              | 315           |                            | 50/4"                        | 50/4"                |      |                            | <b>WEATHERED ROCK</b><br>Sandstone                                    |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
| 10             | 310           |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
| 15             | 305           |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/2"                        | 50/2"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
| 20             | 300           |                            | 50/2"                        | 50/2"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
| 25             | 295           |                            | 33-50/5"                     | 50/5"                |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                     | 24.5        |           |                     |    |                    |                         |
|                |               |                            | 50/4"                        | 50/4"                |      |                            |                                                                       |             |           |                     |    |                    |                         |
| 28.3           |               |                            | 50/4"                        | 50/4"                |      |                            | Boring Terminated                                                     | 28.3        |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND.GPJ CHARLOTTE UES.GDT 6/17/25

# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-3**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.  
LOCATION: SEE ATTACHED BORING LOCATION PLAN  
REMARKS:

G.S. ELEVATION (ft): 316.00 DATE STARTED: 5/7/25  
▽ <24HR WATER TABLE (ft): DRY DATE FINISHED: 5/7/25  
▼ >24HR WATER TABLE (ft): 24.3 DRILLED BY: Michael B. Moseley  
DATE OF READING: TYPE OF SAMPLING: SPT, Hollow Stem Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T. | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                                                       | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|------|----------------------------|---------------------------------------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |      |                            |                                                                                                   |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            |                              |                      |      |                            | <b>FILL</b><br>Brown and Tan, very stiff, dry to moist<br>Lean CLAY with Sand<br><b>CL</b>        |             |           |                     |    |                    |                         |
|                | 315           |                            | 4-6-10-15                    | 16                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
|                |               |                            | 9-9-9-11                     | 18                   |      |                            |                                                                                                   | 76.5        | 17.1      | 35                  | 16 |                    |                         |
| 5              |               |                            | 9-11-15-16                   | 26                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
|                | 310           |                            | 10-12-15-17                  | 27                   |      |                            |                                                                                                   | 71.3        | 11.8      | 29                  | 11 |                    |                         |
|                |               |                            | 7-10-13-15                   | 23                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
| 10             |               |                            | 11-14-13-12                  | 27                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
|                | 305           |                            |                              |                      |      |                            |                                                                                                   | 11.7        |           |                     |    |                    |                         |
|                |               |                            | 3-5-5-7                      | 10                   |      |                            | <b>RESIDUAL</b><br>Tan and Red-Brown, stiff to very stiff, dry<br>to moist Lean CLAY<br><b>CL</b> | 93.7        | 20.3      |                     |    |                    |                         |
| 15             |               |                            | 6-9-12-17                    | 21                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
|                | 300           |                            | 18-25-22-18                  | 47                   |      |                            |                                                                                                   | 96.7        | 10.5      |                     |    |                    |                         |
|                |               |                            | 7-10-24-40                   | 34                   |      |                            |                                                                                                   |             |           |                     |    |                    |                         |
| 20             |               |                            | 26-29-50/3"                  | 50/3"                |      |                            |                                                                                                   | 21.0        |           |                     |    |                    |                         |
|                | 295           |                            |                              |                      |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                                 | 22.0        |           |                     |    |                    |                         |
|                |               |                            | 8-42-50/2"                   | 50/2"                |      |                            | <b>RESIDUAL</b><br>Red-Brown, hard, dry Sandy Lean CLAY<br><b>CL</b>                              | 23.0        |           |                     |    |                    |                         |
|                |               |                            | 50/6"                        | 50/6"                |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                                 |             |           |                     |    |                    |                         |
| 25             |               |                            |                              |                      | 24.3 |                            |                                                                                                   |             |           |                     |    |                    |                         |
|                | 290           |                            | 16-29-50/4"                  | 50/4"                |      |                            | <b>RESIDUAL</b><br>Red-Brown, hard, dry Sandy Lean CLAY<br><b>CL</b>                              | 26.0        |           |                     |    |                    |                         |
|                |               |                            |                              |                      |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                                 | 27.0        |           |                     |    |                    |                         |
|                |               |                            | 30-50/5"                     | 50/5"                |      |                            |                                                                                                   | 28.9        |           |                     |    |                    |                         |
| 28.9           |               |                            |                              |                      |      |                            | Boring Terminated                                                                                 |             |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND GPJ CHARLOTTE UES GDT 6/17/25

# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-4**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.

G.S. ELEVATION (ft): 316.00

DATE STARTED: 5/8/25

LOCATION: SEE ATTACHED BORING LOCATION PLAN

▽ <24HR WATER TABLE (ft): DRY

DATE FINISHED: 5/8/25

REMARKS:

▼ >24HR WATER TABLE (ft): 21.4

DRILLED BY: Michael B. Moseley

DATE OF READING:

TYPE OF SAMPLING: SPT, Hollow Stem  
Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T. | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                                                                      | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|------|----------------------------|------------------------------------------------------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |      |                            |                                                                                                                  |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            |                              |                      |      |                            | <b>FILL</b><br>Brown, Gray and Tan, medium stiff to<br>very stiff, dry to moist Lean CLAY, with<br>Sand to Sandy |             |           |                     |    |                    |                         |
|                | 315           |                            | 3-2-2-6                      | 4                    |      |                            | <b>CL</b>                                                                                                        |             |           |                     |    |                    |                         |
|                |               |                            | 9-10-14-15                   | 24                   |      |                            |                                                                                                                  | 77.8        | 15.1      | 36                  | 18 |                    |                         |
| 5              |               |                            | 6-10-14-15                   | 24                   |      |                            |                                                                                                                  | 74.8        | 14.4      |                     |    |                    |                         |
|                | 310           |                            | 9-12-12-10                   | 24                   |      |                            |                                                                                                                  |             |           |                     |    |                    |                         |
|                |               |                            | 7-9-13-15                    | 22                   |      |                            |                                                                                                                  |             |           |                     |    |                    |                         |
| 10             |               |                            | 4-7-8-10                     | 15                   |      |                            |                                                                                                                  | 69.4        | 17.7      |                     |    |                    |                         |
|                | 305           |                            | 8-9-12-12                    | 21                   |      |                            |                                                                                                                  |             |           |                     |    |                    |                         |
|                |               |                            | 3-4-6-6                      | 10                   |      |                            |                                                                                                                  |             |           |                     |    |                    |                         |
| 15             |               |                            | 5-6-7-6                      | 13                   |      |                            |                                                                                                                  |             |           |                     |    |                    |                         |
|                | 300           |                            | 3-4-5-6                      | 9                    |      |                            |                                                                                                                  |             |           |                     |    |                    |                         |
| 20             |               |                            | 3-4-5-6                      | 9                    |      |                            |                                                                                                                  |             | 19.0      | 42                  | 24 |                    |                         |
|                | 295           |                            | 2-4-6-8                      | 10                   |      |                            |                                                                                                                  | 87.7        | 22.0      | 48                  | 26 |                    |                         |
|                |               |                            | 5-7-13-15                    | 20                   |      |                            |                                                                                                                  | 25.0        |           |                     |    |                    |                         |
| 25             |               |                            | 13-31-50/3"                  | 50/3"                |      |                            | <b>RESIDUAL</b><br>Red-Brown, very stiff, dry Sandy Lean<br>CLAY                                                 |             |           |                     |    |                    |                         |
|                | 290           |                            | 35-50/3"                     | 50/3"                |      |                            | <b>CL</b>                                                                                                        | 27.0        |           |                     |    |                    |                         |
|                |               |                            |                              |                      |      |                            | <b>WEATHERED ROCK</b><br>Mudstone                                                                                |             |           |                     |    |                    |                         |
|                |               |                            |                              |                      |      |                            |                                                                                                                  | 28.8        |           |                     |    |                    |                         |
| 28.8           |               |                            |                              |                      |      |                            | Boring Terminated                                                                                                |             |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND.GPJ CHARLOTTE UES.GDT 6/17/25

# SUMMIT DESIGN AND ENGINEERING SERVICES

## BORING LOG

PROJECT NO.: 24-0050.208

REPORT NO.: 1

PROJECT: Geotechnical Exploration  
Legion Pond Dam  
Chapel Hill, North Carolina

BORING DESIGNATION: **B-25-5**  
SHEET: **1 of 1**

CLIENT: Tetra Tech, Inc.

G.S. ELEVATION (ft): 316.00

DATE STARTED: 5/8/25

LOCATION: SEE ATTACHED BORING LOCATION PLAN

▽ <24HR WATER TABLE (ft): DRY

DATE FINISHED: 5/8/25

REMARKS:

▼ >24HR WATER TABLE (ft): 13.3

DRILLED BY:

Michael B. Moseley

DATE OF READING:

TYPE OF SAMPLING: SPT, Hollow Stem  
Auger

| DEPTH<br>(FT.) | ELEV<br>(FT.) | S<br>A<br>M<br>P<br>L<br>E | BLOWS<br>PER 6"<br>INCREMENT | N<br>(BLOWS/<br>FT.) | W.T.   | S<br>Y<br>M<br>B<br>O<br>L | DESCRIPTION                                                                           | -200<br>(%) | MC<br>(%) | ATTERBERG<br>LIMITS |    | K<br>(FT./<br>DAY) | POCKET<br>PEN.<br>(tsf) |
|----------------|---------------|----------------------------|------------------------------|----------------------|--------|----------------------------|---------------------------------------------------------------------------------------|-------------|-----------|---------------------|----|--------------------|-------------------------|
|                |               |                            |                              |                      |        |                            |                                                                                       |             |           | LL                  | PI |                    |                         |
| 0.0            |               |                            |                              |                      |        |                            |                                                                                       |             |           |                     |    |                    |                         |
|                | 315           |                            | 4-4-5-7                      | 9                    |        |                            | FILL<br>Brown and Tan, stiff to very stiff, dry Fat<br>CLAY with Sand<br>CH           |             |           |                     |    |                    |                         |
|                |               |                            | 6-7-9-10                     | 16                   |        |                            |                                                                                       | 78.1        | 17.1      | 52                  | 29 |                    |                         |
|                |               |                            |                              |                      |        |                            | 4.0                                                                                   |             |           |                     |    |                    |                         |
| 5              |               |                            | 5-7-12-17                    | 19                   |        |                            | FILL<br>Brown and Tan, stiff to very stiff, dry to<br>moist Lean CLAY with Sand<br>CL |             |           |                     |    |                    |                         |
|                | 310           |                            | 9-11-14-16                   | 25                   |        |                            |                                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 8-11-11-10                   | 22                   |        |                            |                                                                                       | 75.5        | 20.4      |                     |    |                    |                         |
| 10             |               |                            |                              |                      |        |                            |                                                                                       |             |           |                     |    |                    |                         |
|                | 305           |                            | 4-4-5-5                      | 9                    |        |                            |                                                                                       |             |           |                     |    |                    |                         |
|                |               |                            | 5-4-26-50/6"                 | 50/6"                |        |                            |                                                                                       |             | 16.1      |                     |    |                    |                         |
|                |               |                            |                              |                      | ▼ 13.3 |                            |                                                                                       | 13.5        |           |                     |    |                    |                         |
|                |               |                            | 27-50/5"                     | 50/5"                |        |                            | WEATHERED ROCK<br>Sandstone                                                           | 14.9        |           |                     |    |                    |                         |
| 14.9           |               |                            |                              |                      |        |                            | Boring Terminated                                                                     |             |           |                     |    |                    |                         |

BORING LOG - DEPTH 24-0050.208 LEGION POND.GPJ CHARLOTTE UES.GDT 6/17/25

# LABORATORY RESULTS

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June 19, 2025



Project No. R-2025-143-001

Aaron Gross  
Summit Design & Eng. Services  
504 Meadowland Drive  
Hillsborough, NC 27278

[Aaron.gross@summitde.net](mailto:Aaron.gross@summitde.net)

**Transmittal**  
**Laboratory Test Results**  
**Legion Pond**

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,  
**Geotechnics, Inc.**

Michael P. Smith  
Regional Manager

***We understand that you have a choice in your laboratory services  
and we thank you for choosing Geotechnics.***

## MOISTURE CONTENT

ASTM D 2216-19

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001

|                              |             |            |             |             |             |
|------------------------------|-------------|------------|-------------|-------------|-------------|
| Lab ID:                      | 001         | 002        | 003         | 004         | 005         |
| Boring No.:                  | B-25-1      | B-25-1     | B-25-2      | B-25-3      | B-25-3      |
| Depth (ft):                  | 0.0-1.5     | 2.0-4.0    | 0.0-2.0     | 2.0-4.0     | 6.0-8.0     |
| Sample No.:                  | ST-1        | SS-2       | SS-1        | SS-2        | SS-4        |
| Tare Number                  | 4-a         | 453        | 31-A        | 455         | 450         |
| Wt. of Tare & Wet Sample (g) | 311.46      | 568.49     | 192.10      | 453.31      | 379.87      |
| Wt. of Tare & Dry Sample (g) | 275.45      | 532.58     | 182.71      | 407.70      | 354.96      |
| Weight of Tare (g)           | 88.53       | 146.30     | 136.69      | 141.41      | 144.34      |
| Weight of Water (g)          | 36.01       | 35.91      | 9.39        | 45.61       | 24.91       |
| Weight of Dry Sample (g)     | 186.92      | 386.28     | 46.02       | 266.29      | 210.62      |
| <b>Water Content (%)</b>     | <b>19.3</b> | <b>9.3</b> | <b>20.4</b> | <b>17.1</b> | <b>11.8</b> |

|                              |             |             |             |                |             |
|------------------------------|-------------|-------------|-------------|----------------|-------------|
| Lab ID                       | 006         | 007         | 009         | 010            | 012         |
| Boring No.                   | B-25-3      | B-25-3      | B-25-4      | B-25-4         | B-25-4      |
| Depth (ft)                   | 12.0-14.0   | 16.0-18.0   | 2.0-4.0     | 8.0-14.0       | 22.0-24.0   |
| Sample No.                   | SS-7        | SS-9        | SS-2        | SS-5,SS-6,SS-7 | SS-12       |
| Tare Number                  | 468         | 414         | 469         | 27-A           | 746         |
| Wt. of Tare & Wet Sample (g) | 240.09      | 363.80      | 498.83      | 481.24         | 448.05      |
| Wt. of Tare & Dry Sample (g) | 222.79      | 342.92      | 452.42      | 429.20         | 392.53      |
| Weight of Tare (g)           | 137.50      | 144.71      | 146.07      | 135.77         | 140.49      |
| Weight of Water (g)          | 17.30       | 20.88       | 46.41       | 52.04          | 55.52       |
| Weight of Dry Sample (g)     | 85.29       | 198.21      | 306.35      | 293.43         | 252.04      |
| <b>Water Content (%)</b>     | <b>20.3</b> | <b>10.5</b> | <b>15.1</b> | <b>17.7</b>    | <b>22.0</b> |

Notes :

Tested By BS Date 5/21/25 Checked By AES Date 5/22/25



## MOISTURE CONTENT

ASTM D 2216-19

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001

|                              |             |                  |             |
|------------------------------|-------------|------------------|-------------|
| Lab ID:                      | 013         | 014              | 015         |
| Boring No.:                  | B-25-5      | B-25-5           | B-25-5      |
| Depth (ft):                  | 2.0-4.0     | 6.0-12.0         | 12.0-14.0   |
| Sample No.:                  | SS-2        | SS-4, SS-5, SS-6 | SS-7        |
| Tare Number                  | 37-A        | 418              | TB-09       |
| Wt. of Tare & Wet Sample (g) | 339.87      | 429.39           | 355.79      |
| Wt. of Tare & Dry Sample (g) | 310.12      | 380.00           | 325.02      |
| Weight of Tare (g)           | 136.09      | 138.23           | 133.81      |
| Weight of Water (g)          | 29.75       | 49.39            | 30.77       |
| Weight of Dry Sample (g)     | 174.03      | 241.77           | 191.21      |
| <b>Water Content (%)</b>     | <b>17.1</b> | <b>20.4</b>      | <b>16.1</b> |

Notes :

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | BS | Date | 5/21/25 | Checked By | AES | Date | 5/22/25 |
|-----------|----|------|---------|------------|-----|------|---------|

page 1 of 1 DCN: CT-S1 DATE: 3/18/13 REVISION: 4

**pH OF SOILS**  
AASHTO T 289-91 (2013)

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001

|             |         |                |                |
|-------------|---------|----------------|----------------|
| Lab ID:     | 008     | 010            | 014            |
| Boring No.: | B-25-4  | B-25-4         | B-25-5         |
| Depth (ft): | 1.0-6.0 | 8.0-14.0       | 6.0-12.0       |
| Sample No.: | S-1     | SS-5,SS-6,SS-7 | SS-4,SS-5,SS-6 |

|                   |     |     |     |
|-------------------|-----|-----|-----|
| Drying Tare No.:  | X-1 | X-2 | X-3 |
| Testing Tare No.: | 819 | 814 | 818 |

|                   |      |      |      |
|-------------------|------|------|------|
| Temperature (°C): | 23.6 | 23.3 | 23.1 |
|-------------------|------|------|------|

|                      |             |             |             |
|----------------------|-------------|-------------|-------------|
| <b>pH of Sample:</b> | <b>5.05</b> | <b>5.39</b> | <b>5.39</b> |
|----------------------|-------------|-------------|-------------|

| Meter Calibration<br>(as used each day) |                       |                 |
|-----------------------------------------|-----------------------|-----------------|
| Buffer<br>pH                            | Meter<br>Reading      | Meter<br>Model  |
| 4.00<br>7.00<br>10.01                   | 4.01<br>7.00<br>10.01 | ORION Dual Star |

Tested By BS Date 6/10/25 Checked By AES Date 6/12/25

page 1 of 1 DCN: CT-S36B DATE 6/5/14 REVISION: 1

## PERCENT PASSING # 200 SIEVE

ASTM D 1140-17

|                  |                               |
|------------------|-------------------------------|
| Client           | Summit Design & Eng. Services |
| Client Reference | Legion Pond                   |
| Project No.      | R-2025-143-001                |

|                             |             |             |             |                |             |                  |
|-----------------------------|-------------|-------------|-------------|----------------|-------------|------------------|
| Lab Id.                     | 002         | 003         | 007         | 010            | 012         | 014              |
| Boring No.                  | B-25-1      | B-25-2      | B-25-3      | B-25-4         | B-25-4      | B-25-5           |
| Depth (ft)                  | 2.0-4.0     | 0.0-2.0     | 16.0-18.0   | 8.0-14.0       | 22.0-24.0   | 6.0-12.0         |
| Sample No.                  | SS-2        | SS-1        | SS-9        | SS-5,SS-6,SS-7 | SS-12       | SS-4, SS-5, SS-6 |
| Tare Number                 | 453         | 31-A        | 414         | 27-A           | 746         | 418              |
| Wt. of Tare & WS (gm)       | 568.49      | 440.66      | 363.8       | 481.24         | 448.05      | 429.39           |
| Wt. of Tare & DS (gm)       | 532.58      | 389.16      | 342.92      | 429.2          | 392.53      | 380              |
| Wt. of Tare (gm)            | 146.3       | 136.69      | 144.71      | 135.77         | 140.49      | 138.23           |
| Wt. of Water (gm)           | 35.91       | 51.5        | 20.88       | 52.04          | 55.52       | 49.39            |
| Wt. of DS (gm)              | 386.28      | 252.47      | 198.21      | 293.43         | 252.04      | 241.77           |
| <b>Water Content (%)</b>    | <b>9.3</b>  | <b>20.4</b> | <b>10.5</b> | <b>17.7</b>    | <b>22.0</b> | <b>20.4</b>      |
| Wt. of Washed Soil & Tare   | 188.57      | 245.47      | 151.33      | 225.7          | 171.38      | 197.39           |
| <b>Percent Passing #200</b> | <b>89.1</b> | <b>56.9</b> | <b>96.7</b> | <b>69.4</b>    | <b>87.7</b> | <b>75.5</b>      |

|                  |    |             |        |                   |     |             |        |
|------------------|----|-------------|--------|-------------------|-----|-------------|--------|
| <i>Tested By</i> | BS | <i>Date</i> | 6/5/25 | <i>Checked By</i> | AES | <i>Date</i> | 6/6/25 |
|------------------|----|-------------|--------|-------------------|-----|-------------|--------|

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001

Boring No.: B-25-1  
 Depth (ft): 0.0-1.5  
 Sample No.: ST-1  
 Soil Color: Brown



**USCS Symbol:**  
**SM, TESTED**

**D50 = 0.11**

**USCS Classification:**  
**SILTY SAND**

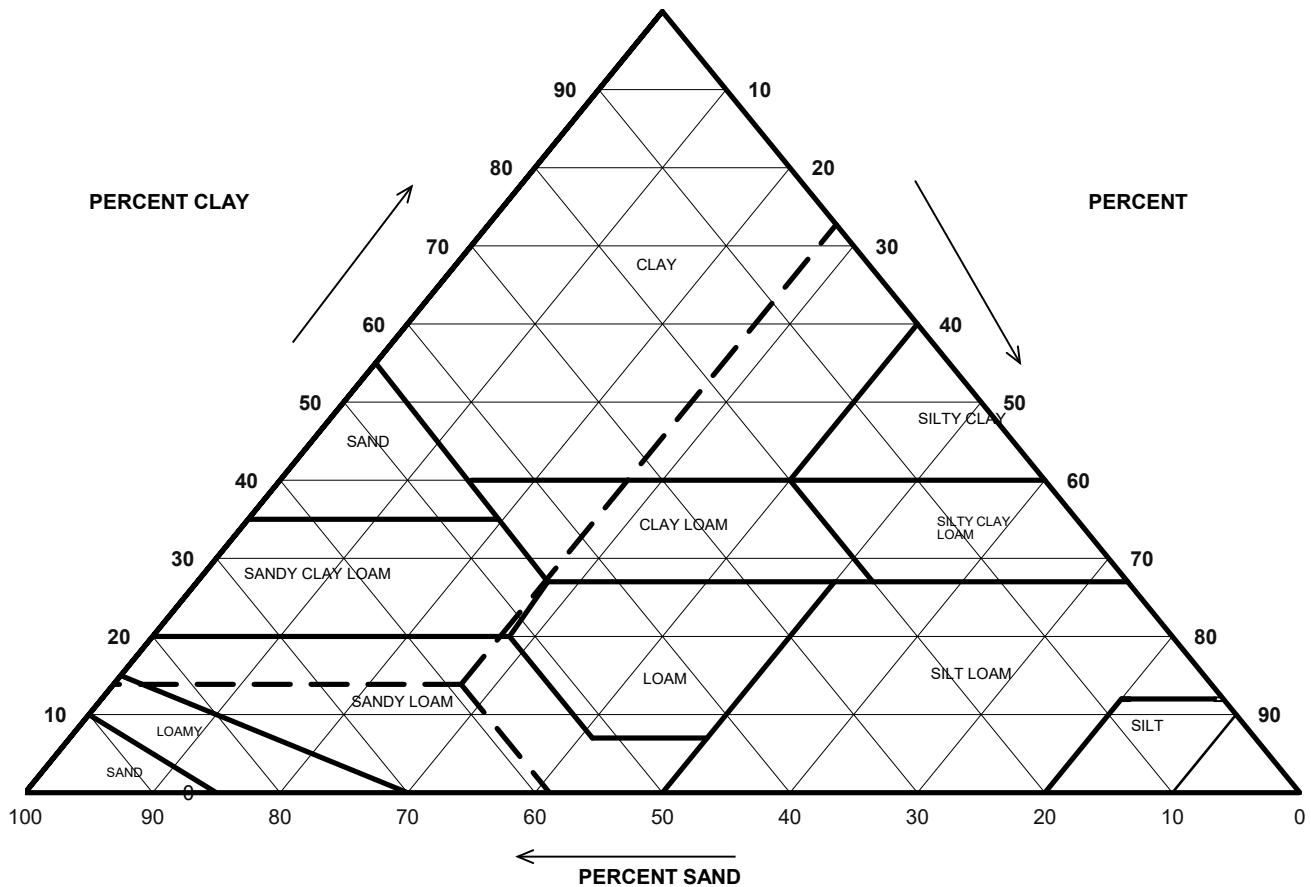
|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Tested By CB | Date 6/12/25 | Checked By AES | Date 6/12/25 |
|--------------|--------------|----------------|--------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-001

Boring No.: B-25-1  
Depth (ft): 0.0-1.5  
Sample No.: ST-1  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.62              |                                                              |
| 2                  | 99.38         | Sand   | 58.50             | 58.86                                                        |
| 0.05               | 40.88         | Silt   | 27.10             | 27.27                                                        |
| 0.002              | 13.78         | Clay   | 13.78             | 13.87                                                        |

USDA Classification: **SANDY LOAM**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001

Boring No.: B-25-1  
 Depth (ft): 0.0-1.5  
 Sample No.: ST-1  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 4-a         | Tare No.:                          | NA         | Tare No.:                                  | 4-a        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 311.46      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 311.46     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 275.45      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 275.45     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 88.53       | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 88.53      | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 36.01       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 36.01      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 186.92      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 186.92     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>19.3</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 186.92     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 186.92     |
| Tare No. (Sub-Specimen)                   | 4-a         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 4-a        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 311.46      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 311.46     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 88.53       | Dry Weight of - 3/4" Sample (g):   | 186.92     | Weight of Tare (g):                        | 88.53      | Dry Weight of - 3/4" Sample (g):   | 186.92     |
| Sub-Specimen Wet Weight (g):              | 222.93      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 222.93     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 186.92     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 186.92     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.36                        | 0.19                 | 0.19                             | 99.81             | 99.8                          |
| #10        | 2                  | 0.80                        | 0.43                 | 0.62                             | 99.38             | 99.4                          |
| #20        | 0.85               | 8.01                        | ( ** )               | 4.91                             | 95.09             | 95.1                          |
| #40        | 0.425              | 21.76                       | 11.64                | 16.55                            | 83.45             | 83.5                          |
| #60        | 0.25               | 23.80                       | 12.73                | 29.28                            | 70.72             | 70.7                          |
| #100       | 0.15               | 25.60                       | 13.70                | 42.98                            | 57.02             | 57.0                          |
| #140       | 0.106              | 15.21                       | 8.14                 | 51.11                            | 48.89             | 48.9                          |
| #200       | 0.075              | 12.69                       | 6.79                 | 57.90                            | 42.10             | 42.1                          |
| Pan        | -                  | 78.69                       | 42.10                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/12/25 Checked By AES Date 6/12/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 30.8       | 23.3       | 2.45        | 11.1                     | 0.0435 | 96.1                       | 40.5                        |
| 2                  | 28.3       | 23.3       | 2.45        | 11.5                     | 0.0314 | 87.6                       | 36.9                        |
| 4                  | 25.8       | 23.3       | 2.45        | 12.0                     | 0.0226 | 79.1                       | 33.3                        |
| 8                  | 22.8       | 23.3       | 2.45        | 12.5                     | 0.0163 | 68.9                       | 29.0                        |
| 15                 | 20.5       | 23.3       | 2.45        | 12.9                     | 0.0121 | 61.3                       | 25.8                        |
| 30                 | 18.8       | 23.3       | 2.45        | 13.2                     | 0.0087 | 55.4                       | 23.3                        |
| 60                 | 16.3       | 23.4       | 2.41        | 13.7                     | 0.0062 | 47.0                       | 19.8                        |
| 240                | 12.8       | 23.4       | 2.41        | 14.3                     | 0.0032 | 35.1                       | 14.8                        |
| 1440               | 9.8        | 27.3       | 0.79        | 14.8                     | 0.0013 | 30.4                       | 12.8                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 211    | Percent Finer than # 200: | 42.10        |
| Wt. of Tare & Dry Material (g): | 204.58 |                           |              |
| Weight of Tare (g):             | 170.46 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 29.12  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |        |            |     |      |         |
|-----------|----|------|--------|------------|-----|------|---------|
| Tested By | CB | Date | 6/6/25 | Checked By | AES | Date | 6/12/25 |
|-----------|----|------|--------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001

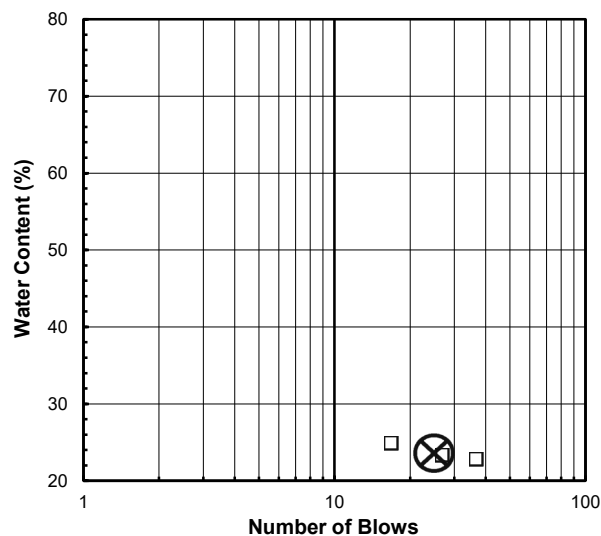
Boring No.: B-25-1  
 Depth (ft): 0.0-1.5  
 Sample No.: ST-1  
 Soil Description: BROWN SILT

**Note: The USCS symbol used with this test refers only to the minus No. 40** (Minus #40 sieve material, Air dried)  
**sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.**

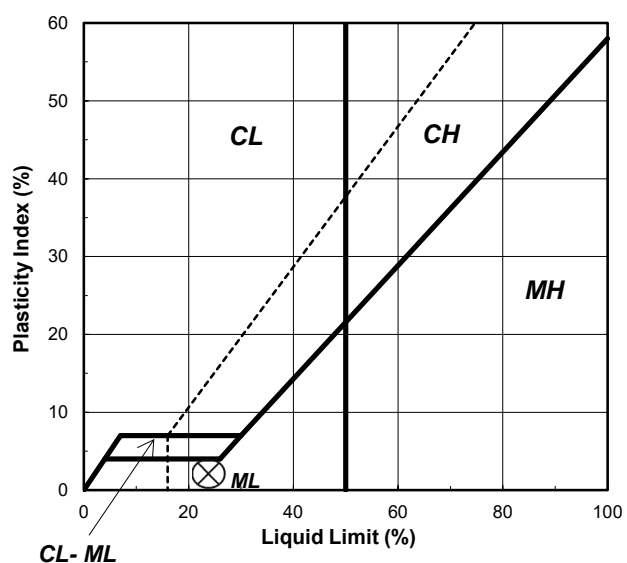
| As Received Moisture Content  |             | Liquid Limit Test |             |             |          |
|-------------------------------|-------------|-------------------|-------------|-------------|----------|
| ASTM D2216-19                 |             | <b>1</b>          | <b>2</b>    | <b>3</b>    | <b>M</b> |
| Tare Number:                  | 4-a         | A-B               | I           | V-2         | U        |
| Wt. of Tare & Wet Sample (g): | 311.46      | 32.72             | 30.83       | 32.36       | L        |
| Wt. of Tare & Dry Sample (g): | 275.45      | 29.53             | 27.87       | 29.02       | T        |
| Weight of Tare (g):           | 88.53       | 15.46             | 15.12       | 15.53       | I        |
| Weight of Water (g):          | 36.0        | 3.2               | 3.0         | 3.3         | P        |
| Weight of Dry Sample (g):     | 186.9       | 14.1              | 12.8        | 13.5        | O        |
| Was As Received MC Preserved: | Yes         |                   |             |             | I        |
| <b>Moisture Content (%):</b>  | <b>19.3</b> | <b>22.7</b>       | <b>23.2</b> | <b>24.8</b> | <b>N</b> |
| <b>Number of Blows:</b>       |             | <b>37</b>         | <b>27</b>   | <b>17</b>   | <b>T</b> |

| Plastic Limit Test                                                                      | 1           | 2           | Range      | Test Results                   |
|-----------------------------------------------------------------------------------------|-------------|-------------|------------|--------------------------------|
| Tare Number:                                                                            | 13          | 15          |            |                                |
| Wt. of Tare & Wet Sample (g):                                                           | 13.47       | 14.42       |            | <b>Liquid Limit (%): 24</b>    |
| Wt. of Tare & Dry Sample (g):                                                           | 12.32       | 13.10       |            | <b>Plastic Limit (%): 22</b>   |
| Weight of Tare (g):                                                                     | 7.02        | 6.98        |            | <b>Plasticity Index (%): 2</b> |
| Weight of Water (g):                                                                    | 1.2         | 1.3         |            | <b>USCS Symbol: ML</b>         |
| Weight of Dry Sample (g):                                                               | 5.3         | 6.1         |            |                                |
| <b>Moisture Content (%):</b>                                                            | <b>21.7</b> | <b>21.6</b> | <b>0.1</b> |                                |
| <i>Note: The acceptable range of the two Moisture Contents is <math>\pm</math> 0.84</i> |             |             |            |                                |

Flow Curve



Plasticity Chart



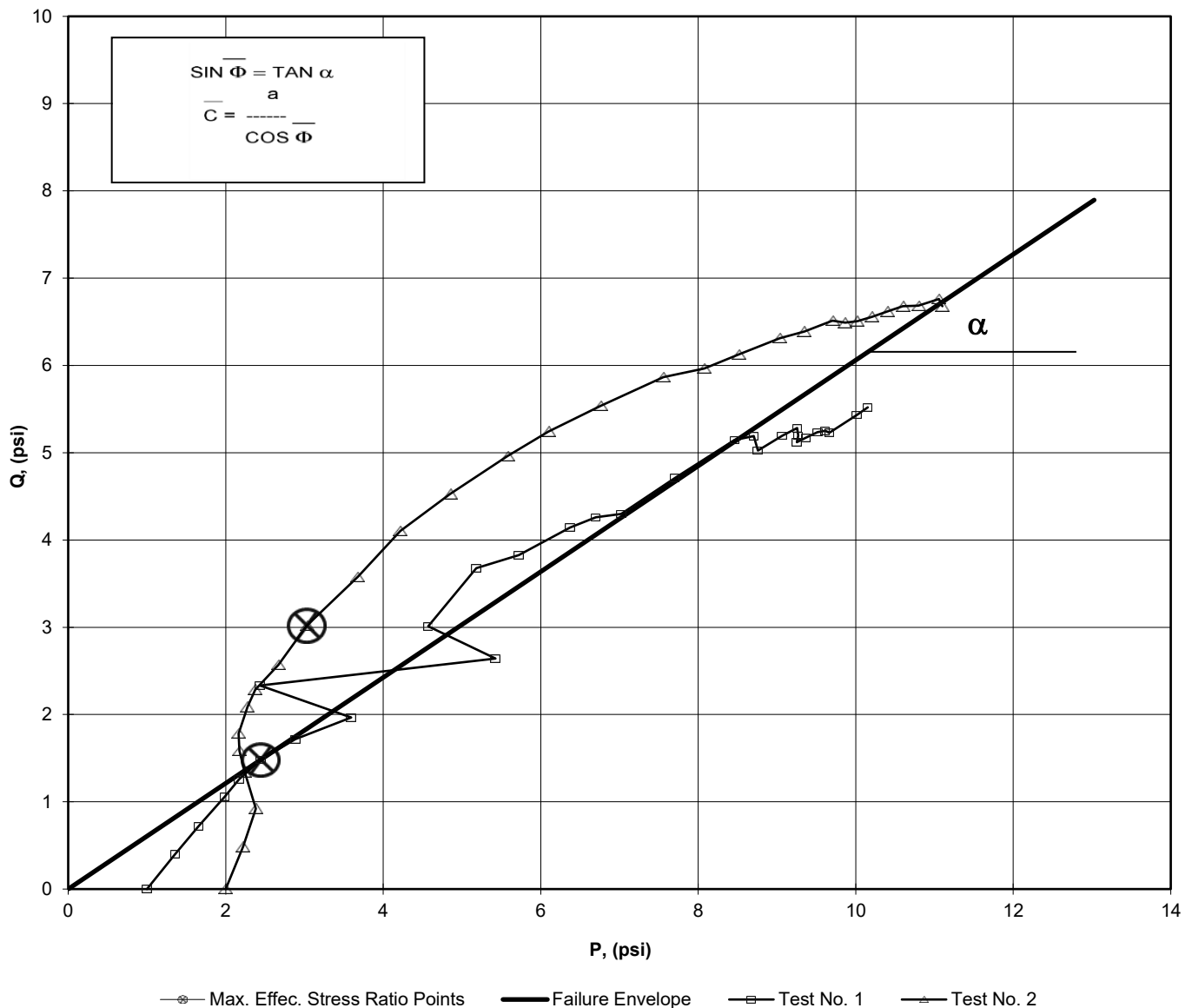
Tested By JCB IV Date 6/12/25 Checked By AES Date 6/13/25



**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS  
ASTM D4767-11**

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            |             |         |

**Consolidated Undrained Triaxial Test with Pore Pressure**

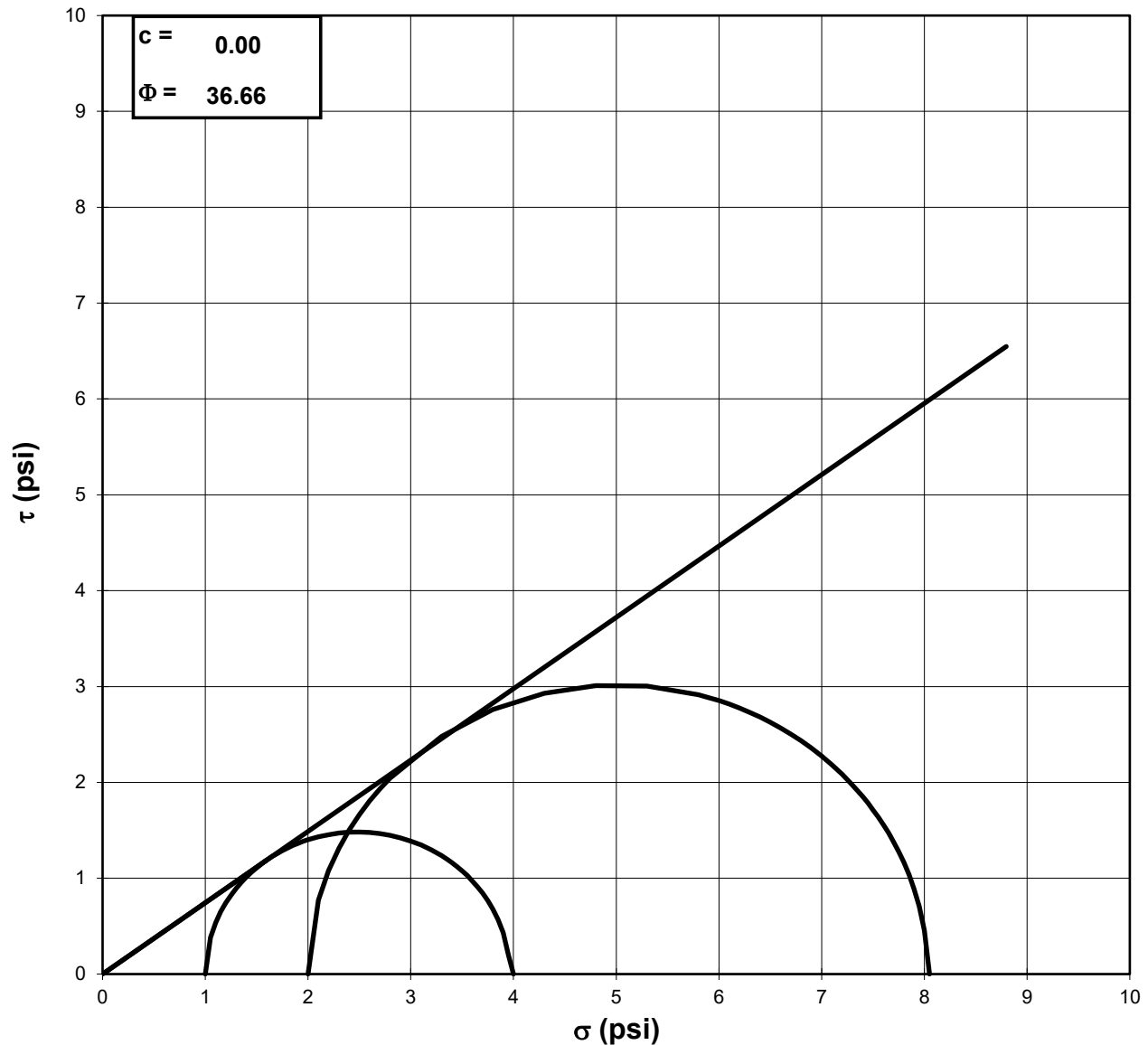


|          |          |             |          |          |              |
|----------|----------|-------------|----------|----------|--------------|
| <b>a</b> | <b>=</b> | <b>0.00</b> | <b>C</b> | <b>=</b> | <b>0.00</b>  |
| <b>α</b> | <b>=</b> | <b>31.2</b> | <b>Φ</b> | <b>=</b> | <b>37.31</b> |

|            |    |       |        |              |     |       |        |
|------------|----|-------|--------|--------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Approved By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|--------------|-----|-------|--------|

