

SARANAC LAKE GAS CO., INC. SITE OU01 - REMEDIAL ACTION

**Village of Saranac Lake, Essex County, New York
Inactive Hazardous Waste Site Number 516008**

**AUGUST 2020
ADDENDUM NUMBER 1
TO CONTRACT D010663**



Prepared by:

**MACTEC Engineering and Geology P.C.
and
New York State Department of Environmental Conservation
Division of Environmental Remediation**

**ADDENDUM NUMBER 1
TO THE JULY 2020 CONTRAT DOCUMENTS
SARANA LAKE GAS COMPANY INC, SITE
OU02 REMEDIAL ACTION
VILLAGE OF SARANAC LAKE,
ESSEX COUNTY, NEW YORK
Contract No. D011909
AUGUST 6, 2020**

TO ALL HOLDERS OF THE CONTRACT DOCUMENTS:

Your attention is directed to the following changes and additions to the July 2020 Contract Documents for the Saranac Lake Gas Company, Inc., Site. This addendum has been prepared in accordance with the provisions of the Contract Documents.

Item 1:

Replace Section III “Bidding Information and Requirements” of the Contract with the revised attached Section III (Attachment A).

Item 2:

Replace Section V “Bid Forms and Attachments” of the Contract with the revised attached Section V (Attachment B).

Item 3:

Section VIII “General Conditions” of the Contract:

- Section 4.2.6 Professional Liability. Replace the amount of \$1,000,000 for professional liability insurance to \$2,000,000.
- Section 4.2.5 Environmental Liability: Replace the minimum limit of \$5,000,000 for pollution liability insurance to \$2,000,000.
- Section 4.2.11 Marine Protection and Indemnity: Replace minimum limit of \$1,000,000 for Marine Protection and Indemnity to \$2,000,000

Item 4:

Replace Specification 31 32 13 – Solidification from Section X1 of the Contract with the revised attached Specification 31 32 13 (Attachment C).

Item 5:

Replace Section XII “Measurement for Payment” of the Contract with the revised attached Section XII (Attachment D).

Item 6:

Replace the draft In-Situ Solidification Preliminary Bench Scale Mix Study Report, included in

the Limited Site Data Document, Investigation Report with the final In-Situ Solidification Preliminary Bench Scale Mix Study Report (Attachment E).

Item 7:

Section VII “Agreement”, Article 6 – Contract Terms, replace the following items:

- 1.1 The Work will be Substantially Completed within **Two Hundred Eighty Nine (289) calendar days** from the Effective Date of the Agreement, plus twenty (20) calendar days.
- 1.3 The Work will be completed and ready for final payment in accordance with the General Conditions within **Three Hundred Nineteen (319) calendar days** from the Effective Date of the Agreement, plus twenty (20) calendar days.

Item 8:

COVID-19 Travel Advisory: New York State has issued a travel advisory for anyone returning from or travelling from states that have a significant degree of community-wide spread of COVID-19. Pre-bid conference attendees are encouraged to review the New York State