# **MOHR TOTAL STRENGTH ENVELOPE** ASTM D4767-11

|                     |                                              |             |         |
|---------------------|----------------------------------------------|-------------|---------|
| Client:             | Summit Design & Eng. Services                | Boring No.: | B-25-1  |
| Client Reference:   | Legion Pond                                  | Depth (ft): | 0.0-1.5 |
| Project No.:        | R-2025-143-001                               | Sample No.: | ST-1    |
| Lab ID:             | R-2025-143-001-001                           |             |         |
| Visual Description: | Brown Sand with Clay and Roots (UNDISTURBED) |             |         |



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

|            |    |       |        |              |     |       |        |
|------------|----|-------|--------|--------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Approved By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|--------------|-----|-------|--------|

page 2 of 8 DCN: CT-S28 DATE: 4/12/13 REVISION: 3

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11



|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            |             |         |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|           |   |
|-----------|---|
| Stage No. | 1 |
| Test No.  | 1 |

**INITIAL SAMPLE DIMENSIONS (in)**

|              |       |             |       |
|--------------|-------|-------------|-------|
| Length 1:    | 6.106 | Diameter 1: | 2.848 |
| Length 2:    | 6.065 | Diameter 2: | 2.865 |
| Length 3:    | 6.108 | Diameter 3: | 2.846 |
| Avg. Length: | 6.093 | Avg. Diam.: | 2.853 |

**PRESSURES (psi)**

|                           |      |
|---------------------------|------|
| Cell Pressure (psi)       | 61.0 |
| Back Pressure (psi)       | 60.0 |
| Eff. Conf. Pressure (psi) | 1.0  |
| Pore Pressure             |      |
| Response (%)              | 96   |

**VOLUME CHANGE**

|                              |      |
|------------------------------|------|
| Initial Burette Reading (ml) | 24.0 |
| Final Burette Reading (ml)   | 24.0 |
| Final Change (ml)            | 0.0  |

**MAXIMUM OBLIQUITY POINTS**

|   |   |      |
|---|---|------|
| P | = | 2.44 |
| Q | = | 1.48 |

|                                        |     |
|----------------------------------------|-----|
| Initial Dial Reading (mil)             | 243 |
| Dial Reading After Saturation (mil)    | 234 |
| Dial Reading After Consolidation (mil) | 234 |

| LOAD<br>(LB) | DEFORMATION<br>(IN) | PORE PRESSURE<br>(PSI) |
|--------------|---------------------|------------------------|
| 16.7         | 0.000               | 60.0                   |
| 21.9         | 0.001               | 60.0                   |
| 26.0         | 0.003               | 60.1                   |
| 30.3         | 0.009               | 60.1                   |
| 32.9         | 0.015               | 60.1                   |
| 35.8         | 0.021               | 60.0                   |
| 38.9         | 0.029               | 59.8                   |
| 42.1         | 0.039               | 59.4                   |
| 46.9         | 0.050               | 60.9                   |
| 51.0         | 0.072               | 58.2                   |
| 56.0         | 0.101               | 59.4                   |
| 65.0         | 0.136               | 59.5                   |
| 67.3         | 0.173               | 59.1                   |
| 71.8         | 0.214               | 58.8                   |
| 73.6         | 0.244               | 58.6                   |
| 74.6         | 0.286               | 58.3                   |
| 80.8         | 0.344               | 58.0                   |
| 87.4         | 0.404               | 57.7                   |
| 88.6         | 0.450               | 57.5                   |
| 87.1         | 0.509               | 57.3                   |
| 90.0         | 0.554               | 57.1                   |
| 91.9         | 0.599               | 57.0                   |
| 91.3         | 0.644               | 56.9                   |
| 90.6         | 0.674               | 56.9                   |
| 91.7         | 0.704               | 56.8                   |
| 93.0         | 0.734               | 56.7                   |
| 93.7         | 0.764               | 56.6                   |
| 94.0         | 0.809               | 56.6                   |
| 97.8         | 0.854               | 56.4                   |
| 99.5         | 0.884               | 56.4                   |
| 102.8        | 0.914               | 56.3                   |

|               |              |                       |              |
|---------------|--------------|-----------------------|--------------|
| Tested By: DL | Date: 6/2/25 | Input Checked By: MPS | Date: 6/6/25 |
|---------------|--------------|-----------------------|--------------|

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11



|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1  |
| Client Reference: | Legion Pond                   | Depth (ft): | 0.0-1.5 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1    |
| Lab ID:           | R-2025-143-001-001            |             |         |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|                                    |     |           |   |
|------------------------------------|-----|-----------|---|
| Effective Confining Pressure (psi) | 1.0 | Stage No. | 1 |
|                                    |     | Test No   | 1 |

**INITIAL DIMENSIONS**

|                                          |       |
|------------------------------------------|-------|
| Initial Sample Length (in)               | 6.09  |
| Initial Sample Diameter (in)             | 2.85  |
| Initial Sample Area (in <sup>2</sup> )   | 6.39  |
| Initial Sample Volume (in <sup>3</sup> ) | 38.95 |

**VOLUME CHANGE**

|                                               |       |
|-----------------------------------------------|-------|
| Volume After Consolidation (in <sup>3</sup> ) | 39.12 |
| Length After Consolidation (in)               | 6.10  |
| Area After Consolidation (in <sup>2</sup> )   | 6.412 |

| Strain (%) | Deviator Stress PSI | Δ U   | σ <sub>1</sub> | σ <sub>3</sub> | Effective Principal Stress Ratio | A     | P     | Q    |
|------------|---------------------|-------|----------------|----------------|----------------------------------|-------|-------|------|
| 0.02       | 0.80                | 0.04  | 1.76           | 1.0            | 1.837                            | 0.06  | 1.36  | 0.40 |
| 0.05       | 1.44                | 0.06  | 2.37           | 0.9            | 2.537                            | 0.05  | 1.65  | 0.72 |
| 0.15       | 2.12                | 0.07  | 3.05           | 0.9            | 3.280                            | 0.04  | 1.99  | 1.06 |
| 0.24       | 2.52                | 0.09  | 3.43           | 0.9            | 3.765                            | 0.04  | 2.17  | 1.26 |
| 0.34       | 2.96                | 0.04  | 3.93           | 1.0            | 4.077                            | 0.01  | 2.44  | 1.48 |
| 0.48       | 3.43                | -0.17 | 4.60           | 1.2            | 3.943                            | -0.05 | 2.88  | 1.72 |
| 0.63       | 3.93                | -0.63 | 5.56           | 1.6            | 3.420                            | -0.17 | 3.59  | 1.97 |
| 0.82       | 4.67                | 0.90  | 4.77           | 0.1            | 47.681                           | 0.20  | 2.43  | 2.33 |
| 1.17       | 5.28                | -1.78 | 8.07           | 2.8            | 2.899                            | -0.35 | 5.42  | 2.64 |
| 1.65       | 6.02                | -0.56 | 7.58           | 1.6            | 4.861                            | -0.10 | 4.57  | 3.01 |
| 2.23       | 7.35                | -0.50 | 8.86           | 1.5            | 5.890                            | -0.07 | 5.18  | 3.68 |
| 2.84       | 7.65                | -0.90 | 9.55           | 1.9            | 5.037                            | -0.12 | 5.72  | 3.83 |
| 3.51       | 8.28                | -1.23 | 10.51          | 2.2            | 4.712                            | -0.15 | 6.37  | 4.14 |
| 4.00       | 8.52                | -1.44 | 10.96          | 2.4            | 4.492                            | -0.18 | 6.70  | 4.26 |
| 4.69       | 8.60                | -1.72 | 11.32          | 2.7            | 4.157                            | -0.21 | 7.02  | 4.30 |
| 5.63       | 9.42                | -1.99 | 12.41          | 3.0            | 4.149                            | -0.22 | 7.70  | 4.71 |
| 6.62       | 10.30               | -2.31 | 13.61          | 3.3            | 4.106                            | -0.23 | 8.46  | 5.15 |
| 7.37       | 10.38               | -2.51 | 13.89          | 3.5            | 3.953                            | -0.25 | 8.70  | 5.19 |
| 8.34       | 10.05               | -2.73 | 13.78          | 3.7            | 3.695                            | -0.28 | 8.76  | 5.03 |
| 9.08       | 10.39               | -2.87 | 14.26          | 3.9            | 3.681                            | -0.29 | 9.07  | 5.19 |
| 9.81       | 10.57               | -2.97 | 14.54          | 4.0            | 3.659                            | -0.29 | 9.26  | 5.28 |
| 10.56      | 10.39               | -3.07 | 14.47          | 4.1            | 3.553                            | -0.31 | 9.27  | 5.20 |
| 11.04      | 10.24               | -3.13 | 14.37          | 4.1            | 3.478                            | -0.32 | 9.25  | 5.12 |
| 11.54      | 10.34               | -3.20 | 14.54          | 4.2            | 3.465                            | -0.32 | 9.37  | 5.17 |
| 12.02      | 10.47               | -3.28 | 14.75          | 4.3            | 3.446                            | -0.33 | 9.51  | 5.23 |
| 12.52      | 10.50               | -3.36 | 14.86          | 4.4            | 3.408                            | -0.33 | 9.61  | 5.25 |
| 13.26      | 10.45               | -3.44 | 14.89          | 4.4            | 3.355                            | -0.34 | 9.67  | 5.23 |
| 14.00      | 10.87               | -3.58 | 15.45          | 4.6            | 3.372                            | -0.34 | 10.02 | 5.43 |
| 14.49      | 11.04               | -3.63 | 15.67          | 4.6            | 3.383                            | -0.34 | 10.15 | 5.52 |
| 14.98      | 11.41               | -3.70 | 16.12          | 4.7            | 3.427                            | -0.34 | 10.41 | 5.71 |

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**

ASTM D4767-11

|                   |                               |             |          |
|-------------------|-------------------------------|-------------|----------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1   |
| Client Reference: | Legion Pond                   | Depth (ft): | 9.9-10.4 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1     |
| Lab ID:           | R-2025-143-001-001            |             |          |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|           |   |
|-----------|---|
| Stage No. | 1 |
| Test No.  | 2 |

**INITIAL SAMPLE DIMENSIONS (in)**

|              |       |             |       |
|--------------|-------|-------------|-------|
| Length 1:    | 6.134 | Diameter 1: | 2.864 |
| Length 2:    | 5.875 | Diameter 2: | 2.863 |
| Length 3:    | 6.060 | Diameter 3: | 2.853 |
| Avg. Length: | 6.023 | Avg. Diam.: | 2.860 |

**PRESSURES (psi)**

|                           |      |
|---------------------------|------|
| Cell Pressure (psi)       | 62.0 |
| Back Pressure (psi)       | 60.0 |
| Eff. Conf. Pressure (psi) | 2.0  |
| Pore Pressure             |      |
| Response (%)              | 95   |

**VOLUME CHANGE**

|                              |      |
|------------------------------|------|
| Initial Burette Reading (ml) | 24.0 |
| Final Burette Reading (ml)   | 23.6 |
| Final Change (ml)            | 0.4  |

**MAXIMUM OBLIQUITY POINTS**

|           |   |      |
|-----------|---|------|
| $\bar{P}$ | = | 3.03 |
| Q         | = | 3.02 |

|                                        |     |
|----------------------------------------|-----|
| Initial Dial Reading (mil)             | 170 |
| Dial Reading After Saturation (mil)    | 169 |
| Dial Reading After Consolidation (mil) | 171 |

| LOAD<br>(LB) | DEFORMATION<br>(IN) | PORE PRESSURE<br>(PSI) |
|--------------|---------------------|------------------------|
| 15.9         | 0.000               | 60.0                   |
| 22.1         | 0.001               | 60.3                   |
| 27.7         | 0.002               | 60.5                   |
| 33.2         | 0.008               | 61.1                   |
| 36.3         | 0.014               | 61.4                   |
| 38.9         | 0.020               | 61.6                   |
| 42.8         | 0.030               | 61.8                   |
| 45.4         | 0.038               | 61.9                   |
| 49.2         | 0.050               | 61.9                   |
| 55.1         | 0.071               | 62.0                   |
| 62.7         | 0.101               | 61.9                   |
| 69.9         | 0.137               | 61.9                   |
| 75.8         | 0.173               | 61.7                   |
| 82.0         | 0.216               | 61.4                   |
| 86.1         | 0.246               | 61.1                   |
| 90.6         | 0.288               | 60.8                   |
| 95.8         | 0.344               | 60.3                   |
| 98.1         | 0.405               | 59.9                   |
| 101.0        | 0.450               | 59.6                   |
| 104.5        | 0.510               | 59.3                   |
| 106.3        | 0.555               | 59.0                   |
| 108.9        | 0.601               | 58.8                   |
| 109.3        | 0.646               | 58.6                   |
| 110.0        | 0.675               | 58.5                   |
| 111.3        | 0.706               | 58.3                   |
| 112.8        | 0.736               | 58.2                   |
| 114.2        | 0.767               | 58.1                   |
| 115.2        | 0.812               | 57.9                   |
| 117.2        | 0.857               | 57.7                   |
| 116.5        | 0.887               | 57.6                   |
| 118.6        | 0.917               | 57.5                   |

|            |    |       |        |                   |     |       |        |
|------------|----|-------|--------|-------------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Input Checked By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|-------------------|-----|-------|--------|

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11

|                   |                               |             |          |
|-------------------|-------------------------------|-------------|----------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-1   |
| Client Reference: | Legion Pond                   | Depth (ft): | 9.9-10.4 |
| Project No.:      | R-2025-143-001                | Sample No.: | ST-1     |
| Lab ID:           | R-2025-143-001-001            |             |          |

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

|                                    |     |           |   |
|------------------------------------|-----|-----------|---|
| Effective Confining Pressure (psi) | 2.0 | Stage No. | 1 |
|                                    |     | Test No   | 2 |

**INITIAL DIMENSIONS**

|                                          |       |
|------------------------------------------|-------|
| Initial Sample Length (in)               | 6.02  |
| Initial Sample Diameter (in)             | 2.86  |
| Initial Sample Area (in <sup>2</sup> )   | 6.42  |
| Initial Sample Volume (in <sup>3</sup> ) | 38.69 |

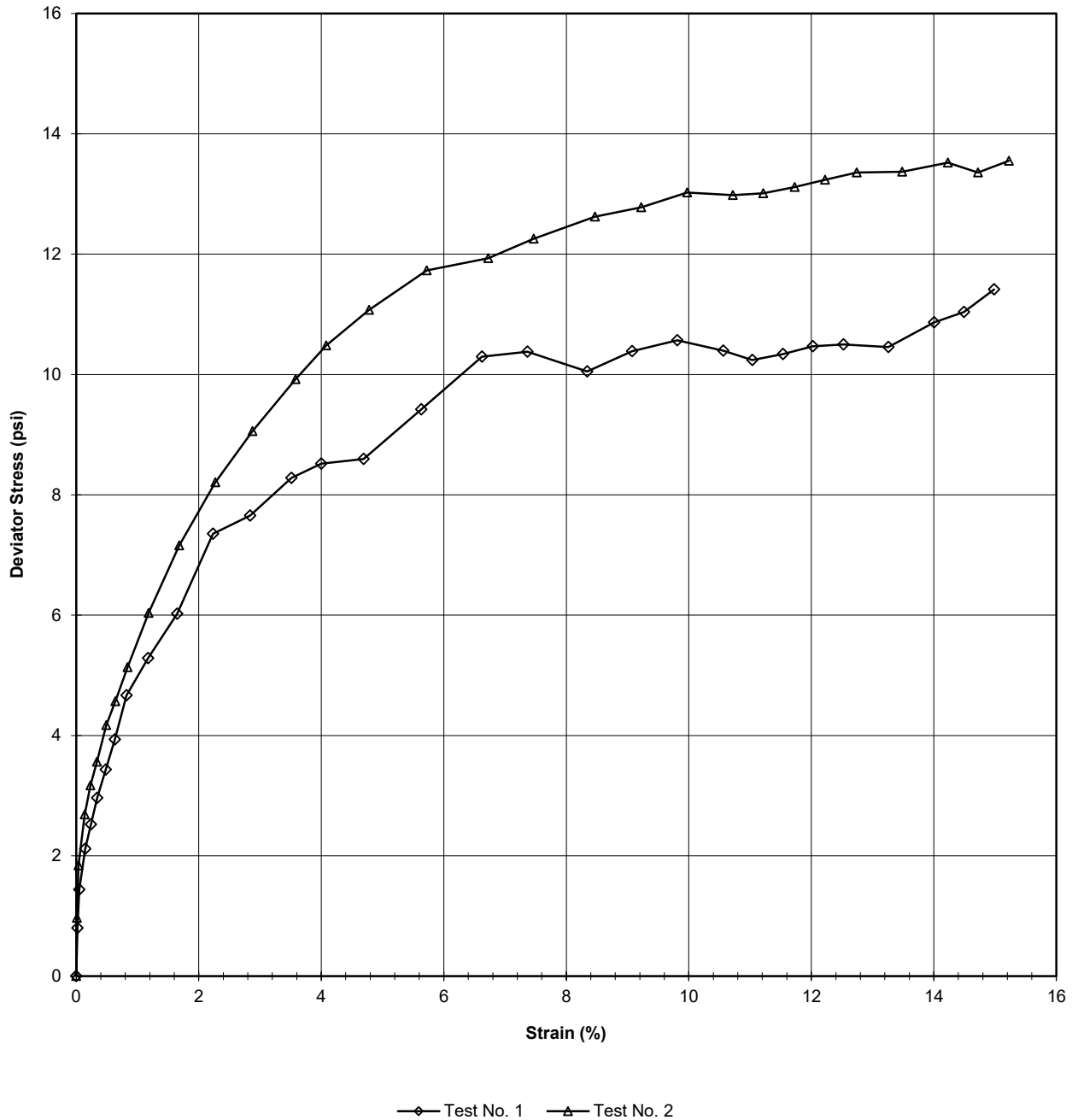
**VOLUME CHANGE**

|                                               |       |
|-----------------------------------------------|-------|
| Volume After Consolidation (in <sup>3</sup> ) | 38.69 |
| Length After Consolidation (in)               | 6.02  |
| Area After Consolidation (in <sup>2</sup> )   | 6.424 |

| Strain<br>(%) | Deviator<br>Stress<br>PSI | $\Delta U$ | $\bar{\sigma}_1$ | $\bar{\sigma}_3$ | Effective Principal<br>Stress Ratio | $\bar{A}$ | $\bar{P}$ | Q    |
|---------------|---------------------------|------------|------------------|------------------|-------------------------------------|-----------|-----------|------|
| 0.01          | 0.97                      | 0.27       | 2.70             | 1.7              | 1.559                               | 0.29      | 2.22      | 0.48 |
| 0.04          | 1.84                      | 0.54       | 3.30             | 1.5              | 2.260                               | 0.31      | 2.38      | 0.92 |
| 0.14          | 2.69                      | 1.10       | 3.58             | 0.9              | 3.990                               | 0.43      | 2.24      | 1.34 |
| 0.23          | 3.17                      | 1.41       | 3.76             | 0.6              | 6.381                               | 0.47      | 2.17      | 1.58 |
| 0.34          | 3.56                      | 1.62       | 3.94             | 0.4              | 10.303                              | 0.48      | 2.16      | 1.78 |
| 0.49          | 4.17                      | 1.81       | 4.36             | 0.2              | 22.733                              | 0.46      | 2.28      | 2.09 |
| 0.64          | 4.57                      | 1.91       | 4.66             | 0.1              | 50.637                              | 0.44      | 2.38      | 2.28 |
| 0.84          | 5.13                      | 1.90       | 5.23             | 0.1              | 52.340                              | 0.39      | 2.67      | 2.57 |
| 1.18          | 6.03                      | 1.99       | 6.04             | 0.0              | 604.422                             | 0.35      | 3.03      | 3.02 |
| 1.68          | 7.16                      | 1.90       | 7.26             | 0.1              | 72.578                              | 0.28      | 3.68      | 3.58 |
| 2.27          | 8.21                      | 1.89       | 8.32             | 0.1              | 73.654                              | 0.24      | 4.22      | 4.10 |
| 2.88          | 9.06                      | 1.68       | 9.38             | 0.3              | 29.257                              | 0.20      | 4.85      | 4.53 |
| 3.58          | 9.92                      | 1.38       | 10.54            | 0.6              | 17.034                              | 0.15      | 5.58      | 4.96 |
| 4.08          | 10.48                     | 1.14       | 11.34            | 0.9              | 13.250                              | 0.11      | 6.10      | 5.24 |
| 4.78          | 11.07                     | 0.78       | 12.30            | 1.2              | 10.040                              | 0.07      | 6.76      | 5.54 |
| 5.72          | 11.73                     | 0.31       | 13.42            | 1.7              | 7.924                               | 0.03      | 7.56      | 5.86 |
| 6.73          | 11.93                     | -0.11      | 14.04            | 2.1              | 6.651                               | -0.01     | 8.08      | 5.97 |
| 7.47          | 12.26                     | -0.39      | 14.64            | 2.4              | 6.131                               | -0.03     | 8.52      | 6.13 |
| 8.47          | 12.62                     | -0.73      | 15.35            | 2.7              | 5.627                               | -0.06     | 9.04      | 6.31 |
| 9.22          | 12.78                     | -0.96      | 15.74            | 3.0              | 5.316                               | -0.08     | 9.35      | 6.39 |
| 9.97          | 13.03                     | -1.19      | 16.22            | 3.2              | 5.082                               | -0.10     | 9.70      | 6.51 |
| 10.72         | 12.98                     | -1.37      | 16.36            | 3.4              | 4.846                               | -0.11     | 9.87      | 6.49 |
| 11.22         | 13.01                     | -1.51      | 16.52            | 3.5              | 4.704                               | -0.12     | 10.02     | 6.51 |
| 11.73         | 13.11                     | -1.65      | 16.77            | 3.7              | 4.592                               | -0.13     | 10.21     | 6.56 |
| 12.22         | 13.24                     | -1.78      | 17.02            | 3.8              | 4.500                               | -0.14     | 10.40     | 6.62 |
| 12.74         | 13.36                     | -1.92      | 17.28            | 3.9              | 4.406                               | -0.15     | 10.60     | 6.68 |
| 13.48         | 13.37                     | -2.11      | 17.48            | 4.1              | 4.252                               | -0.17     | 10.80     | 6.69 |
| 14.23         | 13.52                     | -2.29      | 17.82            | 4.3              | 4.148                               | -0.18     | 11.06     | 6.76 |
| 14.72         | 13.36                     | -2.42      | 17.78            | 4.4              | 4.021                               | -0.19     | 11.10     | 6.68 |
| 15.23         | 13.55                     | -2.54      | 18.09            | 4.5              | 3.986                               | -0.20     | 11.31     | 6.78 |

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS  
ASTM D4767-11**

|                     |                                              |             |         |
|---------------------|----------------------------------------------|-------------|---------|
| Client:             | Summit Design & Eng. Services                | Boring No.: | B-25-1  |
| Client Reference:   | Legion Pond                                  | Depth (ft): | 0.0-1.5 |
| Project No.:        | R-2025-143-001                               | Sample No.: | ST-1    |
| Lab ID:             | R-2025-143-001-001                           |             |         |
| Visual Description: | Brown Sand with Clay and Roots (UNDISTURBED) |             |         |



|            |    |       |        |              |     |       |        |
|------------|----|-------|--------|--------------|-----|-------|--------|
| Tested By: | DL | Date: | 6/2/25 | Approved By: | MPS | Date: | 6/6/25 |
|------------|----|-------|--------|--------------|-----|-------|--------|

page 7 of 8

**CONSOLIDATED UNDRAINED TRIAXIAL TEST  
WITH PORE PRESSURE READINGS**  
ASTM D4767-11

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-001      Specific Gravity (Assumed)      2.7

Visual Description: Brown Sand with Clay and Roots (UNDISTURBED)

**SAMPLE CONDITION SUMMARY**

|                                |         |          |
|--------------------------------|---------|----------|
| Boring No.:                    | B-25-1  | B-25-1   |
| Depth (ft):                    | 0.0-1.5 | 9.9-10.4 |
| Sample No.:                    | ST-1    | ST-1     |
| Test No.                       | T1      | T2       |
| Deformation Rate (in/min)      | 0.001   | 0.001    |
| Back Pressure (psi)            | 60      | 60       |
| Consolidation Time (days)      | 1       | 1        |
| Moisture Content (%) (INITIAL) | 16.4    | 16.4     |
| Total Unit Weight (pcf)        | 119.6   | 125.4    |
| Dry Unit Weight (pcf)          | 102.8   | 107.7    |
| Moisture Content (%) (FINAL)   | 26.6    | 25.7     |
| Initial State Void Ratio, $e$  | 0.639   | 0.565    |
| Void Ratio at Shear, $e$       | 0.647   | 0.565    |



Tested By: DL      Date: 6/2/25      Input Checked By: MPS      Date: 6/6/25  
 page 8 of 8      DCN: CT-S28    DATE: 4/12/13    REVISION: 3



## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-003

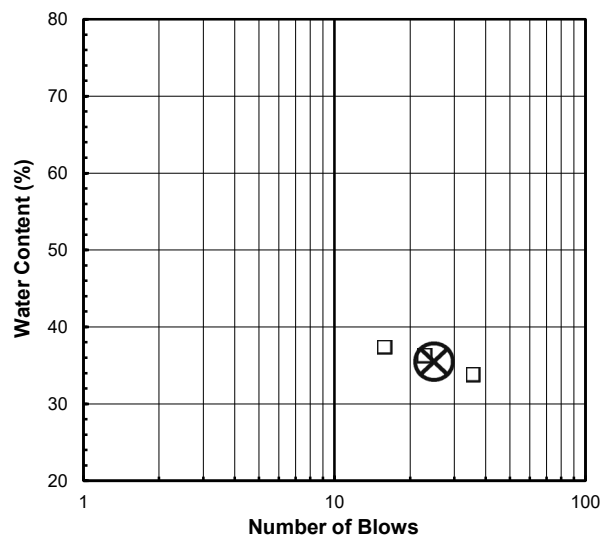
Boring No.: B-25-2  
 Depth (ft): 0.0-2.0  
 Sample No.: SS-1  
 Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

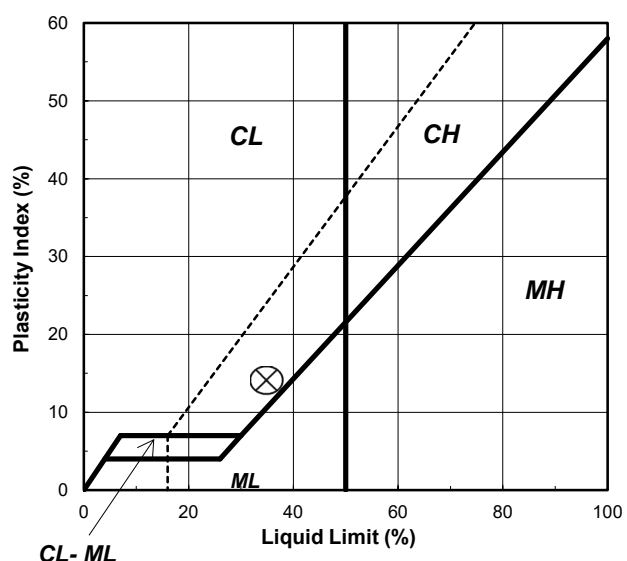
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |       |       |   |
|-----------------------------------------------|--------|-------------------|-------|-------|---|
|                                               |        | 1                 | 2     | 3     | M |
| Tare Number:                                  | 31-A   | G                 | A-M   | I-7   | U |
| Wt. of Tare & Wet Sample (g):                 | 192.10 | 25.96             | 27.48 | 30.52 | L |
| Wt. of Tare & Dry Sample (g):                 | 182.71 | 23.18             | 24.24 | 26.41 | T |
| Weight of Tare (g):                           | 136.69 | 14.93             | 15.28 | 15.38 | I |
| Weight of Water (g):                          | 9.4    | 2.8               | 3.2   | 4.1   | P |
| Weight of Dry Sample (g):                     | 46.0   | 8.3               | 9.0   | 11.0  | O |
| Was As Received MC Preserved:                 | Yes    |                   |       |       | I |
| Moisture Content (%):                         | 20.4   | 33.7              | 36.2  | 37.3  | N |
| Number of Blows:                              |        | 36                | 23    | 16    | T |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | A-B   | X-9   |       | Liquid Limit (%): 35     |
| Wt. of Tare & Wet Sample (g):                                         | 27.43 | 26.52 |       | Plastic Limit (%): 21    |
| Wt. of Tare & Dry Sample (g):                                         | 25.40 | 24.64 |       | Plasticity Index (%): 14 |
| Weight of Tare (g):                                                   | 15.46 | 15.56 |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 2.0   | 1.9   |       |                          |
| Weight of Dry Sample (g):                                             | 9.9   | 9.1   |       |                          |
| Moisture Content (%):                                                 | 20.4  | 20.7  | -0.3  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



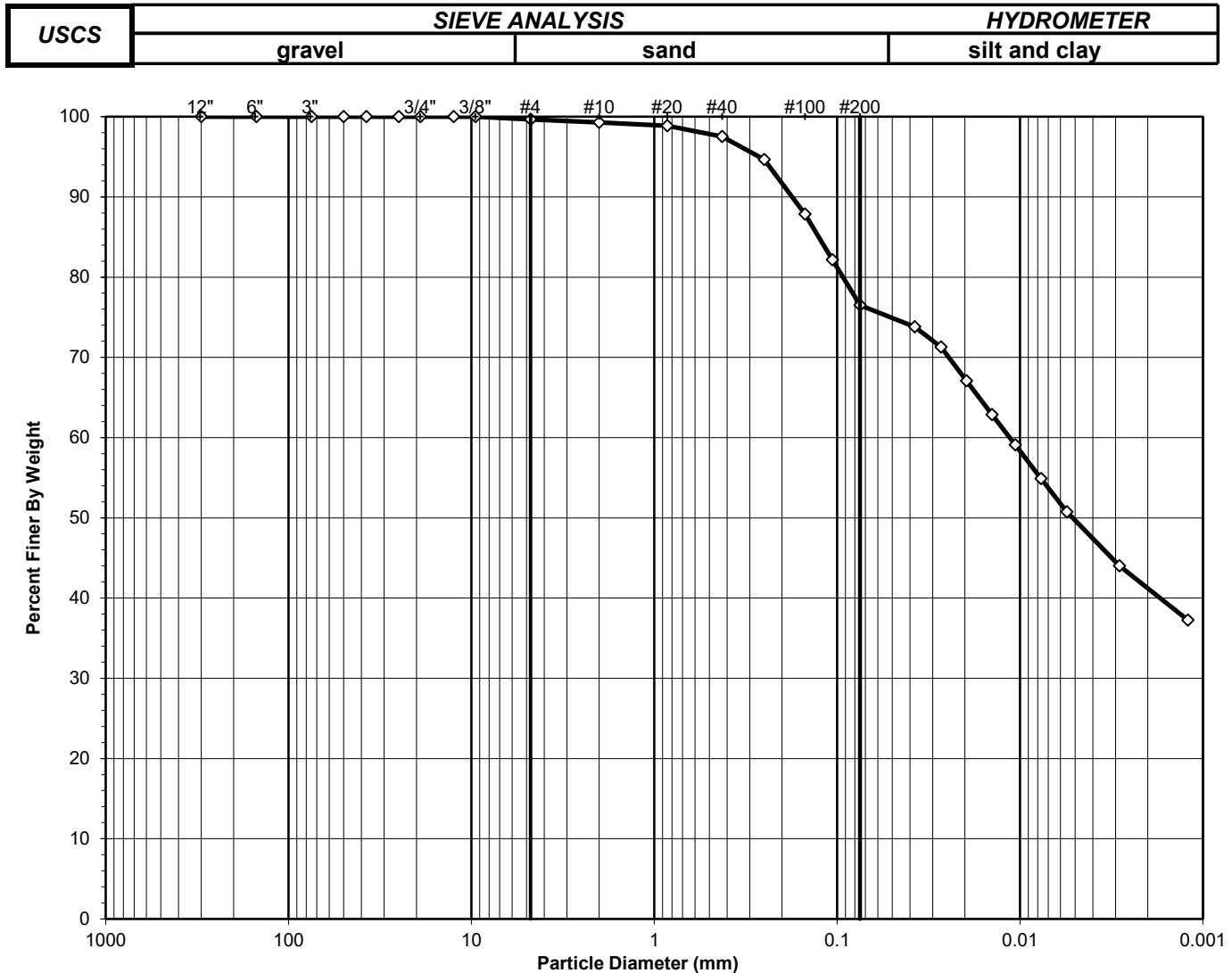
Tested By JCB IV Date 5/25/25 Checked By AES Date 5/28/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-004

Boring No.: B-25-3  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown



**USCS Symbol:**  
**CL, TESTED**

**USCS Classification:**  
**LEAN CLAY WITH SAND**

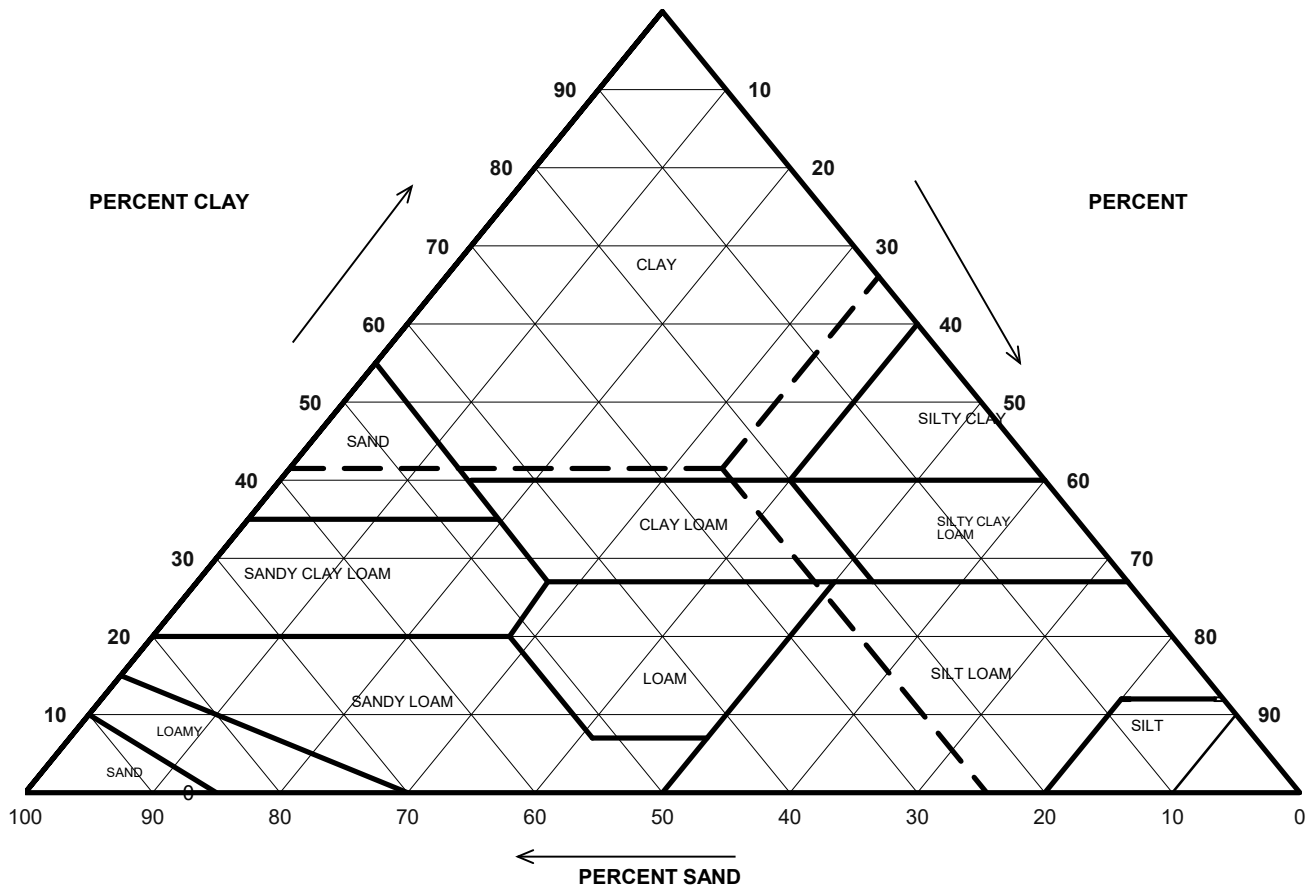
|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Tested By CB | Date 5/28/25 | Checked By AES | Date 5/28/25 |
|--------------|--------------|----------------|--------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-004

Boring No.: B-25-3  
Depth (ft): 2.0-4.0  
Sample No.: SS-2  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.70              |                                                              |
| 2                  | 99.30         | Sand   | 24.39             | 24.57                                                        |
| 0.05               | 74.90         | Silt   | 33.69             | 33.93                                                        |
| 0.002              | 41.21         | Clay   | 41.21             | 41.50                                                        |

**USDA Classification: CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-004

Boring No.: B-25-3  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 455         | Tare No.:                          | NA         | Tare No.:                                  | 455        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 453.31      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 453.31     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 407.70      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 407.70     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 141.41      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 141.41     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 45.61       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 45.61      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 266.29      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 266.29     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>17.1</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 266.29     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 266.29     |
| Tare No. (Sub-Specimen)                   | 455         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 455        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 453.31      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 453.31     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 141.41      | Dry Weight of - 3/4" Sample (g):   | 266.29     | Weight of Tare (g):                        | 141.41     | Dry Weight of - 3/4" Sample (g):   | 266.29     |
| Sub-Specimen Wet Weight (g):              | 311.90      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 311.90     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 266.29     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 266.29     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.95                        | 0.36                 | 0.36                             | 99.64             | 99.6                          |
| #10        | 2                  | 0.92                        | 0.35                 | 0.70                             | 99.30             | 99.3                          |
| #20        | 0.85               | 1.18                        | ( ** ) 0.44          | 1.15                             | 98.85             | 98.9                          |
| #40        | 0.425              | 3.57                        | 1.34                 | 2.49                             | 97.51             | 97.5                          |
| #60        | 0.25               | 7.57                        | 2.84                 | 5.33                             | 94.67             | 94.7                          |
| #100       | 0.15               | 18.11                       | 6.80                 | 12.13                            | 87.87             | 87.9                          |
| #140       | 0.106              | 15.21                       | 5.71                 | 17.84                            | 82.16             | 82.2                          |
| #200       | 0.075              | 15.11                       | 5.67                 | 23.52                            | 76.48             | 76.5                          |
| Pan        | -                  | 203.67                      | 76.48                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 5/28/25 Checked By AES Date 5/28/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-3  |
| Client Reference: | Legion Pond                   | Depth (ft): | 2.0-4.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-2    |
| Lab ID:           | R-2025-143-001-004            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 46.5       | 22.9       | 2.60        | 8.2                      | 0.0377 | 96.5                       | 73.8                        |
| 2                  | 45.0       | 22.9       | 2.60        | 8.5                      | 0.0271 | 93.2                       | 71.3                        |
| 4                  | 42.5       | 22.9       | 2.60        | 8.9                      | 0.0196 | 87.7                       | 67.1                        |
| 8                  | 40.0       | 22.9       | 2.60        | 9.4                      | 0.0142 | 82.2                       | 62.9                        |
| 15                 | 37.8       | 22.9       | 2.60        | 9.8                      | 0.0106 | 77.3                       | 59.1                        |
| 30                 | 35.3       | 22.9       | 2.60        | 10.3                     | 0.0077 | 71.8                       | 54.9                        |
| 60                 | 32.8       | 23.0       | 2.56        | 10.7                     | 0.0055 | 66.4                       | 50.7                        |
| 240                | 28.8       | 23.0       | 2.56        | 11.4                     | 0.0029 | 57.6                       | 44.0                        |
| 1440               | 24.8       | 22.9       | 2.60        | 12.1                     | 0.0012 | 48.7                       | 37.2                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 200    | Percent Finer than # 200: | 76.48        |
| Wt. of Tare & Dry Material (g): | 221.21 |                           |              |
| Weight of Tare (g):             | 171.22 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 44.99  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 5/29/25 |
|-----------|----|------|---------|------------|-----|------|---------|

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## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-004

Boring No.: B-25-3

Depth (ft): 2.0-4.0

Sample No.: SS-2

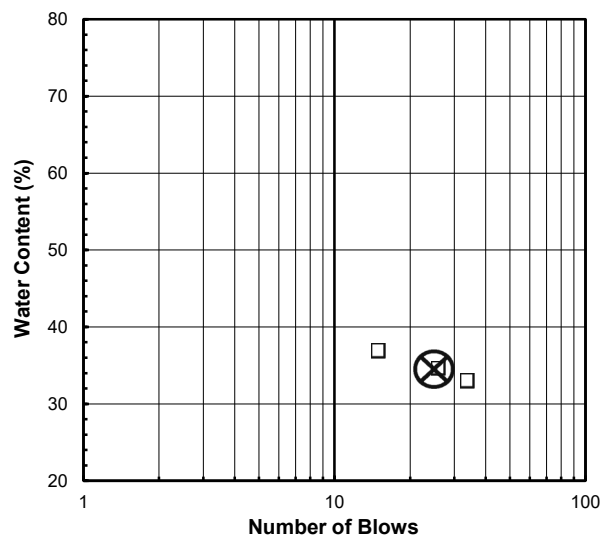
Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

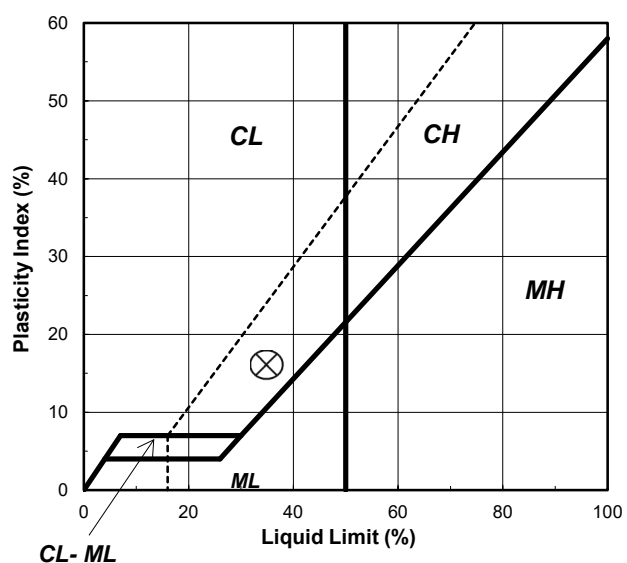
| As Received Moisture Content<br>ASTM D2216-19 |             | Liquid Limit Test |             |             |          |
|-----------------------------------------------|-------------|-------------------|-------------|-------------|----------|
| Tare Number:                                  | 455         | 1                 | 2           | 3           | M        |
| Wt. of Tare & Wet Sample (g):                 | 453.31      | A-C               | J           | AT          | U        |
| Wt. of Tare & Dry Sample (g):                 | 407.70      | 32.95             | 37.20       | 33.17       | L        |
| Weight of Tare (g):                           | 141.41      | 28.62             | 31.50       | 28.41       | T        |
| Weight of Water (g):                          | 45.6        | 15.46             | 15.01       | 15.48       | I        |
| Weight of Dry Sample (g):                     | 266.3       | 4.3               | 5.7         | 4.8         | P        |
| Was As Received MC Preserved:                 | Yes         | 13.2              | 16.5        | 12.9        | O        |
| <b>Moisture Content (%):</b>                  | <b>17.1</b> | <b>32.9</b>       | <b>34.6</b> | <b>36.8</b> | <b>N</b> |
| <b>Number of Blows:</b>                       |             | <b>34</b>         | <b>26</b>   | <b>15</b>   | <b>T</b> |

| Plastic Limit Test                                                                      | 1           | 2           | Range      | Test Results                    |
|-----------------------------------------------------------------------------------------|-------------|-------------|------------|---------------------------------|
| Tare Number:                                                                            | 10          | 16          |            | <b>Liquid Limit (%): 35</b>     |
| Wt. of Tare & Wet Sample (g):                                                           | 17.26       | 17.76       |            | <b>Plastic Limit (%): 19</b>    |
| Wt. of Tare & Dry Sample (g):                                                           | 15.62       | 16.06       |            | <b>Plasticity Index (%): 16</b> |
| Weight of Tare (g):                                                                     | 6.94        | 7.04        |            | <b>USCS Symbol: CL</b>          |
| Weight of Water (g):                                                                    | 1.6         | 1.7         |            |                                 |
| Weight of Dry Sample (g):                                                               | 8.7         | 9.0         |            |                                 |
| <b>Moisture Content (%):</b>                                                            | <b>18.9</b> | <b>18.8</b> | <b>0.0</b> |                                 |
| <i>Note: The acceptable range of the two Moisture Contents is <math>\pm</math> 1.12</i> |             |             |            |                                 |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 5/29/25 Checked By AES Date 6/2/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-005

Boring No.: B-25-3  
 Depth (ft): 6.0-8.0  
 Sample No.: SS-4  
 Soil Color: Brown



**USCS Symbol:**  
**CL, TESTED**

**USCS Classification:**  
**LEAN CLAY WITH SAND**

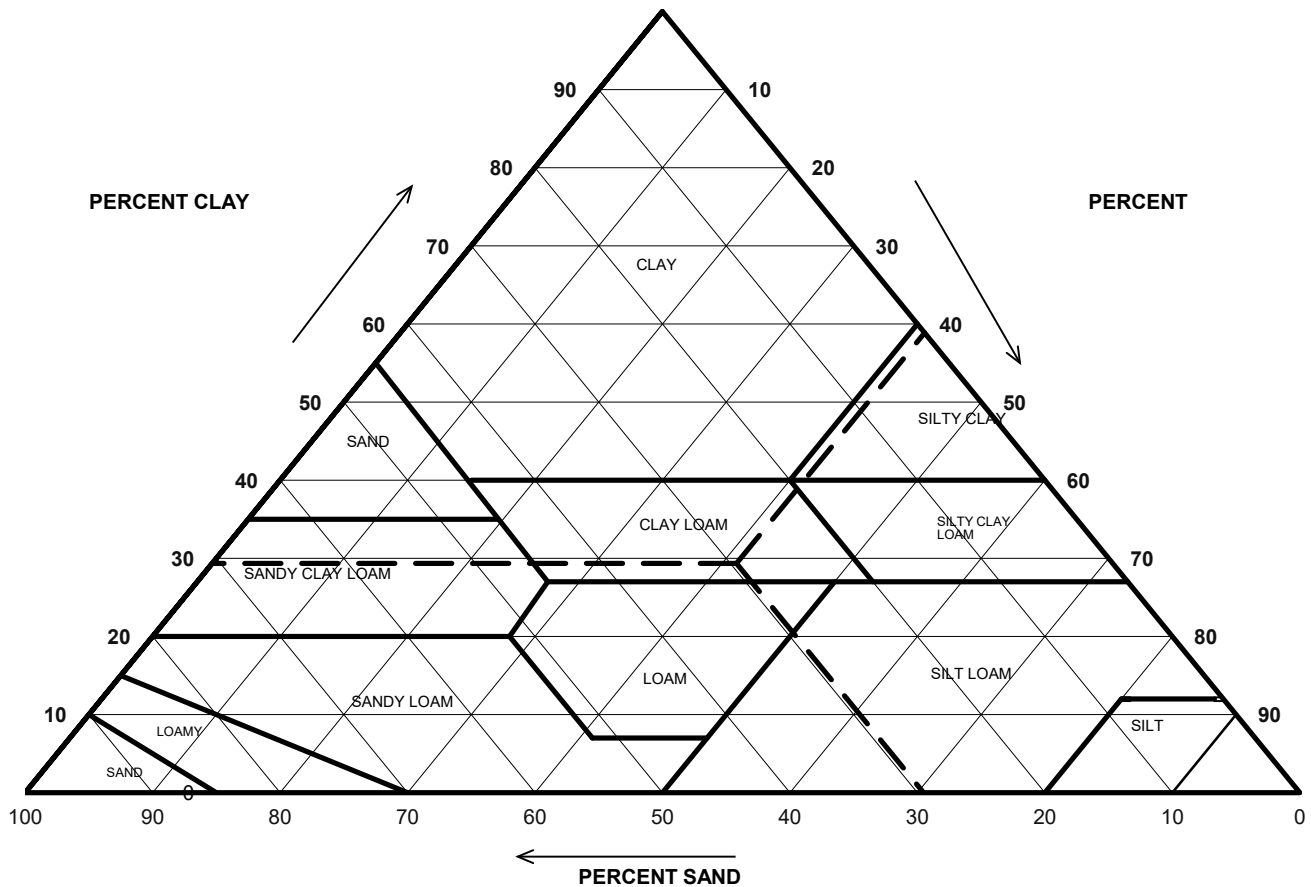
|              |             |                |             |
|--------------|-------------|----------------|-------------|
| Tested By CB | Date 6/6/25 | Checked By AES | Date 6/6/25 |
|--------------|-------------|----------------|-------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-005

Boring No.: B-25-3  
Depth (ft): 6.0-8.0  
Sample No.: SS-4  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.30              |                                                              |
| 2                  | 99.70         | Sand   | 29.43             | 29.52                                                        |
| 0.05               | 70.27         | Silt   | 41.01             | 41.13                                                        |
| 0.002              | 29.26         | Clay   | 29.26             | 29.35                                                        |

USDA Classification: **CLAY LOAM**



## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-005

Boring No.: B-25-3  
 Depth (ft): 6.0-8.0  
 Sample No.: SS-4  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 450         | Tare No.:                          | NA         | Tare No.:                                  | 450        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 379.87      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 379.87     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 354.96      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 354.96     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 144.34      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 144.34     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 24.91       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 24.91      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 210.62      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 210.62     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>11.8</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 210.62     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 210.62     |
| Tare No. (Sub-Specimen)                   | 450         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 450        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 379.87      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 379.87     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 144.34      | Dry Weight of - 3/4" Sample (g):   | 210.62     | Weight of Tare (g):                        | 144.34     | Dry Weight of - 3/4" Sample (g):   | 210.62     |
| Sub-Specimen Wet Weight (g):              | 235.53      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 235.53     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 210.62     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 210.62     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * ) 0.00           | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** ) 0.00          | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.64                        | 0.30                 | 0.30                             | 99.70             | 99.7                          |
| #20        | 0.85               | 4.94                        | ( ** ) 2.35          | 2.65                             | 97.35             | 97.4                          |
| #40        | 0.425              | 5.55                        | 2.64                 | 5.28                             | 94.72             | 94.7                          |
| #60        | 0.25               | 9.48                        | 4.50                 | 9.79                             | 90.21             | 90.2                          |
| #100       | 0.15               | 14.88                       | 7.06                 | 16.85                            | 83.15             | 83.1                          |
| #140       | 0.106              | 12.09                       | 5.74                 | 22.59                            | 77.41             | 77.4                          |
| #200       | 0.075              | 12.89                       | 6.12                 | 28.71                            | 71.29             | 71.3                          |
| Pan        | -                  | 150.15                      | 71.29                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/6/25 Checked By AES Date 6/6/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-3  |
| Client Reference: | Legion Pond                   | Depth (ft): | 6.0-8.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-4    |
| Lab ID:           | R-2025-143-001-005            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 40.0       | 22.9       | 2.60        | 9.4                      | 0.0402 | 95.2                       | 67.9                        |
| 2                  | 38.5       | 22.9       | 2.60        | 9.7                      | 0.0289 | 91.4                       | 65.2                        |
| 4                  | 35.8       | 22.9       | 2.60        | 10.2                     | 0.0209 | 84.4                       | 60.2                        |
| 8                  | 32.5       | 22.9       | 2.60        | 10.7                     | 0.0152 | 76.1                       | 54.3                        |
| 15                 | 29.8       | 22.9       | 2.60        | 11.2                     | 0.0114 | 69.1                       | 49.3                        |
| 30                 | 27.3       | 23.0       | 2.56        | 11.7                     | 0.0082 | 62.9                       | 44.8                        |
| 60                 | 24.5       | 23.0       | 2.56        | 12.2                     | 0.0059 | 55.9                       | 39.8                        |
| 240                | 20.8       | 23.0       | 2.56        | 12.9                     | 0.0030 | 46.3                       | 33.0                        |
| 1440               | 16.5       | 22.9       | 2.60        | 13.6                     | 0.0013 | 35.4                       | 25.2                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 201    | Percent Finer than # 200: | 71.29        |
| Wt. of Tare & Dry Material (g): | 213.50 |                           |              |
| Weight of Tare (g):             | 169.66 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 38.84  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |        |
|-----------|----|------|---------|------------|-----|------|--------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 6/6/25 |
|-----------|----|------|---------|------------|-----|------|--------|

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## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-005

Boring No.: B-25-3

Depth (ft): 6.0-8.0

Sample No.: SS-4

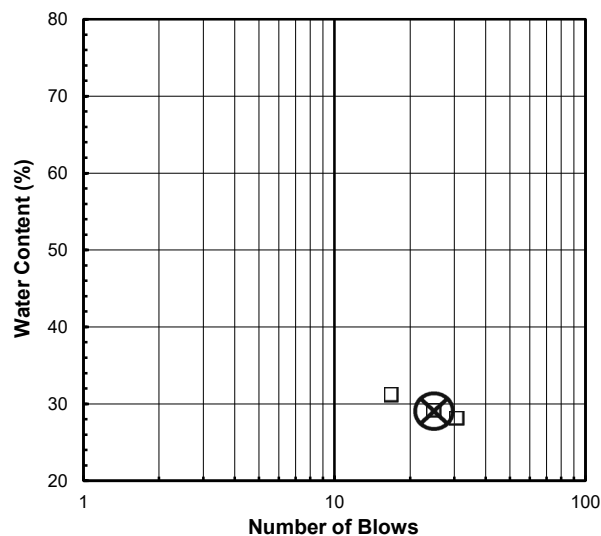
Soil Description: BROWN LEAN CLAY

**Note:** The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

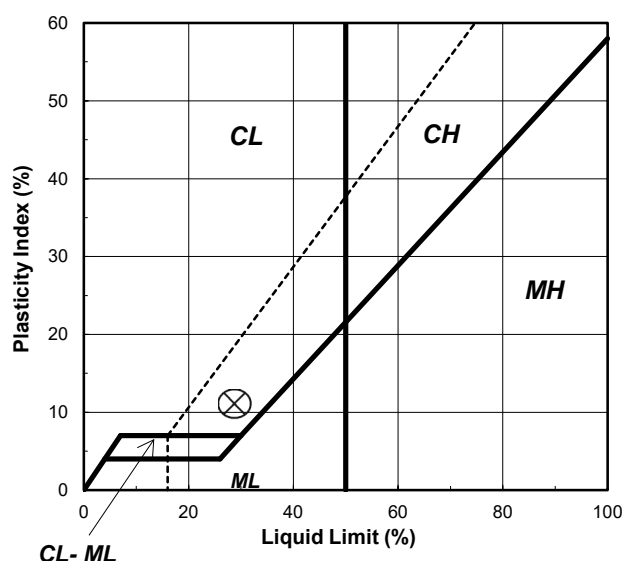
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |       |       |   |
|-----------------------------------------------|--------|-------------------|-------|-------|---|
| Tare Number:                                  | 450    | 1                 | 2     | 3     | M |
| Wt. of Tare & Wet Sample (g):                 | 379.87 | X-9               | A     | G     | U |
| Wt. of Tare & Dry Sample (g):                 | 354.96 | 36.14             | 34.07 | 33.27 | L |
| Weight of Tare (g):                           | 144.34 | 31.63             | 29.80 | 28.92 | T |
| Weight of Water (g):                          | 24.9   | 15.56             | 15.10 | 14.93 | I |
| Weight of Dry Sample (g):                     | 210.6  | 4.5               | 4.3   | 4.4   | P |
| Was As Received MC Preserved:                 | Yes    | 16.1              | 14.7  | 14.0  | O |
| Moisture Content (%):                         | 11.8   | 28.1              | 29.0  | 31.1  | N |
| Number of Blows:                              |        | 31                | 25    | 17    | T |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 12    | 34    |       | Liquid Limit (%): 29     |
| Wt. of Tare & Wet Sample (g):                                         | 20.18 | 17.20 |       | Plastic Limit (%): 18    |
| Wt. of Tare & Dry Sample (g):                                         | 18.20 | 15.67 |       | Plasticity Index (%): 11 |
| Weight of Tare (g):                                                   | 7.00  | 7.00  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 2.0   | 1.5   |       |                          |
| Weight of Dry Sample (g):                                             | 11.2  | 8.7   |       |                          |
| Moisture Content (%):                                                 | 17.7  | 17.6  | 0.0   |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 6/2/25 Checked By AES Date 6/3/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown



**USCS Symbol:**  
*ml, ASSUMED*

**USCS Classification:**  
**SILT**

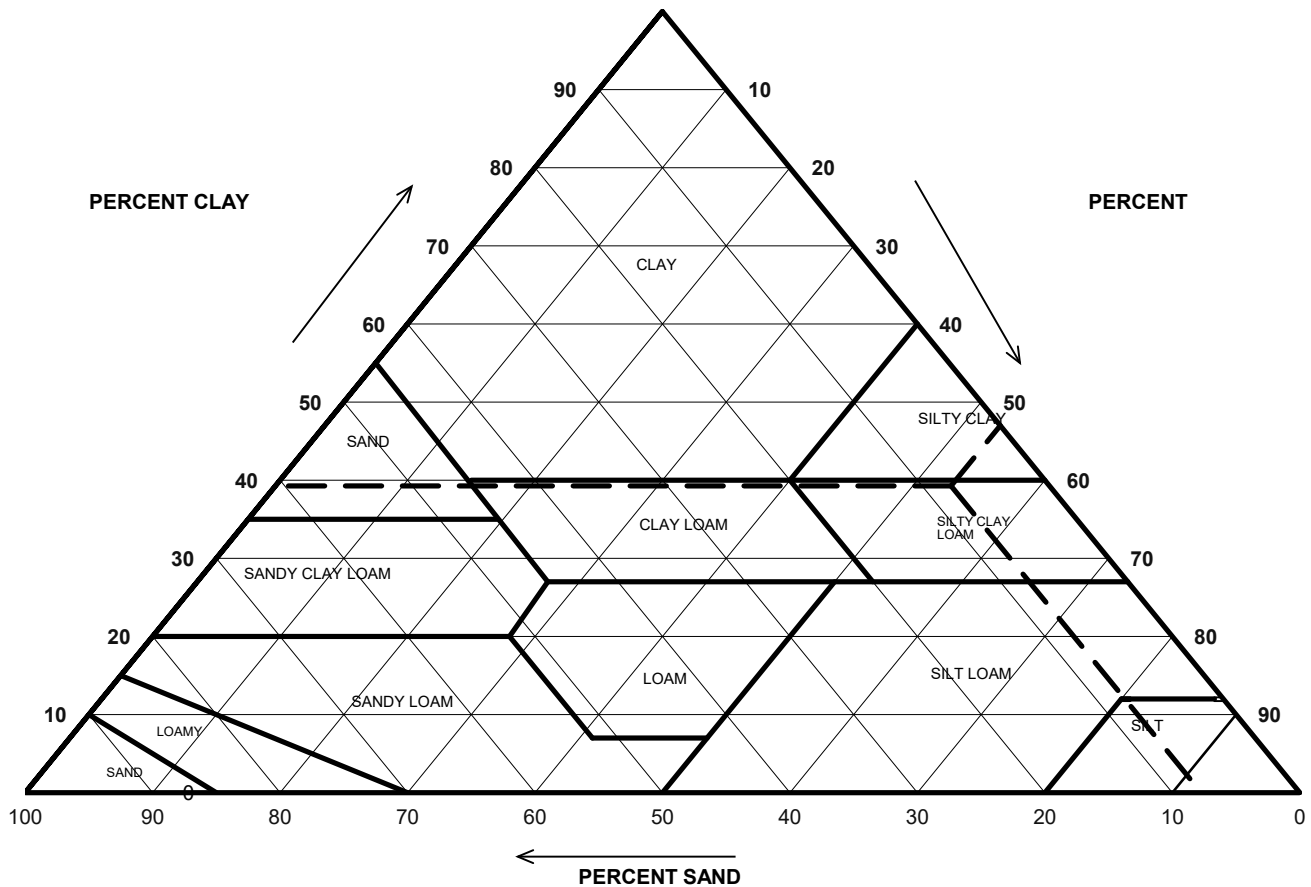
|              |             |                |             |
|--------------|-------------|----------------|-------------|
| Tested By CB | Date 6/2/25 | Checked By AES | Date 6/2/25 |
|--------------|-------------|----------------|-------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
Depth (ft): 12.0-14.0  
Sample No.: SS-7  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.27              |                                                              |
| 2                  | 99.73         | Sand   | 7.71              | 7.73                                                         |
| 0.05               | 92.02         | Silt   | 52.86             | 53.00                                                        |
| 0.002              | 39.16         | Clay   | 39.16             | 39.27                                                        |

USDA Classification: **SILTY CLAY LOAM**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 468         | Tare No.:                          | NA         | Tare No.:                                  | 468        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 280.44      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 280.44     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 256.34      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 256.34     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 137.50      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 137.50     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 24.10       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 24.10      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 118.84      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 118.84     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>20.3</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 118.84     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 118.84     |
| Tare No. (Sub-Specimen)                   | 468         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 468        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 280.44      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 280.44     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 137.50      | Dry Weight of - 3/4" Sample (g):   | 118.84     | Weight of Tare (g):                        | 137.50     | Dry Weight of - 3/4" Sample (g):   | 118.84     |
| Sub-Specimen Wet Weight (g):              | 142.94      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 142.94     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 118.84     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 118.84     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.32                        | 0.27                 | 0.27                             | 99.73             | 99.7                          |
| #20        | 0.85               | 0.38                        | ( ** )               | 0.59                             | 99.41             | 99.4                          |
| #40        | 0.425              | 0.59                        | 0.50                 | 1.09                             | 98.91             | 98.9                          |
| #60        | 0.25               | 1.07                        | 0.90                 | 1.99                             | 98.01             | 98.0                          |
| #100       | 0.15               | 1.75                        | 1.47                 | 3.46                             | 96.54             | 96.5                          |
| #140       | 0.106              | 1.59                        | 1.34                 | 4.80                             | 95.20             | 95.2                          |
| #200       | 0.075              | 1.83                        | 1.54                 | 6.34                             | 93.66             | 93.7                          |
| Pan        | -                  | 111.31                      | 93.66                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/2/25 Checked By AES Date 6/2/25

## HYDROMETER ANALYSIS

ASTM D7928-21

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-006

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 58.8       | 22.9       | 2.60        | 6.0                      | 0.0322 | 96.3                       | 90.2                        |
| 2                  | 56.0       | 22.9       | 2.60        | 6.5                      | 0.0237 | 91.5                       | 85.7                        |
| 4                  | 52.0       | 22.9       | 2.60        | 7.2                      | 0.0177 | 84.7                       | 79.3                        |
| 8                  | 47.8       | 22.9       | 2.60        | 8.0                      | 0.0131 | 77.4                       | 72.5                        |
| 15                 | 44.0       | 22.9       | 2.60        | 8.7                      | 0.0100 | 71.0                       | 66.5                        |
| 30                 | 39.5       | 23.0       | 2.56        | 9.5                      | 0.0074 | 63.3                       | 59.3                        |
| 60                 | 36.0       | 23.0       | 2.56        | 10.1                     | 0.0054 | 57.3                       | 53.7                        |
| 240                | 29.3       | 23.0       | 2.56        | 11.3                     | 0.0028 | 45.8                       | 42.9                        |
| 1440               | 23.8       | 22.9       | 2.60        | 12.3                     | 0.0012 | 36.3                       | 34.0                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 2010   | Percent Finer than # 200: | 93.66        |
| Wt. of Tare & Dry Material (g): | 231.37 |                           |              |
| Weight of Tare (g):             | 168.69 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 57.68  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |        |
|-----------|----|------|---------|------------|-----|------|--------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 6/2/25 |
|-----------|----|------|---------|------------|-----|------|--------|

page 4 of 4

## CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
 Depth (ft): 1.0-6.0  
 Sample No.: S-1  
 Description: Brown Clay  
 ( - # 10 Sieve material )

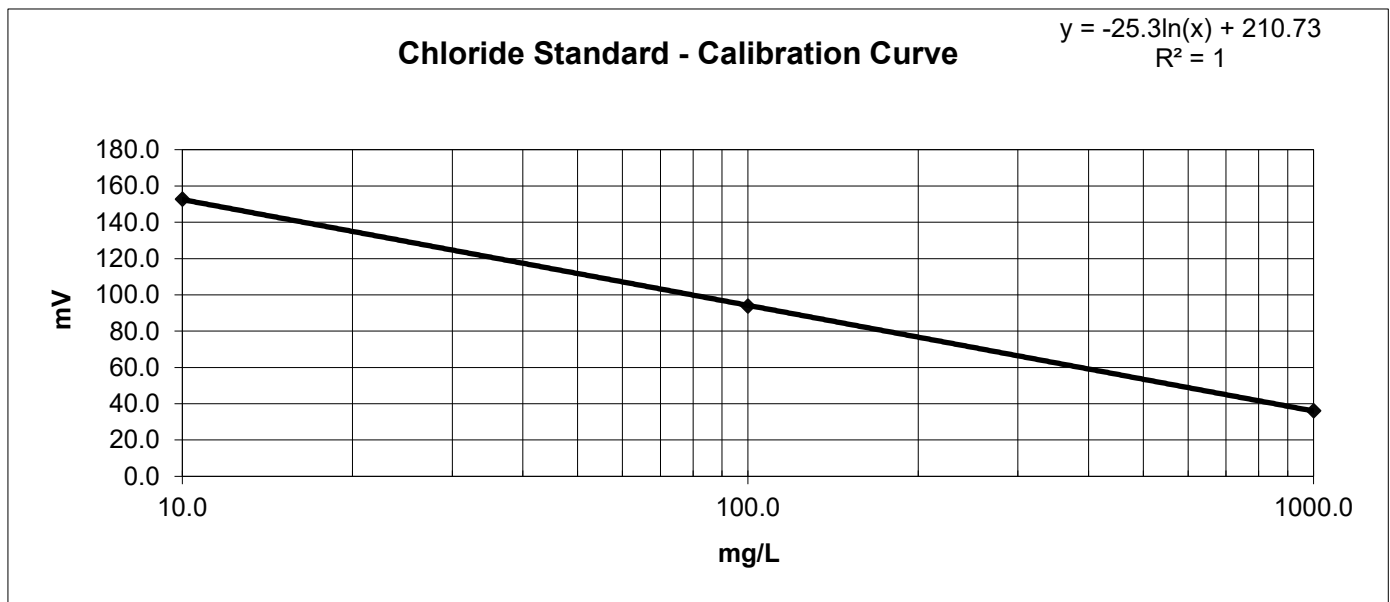
### CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD    | MILLIVOLTS<br>(mV) |
|-------------|--------------------|
| 10.0 mg/L   | 152.7              |
| 100.0 mg/L  | 93.8               |
| 1000.0 mg/L | 36.2               |

### MEASUREMENT OF CHLORIDES

|                              |       |               |               |
|------------------------------|-------|---------------|---------------|
| Sample Weight (g):           | 100.0 | CONCENTRATION | CONCENTRATION |
| Water added to Sample (ml):  | 100.0 | (mg/L)        | (mg/kg)       |
| Size of Sample Aliquot (ml): | 20.0  |               |               |
| Sample Reading (mV):         | 73.0  | 231.48        | 231.48        |

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO<sub>3</sub> solution (1:1 volume).  
 2) Samples were dried for a minimum of 12 hours at 110 ± 5°C.



Notes:

Tested By BS Date 6/10/25 Checked By AES Date 6/10/25

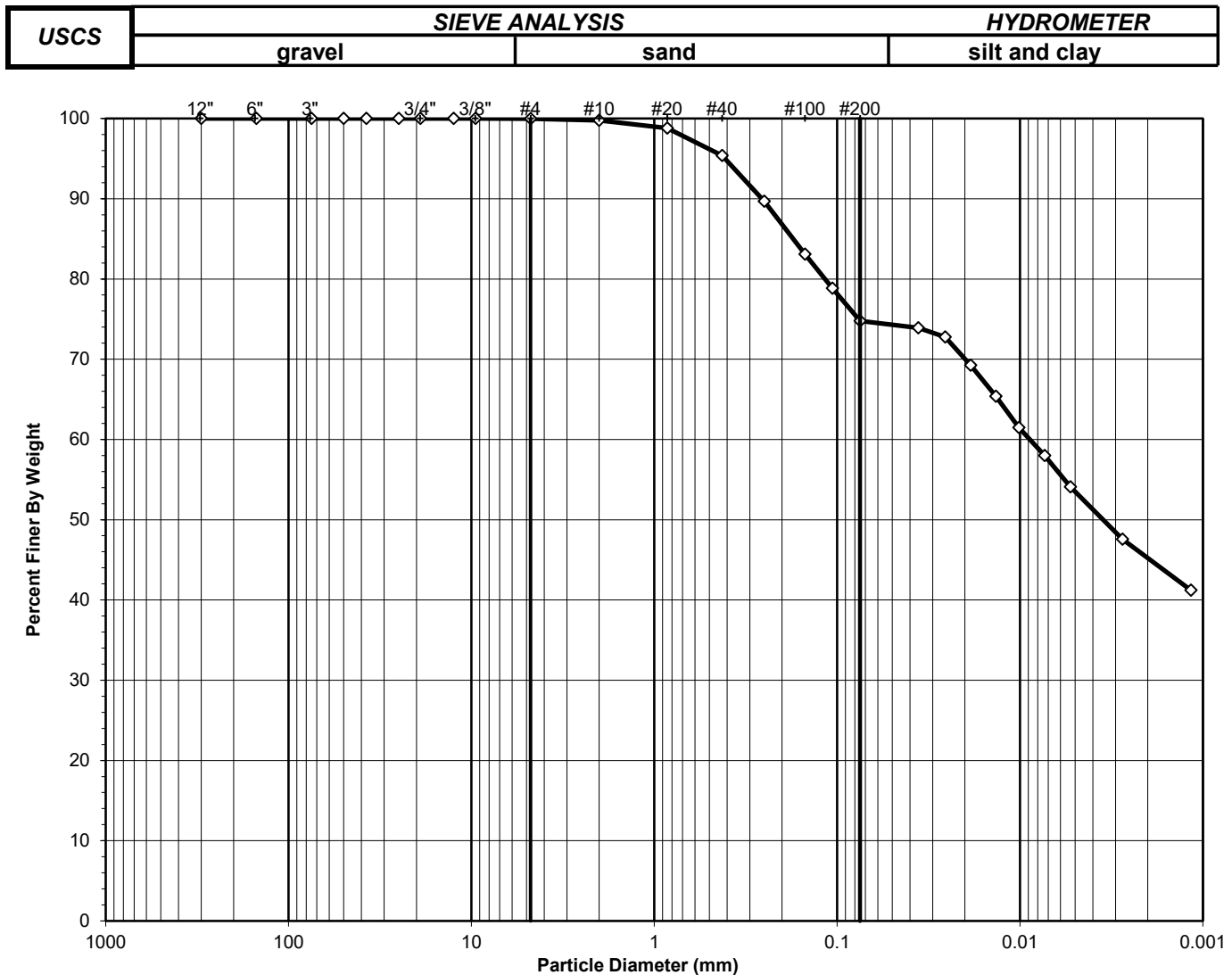


## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown



**USCS Symbol:**  
*ml, ASSUMED*

**USCS Classification:**  
**SILT WITH SAND**

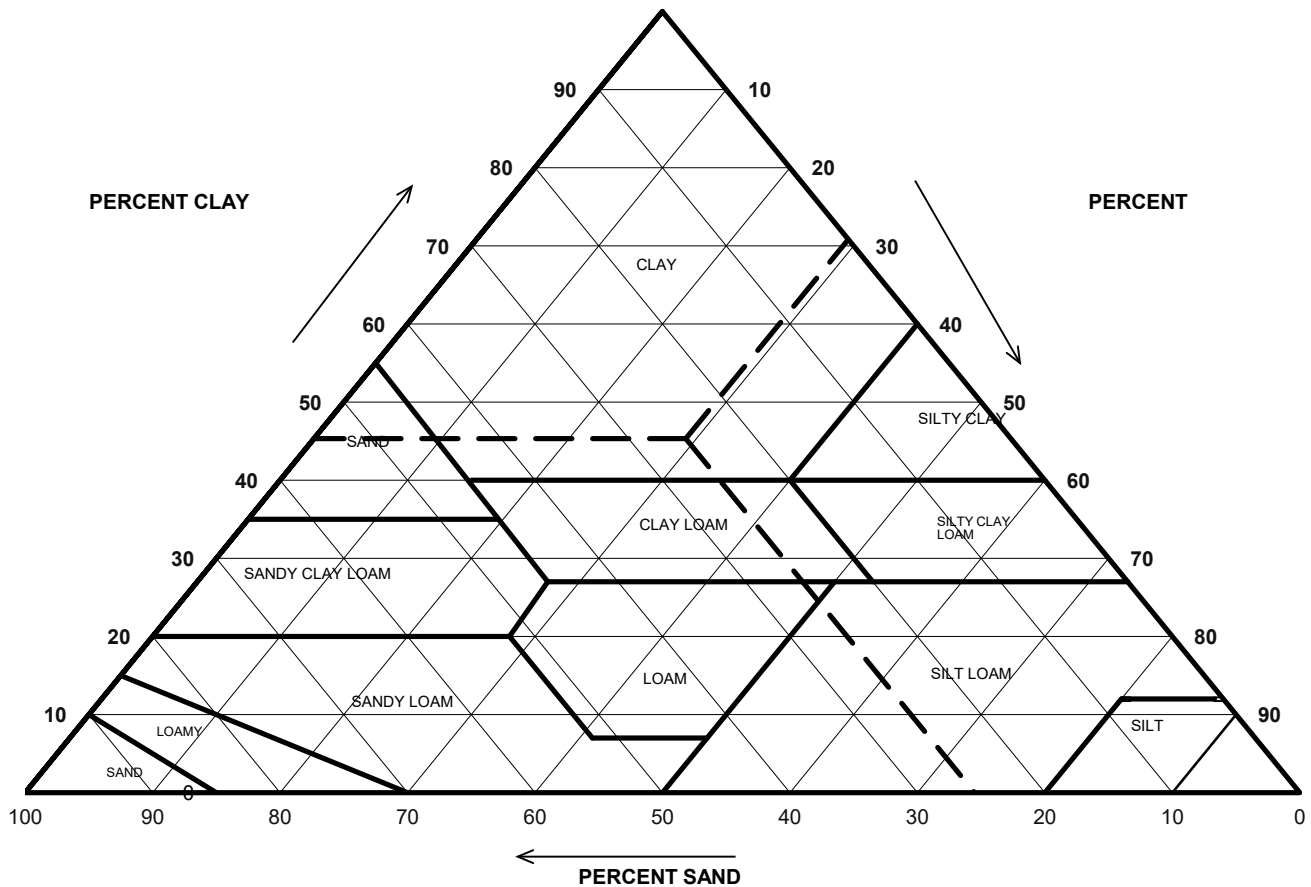
|              |             |                |             |
|--------------|-------------|----------------|-------------|
| Tested By CB | Date 6/6/25 | Checked By AES | Date 6/9/25 |
|--------------|-------------|----------------|-------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
Depth (ft): 12.0-14.0  
Sample No.: SS-7  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.25              |                                                              |
| 2                  | 99.75         | Sand   | 25.45             | 25.51                                                        |
| 0.05               | 74.30         | Silt   | 29.09             | 29.17                                                        |
| 0.002              | 45.21         | Clay   | 45.21             | 45.32                                                        |

USDA Classification: **CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 458         | Tare No.:                          | NA         | Tare No.:                                  | 458        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 796.31      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 796.31     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 714.26      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 714.26     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 145.70      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 145.70     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 82.05       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 82.05      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 568.56      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 568.56     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>14.4</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 568.56     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 568.56     |
| Tare No. (Sub-Specimen)                   | 458         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 458        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 796.31      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 796.31     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 145.70      | Dry Weight of - 3/4" Sample (g):   | 568.56     | Weight of Tare (g):                        | 145.70     | Dry Weight of - 3/4" Sample (g):   | 568.56     |
| Sub-Specimen Wet Weight (g):              | 650.61      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 650.61     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 568.56     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 568.56     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.16                        | 0.03                 | 0.03                             | 99.97             | 100.0                         |
| #10        | 2                  | 1.27                        | 0.22                 | 0.25                             | 99.75             | 99.7                          |
| #20        | 0.85               | 5.48                        | ( ** )               | 1.22                             | 98.78             | 98.8                          |
| #40        | 0.425              | 19.27                       | 3.39                 | 4.60                             | 95.40             | 95.4                          |
| #60        | 0.25               | 32.43                       | 5.70                 | 10.31                            | 89.69             | 89.7                          |
| #100       | 0.15               | 37.44                       | 6.59                 | 16.89                            | 83.11             | 83.1                          |
| #140       | 0.106              | 24.22                       | 4.26                 | 21.15                            | 78.85             | 78.8                          |
| #200       | 0.075              | 23.18                       | 4.08                 | 25.23                            | 74.77             | 74.8                          |
| Pan        | -                  | 425.11                      | 74.77                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 6/6/25 Checked By AES Date 6/9/25

## HYDROMETER ANALYSIS

ASTM D7928-21

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-3  
 Depth (ft): 12.0-14.0  
 Sample No.: SS-7  
 Soil Color: Brown

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 50.0       | 23.3       | 2.45        | 7.6                      | 0.0360 | 98.9                       | 73.9                        |
| 2                  | 49.3       | 23.3       | 2.45        | 7.7                      | 0.0257 | 97.3                       | 72.8                        |
| 4                  | 47.0       | 23.3       | 2.45        | 8.1                      | 0.0186 | 92.6                       | 69.3                        |
| 8                  | 44.5       | 23.3       | 2.45        | 8.6                      | 0.0135 | 87.4                       | 65.4                        |
| 15                 | 42.0       | 23.3       | 2.45        | 9.0                      | 0.0101 | 82.2                       | 61.5                        |
| 30                 | 39.8       | 23.3       | 2.45        | 9.4                      | 0.0073 | 77.6                       | 58.0                        |
| 60                 | 37.3       | 23.3       | 2.45        | 9.9                      | 0.0053 | 72.4                       | 54.1                        |
| 240                | 33.0       | 23.4       | 2.41        | 10.7                     | 0.0028 | 63.6                       | 47.6                        |
| 1440               | 29.0       | 23.2       | 2.49        | 11.4                     | 0.0012 | 55.1                       | 41.2                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 201    | Percent Finer than # 200: | 74.77        |
| Wt. of Tare & Dry Material (g): | 222.16 |                           |              |
| Weight of Tare (g):             | 169.60 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 47.56  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |        |            |     |      |        |
|-----------|----|------|--------|------------|-----|------|--------|
| Tested By | CB | Date | 6/5/25 | Checked By | AES | Date | 6/9/25 |
|-----------|----|------|--------|------------|-----|------|--------|

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# MOISTURE - DENSITY RELATIONSHIP

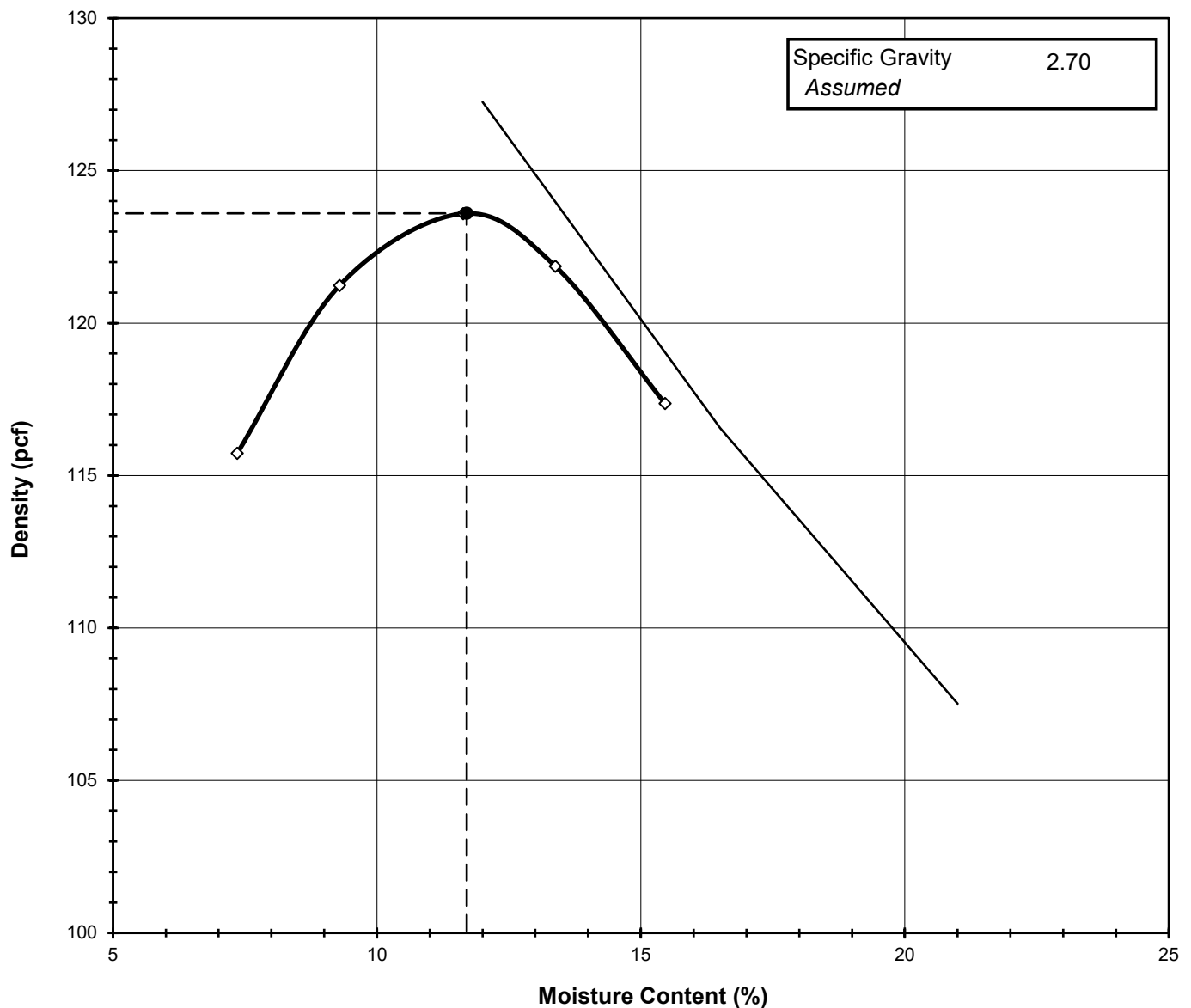
ASTM D1557-12

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
Depth (ft): 1.0-6.0  
Sample No.: S-1  
Test Method: **MODIFIED**

Visual Description: Brown Sandy Clay

**Optimum Moisture Content (%): 11.7**  
**Maximum Dry Density (pcf): 123.6**



Tested By CRW Date 6/2/25 Checked By AES Date 6/3/25

page 1 of 2 DCN:CT-S12 DATE: 4/21/23 REVISION: 17

## MOISTURE - DENSITY RELATIONSHIP

ASTM D1557-12

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
 Depth (ft): 1.0-6.0  
 Sample No.: S-1

Visual Description: Brown Sandy Clay

|                                 |              |
|---------------------------------|--------------|
| Total Weight of the Sample (g): | 28050        |
| As Received Water Content (%):  | NA           |
| Assumed Specific Gravity:       | 2.70         |
| Percent Retained on 3/4":       | NA           |
| Percent Retained on 3/8":       | NA           |
| Percent Retained on #4:         | NA           |
| Oversize Material:              | Not included |
| Procedure Used:                 | B            |

|                                        |                 |
|----------------------------------------|-----------------|
| Test Type:                             | <b>MODIFIED</b> |
| Rammer Weight (lb):                    | 10.0            |
| Rammer Drop (in):                      | 18              |
| Rammer Type:                           | MECHANICAL      |
| Machine ID:                            | R174            |
| Mold ID:                               | R607            |
| Mold diameter:                         | 4"              |
| Weight of the Mold (g):                | 4235            |
| Volume of the Mold (cm <sup>3</sup> ): | 943             |

### Mold / Specimen

| Point No.                        | 1    | 2    | 3    | 4    | 5    |
|----------------------------------|------|------|------|------|------|
| Weight of Mold & Wet Sample (g): | 6113 | 6238 | 6320 | 6323 | 6283 |
| Weight of Mold (g):              | 4235 | 4235 | 4235 | 4235 | 4235 |
| Weight of Wet Sample (g):        | 1878 | 2002 | 2085 | 2088 | 2048 |
| Mold Volume (cm <sup>3</sup> ):  | 943  | 943  | 943  | 943  | 943  |

### Moisture Content / Density

|                                  |        |        |        |        |        |
|----------------------------------|--------|--------|--------|--------|--------|
| Tare Number:                     | 444    | 482    | 426    | 705    | 719    |
| Weight of Tare & Wet Sample (g): | 351.80 | 360.00 | 365.20 | 387.90 | 354.70 |
| Weight of Tare & Dry Sample (g): | 334.49 | 337.68 | 337.52 | 352.89 | 319.46 |
| Weight of Tare (g):              | 99.10  | 97.50  | 99.50  | 91.20  | 91.50  |
| Weight of Water (g):             | 17.31  | 22.32  | 27.68  | 35.01  | 35.24  |
| Weight of Dry Sample (g):        | 235.39 | 240.18 | 238.02 | 261.69 | 227.96 |

|                                   |              |              |              |              |              |
|-----------------------------------|--------------|--------------|--------------|--------------|--------------|
| Wet Density (g/cm <sup>3</sup> ): | 1.99         | 2.12         | 2.21         | 2.21         | 2.17         |
| Wet Density (pcf):                | 124.2        | 132.5        | 138.0        | 138.2        | 135.5        |
| <b>Moisture Content (%)</b> :     | <b>7.4</b>   | <b>9.3</b>   | <b>11.6</b>  | <b>13.4</b>  | <b>15.5</b>  |
| <b>Dry Density (pcf)</b> :        | <b>115.7</b> | <b>121.2</b> | <b>123.6</b> | <b>121.9</b> | <b>117.4</b> |

### Zero Air Voids

|                                |       |       |       |
|--------------------------------|-------|-------|-------|
| <b>Moisture Content (%)</b> :  | 12.0  | 16.5  | 21.0  |
| <b>Dry Unit Weight (pcf)</b> : | 127.3 | 116.6 | 107.5 |

Tested By CRW Date 6/2/25 Checked By AES Date 6/3/25

# Minimum Resistivity

AASHTO T288-12



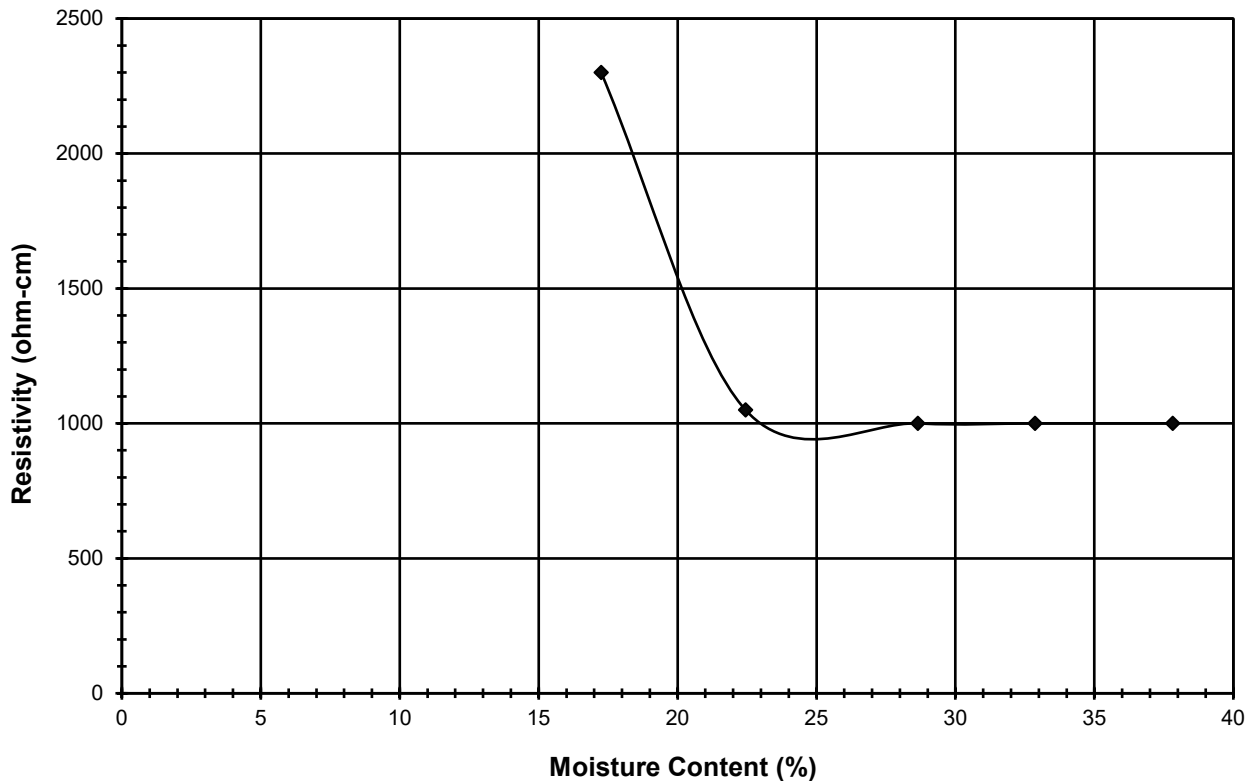
Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-008

Boring No.: B-25-4  
 Depth (ft): 1.0-6.0  
 Sample No.: S-1  
 Visual Description: Brown Clay  
 ( - #10 Sieve material )

| Tare No.:                | Z     | 7     | B2    | B8    | B19   |
|--------------------------|-------|-------|-------|-------|-------|
| Tare & Wet Specimen (g): | 29.59 | 29.62 | 29.60 | 29.58 | 29.70 |
| Tare & Dry Specimen (g): | 27.52 | 27.03 | 26.44 | 26.10 | 25.82 |
| Tare Weight (g):         | 15.52 | 15.49 | 15.41 | 15.51 | 15.56 |

|                              |             |             |             |             |             |
|------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Moisture Content (%):</b> | <b>17.3</b> | <b>22.4</b> | <b>28.6</b> | <b>32.9</b> | <b>37.8</b> |
| <b>Resistance (ohm):</b>     | <b>2300</b> | <b>1050</b> | <b>1000</b> | <b>1000</b> | <b>1000</b> |
| <b>Resistivity (ohm-cm):</b> | <b>2300</b> | <b>1050</b> | <b>1000</b> | <b>1000</b> | <b>1000</b> |

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



| Soil Class | Corrosion Resistance | Specific Resistivity (ohm-cm) |
|------------|----------------------|-------------------------------|
| 1          | Excellent            | 10,000 - 6,000                |
| 2          | Good                 | 6,000 - 4,500                 |
| 3          | Fair                 | 4,500 - 2,000                 |
| 4          | Bad                  | 2,000 - 0                     |

Tested By BS Date 6/6/25 Checked By AES Date 6/9/25

## Water-Soluble Sulfate Ion Content in Soil

### AASHTO T 290-95 (2020)

|                   |                               |                              |
|-------------------|-------------------------------|------------------------------|
| Client:           | Summit Design & Eng. Services | Boring No.: B-25-4           |
| Client Reference: | Legion Pond                   | Depth (ft): 1.0-6.0          |
| Project No.:      | R-2025-143-001                | Sample No.: S-1              |
| Lab ID:           | R-2025-143-001-008            | Soil Description: Brown Clay |

#### Sulfate Standard - Calibration Curve Spectrophotometer Readings

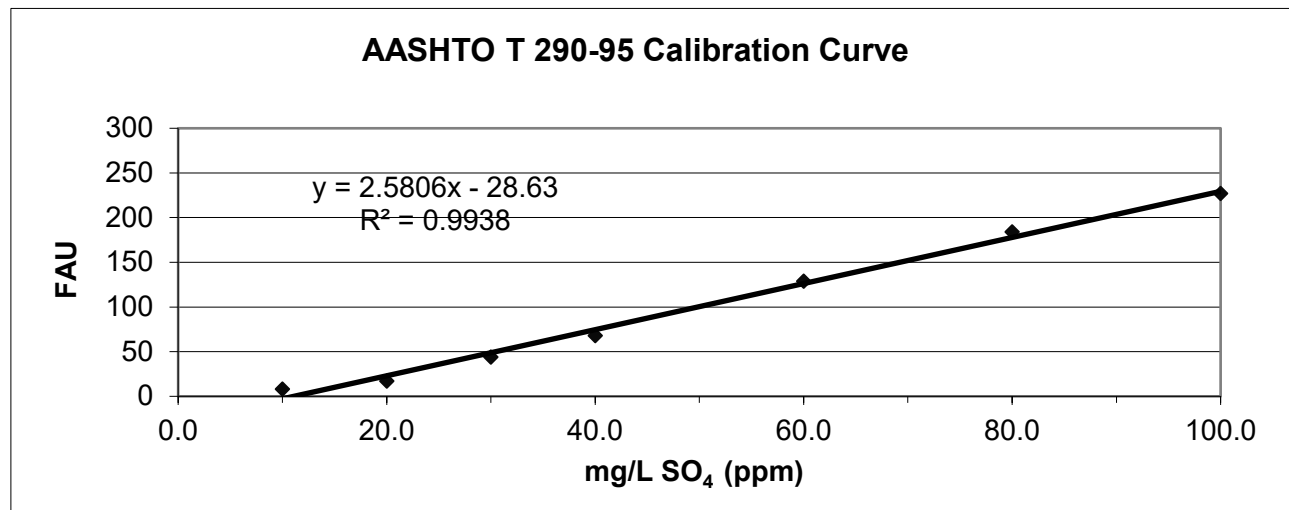
| <u>Sulfate Ion Concentrations (mg/L)</u> |            |      |      |      |      |      |      |       |
|------------------------------------------|------------|------|------|------|------|------|------|-------|
| 0.0                                      | 4.0        | 10.0 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 |
| <u>Spectrophotometer Readings (FAU)</u>  |            |      |      |      |      |      |      |       |
| Underrange                               | Underrange | 8    | 17   | 44   | 68   | 129  | 184  | 227   |

#### Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl<sub>2</sub>·2H<sub>2</sub>O)

|                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Sample Weight (g):</b> 100.0</p> <p><b>Water added to Sample (mL):</b> 300.0</p> <p><b>Size of Sample Aliquot (mL):</b> 50.0</p> <p><b>Sample Reading (FAU):</b> 10</p> <p><b>Sample Diluted:</b> No</p> <p><b>Sulfate Solution Added (ml):</b> 0</p> | <p><b><u>Sample Moisture Content</u></b></p> <p>Tare Number: 442</p> <p>Weight of Tare &amp; Wet Sample (g): 227.50</p> <p>Weight of Tare &amp; Dry Sample (g): 217.68</p> <p>Weight of Tare (g): 98.67</p> <p>Weight of Water (g): 9.82</p> <p>Weight of Dry Sample (g): 119.01</p> <p>Moisture Content (%): 8.25</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                   |       |                                                    |
|-----------------------------------|-------|----------------------------------------------------|
| Sample Sulfate Ion Concentration: | 14.97 | mg/L SO <sub>4</sub> (ppm)                         |
| Sample Sulfate Ion Content:       | 44.9  | mg/Kg SO <sub>4</sub> (not corrected for moisture) |
| Sample Sulfate Ion Content:       | 48.9  | mg/Kg SO <sub>4</sub> (corrected for moisture)     |



|               |               |                 |               |
|---------------|---------------|-----------------|---------------|
| Tested by: BS | Date: 6/11/25 | Checked by: AES | Date: 6/12/25 |
|---------------|---------------|-----------------|---------------|

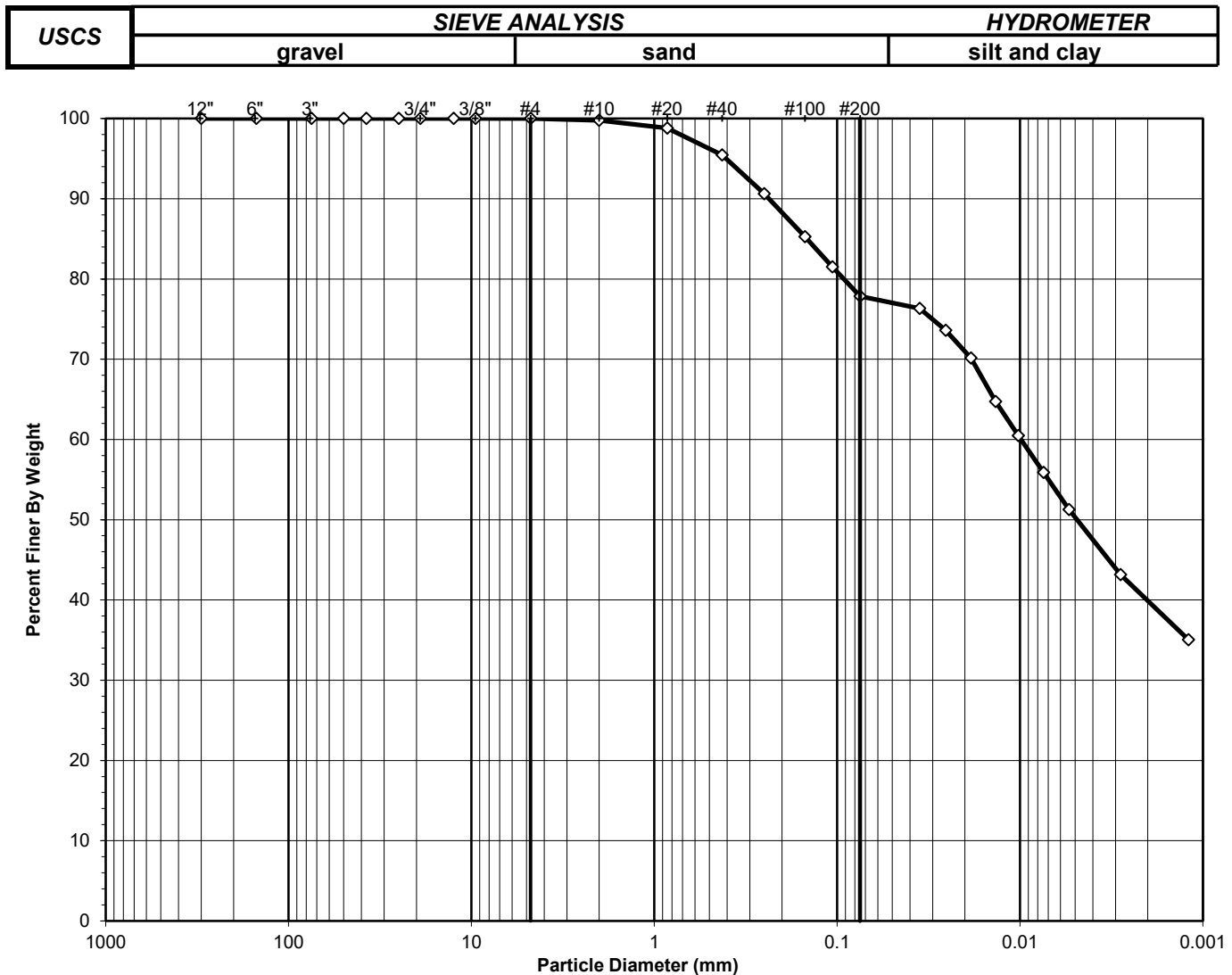


## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-009

Boring No.: B-25-4  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown



**USCS Symbol:**  
**CL, TESTED**

**USCS Classification:**  
**LEAN CLAY WITH SAND**

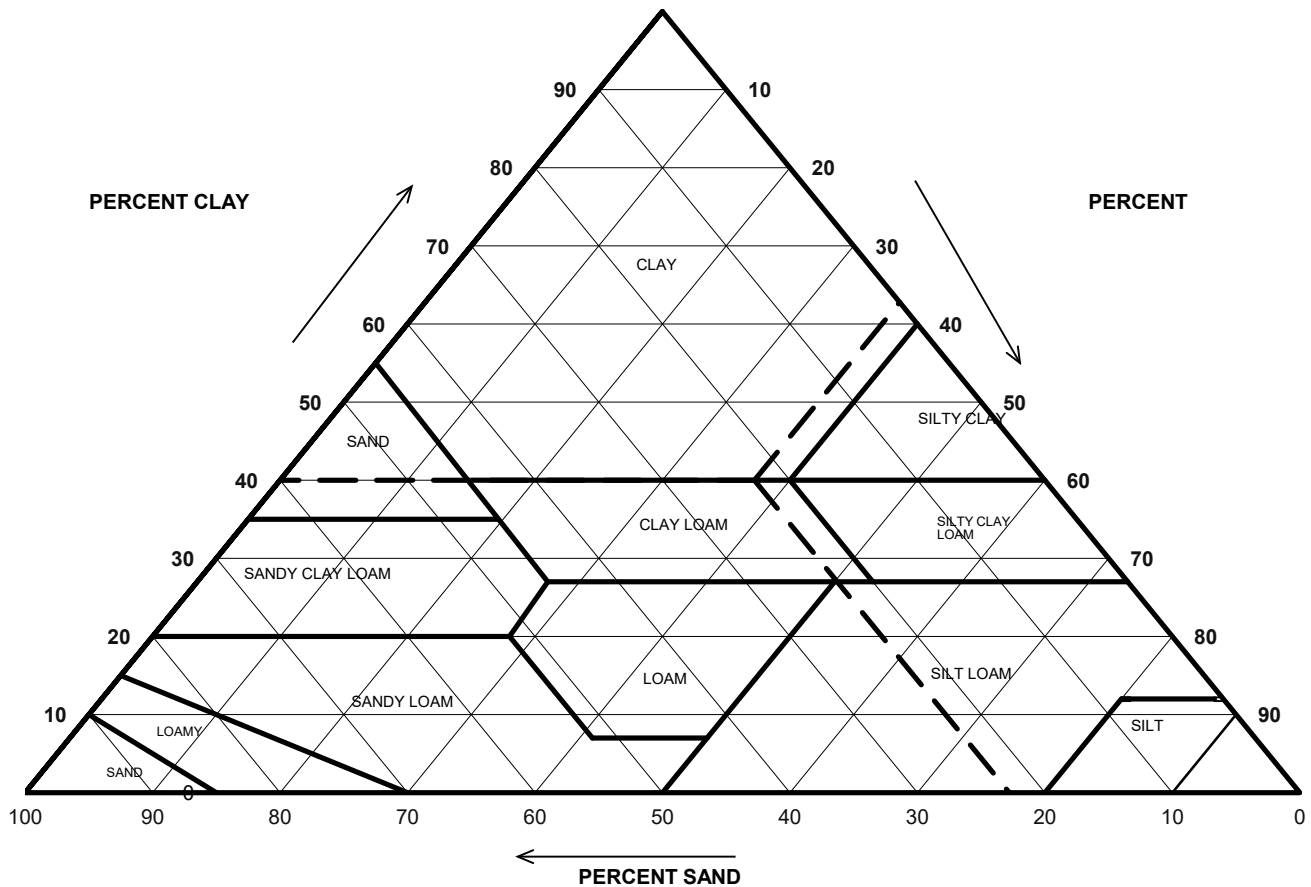
|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Tested By CB | Date 5/29/25 | Checked By AES | Date 5/29/25 |
|--------------|--------------|----------------|--------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-009

Boring No.: B-25-4  
Depth (ft): 2.0-4.0  
Sample No.: SS-2  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.24              |                                                              |
| 2                  | 99.76         | Sand   | 22.73             | 22.79                                                        |
| 0.05               | 77.02         | Silt   | 37.12             | 37.22                                                        |
| 0.002              | 39.90         | Clay   | 39.90             | 39.99                                                        |

USDA Classification: CLAY LOAM

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-009

Boring No.: B-25-4  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 469         | Tare No.:                          | NA         | Tare No.:                                  | 469        | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 498.63      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 498.63     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 452.42      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 452.42     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 146.07      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 146.07     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 46.21       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 46.21      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 306.35      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 306.35     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>15.1</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 306.35     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 306.35     |
| Tare No. (Sub-Specimen)                   | 469         | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 469        | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 498.63      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 498.63     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 146.07      | Dry Weight of - 3/4" Sample (g):   | 306.35     | Weight of Tare (g):                        | 146.07     | Dry Weight of - 3/4" Sample (g):   | 306.35     |
| Sub-Specimen Wet Weight (g):              | 352.56      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 352.56     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 306.35     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 306.35     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( * )                | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.75                        | 0.24                 | 0.24                             | 99.76             | 99.8                          |
| #20        | 0.85               | 2.89                        | ( ** )               | 1.19                             | 98.81             | 98.8                          |
| #40        | 0.425              | 10.33                       | 3.37                 | 4.56                             | 95.44             | 95.4                          |
| #60        | 0.25               | 14.73                       | 4.81                 | 9.37                             | 90.63             | 90.6                          |
| #100       | 0.15               | 16.41                       | 5.36                 | 14.72                            | 85.28             | 85.3                          |
| #140       | 0.106              | 11.55                       | 3.77                 | 18.50                            | 81.50             | 81.5                          |
| #200       | 0.075              | 11.21                       | 3.66                 | 22.15                            | 77.85             | 77.8                          |
| Pan        | -                  | 238.48                      | 77.85                | 100.00                           | -                 | -                             |

**Notes :** ( \* ) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 5/29/25 Checked By AES Date 5/29/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-4  |
| Client Reference: | Legion Pond                   | Depth (ft): | 2.0-4.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-2    |
| Lab ID:           | R-2025-143-001-009            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 52.0       | 22.9       | 2.60        | 7.2                      | 0.0353 | 98.0                       | 76.3                        |
| 2                  | 50.3       | 22.9       | 2.60        | 7.6                      | 0.0255 | 94.6                       | 73.6                        |
| 4                  | 48.0       | 22.9       | 2.60        | 8.0                      | 0.0185 | 90.1                       | 70.1                        |
| 8                  | 44.5       | 22.9       | 2.60        | 8.6                      | 0.0136 | 83.1                       | 64.7                        |
| 15                 | 41.8       | 22.9       | 2.60        | 9.1                      | 0.0102 | 77.7                       | 60.5                        |
| 30                 | 38.8       | 23.0       | 2.56        | 9.6                      | 0.0074 | 71.8                       | 55.9                        |
| 60                 | 35.8       | 23.0       | 2.56        | 10.2                     | 0.0054 | 65.9                       | 51.3                        |
| 240                | 30.5       | 23.0       | 2.56        | 11.1                     | 0.0028 | 55.4                       | 43.2                        |
| 1440               | 25.3       | 23.0       | 2.56        | 12.1                     | 0.0012 | 45.0                       | 35.0                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 217    | Percent Finer than # 200: | 77.85        |
| Wt. of Tare & Dry Material (g): | 225.29 |                           |              |
| Weight of Tare (g):             | 170.46 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 49.83  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 5/29/25 |
|-----------|----|------|---------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-009

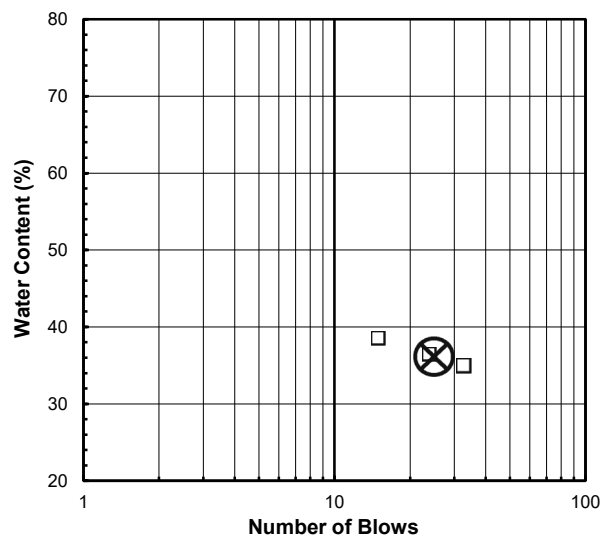
Boring No.: B-25-4  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40** (Minus #40 sieve material, Air dried)  
**sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.**

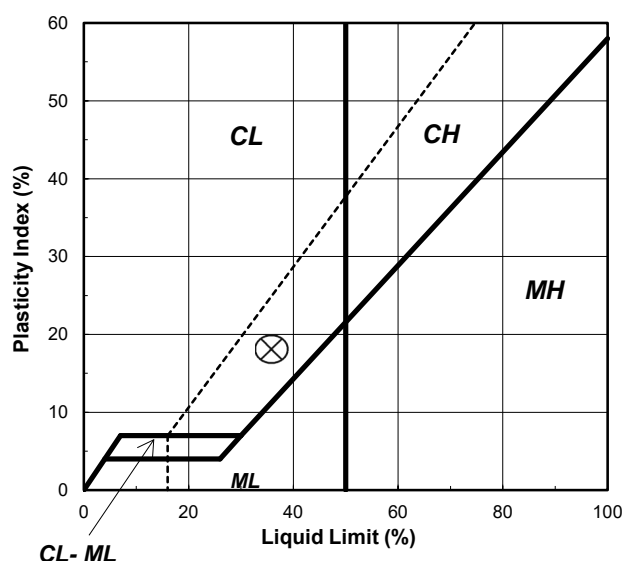
| As Received Moisture Content<br>ASTM D2216-19 |             | Liquid Limit Test |             |             |          |
|-----------------------------------------------|-------------|-------------------|-------------|-------------|----------|
| Tare Number:                                  | 469         | 1                 | 2           | 3           | M        |
| Wt. of Tare & Wet Sample (g):                 | 498.63      | A-D               | W-2         | A-N         | U        |
| Wt. of Tare & Dry Sample (g):                 | 452.42      | 30.06             | 28.56       | 32.81       | L        |
| Weight of Tare (g):                           | 146.07      | 26.24             | 25.14       | 27.95       | T        |
| Weight of Water (g):                          | 46.2        | 15.28             | 15.73       | 15.30       | I        |
| Weight of Dry Sample (g):                     | 306.4       | 3.8               | 3.4         | 4.9         | P        |
| Was As Received MC Preserved:                 | Yes         | 11.0              | 9.4         | 12.7        | O        |
| <b>Moisture Content (%):</b>                  | <b>15.1</b> | <b>34.9</b>       | <b>36.3</b> | <b>38.4</b> | <b>N</b> |
| <b>Number of Blows:</b>                       |             | <b>33</b>         | <b>24</b>   | <b>15</b>   | <b>T</b> |

| Plastic Limit Test                                                                      | 1           | 2           | Range       | Test Results                    |
|-----------------------------------------------------------------------------------------|-------------|-------------|-------------|---------------------------------|
| Tare Number:                                                                            | 18          | 29          |             | <b>Liquid Limit (%): 36</b>     |
| Wt. of Tare & Wet Sample (g):                                                           | 18.99       | 17.03       |             | <b>Plastic Limit (%): 18</b>    |
| Wt. of Tare & Dry Sample (g):                                                           | 17.14       | 15.47       |             | <b>Plasticity Index (%): 18</b> |
| Weight of Tare (g):                                                                     | 6.98        | 7.00        |             | <b>USCS Symbol: CL</b>          |
| Weight of Water (g):                                                                    | 1.9         | 1.6         |             |                                 |
| Weight of Dry Sample (g):                                                               | 10.2        | 8.5         |             |                                 |
| <b>Moisture Content (%):</b>                                                            | <b>18.2</b> | <b>18.4</b> | <b>-0.2</b> |                                 |
| <i>Note: The acceptable range of the two Moisture Contents is <math>\pm</math> 1.12</i> |             |             |             |                                 |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 5/28/25 Checked By AES Date 5/29/25

## CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-010

Boring No.: B-25-4  
 Depth (ft): 8.0-14.0  
 Sample No.: SS-5, SS-6, SS-7  
 Description: Brown Clay

( - # 10 Sieve material )

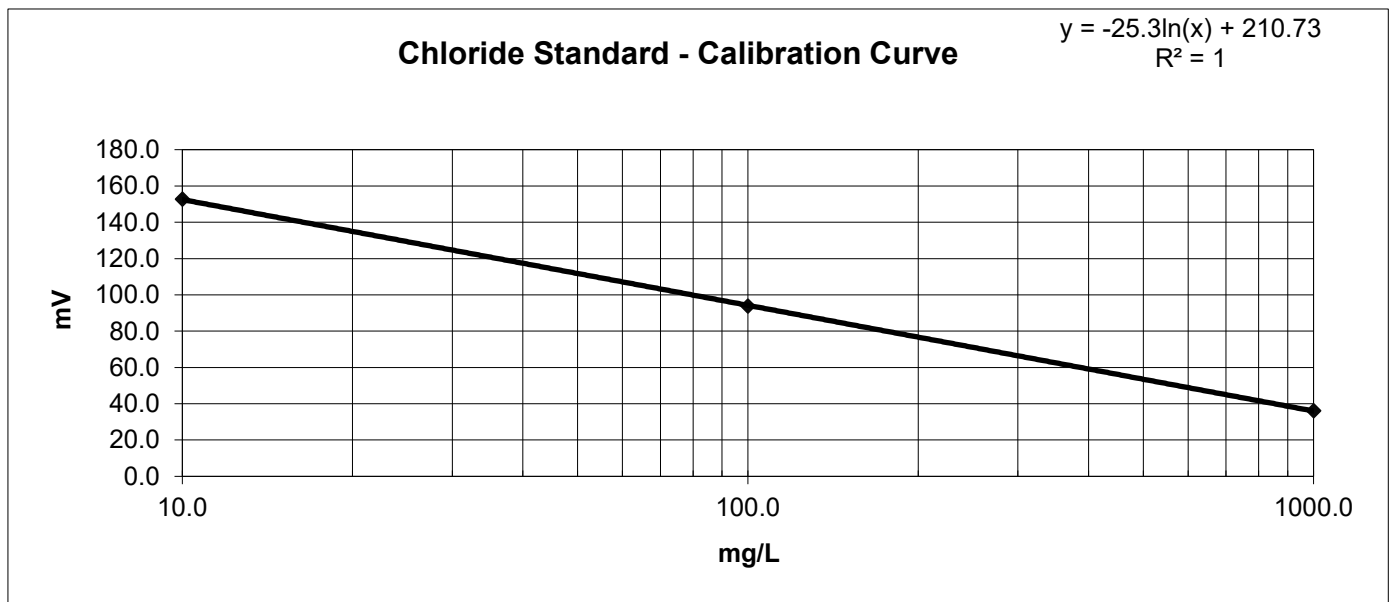
### CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD    | MILLIVOLTS<br>(mV) |
|-------------|--------------------|
| 10.0 mg/L   | 152.7              |
| 100.0 mg/L  | 93.8               |
| 1000.0 mg/L | 36.2               |

### MEASUREMENT OF CHLORIDES

|                              |       |               |               |
|------------------------------|-------|---------------|---------------|
| Sample Weight (g):           | 100.0 | CONCENTRATION | CONCENTRATION |
| Water added to Sample (ml):  | 100.0 | (mg/L)        | (mg/kg)       |
| Size of Sample Aliquot (ml): | 20.0  |               |               |
| Sample Reading (mV):         | 95.4  | 95.49         | 95.49         |

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO<sub>3</sub> solution (1:1 volume).  
 2) Samples were dried for a minimum of 12 hours at 110 ± 5°C.



Notes:

Tested By BS Date 6/10/25 Checked By AES Date 6/10/25

page 1 of 1 DCN: CT-S63A DATE: 6/2/14 REVISION: 1

# Minimum Resistivity

AASHTO T288-12



Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-010

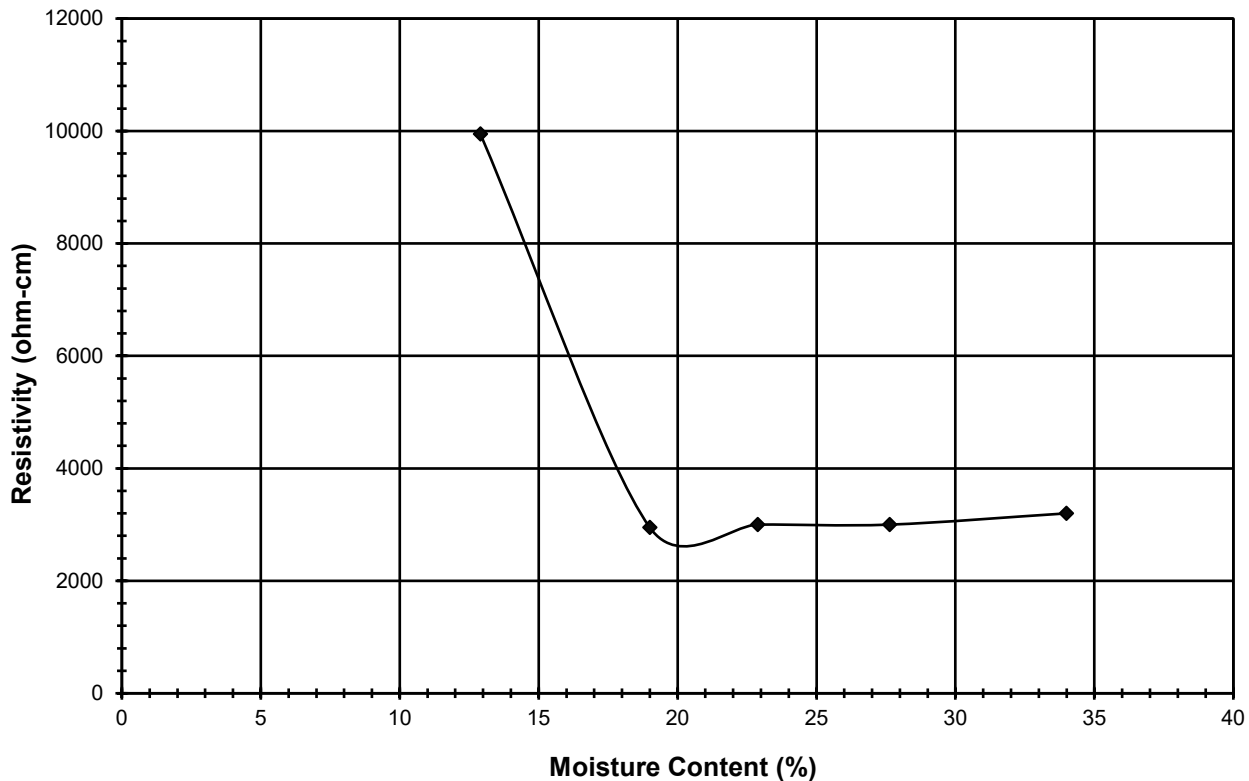
Boring No.: B-25-4  
 Depth (ft): 8.0-14.0  
 Sample No.: SS-5, SS-6, SS-7

Visual Description: Brown Clay  
 ( - #10 Sieve material )

| Tare No.:                | B5    | B11   | B12   | B16   | B18   |
|--------------------------|-------|-------|-------|-------|-------|
| Tare & Wet Specimen (g): | 29.61 | 29.36 | 29.69 | 29.95 | 29.67 |
| Tare & Dry Specimen (g): | 28.00 | 27.16 | 27.04 | 26.83 | 26.07 |
| Tare Weight (g):         | 15.52 | 15.58 | 15.46 | 15.54 | 15.48 |

|                              |             |             |             |             |             |
|------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Moisture Content (%):</b> | <b>12.9</b> | <b>19.0</b> | <b>22.9</b> | <b>27.6</b> | <b>34.0</b> |
| <b>Resistance (ohm):</b>     | <b>9950</b> | <b>2950</b> | <b>3000</b> | <b>3000</b> | <b>3200</b> |
| <b>Resistivity (ohm-cm):</b> | <b>9950</b> | <b>2950</b> | <b>3000</b> | <b>3000</b> | <b>3200</b> |

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



| Soil Class | Corrosion Resistance | Specific Resistivity (ohm-cm) |
|------------|----------------------|-------------------------------|
| 1          | Excellent            | 10,000 - 6,000                |
| 2          | Good                 | 6,000 - 4,500                 |
| 3          | Fair                 | 4,500 - 2,000                 |
| 4          | Bad                  | 2,000 - 0                     |

Tested By BS Date 6/4/25 Checked By AES Date 6/5/25

## Water-Soluble Sulfate Ion Content in Soil

### AASHTO T 290-95 (2020)

|                   |                               |                   |                  |
|-------------------|-------------------------------|-------------------|------------------|
| Client:           | Summit Design & Eng. Services | Boring No.:       | B-25-4           |
| Client Reference: | Legion Pond                   | Depth (ft):       | 8.0-14.0         |
| Project No.:      | R-2025-143-001                | Sample No.:       | SS-5, SS-6, SS-7 |
| Lab ID:           | R-2025-143-001-010            | Soil Description: | Brown Clay       |

#### Sulfate Standard - Calibration Curve Spectrophotometer Readings

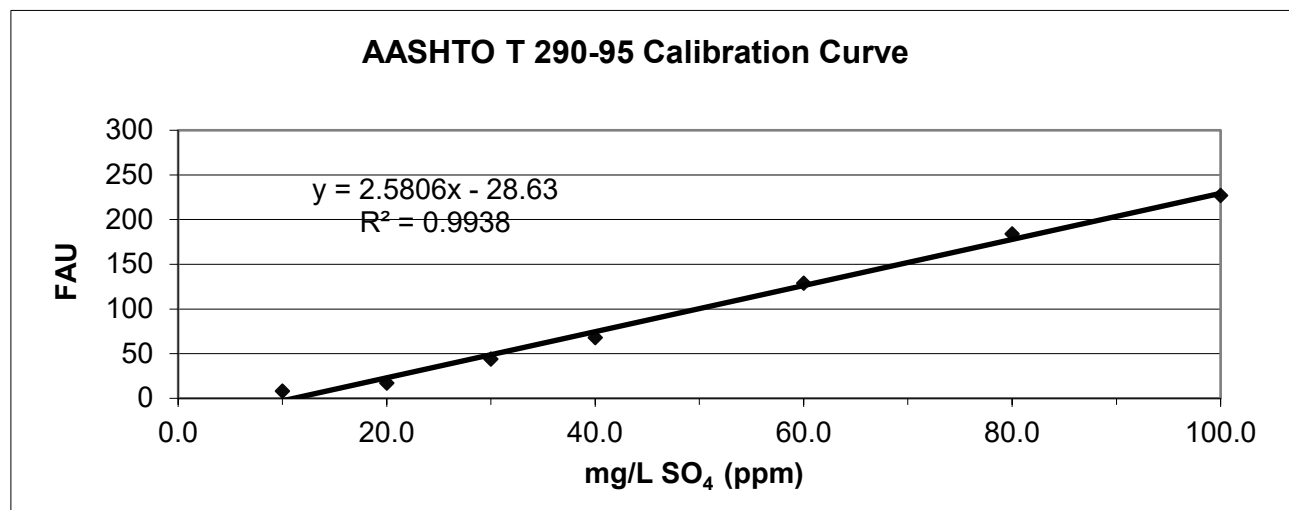
| <u>Sulfate Ion Concentrations (mg/L)</u> |            |      |      |      |      |      |      |       |
|------------------------------------------|------------|------|------|------|------|------|------|-------|
| 0.0                                      | 4.0        | 10.0 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 |
| <u>Spectrophotometer Readings (FAU)</u>  |            |      |      |      |      |      |      |       |
| Underrange                               | Underrange | 8    | 17   | 44   | 68   | 129  | 184  | 227   |

#### Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl<sub>2</sub>·2H<sub>2</sub>O)

|                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Sample Weight (g):</b> 100.0</p> <p><b>Water added to Sample (mL):</b> 300.0</p> <p><b>Size of Sample Aliquot (mL):</b> 50.0</p> <p><b>Sample Reading (FAU):</b> 9</p> <p><b>Sample Diluted:</b> No</p> <p><b>Sulfate Solution Added (ml):</b> 0</p> | <p><b><u>Sample Moisture Content</u></b></p> <p>Tare Number: 474</p> <p>Weight of Tare &amp; Wet Sample (g): 225.68</p> <p>Weight of Tare &amp; Dry Sample (g): 219.53</p> <p>Weight of Tare (g): 98.49</p> <p>Weight of Water (g): 6.15</p> <p>Weight of Dry Sample (g): 121.04</p> <p>Moisture Content (%): 5.08</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                   |       |                                                    |
|-----------------------------------|-------|----------------------------------------------------|
| Sample Sulfate Ion Concentration: | 14.58 | mg/L SO <sub>4</sub> (ppm)                         |
| Sample Sulfate Ion Content:       | 43.7  | mg/Kg SO <sub>4</sub> (not corrected for moisture) |
| Sample Sulfate Ion Content:       | 46.1  | mg/Kg SO <sub>4</sub> (corrected for moisture)     |



|            |    |       |         |             |     |       |         |
|------------|----|-------|---------|-------------|-----|-------|---------|
| Tested by: | BS | Date: | 6/11/25 | Checked by: | AES | Date: | 6/12/25 |
|------------|----|-------|---------|-------------|-----|-------|---------|



## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-011

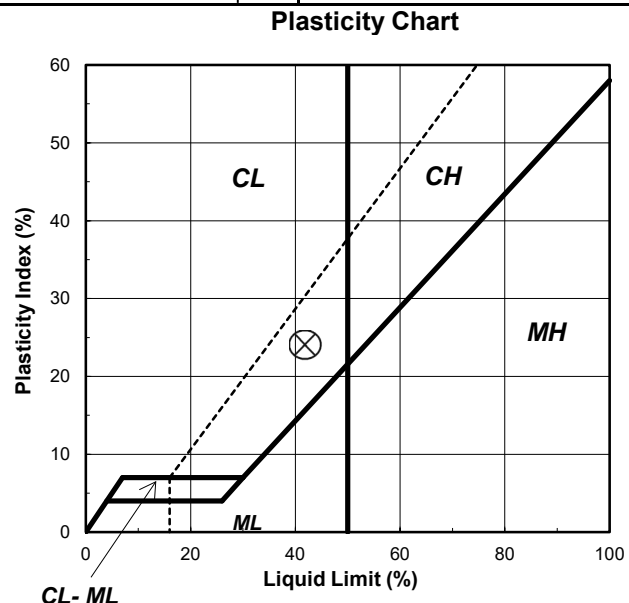
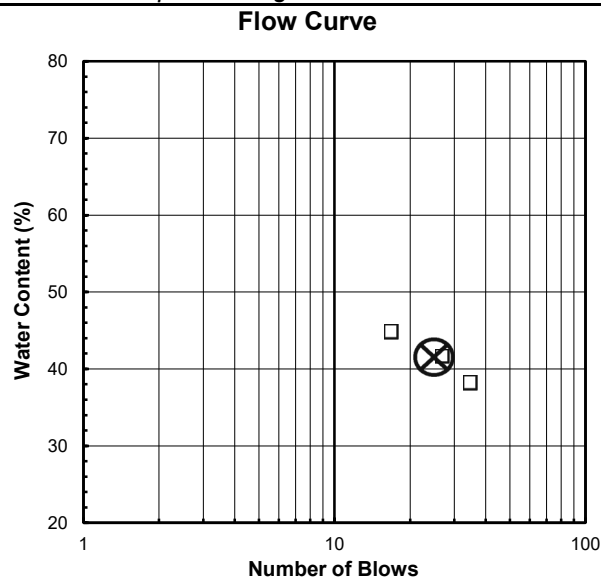
Boring No.: B-25-4  
 Depth (ft): 19.0-22.0  
 Sample No.: S-2

Soil Description: BROWN LEAN CLAY

**Note:** The USCS symbol used with this test refers only to the minus No. 40 sieve material. (Minus #40 sieve material, Air dried)  
 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

| As Received Moisture Content  |  | Liquid Limit Test |             |             |          |
|-------------------------------|--|-------------------|-------------|-------------|----------|
| ASTM D2216-19                 |  | <b>1</b>          | <b>2</b>    | <b>3</b>    | <b>M</b> |
| Tare Number:                  |  | A-C               | W           | E           | U        |
| Wt. of Tare & Wet Sample (g): |  | 29.70             | 29.45       | 29.12       | L        |
| Wt. of Tare & Dry Sample (g): |  | 25.77             | 25.22       | 24.80       | T        |
| Weight of Tare (g):           |  | 15.46             | 15.03       | 15.15       | I        |
| Weight of Water (g):          |  | 3.9               | 4.2         | 4.3         | P        |
| Weight of Dry Sample (g):     |  | 10.3              | 10.2        | 9.7         | O        |
| Was As Received MC Preserved: |  | Yes               |             |             | I        |
| <b>Moisture Content (%):</b>  |  | <b>38.1</b>       | <b>41.5</b> | <b>44.8</b> | <b>N</b> |
| <b>Number of Blows:</b>       |  | <b>35</b>         | <b>27</b>   | <b>17</b>   | <b>T</b> |

| Plastic Limit Test                                                                      | 1           | 2           | Range       | Test Results                    |
|-----------------------------------------------------------------------------------------|-------------|-------------|-------------|---------------------------------|
| Tare Number:                                                                            | 10          | 17          |             |                                 |
| Wt. of Tare & Wet Sample (g):                                                           | 14.20       | 14.30       |             |                                 |
| Wt. of Tare & Dry Sample (g):                                                           | 13.10       | 13.18       |             |                                 |
| Weight of Tare (g):                                                                     | 6.94        | 6.95        |             |                                 |
| Weight of Water (g):                                                                    | 1.1         | 1.1         |             |                                 |
| Weight of Dry Sample (g):                                                               | 6.2         | 6.2         |             |                                 |
| <b>Moisture Content (%):</b>                                                            | <b>17.9</b> | <b>18.0</b> | <b>-0.1</b> |                                 |
| <i>Note: The acceptable range of the two Moisture Contents is <math>\pm</math> 1.12</i> |             |             |             |                                 |
|                                                                                         |             |             |             | <b>Liquid Limit (%): 42</b>     |
|                                                                                         |             |             |             | <b>Plastic Limit (%): 18</b>    |
|                                                                                         |             |             |             | <b>Plasticity Index (%): 24</b> |
|                                                                                         |             |             |             | <b>USCS Symbol: CL</b>          |



Tested By JCB IV Date 6/12/25 Checked By AES Date 6/13/25

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-012

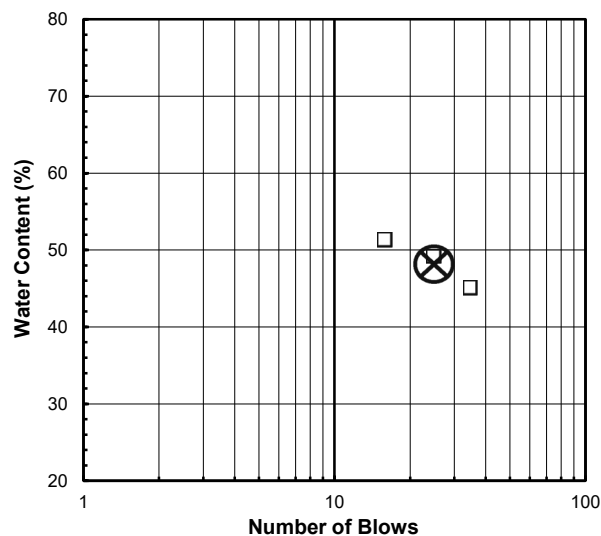
Boring No.: B-25-4  
 Depth (ft): 22.0-24.0  
 Sample No.: SS-12  
 Soil Description: BROWN LEAN CLAY

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

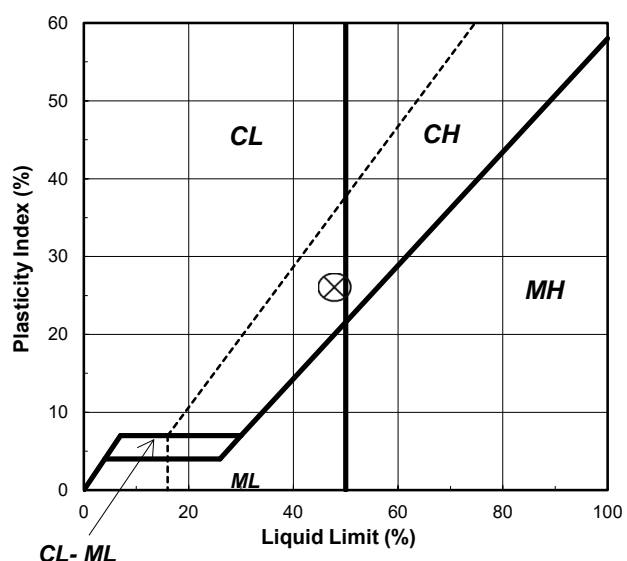
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |       |       |   |
|-----------------------------------------------|--------|-------------------|-------|-------|---|
| Tare Number:                                  | 746    | 1                 | 2     | 3     | M |
| Wt. of Tare & Wet Sample (g):                 | 448.05 | 1M                | KP    | L2    | U |
| Wt. of Tare & Dry Sample (g):                 | 392.53 | 29.53             | 30.69 | 29.23 | L |
| Weight of Tare (g):                           | 140.49 | 25.25             | 25.65 | 24.45 | T |
| Weight of Water (g):                          | 55.5   | 15.74             | 15.39 | 15.12 | I |
| Weight of Dry Sample (g):                     | 252.0  | 4.3               | 5.0   | 4.8   | P |
| Was As Received MC Preserved:                 | Yes    | 9.5               | 10.3  | 9.3   | O |
| Moisture Content (%):                         | 22.0   | 45.0              | 49.1  | 51.2  | N |
| Number of Blows:                              |        | 35                | 25    | 16    | T |

| Plastic Limit Test                                                    | 1     | 2     | Range | Test Results             |
|-----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                          | 6     | 33    |       | Liquid Limit (%): 48     |
| Wt. of Tare & Wet Sample (g):                                         | 17.09 | 16.12 |       | Plastic Limit (%): 22    |
| Wt. of Tare & Dry Sample (g):                                         | 15.30 | 14.48 |       | Plasticity Index (%): 26 |
| Weight of Tare (g):                                                   | 7.02  | 6.97  |       | USCS Symbol: CL          |
| Weight of Water (g):                                                  | 1.8   | 1.6   |       |                          |
| Weight of Dry Sample (g):                                             | 8.3   | 7.5   |       |                          |
| Moisture Content (%):                                                 | 21.6  | 21.8  | -0.2  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm$ 1.12 |       |       |       |                          |

Flow Curve



Plasticity Chart



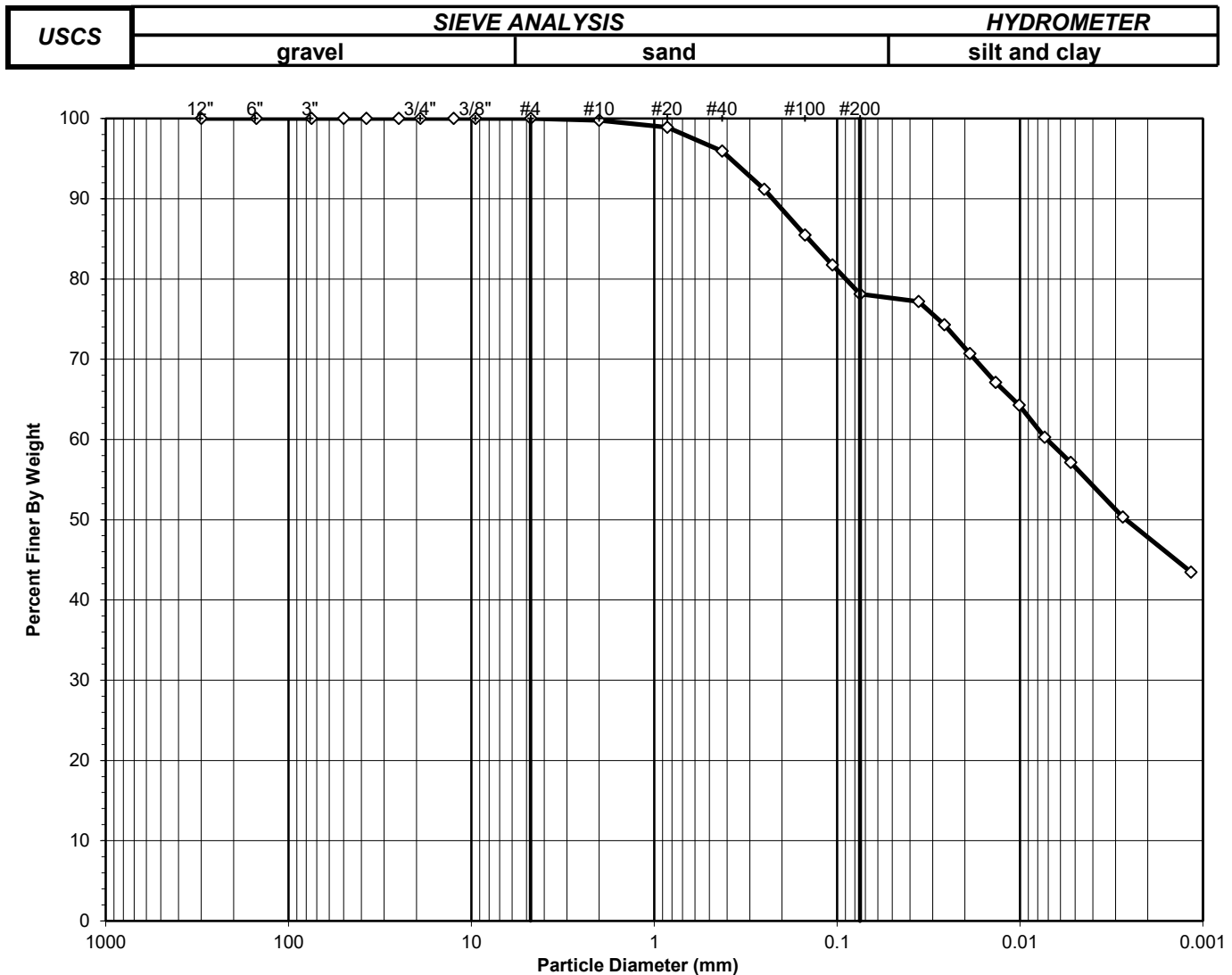
Tested By JCB IV Date 5/29/25 Checked By AES Date 6/2/25

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-013

Boring No.: B-25-5  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown



**USCS Symbol:**  
**CH, TESTED**

**USCS Classification:**  
**FAT CLAY WITH SAND**

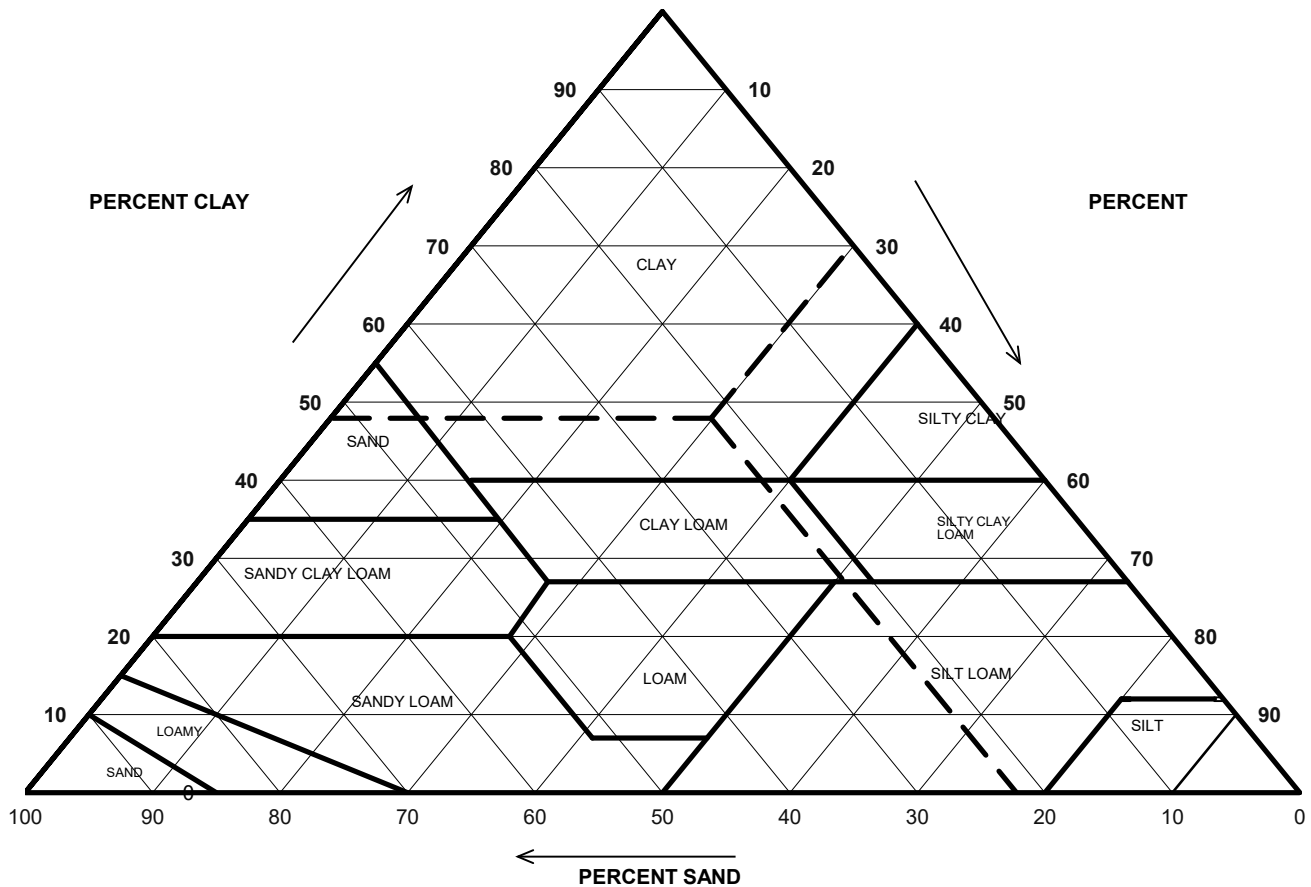
|              |              |                |              |
|--------------|--------------|----------------|--------------|
| Tested By CB | Date 5/28/25 | Checked By AES | Date 5/28/25 |
|--------------|--------------|----------------|--------------|

page 1 of 4 DCN: CT-S73T, DATE 2/25/22, REV. 1

## USDA CLASSIFICATION CHART

Client: Summit Design & Eng. Services  
Client Reference: Legion Pond  
Project No.: R-2025-143-001  
Lab ID: R-2025-143-001-013

Boring No.: B-25-5  
Depth (ft): 2.0-4.0  
Sample No.: SS-2  
Soil Color: Brown



| USDA SUMMARY       |               |        |                   |                                                              |
|--------------------|---------------|--------|-------------------|--------------------------------------------------------------|
| Particle Size (mm) | Percent Finer |        | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classification |
|                    |               | Gravel | 0.22              |                                                              |
| 2                  | 99.78         | Sand   | 22.18             | 22.23                                                        |
| 0.05               | 77.60         | Silt   | 29.78             | 29.84                                                        |
| 0.002              | 47.82         | Clay   | 47.82             | 47.93                                                        |

USDA Classification: **CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-013

Boring No.: B-25-5  
 Depth (ft): 2.0-4.0  
 Sample No.: SS-2  
 Soil Color: Brown

| Moisture Content of Passing 3/4" Material |             |                                    |            | Moisture Content of Retained 3/4" Material |            |                                    |            |
|-------------------------------------------|-------------|------------------------------------|------------|--------------------------------------------|------------|------------------------------------|------------|
| Tare No.:                                 | 37-A        | Tare No.:                          | NA         | Tare No.:                                  | 37-A       | Tare No.:                          | NA         |
| Wt. of Tare & Wet Sample (g):             | 339.87      | Weight of Tare & Wet Sample (g):   | NA         | Wt. of Tare & Wet Sample (g):              | 339.87     | Weight of Tare & Wet Sample (g):   | NA         |
| Wt. of Tare & Dry Sample (g):             | 310.12      | Weight of Tare & Dry Sample (g):   | NA         | Wt. of Tare & Dry Sample (g):              | 310.12     | Weight of Tare & Dry Sample (g):   | NA         |
| Weight of Tare (g):                       | 136.09      | Weight of Tare (g):                | NA         | Weight of Tare (g):                        | 136.09     | Weight of Tare (g):                | NA         |
| Weight of Water (g):                      | 29.75       | Weight of Water (g):               | NA         | Weight of Water (g):                       | 29.75      | Weight of Water (g):               | NA         |
| Weight of Dry Soil (g):                   | 174.03      | Weight of Dry Soil (g):            | NA         | Weight of Dry Soil (g):                    | 174.03     | Weight of Dry Soil (g):            | NA         |
| <b>Moisture Content (%):</b>              | <b>17.1</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> | <b>Moisture Content (%):</b>               | <b>0.0</b> | <b>Moisture Content (%):</b>       | <b>0.0</b> |
| Dry Weight of Sample (g):                 | NA          | Total Dry Weight of Sample (g):    | 174.03     | Dry Weight of Sample (g):                  | NA         | Total Dry Weight of Sample (g):    | 174.03     |
| Tare No. (Sub-Specimen)                   | 37-A        | Wet Weight of +3/4" Sample (g):    | 0.00       | Tare No. (Sub-Specimen)                    | 37-A       | Wet Weight of +3/4" Sample (g):    | 0.00       |
| Wt. of Tare & Wet Sub-Specimen (g):       | 339.87      | Dry Weight of + 3/4" Sample (g):   | 0.00       | Wt. of Tare & Wet Sub-Specimen (g):        | 339.87     | Dry Weight of + 3/4" Sample (g):   | 0.00       |
| Weight of Tare (g):                       | 136.09      | Dry Weight of - 3/4" Sample (g):   | 174.03     | Weight of Tare (g):                        | 136.09     | Dry Weight of - 3/4" Sample (g):   | 174.03     |
| Sub-Specimen Wet Weight (g):              | 203.78      | Dry Weight -3/4" +3/8" Sample (g): | 0.00       | Sub-Specimen Wet Weight (g):               | 203.78     | Dry Weight -3/4" +3/8" Sample (g): | 0.00       |
| Tare No. (-3/8" Sub-Specimen):            | NA          | Dry Weight of -3/8" Sample (g):    | 174.03     | Tare No. (-3/8" Sub-Specimen):             | NA         | Dry Weight of -3/8" Sample (g):    | 174.03     |
| Wt. of Tare & Wet -3/8" Sub-Specimen (g): | NA          | J - Factor (% Finer than 3/4"):    | NA         | Wt. of Tare & Wet -3/8" Sub-Specimen (g):  | NA         | J - Factor (% Finer than 3/4"):    | NA         |
| Weight of Tare (g):                       | NA          | J - Factor (% Finer than 3/8"):    | NA         | Weight of Tare (g):                        | NA         | J - Factor (% Finer than 3/8"):    | NA         |
| Sub-Specimen -3/8" Wet Weight (g):        | NA          |                                    |            | Sub-Specimen -3/8" Wet Weight (g):         | NA         |                                    |            |

| Sieve Size | Sieve Opening (mm) | Weight of Soil Retained (g) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|-----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12"        | 300                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 6"         | 150                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3"         | 75                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 2"         | 50                 | 0.00                        | ( *)                 | 0.00                             | 100.00            | 100.0                         |
| 1 1/2"     | 37.5               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1"         | 25                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 3/4"       | 19                 | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| 1/2"       | 12.5               | 0.00                        | ( ** )               | 0.00                             | 100.00            | 100.0                         |
| 3/8"       | 9.5                | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #4         | 4.75               | 0.00                        | 0.00                 | 0.00                             | 100.00            | 100.0                         |
| #10        | 2                  | 0.39                        | 0.22                 | 0.22                             | 99.78             | 99.8                          |
| #20        | 0.85               | 1.55                        | ( ** )               | 1.11                             | 98.89             | 98.9                          |
| #40        | 0.425              | 5.13                        | 2.95                 | 4.06                             | 95.94             | 95.9                          |
| #60        | 0.25               | 8.33                        | 4.79                 | 8.85                             | 91.15             | 91.2                          |
| #100       | 0.15               | 9.91                        | 5.69                 | 14.54                            | 85.46             | 85.5                          |
| #140       | 0.106              | 6.49                        | 3.73                 | 18.27                            | 81.73             | 81.7                          |
| #200       | 0.075              | 6.29                        | 3.61                 | 21.89                            | 78.11             | 78.1                          |
| Pan        | -                  | 135.94                      | 78.11                | 100.00                           | -                 | -                             |

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By CB Date 5/28/25 Checked By AES Date 5/28/25

## HYDROMETER ANALYSIS

ASTM D7928-21

|                   |                               |             |         |
|-------------------|-------------------------------|-------------|---------|
| Client:           | Summit Design & Eng. Services | Boring No.: | B-25-5  |
| Client Reference: | Legion Pond                   | Depth (ft): | 2.0-4.0 |
| Project No.:      | R-2025-143-001                | Sample No.: | SS-2    |
| Lab ID:           | R-2025-143-001-013            | Soil Color: | Brown   |

| Elapsed Time (min) | Reading mm | Temp. (C°) | Offset rd,m | Effective Depth, Hm (cm) | D (mm) | Mass Percent (%) Finer, Nm | Mass Percent (%) Finer, Nm' |
|--------------------|------------|------------|-------------|--------------------------|--------|----------------------------|-----------------------------|
| 0                  | NA         | NA         | NA          | NA                       | NA     | NA                         | NA                          |
| 1                  | 50.8       | 22.9       | 2.60        | 7.5                      | 0.0358 | 98.8                       | 77.2                        |
| 2                  | 49.0       | 22.9       | 2.60        | 7.8                      | 0.0259 | 95.1                       | 74.3                        |
| 4                  | 46.8       | 22.9       | 2.60        | 8.2                      | 0.0188 | 90.5                       | 70.7                        |
| 8                  | 44.5       | 22.9       | 2.60        | 8.6                      | 0.0136 | 85.9                       | 67.1                        |
| 15                 | 42.8       | 22.9       | 2.60        | 8.9                      | 0.0101 | 82.3                       | 64.3                        |
| 30                 | 40.3       | 22.9       | 2.60        | 9.4                      | 0.0073 | 77.2                       | 60.3                        |
| 60                 | 38.3       | 23.0       | 2.56        | 9.7                      | 0.0053 | 73.2                       | 57.1                        |
| 240                | 34.0       | 23.0       | 2.56        | 10.5                     | 0.0027 | 64.4                       | 50.3                        |
| 1440               | 29.8       | 22.9       | 2.60        | 11.2                     | 0.0012 | 55.7                       | 43.5                        |

### Soil Specimen Data

|                                 |        |                           |              |
|---------------------------------|--------|---------------------------|--------------|
| Tare No.:                       | 211    | Percent Finer than # 200: | 78.11        |
| Wt. of Tare & Dry Material (g): | 223.76 |                           |              |
| Weight of Tare (g):             | 170.52 | Specific Gravity:         | 2.70 Assumed |
| Weight of Deflocculant (g):     | 5.0    |                           |              |
| Weight of Dry Material (g):     | 48.24  |                           |              |

**Notes:** Hydrometer test is performed on - # 200 sieve material.

|                     |         |
|---------------------|---------|
| Hydrometer - 152H   | R- 480  |
| Cylinder            | R- 54   |
| Thermometer         | R- 1505 |
| Balance             | R- 657  |
| #200 Sieve          | R- 1944 |
| Foam Inhibitor Used | No      |

|           |    |      |         |            |     |      |         |
|-----------|----|------|---------|------------|-----|------|---------|
| Tested By | CB | Date | 5/27/25 | Checked By | AES | Date | 5/29/25 |
|-----------|----|------|---------|------------|-----|------|---------|

page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-013

Boring No.: B-25-5

Depth (ft): 2.0-4.0

Sample No.: SS-2

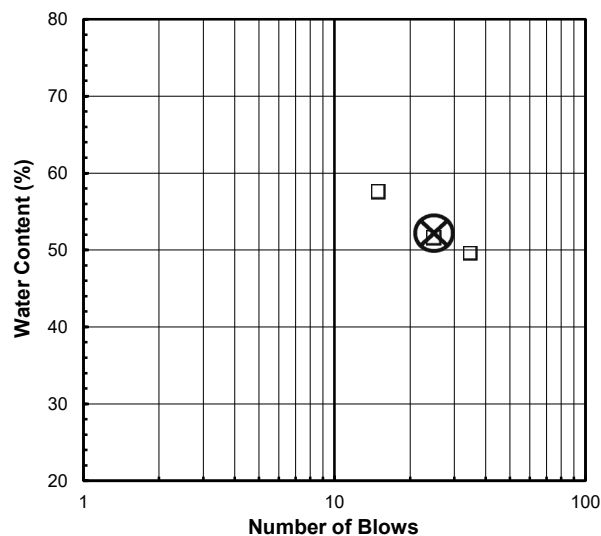
Soil Description: BROWN FAT CLAY

**Note:** The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

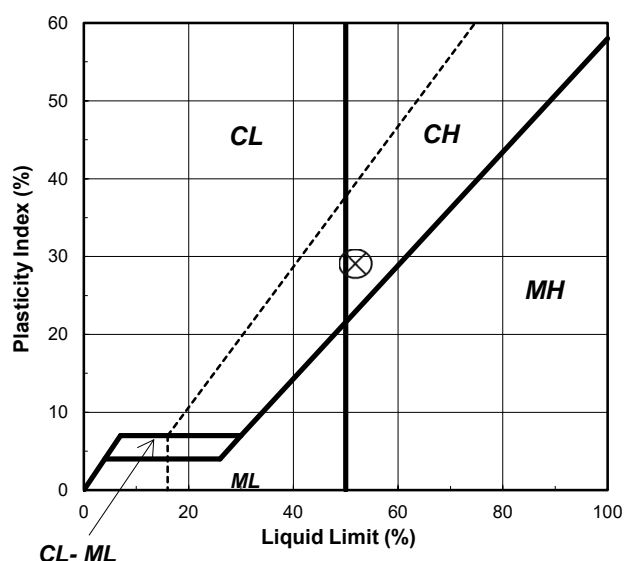
| As Received Moisture Content<br>ASTM D2216-19 |        | Liquid Limit Test |          |          |        |
|-----------------------------------------------|--------|-------------------|----------|----------|--------|
| Tare Number:                                  | 37-A   | 1<br>S            | 2<br>A-P | 3<br>W-5 | M<br>U |
| Wt. of Tare & Wet Sample (g):                 | 339.87 | 29.77             | 30.14    | 28.48    | L      |
| Wt. of Tare & Dry Sample (g):                 | 310.12 | 24.91             | 25.15    | 23.75    | T      |
| Weight of Tare (g):                           | 136.09 | 15.08             | 15.46    | 15.52    | I      |
| Weight of Water (g):                          | 29.8   | 4.9               | 5.0      | 4.7      | P      |
| Weight of Dry Sample (g):                     | 174.0  | 9.8               | 9.7      | 8.2      | O      |
| Was As Received MC Preserved:                 | Yes    |                   |          |          | I      |
| Moisture Content (%):                         | 17.1   | 49.4              | 51.5     | 57.5     | N      |
| Number of Blows:                              |        | 35                | 25       | 15       | T      |

| Plastic Limit Test                                                   | 1     | 2     | Range | Test Results             |
|----------------------------------------------------------------------|-------|-------|-------|--------------------------|
| Tare Number:                                                         | 12    | 21    |       | Liquid Limit (%): 52     |
| Wt. of Tare & Wet Sample (g):                                        | 13.43 | 13.01 |       | Plastic Limit (%): 23    |
| Wt. of Tare & Dry Sample (g):                                        | 12.23 | 11.88 |       | Plasticity Index (%): 29 |
| Weight of Tare (g):                                                  | 7.00  | 7.04  |       | USCS Symbol: CH          |
| Weight of Water (g):                                                 | 1.2   | 1.1   |       |                          |
| Weight of Dry Sample (g):                                            | 5.2   | 4.8   |       |                          |
| Moisture Content (%):                                                | 22.9  | 23.3  | -0.4  |                          |
| Note: The acceptable range of the two Moisture Contents is $\pm 1.4$ |       |       |       |                          |

Flow Curve



Plasticity Chart



Tested By JCB IV Date 6/12/25 Checked By AES Date 6/13/25

## CHLORIDE ION CONTENT IN SOILS

AASHTO T 291 - 94 (2018) (Method B)

Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-014

Boring No.: B-25-5  
 Depth (ft): 6.0-12.0  
 Sample No.: SS-4, SS-5, SS-6  
 Description: Brown Clay

( - # 10 Sieve material )

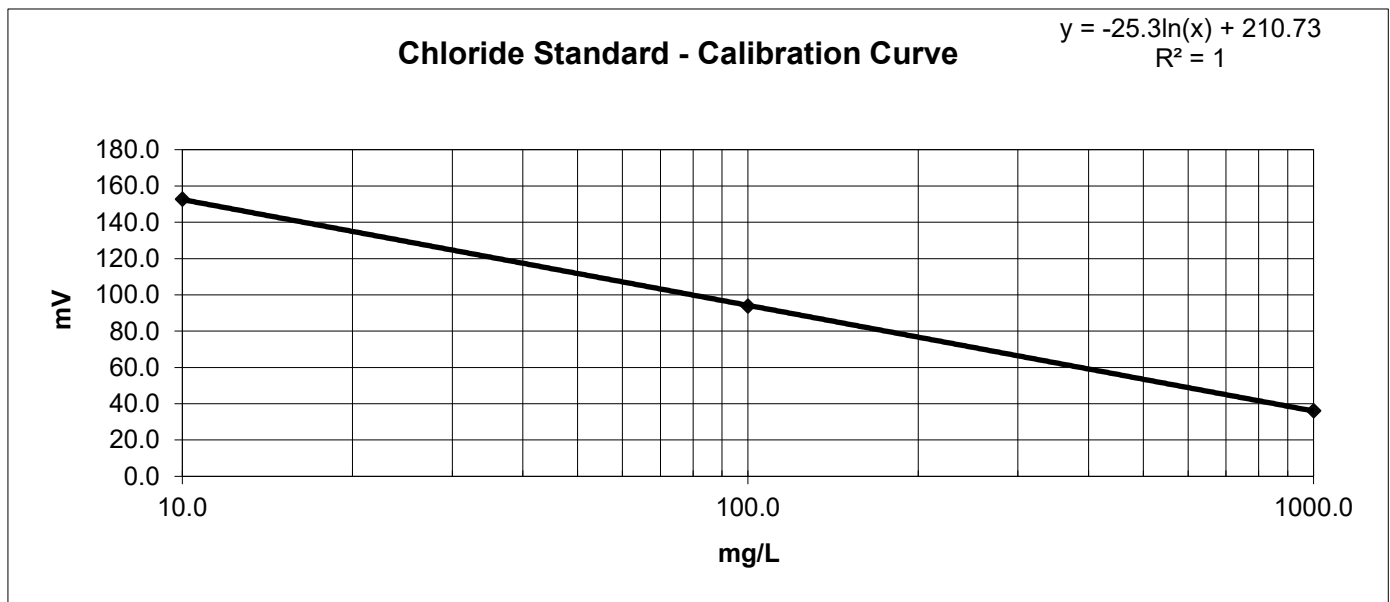
### CHLORIDE STANDARD: CALIBRATION CURVE

| STANDARD    | MILLIVOLTS<br>(mV) |
|-------------|--------------------|
| 10.0 mg/L   | 152.7              |
| 100.0 mg/L  | 93.8               |
| 1000.0 mg/L | 36.2               |

### MEASUREMENT OF CHLORIDES

|                              |       |               |               |
|------------------------------|-------|---------------|---------------|
| Sample Weight (g):           | 100.0 | CONCENTRATION | CONCENTRATION |
| Water added to Sample (ml):  | 100.0 | (mg/L)        | (mg/kg)       |
| Size of Sample Aliquot (ml): | 20.0  |               |               |
| Sample Reading (mV):         | 75.8  | 207.23        | 207.23        |

Notes: 1) Samples and standards were buffered by the addition of an equal volume of the 0.2 M KNO<sub>3</sub> solution (1:1 volume).  
 2) Samples were dried for a minimum of 12 hours at 110 ± 5°C.



Notes:

Tested By BS Date 6/10/25 Checked By AES Date 6/10/25



# Minimum Resistivity

AASHTO T288-12



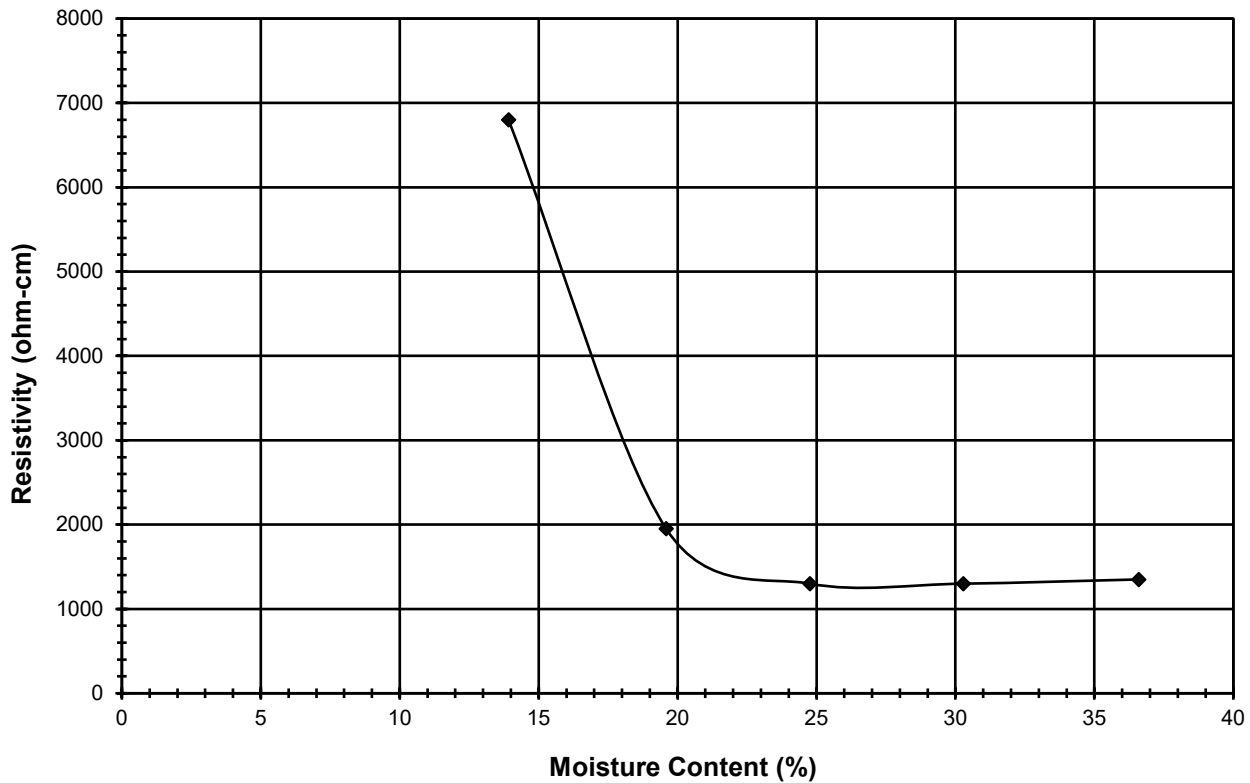
Client: Summit Design & Eng. Services  
 Client Reference: Legion Pond  
 Project No.: R-2025-143-001  
 Lab ID: R-2025-143-001-014

Boring No.: B-25-5  
 Depth (ft): 6.0-12.0  
 Sample No.: SS-4, SS-5, SS-6  
 Visual Description: Brown Clay  
 ( - #10 Sieve material )

|                          |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|
| Tare No.:                | B5    | B11   | B12   | B16   | B18   |
| Tare & Wet Specimen (g): | 29.60 | 29.63 | 29.63 | 29.66 | 29.60 |
| Tare & Dry Specimen (g): | 27.88 | 27.33 | 26.82 | 26.38 | 25.82 |
| Tare Weight (g):         | 15.52 | 15.59 | 15.47 | 15.55 | 15.49 |

|                              |             |             |             |             |             |
|------------------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Moisture Content (%):</b> | <b>13.9</b> | <b>19.6</b> | <b>24.8</b> | <b>30.3</b> | <b>36.6</b> |
| <b>Resistance (ohm):</b>     | <b>6800</b> | <b>1950</b> | <b>1300</b> | <b>1300</b> | <b>1350</b> |
| <b>Resistivity (ohm-cm):</b> | <b>6800</b> | <b>1950</b> | <b>1300</b> | <b>1300</b> | <b>1350</b> |

Note: The ratio of Miller Box area versus distance between electrodes is equal to 1.



| Soil Class | Corrosion Resistance | Specific Resistivity (ohm-cm) |
|------------|----------------------|-------------------------------|
| 1          | Excellent            | 10,000 - 6,000                |
| 2          | Good                 | 6,000 - 4,500                 |
| 3          | Fair                 | 4,500 - 2,000                 |
| 4          | Bad                  | 2,000 - 0                     |

Tested By BS Date 6/6/25 Checked By AES Date 6/9/25

## Water-Soluble Sulfate Ion Content in Soil

### AASHTO T 290-95 (2020)

|                   |                               |                              |
|-------------------|-------------------------------|------------------------------|
| Client:           | Summit Design & Eng. Services | Boring No.: B-25-5           |
| Client Reference: | Legion Pond                   | Depth (ft): 6.0-12.0         |
| Project No.:      | R-2025-143-001                | Sample No.: SS-4, SS-5, SS-6 |
| Lab ID:           | R-2025-143-001-014            | Soil Description: Brown Clay |

#### Sulfate Standard - Calibration Curve Spectrophotometer Readings

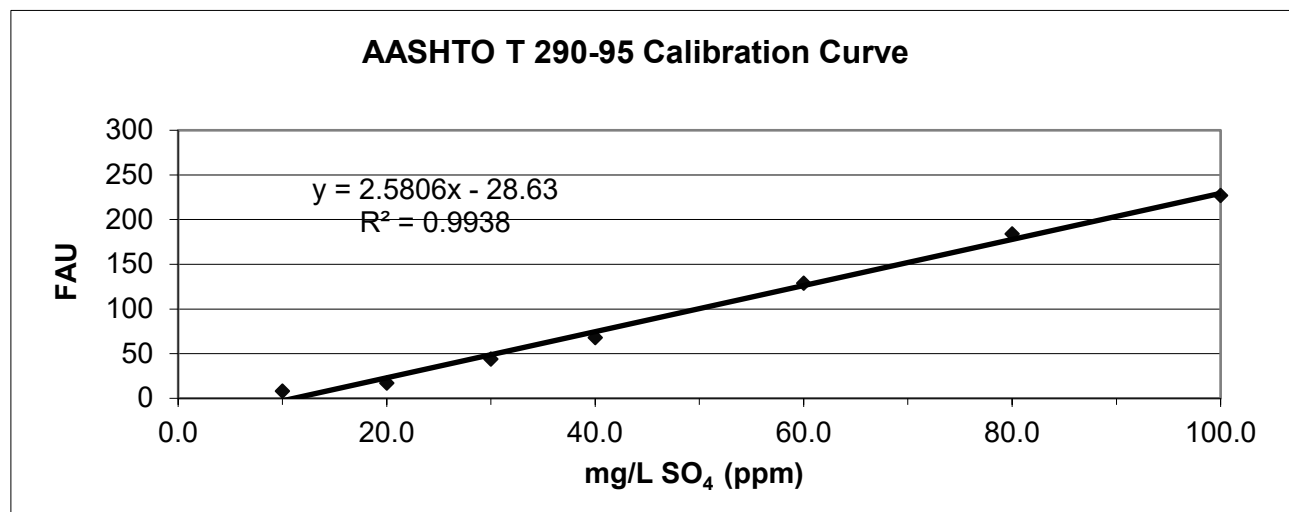
| <u>Sulfate Ion Concentrations (mg/L)</u> |            |      |      |      |      |      |      |       |
|------------------------------------------|------------|------|------|------|------|------|------|-------|
| 0.0                                      | 4.0        | 10.0 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 |
| <u>Spectrophotometer Readings (FAU)</u>  |            |      |      |      |      |      |      |       |
| Underrange                               | Underrange | 8    | 17   | 44   | 68   | 129  | 184  | 227   |

#### Measurement of Barium Chloride Turbidity

(Sample contains 5.0 mL NaCl solution and 0.3 g BaCl<sub>2</sub>·2H<sub>2</sub>O)

|                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Sample Weight (g):</b> 100.0</p> <p><b>Water added to Sample (mL):</b> 300.0</p> <p><b>Size of Sample Aliquot (mL):</b> 50.0</p> <p><b>Sample Reading (FAU):</b> 9</p> <p><b>Sample Diluted:</b> No</p> <p><b>Sulfate Solution Added (ml):</b> 0</p> | <p><b><u>Sample Moisture Content</u></b></p> <p>Tare Number: 491</p> <p>Weight of Tare &amp; Wet Sample (g): 228.89</p> <p>Weight of Tare &amp; Dry Sample (g): 221.90</p> <p>Weight of Tare (g): 100.40</p> <p>Weight of Water (g): 6.99</p> <p>Weight of Dry Sample (g): 121.50</p> <p>Moisture Content (%): 5.75</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                   |       |                                                    |
|-----------------------------------|-------|----------------------------------------------------|
| Sample Sulfate Ion Concentration: | 14.58 | mg/L SO <sub>4</sub> (ppm)                         |
| Sample Sulfate Ion Content:       | 43.7  | mg/Kg SO <sub>4</sub> (not corrected for moisture) |
| Sample Sulfate Ion Content:       | 46.4  | mg/Kg SO <sub>4</sub> (corrected for moisture)     |



|               |               |                 |               |
|---------------|---------------|-----------------|---------------|
| Tested by: BS | Date: 6/11/25 | Checked by: AES | Date: 6/12/25 |
|---------------|---------------|-----------------|---------------|

## **APPENDIX B**

### **Geotechnical Calculations**

# Bearing Capacity Analysis EM 1110-1-1905

Project: Legion Pond Dam and Wetland  
Structure: Riser

Date: 2025.08.25  
Calculated by: BKL  
Checked by: MAB

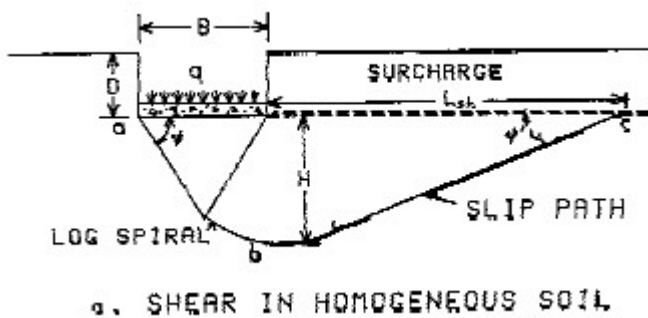
$$GWT_{El} := 300 \text{ ft} \quad GS_{El} := 300 \text{ ft} \quad D_f := 3 \text{ ft} \quad \text{Depth}$$

$$D_{GWT} := GS_{El} - GWT_{El} = 0 \text{ ft} \quad \text{Bearing}_{El} := GS_{El} - D_f = 297 \text{ ft}$$

$$B_f := 10 \text{ ft} \quad L_f := 10 \text{ ft} \quad \gamma_w := 62.4 \text{ pcf} \quad \text{Assumed Footing Dimensions}$$

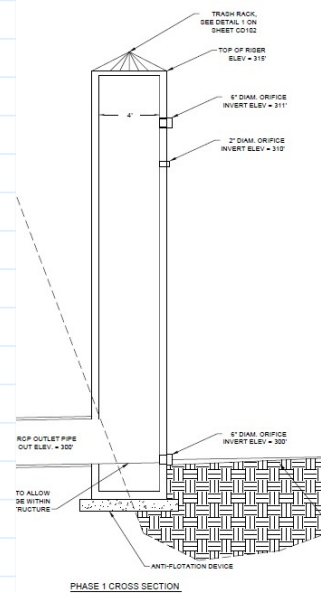
$$H_{fs} := 2 \cdot B_f = 20 \text{ ft}$$

Depth of failure surface approximately 2B (for  $\phi = 37$  deg or less). Therefore, bearing layers include 5 feet of lean clay and 15 feet of weathered mudstone.



## Soil Profile

Assume 5 ft of 900 psf strength sandy CL  
Assume 15+ ft of mudstone



## Soil Properties

$$c := 900 \text{ psf} \quad \gamma_{sat} := 128 \text{ pcf} \quad \gamma_{moist} := 124 \text{ pcf}$$

$$\phi_{pr} := 0 \text{ deg}$$

## Soil Weight and Surcharge

Water table below base of foundation Case 1:  $D_w < D$  (Coduto p. 178)

$$\gamma_{pr} := \gamma_{sat} - \gamma_w = 65.6 \text{ pcf} \quad \text{Soil unit weight for } N_\gamma \text{ term}$$

$$\sigma_{Dpr} := \gamma_{pr} \cdot 8 \text{ ft} = 524.8 \text{ psf} \quad \text{Effective stress for } N_q \text{ term (surcharge)}$$

Use higher  $D_f$  due to dam embankment surcharge

Terzaghi Model (from USACE EM 1101-1-1905, p. 4-2)

$$N_c := 5.7$$

$$N_\gamma := 0$$

$$N_q := 1$$

$$K_p := \left( \tan \left( 45 \text{ deg} + \frac{\phi_{pr}}{2} \right) \right)^2 = 1$$

for friction angle:  $\phi_{pr} = 0 \text{ deg}$

#### Shape Factors

$$s_c := 1.3$$

square footing

$$s_q := 1$$

$$s_\gamma := 0.8$$

square footing

$$FS := 3$$

(Eq. 4-1) USACE EM 1110-2-2502, Table 7.1.  
Critical Structure, Well Defined

$$q_u := \left( c \cdot N_c \cdot s_c + \frac{1}{2} \cdot B_f \cdot \gamma_{pr} \cdot N_\gamma \cdot s_\gamma + \sigma_{Dpr} \cdot N_q \cdot s_q \right) \quad (\text{Eq. 4-1})$$

$$q_u = 7.2 \text{ ksf}$$

$$q_a := \frac{q_u}{FS} = 2.4 \text{ ksf} \quad \text{Say Bearing Capacity} = 2.4 \text{ ksf}$$

#### REFERENCES

Coduto, D. 1994. Foundation Design: Principles and Practices, Prentice-Hall, Inc.

US Army Corps of Engineers, 1992. Bearing Capacity of Soils, EM 1110-1-1905

## Wall Earth Pressures

Project: Legion Pond Dam and Wetland  
Location: Headwall

Date: 09.12.25  
Calculated by: BKL  
Checked by: MB 09.12.25

### Embankment Soil Properties

$$\gamma_t := 126 \text{ pcf} \quad \text{Total soil unit weight} \quad \gamma_w := 62.4 \text{ pcf} \quad \gamma_b := \gamma_t - \gamma_w = 63.6 \text{ pcf}$$

$$\phi := 33 \text{ deg} \quad D := 5 \text{ ft}$$

$$FS_{usual} := 1.5 \quad FS_{unusual} := 1.3 \quad FS_{extreme} := 1.1$$

### **Horizontal Pressure and Equivalent Fluid Density**

#### Active

$$K_a := \left( \tan \left( 45 \text{ deg} - \frac{\phi}{2} \right) \right)^2 = 0.29 \quad EFD_{a1.5} := \gamma_t \cdot K_a = 37.1 \text{ pcf}$$

#### At Rest

$$K_0 := (1 - \sin(\phi)) = 0.455 \quad EFD_0 := \gamma_t \cdot K_0 = 57.4 \text{ pcf}$$

#### Passive

$$K_p := \left( \tan \left( 45 \text{ deg} + \frac{\phi}{2} \right) \right)^2 = 3.4 \quad EFD_{p1.5} := \gamma_t \cdot K_p = 427.4 \text{ pcf}$$

## Legion Pond

## Seepage

**B. Lawrence**  
**8/6/25**

USBR Design Requirements Seepage  
Chapter 8

### Factor of Safety for preventing sand boils/quick conditions

Min required FS for dams typically 4 for new dam, 3 for existing, and could be 2-2.5 when foundation soil properties well understood and sufficient piezometer array is available.

Not applicable for these soil conditions because foundation soils are clays to sandy clays

### Uplift of Confining Soil Layer

Not a concern because foundation materials are alternating rock and low permeability sandy clays.

### Factor of Safety for horizontal gradient

From SEEP/W near toe (conservative due to geometric effects)  
Target horizontal gradient of 0.25 or less.

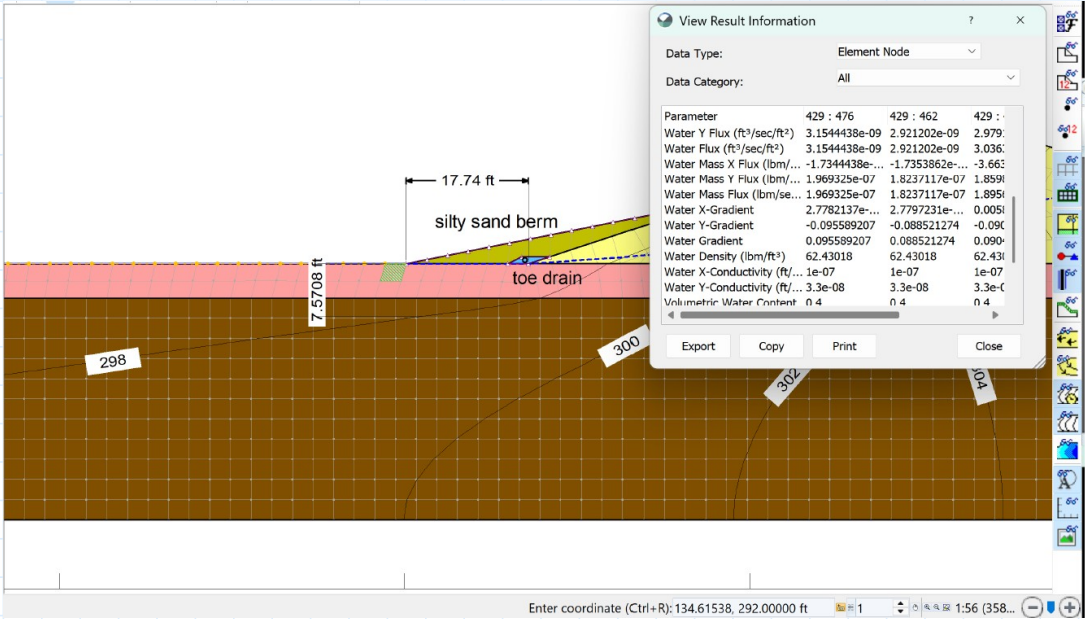
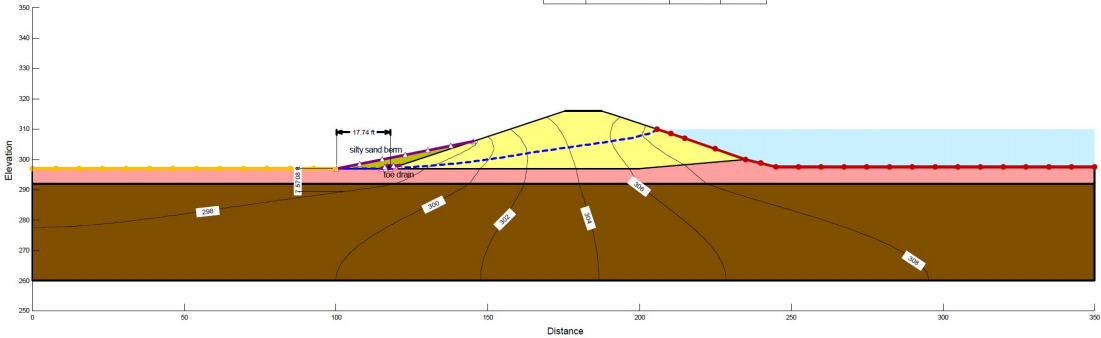
Proposed Geometry (without Berm): Gradient is 0.47, with seepage at face.  
Unacceptable. Add seepage berm and toe drain.

With seepage berm and toe drain: Gradient is 0.1 and no seepage at face.  
Acceptable.

Gradient with Seepage Berm and Drain

Legion Pond  
Description: Normal Pool Steady State Seepage Station 3+50  
File Name: Legion Pond Drain Berm.gsz

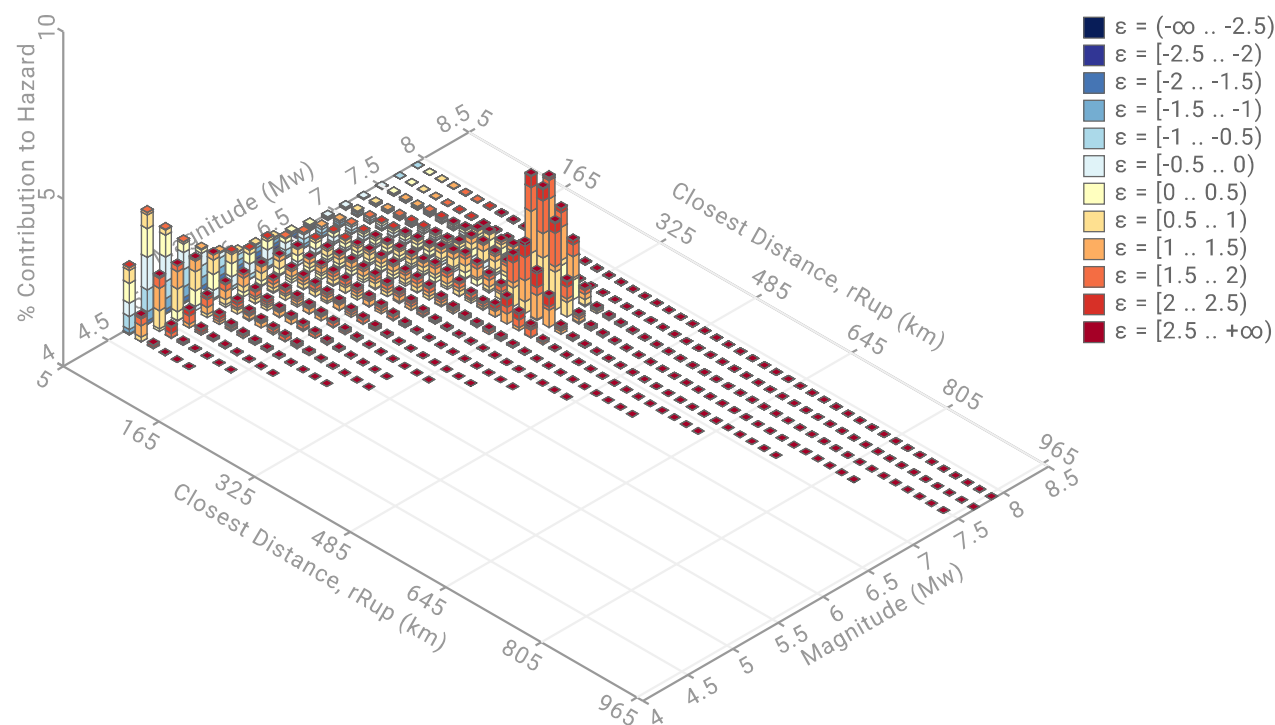
| Color                                                                                                                   | Name                    | Sat Kx (ft/sec) | Ky/Kx' Ratio |
|-------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|--------------|
| <span style="display:inline-block; width:10px; height:10px; background-color: #8B4513; border:1px solid black;"></span> | Bedrock                 | 1.6e-07         | 0.1          |
| <span style="display:inline-block; width:10px; height:10px; background-color: #FFFF00; border:1px solid black;"></span> | Fill - Drained          | 1e-07           | 0.2          |
| <span style="display:inline-block; width:10px; height:10px; background-color: #FF69B4; border:1px solid black;"></span> | Residual Clay - Drained | 1e-07           | 0.33         |
| <span style="display:inline-block; width:10px; height:10px; background-color: #9ACD32; border:1px solid black;"></span> | Silty Sand Berm         | 4.9e-05         | 1            |
| <span style="display:inline-block; width:10px; height:10px; background-color: #6495ED; border:1px solid black;"></span> | Toe Drain               | 0.003           | 1            |



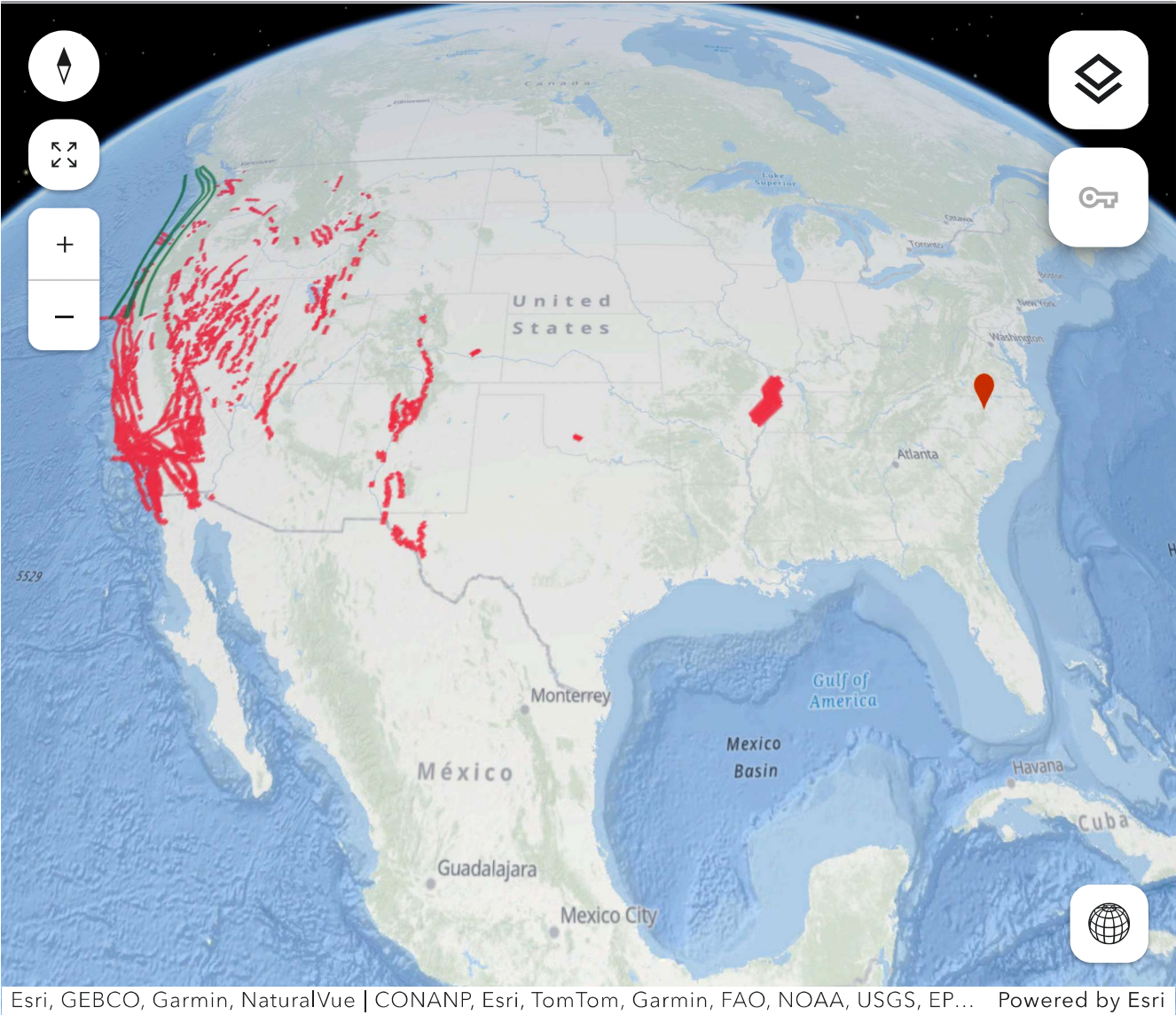


# Disaggregation Report

## Disaggregation



Geographical Disaggregation



Parameter Summary

**Model:** NSHM Conterminous U.S. 2018  
**Latitude:** 35.937225 °  
**Longitude:** -79.016836 °  
**Site Class:** CD (Vs30 365)

**Intensity Measure Type:** PGA  
**Return Period:** 10000 (1% in 100)  
**Component:** Total

## Disaggregation Summary: Total

---

### Disaggregation targets

---

**Return period** : 10000 yrs

**Exceedance rate** : 0.0001 yr<sup>-1</sup>

**PGA ground motion** : 1.553e-1 g

---

### Totals

---

**Binned** : 100 %

**Residual** : 0 %

**Trace** : 2.37 %

---

### Mode (largest m-r bin)

---

**m** : 7.3

**r** : 291.45 km

**ε<sub>0</sub>** : 1.2 σ

**Contribution** : 3.6 %

---

### Discretization

---

**r** : min = 0.0, max = 1000.0, Δ = 20.0 km

**m** : min = 4.4, max = 9.4, Δ = 0.2

**ε** : min = -3.0, max = 3.0, Δ = 0.5 σ

---

### Recovered targets

---

**Return period** : 9934.612 yrs

**Exceedance rate** : 1.007e-4 yr<sup>-1</sup>

---

### Mean (over all sources)

---

**m** : 6.49

**r** : 165.12 km

**ε<sub>0</sub>** : 0.8 σ

---

### Mode (largest m-r-ε<sub>0</sub> bin)

---

**m** : 7.3

**r** : 309.86 km

**ε<sub>0</sub>** : 0.66 σ

**Contribution** : 1.33 %

---

### Epsilon keys

---

**ε0** : [-∞ .. -2.5)

**ε1** : [-2.5 .. -2.0)

**ε2** : [-2.0 .. -1.5)

**ε3** : [-1.5 .. -1.0)

**ε4** : [-1.0 .. -0.5)

**ε5** : [-0.5 .. 0.0)

**ε6** : [0.0 .. 0.5)

**ε7** : [0.5 .. 1.0)

**ε8** : [1.0 .. 1.5)

**ε9** : [1.5 .. 2.0)

**ε10** : [2.0 .. 2.5)

**ε11** : [2.5 .. +∞]

# Disaggregation Contributions: Total

| Source Set                                | ↪ Source                           | Type | r     | m    | $\epsilon_0$ | lon      | lat      | az   | %     |
|-------------------------------------------|------------------------------------|------|-------|------|--------------|----------|----------|------|-------|
| USGS Extended Margin [2] (fixed) (opt)    |                                    | Grid |       |      |              |          |          |      | 19.01 |
|                                           | PointSourceFinite: -79.017, 36.050 |      | 13.19 | 5.24 | -0.48        | 79.017°W | 36.050°N | 0.00 | 1.2   |
|                                           | PointSourceFinite: -79.017, 36.095 |      | 17.77 | 5.32 | -0.11        | 79.017°W | 36.095°N | 0.00 | 1.17  |
|                                           | PointSourceFinite: -79.017, 36.140 |      | 22.41 | 5.41 | 0.17         | 79.017°W | 36.140°N | 0.00 | 1.03  |
| Charleston Local Zone                     |                                    | Zone |       |      |              |          |          |      | 15.07 |
| SSCn Mesozoic [4,5] (fixed) (opt)         |                                    | Grid |       |      |              |          |          |      | 14.97 |
|                                           | PointSourceFinite: -79.017, 36.050 |      | 13.19 | 5.24 | -0.48        | 79.017°W | 36.050°N | 0.00 | 1.2   |
|                                           | PointSourceFinite: -79.017, 36.095 |      | 17.77 | 5.32 | -0.11        | 79.017°W | 36.095°N | 0.00 | 1.17  |
|                                           | PointSourceFinite: -79.017, 36.140 |      | 22.41 | 5.41 | 0.17         | 79.017°W | 36.140°N | 0.00 | 1.03  |
| USGS Extended Margin [2] (adaptive) (opt) |                                    | Grid |       |      |              |          |          |      | 13.89 |
|                                           | PointSourceFinite: -79.017, 36.050 |      | 13.19 | 5.24 | -0.48        | 79.017°W | 36.050°N | 0.00 | 1.05  |
|                                           | PointSourceFinite: -79.017, 36.095 |      | 17.77 | 5.32 | -0.11        | 79.017°W | 36.095°N | 0.00 | 1.02  |
| SSCn Mesozoic [4,5] (adaptive) (opt)      |                                    | Grid |       |      |              |          |          |      | 12.11 |
|                                           | PointSourceFinite: -79.017, 36.050 |      | 13.19 | 5.24 | -0.48        | 79.017°W | 36.050°N | 0.00 | 1.05  |
|                                           | PointSourceFinite: -79.017, 36.095 |      | 17.77 | 5.32 | -0.11        | 79.017°W | 36.095°N | 0.00 | 1.02  |
| Charleston Narrow Zone                    |                                    | Zone |       |      |              |          |          |      | 10.02 |
| Charleston Regional Zone                  |                                    | Zone |       |      |              |          |          |      | 9.44  |
| SSCn Paleozoic [7] (fixed) (opt)          |                                    | Grid |       |      |              |          |          |      | 3.77  |
| SSCn Paleozoic [7] (adaptive) (opt)       |                                    | Grid |       |      |              |          |          |      | 1.65  |

## Application Metadata

---

**Application:** Disaggregation

**URL:** <https://earthquake.usgs.gov/nshmp/hazard/disagg>

**Repository:** nshmp-apps

**Version:** 20.0.3

**URL:** <https://code.usgs.gov/ghsc/nshmp/nshmp-apps>

**Repository :** nshmp-haz

**Version:** 2.6.11

**URL:** <https://code.usgs.gov/ghsc/nshmp/nshmp-haz>

**Repository :** nshmp-lib

**Version:** 1.7.7

**URL:** <https://code.usgs.gov/ghsc/nshmp/nshmp-lib>

**Repository :** nshm-conus

**Version:** 5.2.4

**URL:** <https://code.usgs.gov/ghsc/nshmp/nshms/nshm-conus.git>

---

July 18, 2025, 09:52 PM

| IMT               | PGA      | PGV      | SA0P01   | SA0P02   | SA0P03   | SA0P05   | SA0P075  | SA0P1    | SA0P15   | SA0P2    | SA0P25   | SA0P3    | SA0P4    | SA0P5    | SA0P75   | SA1P0    | SA1P5    | SA2P0    | SA3P0    | SA4P0    | SA5P0    | SA7P5    | SA10P0   |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 50 (40% in 25)    | 0.004784 | 0.371541 | 0.00492  | 0.005728 | 0.00651  | 0.008496 | 0.010634 | 0.012625 | 0.014533 | 0.014447 | 0.013487 | 0.012873 | 0.011316 | 0.009935 | 0.006561 | 0.004605 | NaN      | NaN      | NaN      | NaN      | NaN      | NaN      | NaN      |
| 100 (40% in 50)   | 0.009221 | 0.825611 | 0.0095   | 0.011367 | 0.013039 | 0.017037 | 0.020977 | 0.024556 | 0.027399 | 0.02679  | 0.024981 | 0.023801 | 0.021157 | 0.018969 | 0.013299 | 0.009769 | 0.00571  | 0.003874 | NaN      | NaN      | NaN      | NaN      | NaN      |
| 200 (40% in 100)  | 0.016485 | 1.851012 | 0.017053 | 0.02076  | 0.023934 | 0.031015 | 0.038209 | 0.04387  | 0.048092 | 0.04645  | 0.043286 | 0.041312 | 0.037612 | 0.034328 | 0.025599 | 0.019833 | 0.01278  | 0.00927  | 0.005101 | 0.003464 | 0.002445 | 0.00135  | 0.000831 |
| 225 (20% in 50)   | 0.018097 | 2.103478 | 0.018687 | 0.022805 | 0.026342 | 0.03415  | 0.041843 | 0.048118 | 0.052711 | 0.050803 | 0.047303 | 0.045084 | 0.04107  | 0.037841 | 0.028481 | 0.022066 | 0.014375 | 0.010577 | 0.005922 | 0.004067 | 0.002893 | 0.001638 | 0.001013 |
| 475 (10% in 50)   | 0.030928 | 4.420645 | 0.032052 | 0.039786 | 0.046002 | 0.059754 | 0.072478 | 0.083253 | 0.089952 | 0.086496 | 0.080757 | 0.076453 | 0.069716 | 0.064823 | 0.050847 | 0.04102  | 0.028229 | 0.021488 | 0.012764 | 0.009098 | 0.006752 | 0.004071 | 0.002645 |
| 975 (5% in 50)    | 0.048668 | 7.810018 | 0.050595 | 0.063925 | 0.073804 | 0.09537  | 0.115006 | 0.131476 | 0.140819 | 0.135351 | 0.127715 | 0.120109 | 0.108518 | 0.10087  | 0.081016 | 0.066199 | 0.046191 | 0.035845 | 0.02207  | 0.015817 | 0.011884 | 0.007262 | 0.004808 |
| 1033 (7% in 75)   | 0.050358 | 8.144205 | 0.052384 | 0.066304 | 0.076525 | 0.098721 | 0.11918  | 0.135812 | 0.145482 | 0.139775 | 0.131903 | 0.124438 | 0.112228 | 0.104202 | 0.083879 | 0.068382 | 0.047783 | 0.037199 | 0.022967 | 0.016383 | 0.012314 | 0.007564 | 0.005014 |
| 2475 (2% in 50)   | 0.081029 | 13.99504 | 0.084719 | 0.109763 | 0.126383 | 0.161995 | 0.193503 | 0.218033 | 0.231569 | 0.222237 | 0.210861 | 0.198734 | 0.177728 | 0.163599 | 0.133649 | 0.109086 | 0.076942 | 0.060487 | 0.037581 | 0.026866 | 0.020272 | 0.012691 | 0.008496 |
| 10000 (1% in 100) | 0.155281 | 26.61629 | 0.163723 | 0.220026 | 0.253018 | 0.322919 | 0.37316  | 0.4159   | 0.433245 | 0.412105 | 0.391405 | 0.365578 | 0.325039 | 0.297574 | 0.242781 | 0.199899 | 0.141916 | 0.11005  | 0.069538 | 0.049616 | 0.037576 | 0.023201 | 0.015573 |

**Legion Pond Dam  
Chapel Hill, NC**

07/18/2025

AASHTO Site Classification  
Method B - N bar method

B. Lawrence

Based on Borings B-25-3 and B-25-4

Soil 1 - Fill clays to sandy clays - existing and proposed

$$dc_1 := 17 \text{ ft} \quad N_1 := 18$$

Soil 2 - Clay/Sand

$$dc_2 := 6 \text{ ft} \quad N_2 := 25$$

Soil 3 - Mudstone and Sandstone, Weathered, interbedded with residual clay

$$dc_3 := 77 \text{ ft} \quad N_3 := 50$$

Assumed consistent from 23 to 100 feet

Average N

$$su_{bar} := \frac{100 \text{ ft}}{\frac{dc_1}{N_1} + \frac{dc_2}{N_2} + \frac{dc_3}{N_3}} = 37$$

According to AASHTO Table  
3.10.3.1-1, and ASCE 7-22, this  
is Site Class CD, so use 365 m/  
s.

Legion Pond  
Chapel Hill, NC

B. Lawrence  
7/18/25

From AASHTO LRFD Bridge Design (2017), Table  
3.10.3.1-1 Site Class Definitions and Table C3.10.3.1-1  
Steps for Site Classification, and ASCE 7-22.

Calculate N-bar for upper 100 feet of soil profile. N-bar is 37, which is  
between 15 and 50 bpf, so this would classify as Site CD.

Equivalent average shear wave velocity is:  $V_s := 365 \frac{m}{s}$

$$V_s = 365 \frac{m}{s} \quad H := 19 \text{ ft} \quad H = 5.8 \text{ m}$$

$$D_a := 15 \text{ cm} \quad M_w := 6.49$$

$$T_{sunits} := 4 \cdot \frac{H}{V_s} = 0.063 \text{ s} \quad \varepsilon := 0$$

$$T_s := \frac{T_{sunits}}{1 \text{ s}} = 0.063 \quad T_{s1.5} := 1.3 \cdot T_s = 0.083$$

$$S_{a1.3T_s} := 0.37 \quad \text{5\% damped spectral accel of site's} \\ \text{design ground motion at period of} \\ 1.3T_s$$

Using spreadsheet from Bray and Macedo (2017),  
resulting  $k = 0.04$

With this k value, if pseudostatic FS  $\geq 1.0$ , then displacement will be less than  
15 cm at 50% probability of exceedance.



### Pseudostatic Seismic Coefficient Based on the Bray and Macedo (2019) Seismic Slope Displacement Methodology

From "Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes," ASCE JGGE, 2019, 145(12), doi: 10.1061/(ASCE)GT.1943-5606.0002143

Use only for cases in which the  $PGV \leq 115 \text{ cm/s}$ . The pseudostatic slope stability method should not be used for cases with higher PGV values (i.e. intense pulse motions).

#### Input Parameters

|                                                                                                                               |      |                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------|
| $D_a$ (cm)                                                                                                                    | 15   | Allowable Seismic Displacement Threshold                                                                              |
| $T_s$ (s)                                                                                                                     | 0.06 | Initial Fundamental Period of Slide Mass                                                                              |
| $1.3T_s$ (s)                                                                                                                  | 0.08 | Degraded Period of Slide Mass                                                                                         |
| $S_a(1.3T_s)$ (g)                                                                                                             | 0.37 | Spectral Acceleration at $1.3T_s$ (5% damping) at the base of the sliding mass assuming there is no material above it |
| $M_w$                                                                                                                         | 6.49 | Moment Magnitude                                                                                                      |
| $\varepsilon$                                                                                                                 | 0    | Normally distributed random variable with zero mean and standard deviation of 0.74                                    |
| Set to 0.0 for $D_a$ at the median (50%) estimate level, and set to 0.74 for $D_a$ at the 16% probability of exceedance level |      |                                                                                                                       |

#### Intermediate Parameters

|        |        |                                 |
|--------|--------|---------------------------------|
| $x1 =$ | 0.490  | constant                        |
| $a =$  | 2.833  | Eq. 12b                         |
| $x2 =$ | 6.676  | value in parenthesis in Eq. 12c |
| $b =$  | 1.483  | Eq. 12c                         |
| $x3 =$ | -3.296 | value in parenthesis in Eq. 12a |

#### Pseudostatic k value

|       |       |
|-------|-------|
| $k =$ | 0.037 |
|-------|-------|

With this  $k$  value, if the pseudostatic  $FS \geq 1.0$ , then the displacement will be less than 15 cm at the 50% or 16% probability of exceedance level (i.e.,  $\varepsilon = 0$  or 0.74, respectively).

LEGION POND LIQUEFACTION TRIGGER

Prepared by: Brian Lawrence  
Date: 20-Jul-25

|                |        |        |                                                    |
|----------------|--------|--------|----------------------------------------------------|
| $a_{max}$      | 0.16   | % of g | peak horizontal acceleration at the ground surface |
| g              | 1      | g      | acceleration of gravity                            |
| $\gamma_t$     |        | pcf    | Soil total/moist unit weight                       |
| $\gamma_{sat}$ |        | pcf    | Soil saturated unit weight                         |
| $P_a$          | 2116.2 | psf    | Atmospheric Pressure                               |
| ER             | 0.78   |        | Drill Rig Energy Efficiency for Ce                 |
| $M_w$          | 6.49   |        | Earthquake Magnitude                               |
| MSF            | 1.45   |        | Magnitude Scale Factor                             |
| Crest Elev.    | 316    | ft     | Crest Elevation                                    |
| GWT            | 5      | ft     | Depth to groundwater table                         |
| GWT Elev       | 311    | ft     | Groundwater table elevation                        |
| $\alpha$       | 0      |        | Clean sand correction coefficient                  |
| $\beta$        | 1      |        | Clean sand correction coefficient                  |

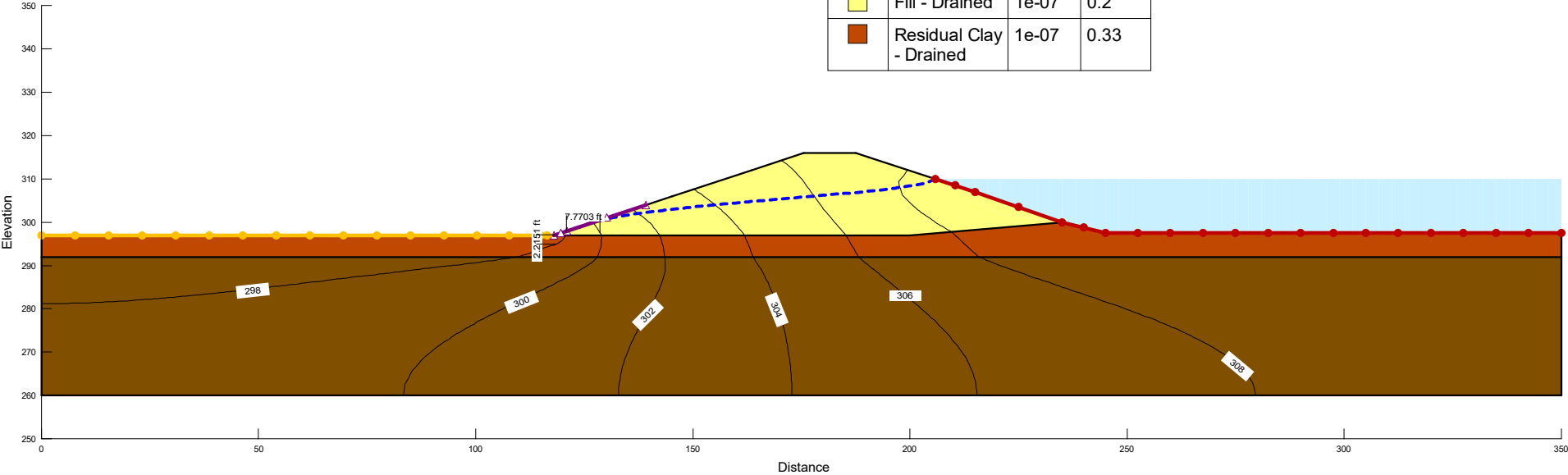
|                         |                                                                                                                                 |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| $N_m$                   | Measured standard penetration resistance                                                                                        |
| $(N_1)_{60}$            | SPT blowcount normalized to an overburden pressue of approximately 1 tsf and a hammer energy ratio/efficiency of 60%            |
| $(N_1)_{60cs}$          | Correction of $(N_1)_{60}$ to an equivalent clean sand value                                                                    |
| $\Delta(N_1)_{60cs-Sr}$ | Addition to $(N_1)_{60}$ to an equivalent clean sand value for use in determining residual strength strength of liquefied soils |
| $(N_1)_{60cs-Sr}$       | Correction of $(N_1)_{60}$ to an equivalent clean sand value for use in determining residual shear strength of liquefied soils  |
| $C_N$                   | Factor to normalize $N_m$ to a common effective overburden stress                                                               |
| $C_E$                   | Correction for hammer energy ratio (ER)                                                                                         |
| $C_B$                   | Correction for borehole diameter                                                                                                |
| $C_R$                   | Correction for rod length                                                                                                       |
| $C_S$                   | Correction for samplers with or without liners                                                                                  |
| $\sigma'_{vo}$          | Total overburden stress                                                                                                         |
| $\sigma'_{vo}$          | Effective overburden stress                                                                                                     |
| CSR                     | Cyclic Stress Ratio                                                                                                             |
| $CRR_{7.5}$             | Cyclic Resistance Ratio for 7.5 Magnitude Earthquake                                                                            |
| $FS_{liq}$              | Factor of safety against liquefaction = $CRR/CSR$                                                                               |
| Fines Content           | percent passing the #200 sieve                                                                                                  |
| $r_d$                   | Stress reduction coefficient                                                                                                    |
| $\alpha$                | Clean sand correction coefficient                                                                                               |
| $\beta$                 | Clean sand correction coefficient                                                                                               |

|  |                       |
|--|-----------------------|
|  | cells with lab data   |
|  | estimated blow counts |

| SAR LEVEE SPT FIELD DATA |      |                         |           |                       |                |             |             |             |                |                            |               |                  |         |                       |         |                        |                |                |                |                |                |                                 |   |   |                                   |                                       |                                      |                |         |                    |           |                    |
|--------------------------|------|-------------------------|-----------|-----------------------|----------------|-------------|-------------|-------------|----------------|----------------------------|---------------|------------------|---------|-----------------------|---------|------------------------|----------------|----------------|----------------|----------------|----------------|---------------------------------|---|---|-----------------------------------|---------------------------------------|--------------------------------------|----------------|---------|--------------------|-----------|--------------------|
| Borehole                 | Type | Depth Top of Layer (ft) | Depth (m) | Top of BH Elev. (ft.) | Elevation (ft) | Blowcount 1 | Blowcount 2 | Blowcount 3 | N <sub>m</sub> | Soil Classification (USCS) | Fines Content | Plasticity Index | γ (pcf) | σ <sub>vo</sub> (psf) | u (psf) | σ' <sub>vo</sub> (psf) | C <sub>N</sub> | C <sub>E</sub> | C <sub>B</sub> | C <sub>R</sub> | C <sub>S</sub> | (N <sub>1</sub> ) <sub>60</sub> | α | β | (N <sub>1</sub> ) <sub>60cs</sub> | Δ(N <sub>1</sub> ) <sub>60cs-Sr</sub> | (N <sub>1</sub> ) <sub>60cs-Sr</sub> | r <sub>d</sub> | CSR     | CRR <sub>7.5</sub> | CRR       | FS <sub>req</sub>  |
| B-23-01                  | SS   | 0                       | 0.0       | 322.0                 | 322.0          | 1           | 2           | 2           | 4              | SM                         | 42            | 2                | 115     | 0                     | 0       | 0                      | 1.83           | 1.3            | 1              | 0.75           | 1              | 7                               | 5 | 1 | 14                                | 2                                     | 9                                    | 1.00           | #DIV/0! | 0.15               | 0.21      | UNSATURATED        |
|                          | SS   | 2                       | 0.6       | 322.0                 | 320.0          | 6           | 10          | 15          | 25             | CL                         | 89            | 15               | 120     | 240                   | 0       | 240                    | 1.68           | 1.3            | 1              | 0.75           | 1              | 41                              | 5 | 1 | 54                                | 5                                     | 46                                   | 1.00           | 0.10    | TOO DENSE          | TOO DENSE | UNSATURATED        |
|                          | SS   | 4                       | 1.2       | 322.0                 | 318.0          | 6           | 26          | 50          | 76             | CL                         | 80            | 15               | 120     | 480                   | 0       | 480                    | 1.54           | 1.3            | 1              | 0.75           | 1              | 114                             | 5 | 1 | 142                               | 5                                     | 119                                  | 0.99           | 0.10    | TOO DENSE          | TOO DENSE | UNSATURATED        |
|                          | SS   | 6                       | 1.8       | 322.0                 | 316.0          | 34          | 50          | 50          | 100            | CL                         | 80            | 15               | 120     | 720                   | 62.4    | 657.6                  | 1.46           | 1.3            | 1              | 0.75           | 1              | 142                             | 5 | 1 | 175                               | 5                                     | 147                                  | 0.99           | 0.11    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 8                       | 2.4       | 322.0                 | 314.0          | 18          | 41          | 50          | 91             | CL                         | 80            | 15               | 120     | 960                   | 187.2   | 772.8                  | 1.41           | 1.3            | 1              | 0.75           | 1              | 125                             | 5 | 1 | 155                               | 5                                     | 130                                  | 0.98           | 0.13    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 10                      | 3.0       | 322.0                 | 312.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 15               | 120     | 1200                  | 312     | 888                    | 1.36           | 1.3            | 1              | 0.8            | 1              | 141                             | 5 | 1 | 175                               | 5                                     | 146                                  | 0.98           | 0.14    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 14                      | 4.3       | 322.0                 | 308.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 15               | 120     | 1680                  | 561.6   | 1118.4                 | 1.27           | 1.3            | 1              | 0.85           | 1              | 141                             | 5 | 1 | 174                               | 5                                     | 146                                  | 0.97           | 0.15    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
| B-23-02                  | SS   | 0                       | 0.0       | 320.0                 | 320.0          | 2           | 3           | 5           | 8              | CL                         | 57            | 14               | 115     | 0                     | 0       | 0                      | 1.83           | 1.3            | 1              | 0.75           | 1              | 14                              | 5 | 1 | 22                                | 4                                     | 18                                   | 1.00           | #DIV/0! | 0.24               | 0.35      | UNSATURATED        |
|                          | SS   | 2                       | 0.6       | 320.0                 | 318.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 120     | 240                   | 0       | 240                    | 1.68           | 1.3            | 1              | 0.75           | 1              | 163                             | 5 | 1 | 201                               | 5                                     | 168                                  | 1.00           | 0.10    | TOO DENSE          | TOO DENSE | UNSATURATED        |
|                          | SS   | 4                       | 1.2       | 320.0                 | 316.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 485                   | 0       | 485                    | 1.54           | 1.3            | 1              | 0.75           | 1              | 150                             | 5 | 1 | 185                               | 5                                     | 155                                  | 0.99           | 0.10    | TOO DENSE          | TOO DENSE | UNSATURATED        |
|                          | SS   | 6                       | 1.8       | 320.0                 | 314.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 735                   | 62.4    | 672.6                  | 1.45           | 1.3            | 1              | 0.75           | 1              | 141                             | 5 | 1 | 175                               | 5                                     | 146                                  | 0.99           | 0.11    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 8                       | 2.4       | 320.0                 | 312.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 985                   | 187.2   | 797.8                  | 1.40           | 1.3            | 1              | 0.75           | 1              | 136                             | 5 | 1 | 168                               | 5                                     | 141                                  | 0.98           | 0.13    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 10                      | 3.0       | 320.0                 | 310.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 1235                  | 312     | 923                    | 1.34           | 1.3            | 1              | 0.8            | 1              | 140                             | 5 | 1 | 173                               | 5                                     | 145                                  | 0.98           | 0.14    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 12                      | 3.7       | 320.0                 | 308.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 1485                  | 436.8   | 1048.2                 | 1.30           | 1.3            | 1              | 0.85           | 1              | 143                             | 5 | 1 | 177                               | 5                                     | 148                                  | 0.97           | 0.14    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 14                      | 4.3       | 320.0                 | 306.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 1735                  | 561.6   | 1173.4                 | 1.25           | 1.3            | 1              | 0.85           | 1              | 139                             | 5 | 1 | 171                               | 5                                     | 144                                  | 0.97           | 0.15    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 16                      | 4.9       | 320.0                 | 304.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 1985                  | 686.4   | 1298.6                 | 1.21           | 1.3            | 1              | 0.85           | 1              | 134                             | 5 | 1 | 166                               | 5                                     | 139                                  | 0.96           | 0.15    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 18                      | 5.5       | 320.0                 | 302.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 2235                  | 811.2   | 1423.8                 | 1.17           | 1.3            | 1              | 0.95           | 1              | 145                             | 5 | 1 | 179                               | 5                                     | 150                                  | 0.96           | 0.16    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 20                      | 6.1       | 320.0                 | 300.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 2485                  | 936     | 1549                   | 1.14           | 1.3            | 1              | 0.95           | 1              | 141                             | 5 | 1 | 174                               | 5                                     | 146                                  | 0.95           | 0.16    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 22                      | 6.7       | 320.0                 | 298.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 2735                  | 1060.8  | 1674.2                 | 1.10           | 1.3            | 1              | 0.95           | 1              | 136                             | 5 | 1 | 169                               | 5                                     | 141                                  | 0.95           | 0.16    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 24                      | 7.3       | 320.0                 | 296.0          | 33          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 2985                  | 1185.6  | 1799.4                 | 1.07           | 1.3            | 1              | 0.95           | 1              | 133                             | 5 | 1 | 164                               | 5                                     | 138                                  | 0.94           | 0.16    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 26                      | 7.9       | 320.0                 | 294.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 3235                  | 1310.4  | 1924.6                 | 1.04           | 1.3            | 1              | 0.95           | 1              | 129                             | 5 | 1 | 160                               | 5                                     | 134                                  | 0.94           | 0.16    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 28                      | 8.5       | 320.0                 | 292.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 125     | 3485                  | 1435.2  | 2049.8                 | 1.01           | 1.3            | 1              | 0.95           | 1              | 125                             | 5 | 1 | 155                               | 5                                     | 130                                  | 0.93           | 0.17    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
| B-24-03                  | SS   | 0                       | 0.0       | 316.0                 | 316.0          | 4           | 6           | 10          | 16             | CL                         |               |                  | 125     | 0                     | 0       | 0                      | 1.83           | 1.3            | 1              | 0.75           | 1              | 29                              | 0 | 1 | 29                                | 1                                     | 30                                   | 1.00           | #DIV/0! | 0.39               | 0.57      | UNSATURATED        |
|                          | SS   | 2                       | 0.6       | 316.0                 | 314.0          | 9           | 9           | 9           | 18             | CL                         | 77            | 16               | 125     | 250                   | 0       | 250                    | 1.67           | 1.3            | 1              | 0.75           | 1              | 29                              | 5 | 1 | 40                                | 5                                     | 34                                   | 1.00           | 0.10    | TOO DENSE          | TOO DENSE | UNSATURATED        |
|                          | SS   | 4                       | 1.2       | 316.0                 | 312.0          | 9           | 11          | 15          | 26             | CL                         | 75            | 12               | 125     | 500                   | 0       | 500                    | 1.53           | 1.3            | 1              | 0.75           | 1              | 39                              | 5 | 1 | 52                                | 4                                     | 43                                   | 0.99           | 0.10    | TOO DENSE          | TOO DENSE | UNSATURATED        |
|                          | SS   | 6                       | 1.8       | 316.0                 | 310.0          | 10          | 12          | 15          | 27             | CL                         | 71            | 11               | 125     | 750                   | 62.4    | 687.6                  | 1.44           | 1.3            | 1              | 0.75           | 1              | 38                              | 5 | 1 | 51                                | 4                                     | 42                                   | 0.99           | 0.11    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 8                       | 2.4       | 316.0                 | 308.0          | 7           | 10          | 13          | 23             | CL                         | 75            | 12               | 125     | 1000                  | 187.2   | 812.8                  | 1.39           | 1.3            | 1              | 0.75           | 1              | 31                              | 5 | 1 | 42                                | 4                                     | 35                                   | 0.98           | 0.13    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 10                      | 3.0       | 316.0                 | 306.0          | 11          | 14          | 13          | 27             | CL                         | 75            | 12               | 120     | 1245                  | 312     | 933                    | 1.34           | 1.3            | 1              | 0.8            | 1              | 38                              | 5 | 1 | 50                                | 4                                     | 42                                   | 0.98           | 0.14    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 12                      | 3.7       | 316.0                 | 304.0          | 3           | 5           | 5           | 10             | CL                         | 94            | 25               | 120     | 1485                  | 436.8   | 1048.2                 | 1.30           | 1.3            | 1              | 0.85           | 1              | 14                              | 5 | 1 | 22                                | 5                                     | 19                                   | 0.97           | 0.14    | 0.24               | 0.35      | CLAY-LIKE BEHAVIOR |
|                          | SS   | 14                      | 4.3       | 316.0                 | 302.0          | 6           | 9           | 12          | 21             | CL                         | 95            | 25               | 115     | 1720                  | 561.6   | 1158.4                 | 1.26           | 1.3            | 1              | 0.85           | 1              | 29                              | 5 | 1 | 40                                | 5                                     | 34                                   | 0.97           | 0.15    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 16                      | 4.9       | 316.0                 | 300.0          | 18          | 25          | 22          | 47             | CL                         | 97            | 25               | 115     | 1950                  | 686.4   | 1263.6                 | 1.22           | 1.3            | 1              | 0.85           | 1              | 64                              | 5 | 1 | 81                                | 5                                     | 69                                   | 0.96           | 0.15    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 18                      | 5.5       | 316.0                 | 298.0          | 7           | 10          | 24          | 34             | CL                         | 95            | 25               | 115     | 2180                  | 811.2   | 1368.8                 | 1.19           | 1.3            | 1              | 0.95           | 1              | 50                              | 5 | 1 | 65                                | 5                                     | 55                                   | 0.96           | 0.16    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 20                      | 6.1       | 316.0                 | 296.0          | 26          | 29          | 50          | 79             | CL                         | 95            | 25               | 115     | 2410                  | 936     | 1474                   | 1.16           | 1.3            | 1              | 0.95           | 1              | 113                             | 5 | 1 | 141                               | 5                                     | 118                                  | 0.95           | 0.16    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 22                      | 6.7       | 316.0                 | 294.0          | 8           | 42          | 50          | 92             | CL                         | 95            | 25               | 120     | 2645                  | 1060.8  | 1584.2                 | 1.13           | 1.3            | 1              | 0.95           | 1              | 128                             | 5 | 1 | 159                               | 5                                     | 133                                  | 0.95           | 0.16    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 24                      | 7.3       | 316.0                 | 292.0          | 50          | 50          | 50          | 100            | CL                         | 80            | 45               | 130     | 2895                  | 1185.6  | 1709.4                 | 1.10           | 1.3            | 1              | 0.95           | 1              | 135                             | 5 | 1 | 167                               | 5                                     | 140                                  | 0.94           | 0.17    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 26                      | 7.9       | 316.0                 | 290.0          | 16          | 29          | 50          | 79             | CL                         | 80            | 45               | 135     | 3160                  | 1310.4  | 1849.6                 | 1.06           | 1.3            | 1              | 0.95           | 1              | 103                             | 5 | 1 | 129                               | 5                                     | 108                                  | 0.94           | 0.17    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
|                          | SS   | 28                      | 8.5       | 316.0                 | 288.0          | 30          | 50          | 50          | 100            | CL                         | 80            | 45               | 130     | 3425                  | 1435.2  | 1989.8                 | 1.03           | 1.3            | 1              | 0.95           | 1              | 127                             | 5 | 1 | 157                               | 5                                     | 132                                  | 0.93           | 0.17    | TOO DENSE          | TOO DENSE | CLAY-LIKE BEHAVIOR |
| B-24-04                  | SS   | 0                       | 0.0       | 316.0                 | 316.0          | 3           | 2           | 2           | 4              | CL                         | 75            | 18               | 130     | 0                     | 0       | 0                      | 1.83           | 1.3            | 1              | 0.75           | 1              | 7                               | 5 | 1 | 14                                | 4                                     | 11                                   | 1.00           | #DIV/0! | 0.15               | 0.21      | UNSATURATED        |
|                          | SS   | 2                       | 0.6       | 316.0                 | 314.0          | 9           | 10          | 14          | 24             | CL                         | 79            | 18               | 130     | 260                   | 0       | 260                    | 1.66           | 1.3            | 1              | 0.75           | 1              | 39                              | 5 | 1 | 52                                | 5                                     | 44                                   | 1.00           | 0.10    | TOO DENSE          | TOO DENSE | UNSATURATED        |
|                          | SS   | 4                       | 1.2       | 316.0                 | 312.0          | 6           | 10          | 14          | 24             | CL                         | 75            | 18               | 120     | 510                   | 0       | 510                    | 1.53           | 1.3            | 1              | 0.75           | 1              | 36                              | 5 | 1 | 48                                | 4                                     | 40                                   | 0.99           | 0.10    | TOO DENSE          | TOO DENSE | UNSATURATED        |
|                          | SS   | 6                       | 1.8       | 316.0                 | 310.0          |             |             |             |                |                            |               |                  |         |                       |         |                        |                |                |                |                |                |                                 |   |   |                                   |                                       |                                      |                |         |                    |           |                    |

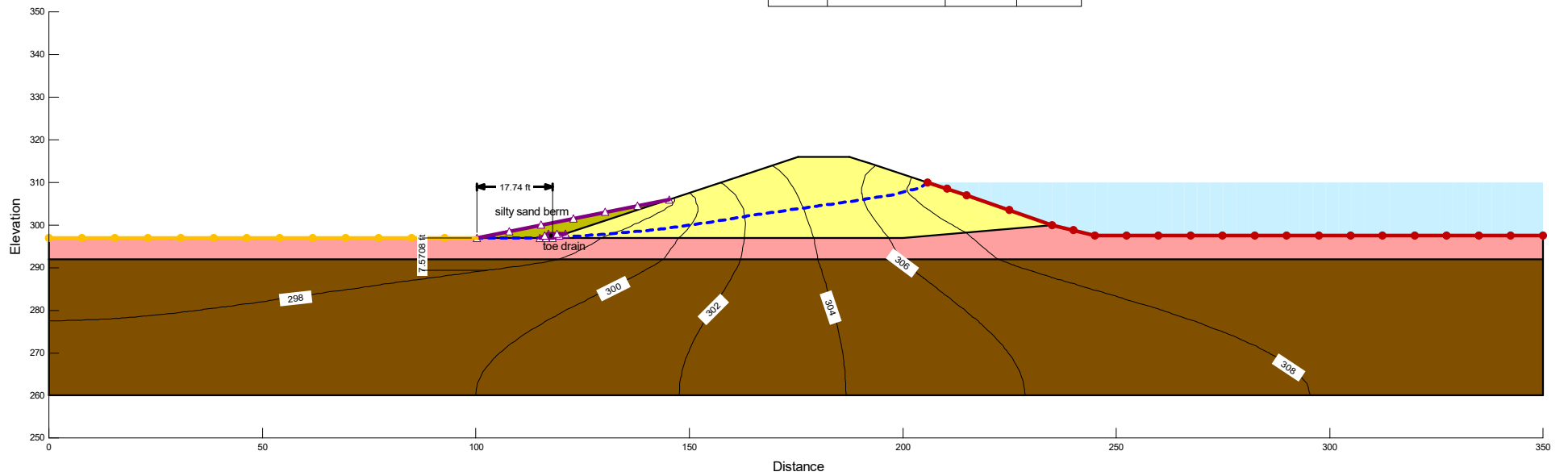
Legion Pond  
Description: Steady State Seepage Station 3+50  
File Name: Legion Pond No Drain\_Berm.gsz

| Color       | Name                    | Sat Kx (ft/sec) | Ky/Kx' Ratio |
|-------------|-------------------------|-----------------|--------------|
| <div></div> | Bedrock                 | 1.6e-07         | 0.1          |
| <div></div> | Fill - Drained          | 1e-07           | 0.2          |
| <div></div> | Residual Clay - Drained | 1e-07           | 0.33         |



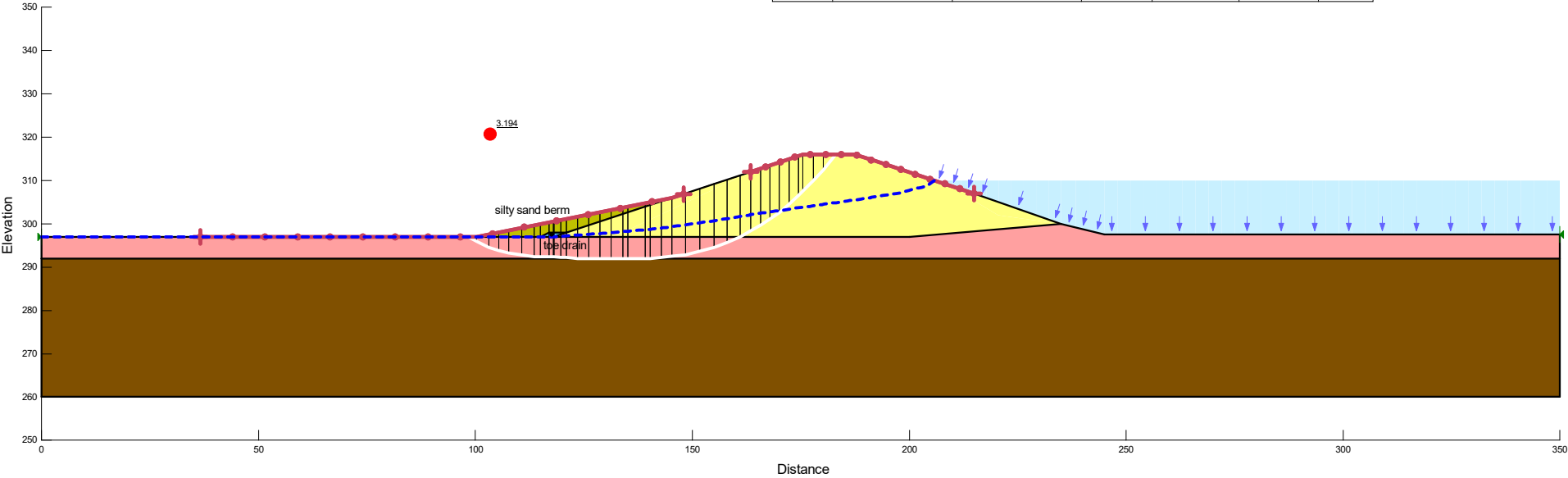
Legion Pond  
 Description: Normal Pool Steady State Seepage Station 3+50  
 File Name: Legions Pond Drain Berm.gsz

| Color                                    | Name                       | Sat Kx<br>(ft/sec) | Ky//Kx'<br>Ratio |
|------------------------------------------|----------------------------|--------------------|------------------|
| <span style="color: brown;">■</span>     | Bedrock                    | 1.6e-07            | 0.1              |
| <span style="color: yellow;">■</span>    | Fill - Drained             | 1e-07              | 0.2              |
| <span style="color: pink;">■</span>      | Residual Clay<br>- Drained | 1e-07              | 0.33             |
| <span style="color: olive;">■</span>     | Silty Sand<br>Berm         | 4.9e-05            | 1                |
| <span style="color: lightblue;">■</span> | Toe Drain                  | 0.003              | 1                |



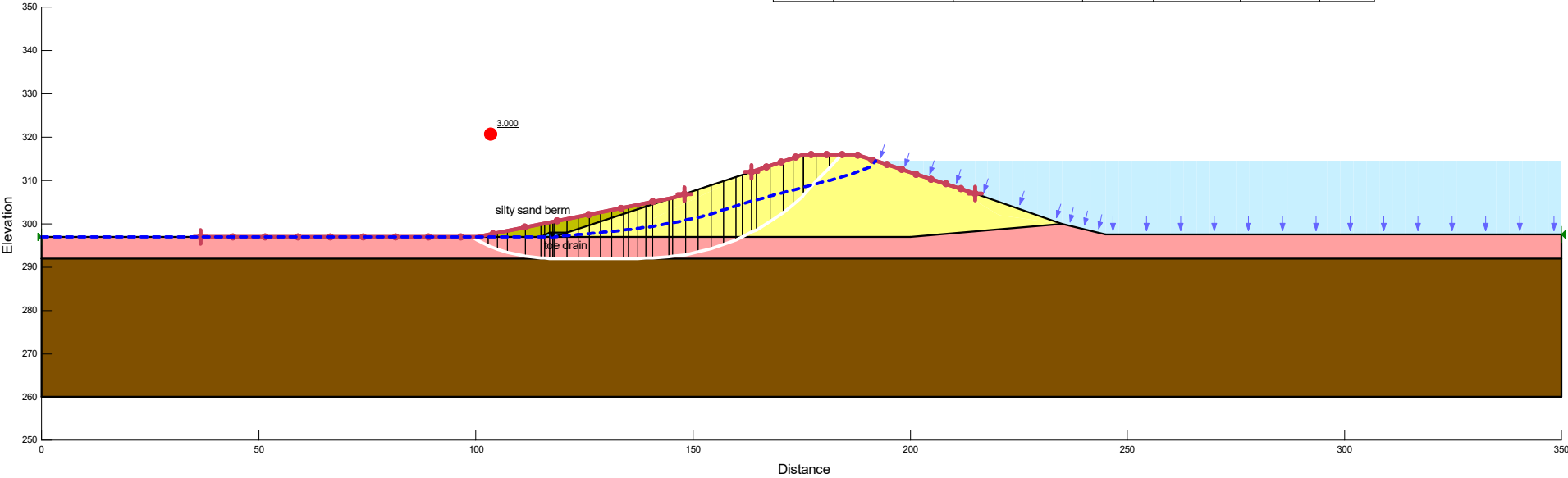
| Color       | Name                       | Slope Stability<br>Material Model | Unit<br>Weight<br>(pcf) | Effective<br>Cohesion<br>(psf) | Effective<br>Friction<br>Angle (°) | Phi-B<br>(°) |
|-------------|----------------------------|-----------------------------------|-------------------------|--------------------------------|------------------------------------|--------------|
| <div></div> | Bedrock                    | Mohr-Coulomb                      | 135                     | 5,000                          | 0                                  | 0            |
| <div></div> | Fill - Drained             | Mohr-Coulomb                      | 126                     | 200                            | 33                                 | 0            |
| <div></div> | Residual Clay<br>- Drained | Mohr-Coulomb                      | 124                     | 200                            | 33                                 | 0            |
| <div></div> | Silty Sand<br>Berm         | Mohr-Coulomb                      | 125                     | 0                              | 33                                 | 0            |
| <div></div> | Toe Drain                  | Mohr-Coulomb                      | 125                     | 0                              | 36                                 | 0            |

Legion Pond  
Description: Normal Pool Stability Station 3+50  
File Name: Legions Pond Drain Berm.gsz



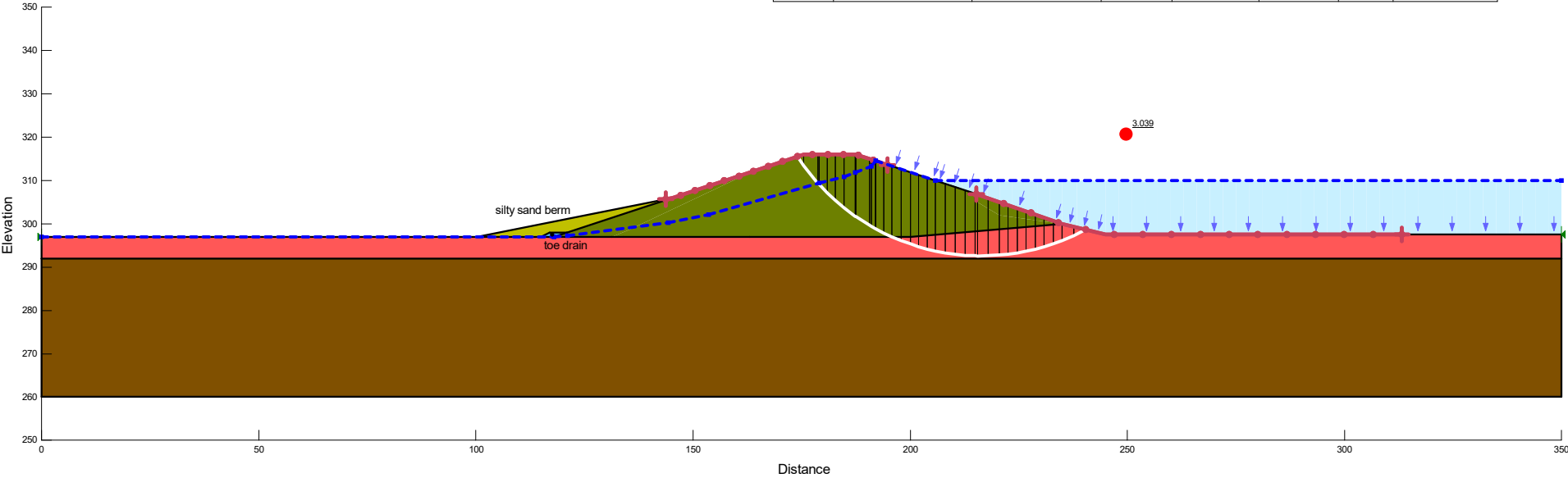
| Color       | Name                       | Slope Stability<br>Material Model | Unit<br>Weight<br>(pcf) | Effective<br>Cohesion<br>(psf) | Effective<br>Friction<br>Angle (°) | Phi-B<br>(°) |
|-------------|----------------------------|-----------------------------------|-------------------------|--------------------------------|------------------------------------|--------------|
| <div></div> | Bedrock                    | Mohr-Coulomb                      | 135                     | 5,000                          | 0                                  | 0            |
| <div></div> | Fill - Drained             | Mohr-Coulomb                      | 126                     | 200                            | 33                                 | 0            |
| <div></div> | Residual Clay<br>- Drained | Mohr-Coulomb                      | 124                     | 200                            | 33                                 | 0            |
| <div></div> | Silty Sand<br>Berm         | Mohr-Coulomb                      | 125                     | 0                              | 33                                 | 0            |
| <div></div> | Toe Drain                  | Mohr-Coulomb                      | 125                     | 0                              | 36                                 | 0            |

Legion Pond  
Description: Flood Pool Stability Station 3+50  
File Name: Legions Pond Drain Berm.gsz



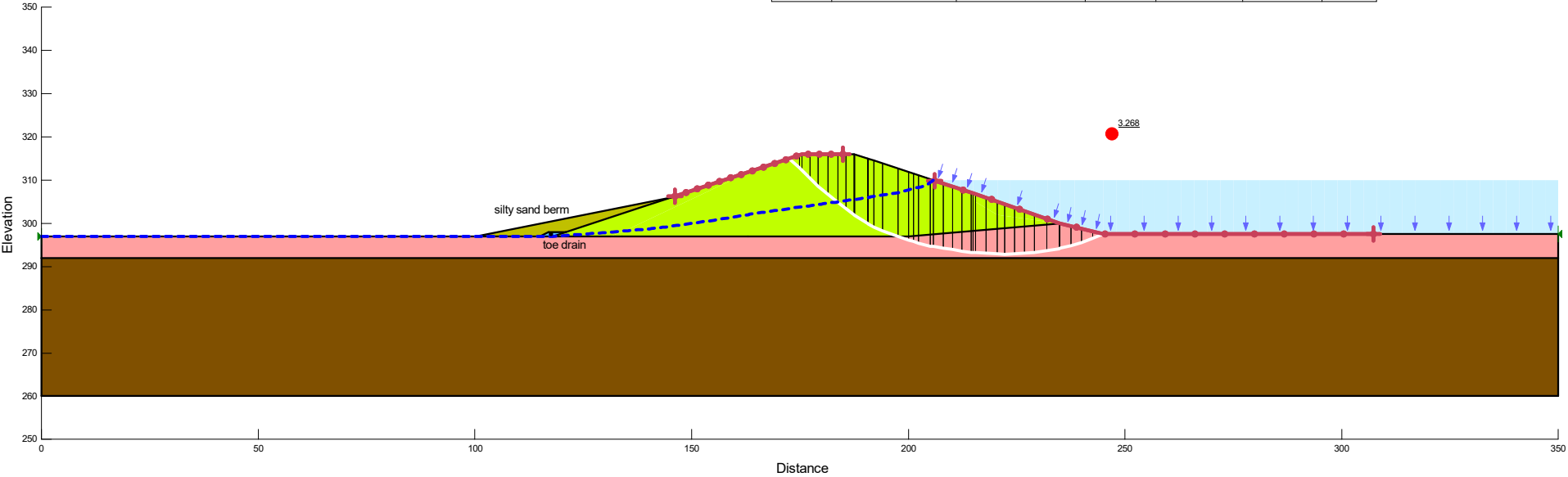
| Color       | Name                                    | Slope Stability<br>Material Model | Unit<br>Weight<br>(pcf) | Effective<br>Cohesion<br>(psf) | Effective<br>Friction<br>Angle (°) | Phi-B<br>(°) | Piezometric<br>Surface |
|-------------|-----------------------------------------|-----------------------------------|-------------------------|--------------------------------|------------------------------------|--------------|------------------------|
| <div></div> | Bedrock                                 | Mohr-Coulomb                      | 135                     | 5,000                          | 0                                  | 0            | 1                      |
| <div></div> | Fill - Undrained<br>Reduced             | Mohr-Coulomb                      | 126                     | 630                            | 0                                  | 0            | 1                      |
| <div></div> | Residual Clay -<br>Undrained<br>Reduced | Mohr-Coulomb                      | 124                     | 630                            | 0                                  | 0            | 1                      |
| <div></div> | Silty Sand Berm                         | Mohr-Coulomb                      | 125                     | 0                              | 33                                 | 0            | 1                      |
| <div></div> | Toe Drain                               | Mohr-Coulomb                      | 125                     | 0                              | 36                                 | 0            | 1                      |

Legion Pond  
Description: Rapid Drawdown Stability Station 3+50  
File Name: Legions Pond Drain Berm.gsz



| Color       | Name                       | Slope Stability<br>Material Model | Unit<br>Weight<br>(pcf) | Effective<br>Cohesion<br>(psf) | Effective<br>Friction<br>Angle (°) | Phi-B<br>(°) |
|-------------|----------------------------|-----------------------------------|-------------------------|--------------------------------|------------------------------------|--------------|
| <div></div> | Bedrock                    | Mohr-Coulomb                      | 135                     | 5,000                          | 0                                  | 0            |
| <div></div> | Fill -<br>Undrained        | Mohr-Coulomb                      | 126                     | 900                            | 0                                  | 0            |
| <div></div> | Residual Clay<br>- Drained | Mohr-Coulomb                      | 124                     | 200                            | 33                                 | 0            |
| <div></div> | Silty Sand<br>Berm         | Mohr-Coulomb                      | 125                     | 0                              | 33                                 | 0            |
| <div></div> | Toe Drain                  | Mohr-Coulomb                      | 125                     | 0                              | 36                                 | 0            |

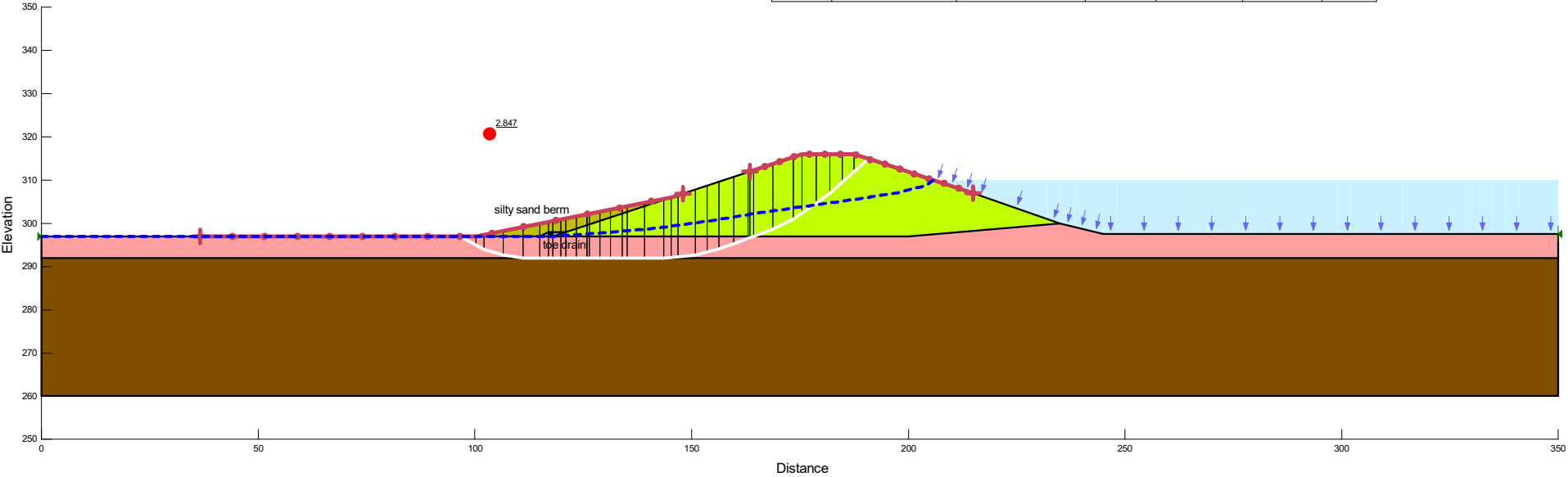
Legion Pond  
Description: Earthquake US Stability Station 3+50  
File Name: Legions Pond Drain Berm.gsz  
Horz Seismic Coef.: 0.04





| Color       | Name                       | Slope Stability<br>Material Model | Unit<br>Weight<br>(pcf) | Effective<br>Cohesion<br>(psf) | Effective<br>Friction<br>Angle (°) | Phi-B<br>(°) |
|-------------|----------------------------|-----------------------------------|-------------------------|--------------------------------|------------------------------------|--------------|
| <div></div> | Bedrock                    | Mohr-Coulomb                      | 135                     | 5,000                          | 0                                  | 0            |
| <div></div> | Fill -<br>Undrained        | Mohr-Coulomb                      | 126                     | 900                            | 0                                  | 0            |
| <div></div> | Residual Clay<br>- Drained | Mohr-Coulomb                      | 124                     | 200                            | 33                                 | 0            |
| <div></div> | Silty Sand<br>Berm         | Mohr-Coulomb                      | 125                     | 0                              | 33                                 | 0            |
| <div></div> | Toe Drain                  | Mohr-Coulomb                      | 125                     | 0                              | 36                                 | 0            |

Legion Pond  
Description: Earthquake DS Stability Station 3+50  
File Name: Legions Pond Drain Berm.gsz  
Horz Seismic Coef.: 0.04

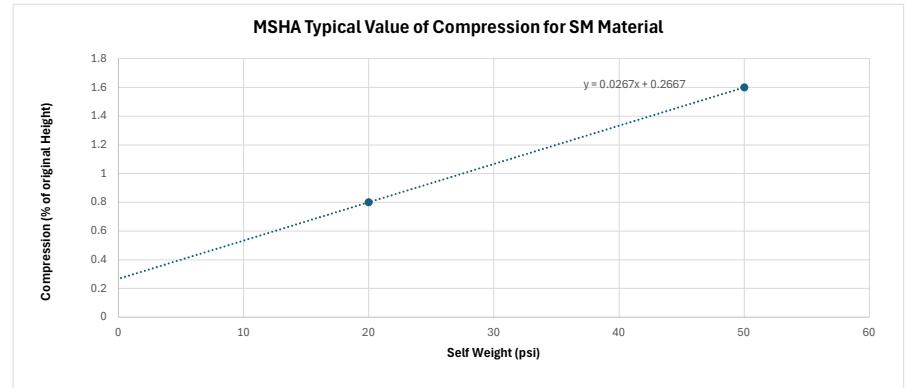


**Legion Pond Settlement Summary**

| Location     | Embankment Immediate Settlement (in) | Foundation Residual Clay Settlement (in) | TOTALS (in) |
|--------------|--------------------------------------|------------------------------------------|-------------|
| Station 3+50 | 0.2                                  | 0.9                                      | 1.1         |

Legion Pond Embankment Immediate Settlement

|                                    |       |    |     |
|------------------------------------|-------|----|-----|
| Embankment Height (ft)             | 6     |    |     |
| Embankment Unit Weight (pcf)       | 126   | 20 | 0.8 |
| Mid-Point Stress (psi)             | 2.63  | 50 | 1.6 |
| Compression (% of Original Height) | 0.31  |    |     |
| Compression (ft)                   | 0.018 |    |     |
| Compression (in)                   | 0.2   |    |     |



6-14

TABLE 6.6 CORRELATION BETWEEN USCS CLASSIFICATION AND PROPERTIES OF COMPACTED SOILS

| Group Symbol | Soil Type                                       | Range of Max. Dry Weight (pcf) | Range of Optimum Moisture (%) | Typical Value of Compression |                  | Typical Strength Characteristics |                          |         |       | Typical Hyd. Cond. (ft/min) | Range of CBR Value | Range of Subgrade Modulus k (lbs/in <sup>2</sup> ) |
|--------------|-------------------------------------------------|--------------------------------|-------------------------------|------------------------------|------------------|----------------------------------|--------------------------|---------|-------|-----------------------------|--------------------|----------------------------------------------------|
|              |                                                 |                                |                               | 1.4 tsf = 20 psi             | 3.6 tsf = 50 psi | Compacted Cohesion (psf)         | Saturated Cohesion (psf) | φ (deg) | tan φ |                             |                    |                                                    |
| GW           | Well graded clean gravels, gravel-sand mixtures | 125-135                        | 11-8                          | 0.3                          | 0.6              | 0                                | 0                        | >38     | >0.79 | $5 \times 10^{-2}$          | 40-80              | 300-500                                            |
| GP           | Poorly-graded clean gravels, gravel-sand mix    | 115-125                        | 14-11                         | 0.4                          | 0.9              | 0                                | 0                        | >37     | >0.74 | $10^{-1}$                   | 30-60              | 250-400                                            |
| GM           | Silty gravels, poorly-graded gravel-sand mix    | 120-135                        | 12-8                          | 0.5                          | 1.1              | —                                | —                        | >34     | >0.67 | $>10^{-6}$                  | 20-60              | 100-400                                            |
| GC           | Clayey gravels, poorly graded gravel-sand-clay  | 115-130                        | 14-9                          | 0.7                          | 1.6              | —                                | —                        | >31     | >0.60 | $>10^{-7}$                  | 20-40              | 100-300                                            |
| SW           | Well-graded clean sands, gravelly sands         | 110-130                        | 16-9                          | 0.6                          | 1.2              | 0                                | 0                        | 38      | 0.79  | $>10^{-3}$                  | 20-40              | 200-300                                            |
| SP           | Poorly-graded clean sands, sand-gravel mix      | 100-120                        | 21-12                         | 0.8                          | 1.4              | 0                                | 0                        | 37      | 0.74  | $>10^{-3}$                  | 10-40              | 200-300                                            |
| SM           | Silty sands, poorly-graded sand-silt mix        | 110-125                        | 16-11                         | 0.8                          | 1.6              | 1050                             | 420                      | 34      | 0.67  | $5 \times 10^{-5}$          | 10-40              | 100-300                                            |
| SM-SC        | Sand-silt-clay mix with slightly plastic fines  | 110-130                        | 15-11                         | 0.8                          | 1.4              | 1050                             | 300                      | 33      | 0.66  | $2 \times 10^{-6}$          | 5-30               | 100-300                                            |
| SC           | Clayey sands, poorly graded sand-clay mix       | 105-125                        | 19-11                         | 1.1                          | 2.2              | 1550                             | 230                      | 31      | 0.60  | $5 \times 10^{-7}$          | 5-20               | 100-300                                            |
| ML           | Inorganic silts and clayey silts                | 95-120                         | 24-12                         | 0.9                          | 1.7              | 1400                             | 190                      | 32      | 0.62  | $>10^{-6}$                  | ≤15                | 100-200                                            |
| ML-CL        | Mixture of inorganic silt and clay              | 100-120                        | 22-12                         | 1.0                          | 2.2              | 1350                             | 460                      | 32      | 0.62  | $5 \times 10^{-7}$          | —                  | —                                                  |
| CL           | Inorganic clays of low to medium plasticity     | 95-120                         | 24-12                         | 1.3                          | 2.5              | 1800                             | 270                      | 28      | 0.54  | $>10^{-7}$                  | ≤15                | 50-200                                             |
| OL           | Organic silts and silt-clays, low plasticity    | 80-100                         | 33-21                         | —                            | —                | —                                | —                        | —       | —     | —                           | ≤5                 | 50-100                                             |
| MH           | Inorganic clayey silts, elastic silts           | 70-95                          | 40-24                         | 2.0                          | 3.8              | 1500                             | 420                      | 25      | 0.47  | $5 \times 10^{-7}$          | ≤10                | 50-100                                             |
| CH           | Inorganic clays of high plasticity              | 75-105                         | 36-19                         | 2.6                          | 3.9              | 2150                             | 230                      | 19      | 0.35  | $>10^{-7}$                  | ≤15                | 50-150                                             |
| OH           | Organic clays and silty clays                   | 65-100                         | 45-21                         | —                            | —                | —                                | —                        | —       | —     | —                           | ≤5                 | 25-100                                             |

< PREVIOUS VIEW

MAY 2009

Note: 1. All properties are for condition of "Standard Proctor" maximum density, except values of k and CBR which are for "Modified Proctor" maximum density.  
2. Typical strength characteristics are for effective strength envelopes and are obtained from USBR data.  
3. Compression values are for vertical loading with complete lateral confinement.  
4. (—) indicates insufficient data available for an estimate.

(DOD, 2005)

## Legion Pond Cohesive Soil Settlement

|                                               |     |
|-----------------------------------------------|-----|
| Embankment Material $\gamma$ (pcf)            | 126 |
| 1. Clay Foundation Unit Weight $\gamma$ (pcf) | 124 |

| STATION 3+50           | CL Layer    | Notes                                                      |
|------------------------|-------------|------------------------------------------------------------|
| H (ft)                 | 3           | Residual clay layer thickness                              |
| Embankment Height (ft) | 5           |                                                            |
| $e_0$                  | 0.8         |                                                            |
| $C_c$                  | 0.19        | Assume LL = 35                                             |
| $C_r$                  | 0.019       |                                                            |
| $\sigma'_p$ (psf)      | 492.4       | Stiff to very stiff clay, assume 400 psf overconsolidation |
| $\Delta\sigma'$ (psf)  | 630         |                                                            |
| $\sigma'_o$ (psf)      | 92.4        |                                                            |
| $S_p$ (in)             | <b>0.91</b> |                                                            |

$$S_c = \left[ \left( \frac{C_r}{1 + e_0} \right) \cdot H \cdot \log \left( \frac{\sigma'_p}{\sigma'_o} \right) \right] + \left[ \left( \frac{C_c}{1 + e_0} \right) \cdot H \cdot \log \left( \frac{\sigma'_o + \Delta\sigma'}{\sigma'_p} \right) \right] \quad (6.3)$$

## **APPENDIX C**

### **Filter Calculations**

# Filter and Drain Design

EM 1110-2-1901, Appendix D

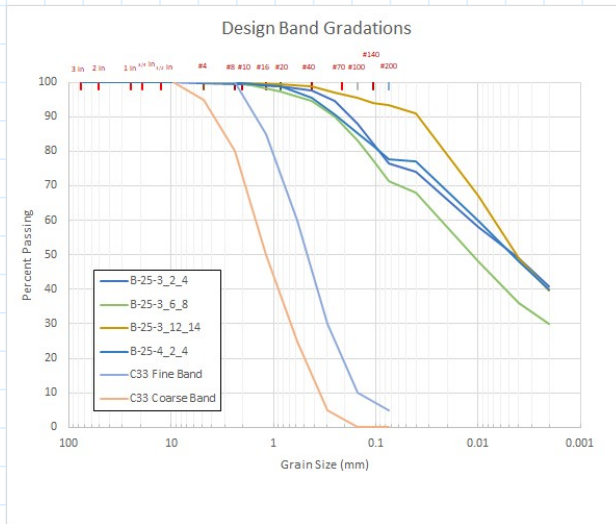
Legion Pond Dam  
Chapel Hill, NC

Conduit Filter Diaphragm

Calculated by: B. Lawrence  
Date: 7/19/2025

## Base Soil Properties

Base soil properties are the existing embankment. Relevant soil information is from embankment soils in borings B-25-3 to B-25-4.



$$d_{15max} := 0.001 \text{ mm}$$

## Base Soil

$$d_{10} := 0.001 \text{ mm} \quad d_{15} := 0.001 \text{ mm} \quad d_{30} := 0.002 \text{ mm} \quad d_{10cm} := \frac{d_{10}}{\text{cm}} = 1 \cdot 10^{-4}$$

$$d_{60} := 0.15 \text{ mm} \quad d_{85} := 0.07 \text{ mm} \quad d_{90} := 0.15 \text{ mm} \quad \text{Hazen Eq check (Eq 2-22, EM 1901)}$$

$$k_{haz} := 100 \cdot d_{10cm}^2 = 1 \cdot 10^{-6}$$

$$PP_{No4} := 0\% \quad \text{percent passing \#4 sieve}$$

$$C_u := \frac{d_{60}}{d_{10}} = 150$$

$$C_c := \frac{d_{30}^2}{d_{10} \cdot d_{60}} = 0.027$$

$$k_{soil} := 10^{-6} \cdot \frac{\text{cm}}{\text{s}}$$

## Filter Properties (ASTM C33 Fine Aggregate.)

Properties for ASTM C33 FA

$$D_{15min33} := 0.19 \text{ mm}$$

$$D_{15max33} := 0.4 \text{ mm}$$

$$D_{10033} := 2.4 \text{ mm}$$

| Filter - C33 Fine Aggregate |           |                 |           |
|-----------------------------|-----------|-----------------|-----------|
| Min                         | Min       | Max             | Max       |
| Sieve Size (mm)             | % Passing | Sieve Size (mm) | % Passing |
| 9.5                         | 100       | 9.5             | 100       |
| 4.76                        | 100       | 4.76            | 95        |
| 2.38                        | 100       | 2.38            | 80        |
| 1.19                        | 85        | 1.19            | 50        |
| 0.59                        | 60        | 0.59            | 25        |
| 0.297                       | 30        | 0.297           | 5         |
| 0.149                       | 10        | 0.149           | 0         |
| 0.075                       | 5         | 0.075           | 0         |
|                             |           |                 |           |

## Definitions by Function

Filter - Retain protected soil and have permeability greater than protected soil

Drain - Same as filter and have adequate discharge capacity

## Gravel Correction

Assume no gravel correction because base soil (Embankment) has minimal gravel (No. 4 sieve).

## Base Soil Category

$PP_{200} := 0\%$  percent passing #200 sieve - Table D-1

$PP_{200} = 0$  Category := 2

Table D-1. Categories of Base Soil Materials

| Category | Percent Finer Than the No. 200 (0.075 mm) Sieve |
|----------|-------------------------------------------------|
| 1        | >85                                             |
| 2        | 40-85                                           |
| 3        | 15-39                                           |
| 4        | <15                                             |

## Filtration Requirements

For Soil Category = 2 Use Table D-2

$D_{15max}$  less than or equal to 0.7 mm

Select  $D_{15max} := 0.7 \text{ mm}$

$D_{15max33} = 0.4 \text{ mm}$

Pass?  $Test_{D_{15max}} := \text{if}(0.7 \text{ mm} > D_{15max33}, \text{"Pass"}, \text{"Fail"})$

Table D-2. Criteria for Filters

| Base Soil Category | Base Soil Description, and Percent Finer Than No. 200 (0.075 mm) Sieve (a) | Filter Criteria (b)                                                                                            |
|--------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 1                  | Fine silts and clays; more than 85% finer                                  | (c) $D_{15} \leq 9 \times d_{45}$                                                                              |
| 2                  | Sands, silts, clays, and silty and clayey sands; 40 to 85% finer           | $D_{15} \leq 0.7 \text{ mm}$                                                                                   |
| 3                  | Silty and clayey sands and gravels; 15 to 39% finer                        | (d), (e) $D_{15} \leq \left[ \frac{40-A}{40-15} \right] [(4 \times d_{45}) - 0.7 \text{ mm}] + 0.7 \text{ mm}$ |
| 4                  | Sands and gravels; less than 15% finer                                     | (f) $D_{15} \leq 4 \text{ to } 5 \times d_{45}$                                                                |

(a) Category designation for soil containing particles larger than 4.75 mm is determined from a gradation curve of the base soil which has been adjusted to 100% passing the No. 4 (4.75 mm) sieve.

(b) Filters are to have a maximum particle size of 3 in. (75 mm) and a maximum of 5% passing the No. 200 (0.075 mm) sieve with the plasticity index (PI) of the fines equal to zero. PI is determined on the material passing the No. 40 (0.425 mm) sieve in accordance with DE 1110-2-1996, "Laboratory Soils Testing." To ensure sufficient permeability, filters are to have a  $D_{15}$  size equal to or greater than  $4 \times d_{15}$  but no smaller than 0.1 mm.

(c) When  $9 \times d_{45}$  is less than 0.2 mm, use 0.2 mm.

(d) A = percent passing the No. 200 (0.075 mm) sieve after any regrading.

(e) When  $4 \times d_{45}$  is less than 0.7 mm, use 0.7 mm.

(f) In category 4, the  $D_{15} \leq 4 \times d_{45}$  criterion should be used in the case of filters beneath riprap subject to wave action and drains which may be subject to violent surging and/or vibration.

$Test_{D_{15max}} = \text{"Pass"}$

## Permeability Requirements

$d_{15max} = 0.001 \text{ mm}$

GTE to 3 to 5 times maximum  $d_{15}$

$D_{15min} := \text{if}(4 \cdot d_{15max} < 0.1 \text{ mm}, 0.1 \text{ mm}, 4 \cdot d_{15max}) = 0.1 \text{ mm}$

$D_{15min} = 0.1 \text{ mm}$

$D_{15min33} = 0.19 \text{ mm}$

$Test_{D_{15min}} := \text{if}(D_{15min} < D_{15min33}, \text{"Pass"}, \text{"Fail"})$

$Test_{D_{15min}} = \text{"Pass"}$

## Summary

\* Use ASTM C33 Fine Aggregate as filter Base Soil

\* Check

### Requirement

$$D_{15min} = 0.1 \text{ mm}$$

$$D_{15max} = 0.7 \text{ mm}$$

### Calculation

$$D_{15min33} = 0.19 \text{ mm}$$

$$D_{15max33} = 13 \text{ mm}$$

### Result

$$Test_{D15max} = \text{"Pass"}$$

$$Test_{D15min} = \text{"Pass"}$$

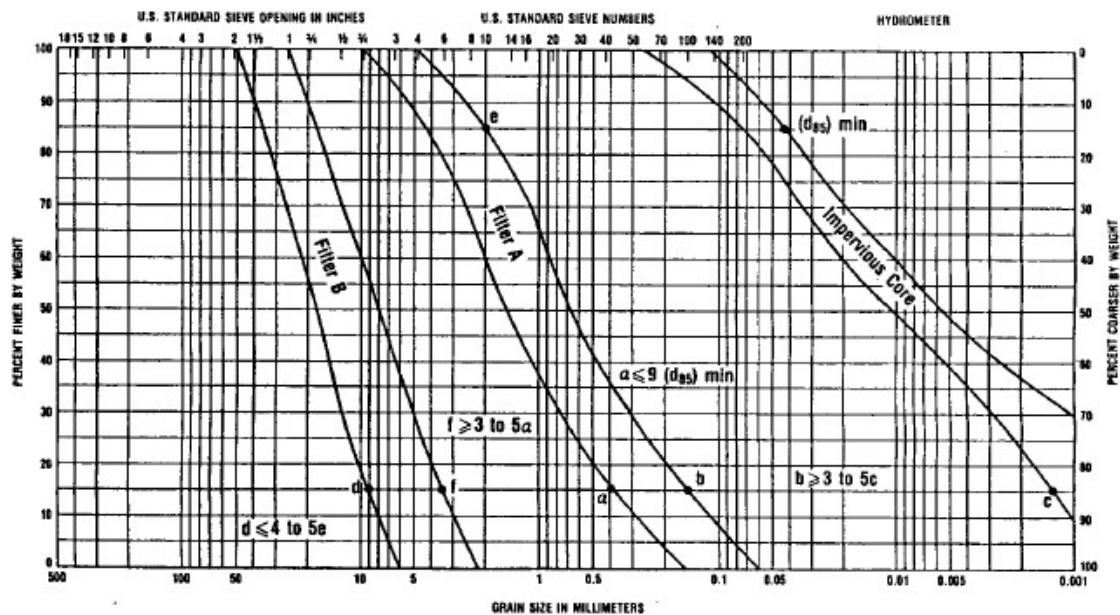


Figure D-2. Illustration of the design of a graded filter



# Filter and Drain Design

EM 1110-2-1901, Appendix D

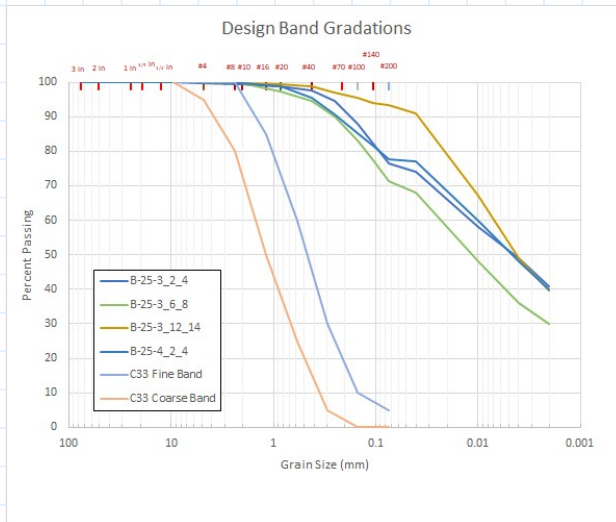
Legion Pond Dam  
Chapel Hill, NC

Berm Filter

Calculated by: B. Lawrence  
Date: 7/19/2025

## Base Soil Properties

Base soil properties are the existing embankment. Relevant soil information is from embankment soils in borings B-25-3 to B-25-4.



$$d_{15max} := 0.001 \text{ mm}$$

## Base Soil

$$d_{10} := 0.001 \text{ mm} \quad d_{15} := 0.001 \text{ mm} \quad d_{30} := 0.002 \text{ mm} \quad d_{10cm} := \frac{d_{10}}{\text{cm}} = 1 \cdot 10^{-4}$$

$$d_{60} := 0.15 \text{ mm} \quad d_{85} := 0.07 \text{ mm} \quad d_{90} := 0.15 \text{ mm} \quad \text{Hazen Eq check (Eq 2-22, EM 1901)}$$

$$k_{haz} := 100 \cdot d_{10cm}^2 = 1 \cdot 10^{-6}$$

$$PP_{No4} := 0\% \quad \text{percent passing \#4 sieve}$$

$$C_u := \frac{d_{60}}{d_{10}} = 150$$

$$C_c := \frac{d_{30}^2}{d_{10} \cdot d_{60}} = 0.027$$

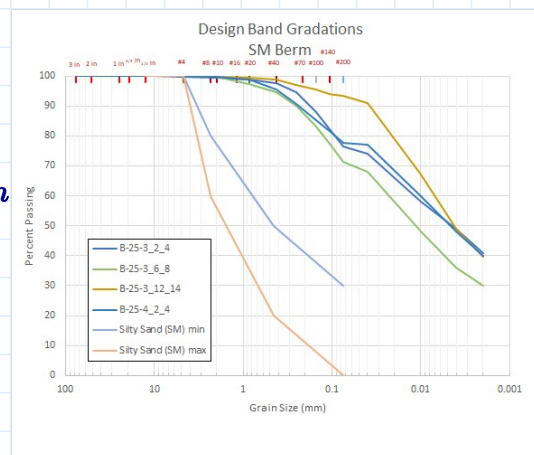
$$k_{soil} := 10^{-6} \cdot \frac{\text{cm}}{\text{s}}$$

## Filter Properties (Silty Sand (SM))

Properties for SM

$$D_{15minF} := 0.03 \text{ mm} \quad D_{15maxF} := 0.25 \text{ mm}$$

$$D_{100F} := 4.7 \text{ mm}$$



## Definitions by Function

Filter - Retain protected soil and have permeability greater than protected soil

Drain - Same as filter and have adequate discharge capacity

## Gravel Correction

Assume no gravel correction because base soil (Embankment) has minimal gravel (No. 4 sieve).

## Base Soil Category

$PP_{200} := 80\%$  percent passing #200 sieve - Table D-1

$PP_{200} = 80\%$  Category := 3

Table D-1. Categories of Base Soil Materials

| Category | Percent Finer Than the No. 200 (0.075 mm) Sieve |
|----------|-------------------------------------------------|
| 1        | >85                                             |
| 2        | 40-85                                           |
| 3        | 15-39                                           |
| 4        | <15                                             |

## Filtration Requirements

For Soil Category = 3 Use Table D-2

$D_{15max}$  less than or equal to 0.7 mm

Select  $D_{15max} := 0.7 \text{ mm}$

$D_{15maxF} = 0.25 \text{ mm}$

Pass?  $Test_{D_{15max}} := \text{if}(0.7 \text{ mm} > D_{15maxF}, \text{"Pass"}, \text{"Fail"})$

Table D-2. Criteria for Filters

| Base Soil Category | Base Soil Description, and Percent Finer Than No. 200 (0.075 mm) Sieve (a) | Filter Criteria (b)                                                                                                       |
|--------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 1                  | Fine silts and clays; more than 85% finer                                  | (c) $D_{15} \leq 9 \times d_{45}$                                                                                         |
| 2                  | Sands, silts, clays, and silty and clayey sands; 40 to 85% finer           | $D_{15} \leq 0.7 \text{ mm}$                                                                                              |
| 3                  | Silty and clayey sands and gravels; 15 to 39% finer                        | (d), (e) $D_{15} \leq \begin{cases} 40-A \\ 40-15 \end{cases}$<br>$[(4 \times d_{45}) - 0.7 \text{ mm}] + 0.7 \text{ mm}$ |
| 4                  | Sands and gravels; less than 15% finer                                     | (f) $D_{15} \leq 4 \text{ to } 5 \times d_{45}$                                                                           |

(a) Category designation for soil containing particles larger than 4.75 mm is determined from a gradation curve of the base soil which has been adjusted to 100% passing the No. 4 (4.75 mm) sieve.

(b) Filters are to have a maximum particle size of 3 in. (75 mm) and a maximum of 5% passing the No. 200 (0.075 mm) sieve with the plasticity index (PI) of the fines equal to zero. PI is determined on the material passing the No. 40 (0.425 mm) sieve in accordance with DE 1110-2-1996, "Laboratory Soils Testing." To ensure sufficient permeability, filters are to have a  $D_{15}$  size equal to or greater than  $4 \times d_{45}$  but no smaller than 0.1 mm.

(c) When  $9 \times d_{45}$  is less than 0.2 mm, use 0.2 mm.

(d) A = percent passing the No. 200 (0.075 mm) sieve after any regrading.

(e) When  $4 \times d_{45}$  is less than 0.7 mm, use 0.7 mm.

(f) In category 4, the  $D_{15} \leq 4 \times d_{45}$  criterion should be used in the case of filters beneath riprap subject to wave action and drains which may be subject to violent surging and/or vibration.

$Test_{D_{15max}} = \text{"Pass"}$

## Permeability Requirements

$d_{15max} = 0.001 \text{ mm}$

GTE to 3 to 5 times maximum  $d_{15}$

$D_{15min} := \text{if}(4 \cdot d_{15max} < 0.1 \text{ mm}, 0.1 \text{ mm}, 4 \cdot d_{15max}) = 0.1 \text{ mm}$

$D_{15min} = 0.1 \text{ mm}$

$D_{15minF} = 0.03 \text{ mm}$

$4 \cdot d_{15max} = 0.004 \text{ mm}$

$Test_{D_{15min}} := \text{if}(D_{15minF} > 4 \cdot d_{15max}, \text{"Pass"}, \text{"Fail"})$

$Test_{D_{15min}} = \text{"Pass"}$

## Summary

\* Use ASTM C33 Fine Aggregate as filter Base Soil

\* Check

### Requirement

$$D_{15min} = 0.1 \text{ mm}$$

$$D_{15max} = 0.7 \text{ mm}$$

### Calculation

$$D_{15minF} = 0.03 \text{ mm}$$

$$D_{15maxF} = 0.25 \text{ mm}$$

### Result

$$Test_{D15max} = \text{"Pass"}$$

$$Test_{D15min} = \text{"Pass"}$$

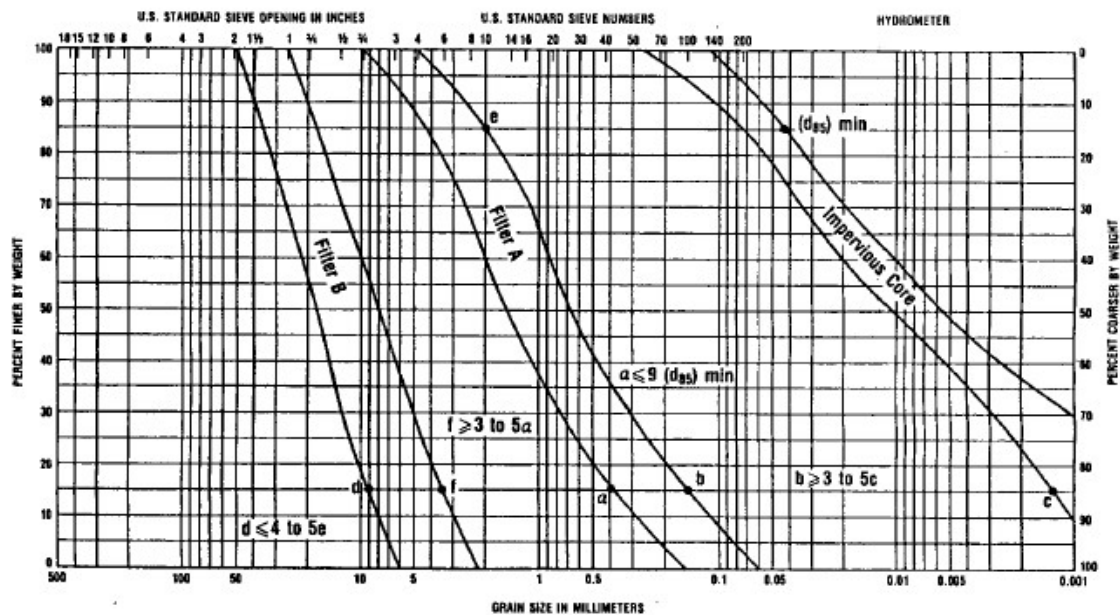


Figure D-2. Illustration of the design of a graded filter

## **APPENDIX D**

### **Riprap Sizing**

# Riprap Size Design

Project: Legion Pond Date: 7/21/2025  
 Location: Chapel Hill, NC

Calc by: BKL  
 Check by:

|                   |            |      |                    |
|-------------------|------------|------|--------------------|
| Average Velocity  | V          | 7    | ft/s               |
| Unit Weight Water | $\gamma_w$ | 62.4 | lb/ft <sup>3</sup> |
| Unit Weight Stone | $\gamma_s$ | 160  | lb/ft <sup>3</sup> |
| Gravity           | g          | 32.2 | ft/s <sup>2</sup>  |
| Ishbash Constant  | C          | 0.88 | turb flow          |

|               |     |
|---------------|-----|
| Safety Factor | 1.1 |
|---------------|-----|

(applied to velocity)

|                              |      |     |
|------------------------------|------|-----|
| <b>D<sub>50</sub> Sphere</b> | 0.76 | ft  |
| <b>W<sub>50min</sub></b>     | 36.8 | lbs |

|                                |      |    |
|--------------------------------|------|----|
| <b>D<sub>50min</sub> Cubic</b> | 0.61 | ft |
| <b>D<sub>50min</sub> Avg</b>   | 0.69 | ft |

EM 1601; page F-6 and

EM 1614; 2-17

Based on filter req.

| Weight                    | lbs | Diameter                  | inches |
|---------------------------|-----|---------------------------|--------|
| <b>W<sub>15min</sub></b>  | 15  | <b>D<sub>15min</sub></b>  | 6.1    |
| <b>W<sub>15max</sub></b>  |     | <b>D<sub>15max</sub></b>  |        |
| <b>W<sub>50min</sub></b>  | 37  | <b>D<sub>50min</sub></b>  | 8.2    |
| <b>W<sub>50max</sub></b>  | 55  | <b>D<sub>50max</sub></b>  | 9.5    |
| <b>W<sub>100min</sub></b> | 74  | <b>D<sub>100min</sub></b> | 10.4   |
| <b>W<sub>100max</sub></b> | 184 | <b>D<sub>100max</sub></b> | 14.1   |

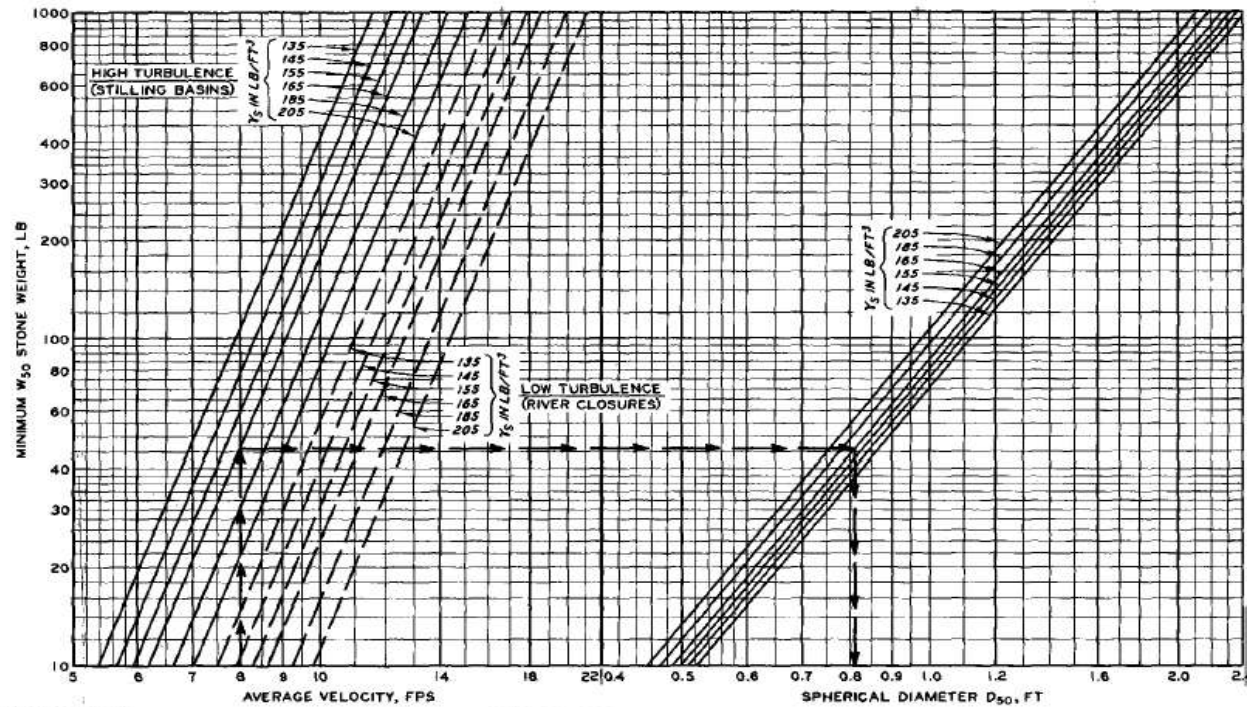
EM 1601; 3-2(e)

| Riprap Layer Thickness (in)                |    |
|--------------------------------------------|----|
| Spherical Diameter W <sub>100min</sub>     | 10 |
| 1.5x Spherical Diameter W <sub>50max</sub> | 14 |
| Greatest                                   | 14 |
| Increase 50% underwater placement          | 21 |

**Notes** 3-2c - use minimum unit weight of available sources if specific source not known

## References

USACE EM 1110-2-1601  
 HDC 712-1, Plates B-29 and B-30  
 USACE EM-1110-2-1614, Section 2-17



**BASIC EQUATIONS**

$$V = C \left[ 2g \left( \frac{\gamma_s - \gamma_w}{\gamma_w} \right) \right]^{1/2} (D_{50})^{1/2}$$

$$D_{50} = \left( \frac{6W_{50}}{\pi \gamma_s} \right)^{1/3}$$

WHERE:  $V$  = VELOCITY, FPS  
 $\gamma_s$  = SPECIFIC STONE WEIGHT, LB/FT<sup>3</sup>  
 $\gamma_w$  = SPECIFIC WEIGHT OF WATER, 62.5 LB/FT<sup>3</sup>  
 $W_{50}$  = WEIGHT OF STONE. SUBSCRIPT DENOTES PERCENT OF TOTAL WEIGHT OF MATERIAL CONTAINING STONE OF LESS WEIGHT.  
 $D_{50}$  = SPHERICAL DIAMETER OF STONE HAVING THE SAME WEIGHT AS  $W_{50}$   
 $C$  = ISBACH CONSTANT (0.86 FOR HIGH TURBULENCE LEVEL FLOW AND 1.20 FOR LOW TURBULENCE LEVEL FLOW)  
 $g$  = ACCELERATION OF GRAVITY, FT/SEC<sup>2</sup>

**STONE STABILITY  
VELOCITY VS STONE DIAMETER**

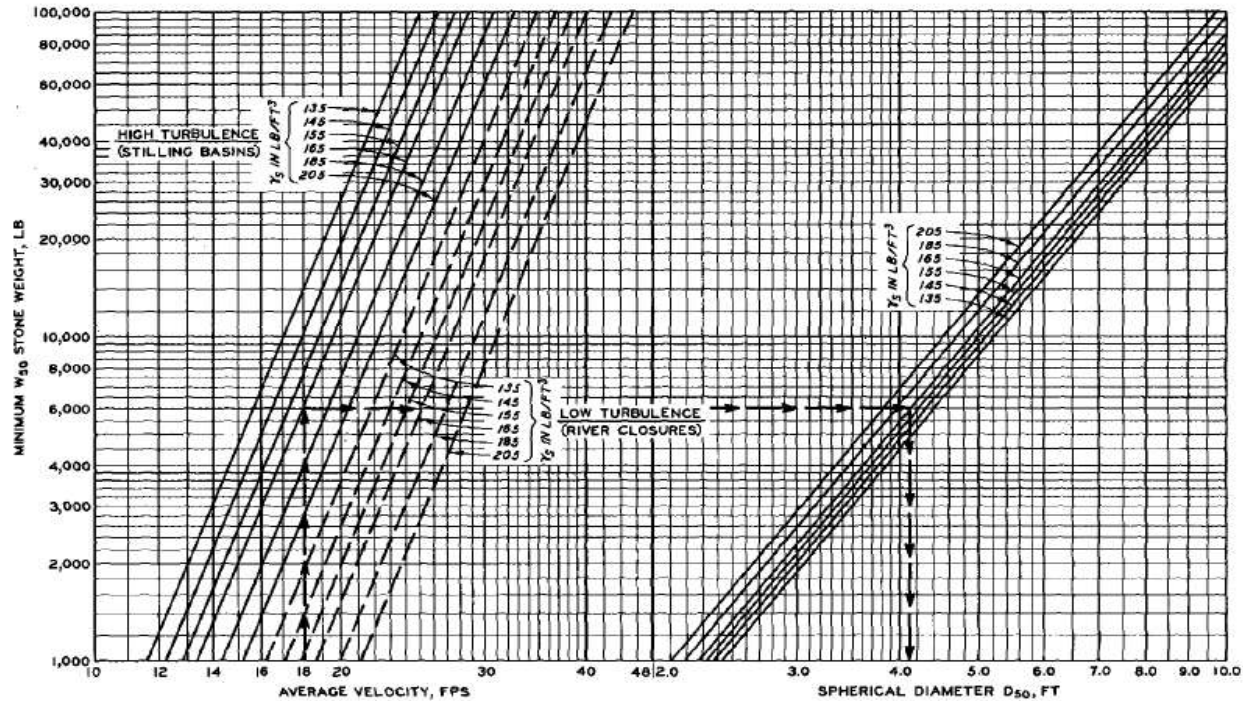
HYDRAULIC DESIGN CHART 712-1  
(SHEET 1 OF 2)

REV 8-56, 9-70

WES 6-57



PREPARED BY U. S. ARMY ENGINEER WATERWAY EXPERIMENT STATION, VICKSBURG, MISSISSIPPI



**BASIC EQUATIONS**

$$V = C \left[ 2g \left( \frac{\gamma_s - \gamma_w}{\gamma_w} \right) \right]^{1/2} (D_{50})^{1/2}$$

$$D_{50} = \left( \frac{6W_{50}}{\pi \gamma_s} \right)^{1/3}$$

WHERE: V = VELOCITY, FPS  
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 $W_{50}$  = WEIGHT OF STONE. SUBSCRIPT DENOTES PERCENT OF TOTAL WEIGHT OF MATERIAL CONTAINING STONE OF LESS WEIGHT.  
 $D_{50}$  = SPHERICAL DIAMETER OF STONE HAVING THE SAME WEIGHT AS  $W_{50}$ .  
 C = ISBACH CONSTANT (0.86 FOR HIGH TURBULENCE LEVEL FLOW AND 1.20 FOR LOW TURBULENCE LEVEL FLOW)  
 g = ACCELERATION OF GRAVITY, FT/SEC<sup>2</sup>

**STONE STABILITY  
 VELOCITY VS STONE DIAMETER**

HYDRAULIC DESIGN CHART 712-1  
 (SHEET 2 OF 2)

REV 8-58, 9-70

WES 6-57

## Section 1042

### 1040-9 MORTAR

Proportion mortar used in all brick and block masonry by volume as shown below. Do not add any more water than is necessary to make a workable mixture.

Mix No. 1: 1 part Portland cement  
1/4 part hydrated lime  
3 3/4 parts mortar sand (maximum)

Mix No. 2: 1 part Portland cement  
1 part masonry cement  
6 parts mortar sand (maximum)

Apply Articles 1040-5, 1040-6, 1040-7 and 1040-8 to all cement, hydrated lime, mortar sand and water.

For the hydrated lime and cement portion of Mix No. 1, the Contractor may substitute Type M or Type S masonry cement that meets ASTM C270 for Type S masonry cement the minimum compressive strength of the test specimens shall be 2,500 psi at 28 days and the test specimens shall be composed of one part Type S masonry cement and 3 parts sand. Furnish a Type 3 certification for the Type M or Type S masonry cement in accordance with Article 106-3.

### 1040-10 ADMIXTURES

Use admixtures that are on the NCDOT APL.

## SECTION 1042 RIP RAP MATERIALS

Use field stone or rough unhewn quarry stone for plain rip rap. Use stone that is sound, tough, dense, resistant to the action of air and water and suitable in all other respects for the purpose intended. Where broken concrete from demolished structures or pavement is available, it may be used in place of stone provided that such use meets with the approval of the Engineer. However, the use of broken concrete that contains reinforcing steel will not be permitted.

All stone shall meet the approval of the Engineer. While no specific gradation is required, there shall be equal distribution of the various sizes of the stone within the required size range. The size of an individual stone particle will be determined by measuring its long dimension.

Stone or broken concrete for rip rap shall meet Table 1042-1 for the class and size distribution.

| TABLE 1042-1<br>ACCEPTANCE CRITERIA FOR RIP RAP AND STONE FOR EROSION<br>CONTROL |                              |          |         |
|----------------------------------------------------------------------------------|------------------------------|----------|---------|
| Class                                                                            | Required Stone Sizes, inches |          |         |
|                                                                                  | Minimum                      | Midrange | Maximum |
| A                                                                                | 2                            | 4        | 6       |
| B                                                                                | 5                            | 8        | 12      |
| 1                                                                                | 5                            | 10       | 17      |
| 2                                                                                | 9                            | 14       | 23      |

No more than 5.0% of the material furnished can be less than the minimum size specified nor no more than 10.0% of the material can exceed the maximum size specified.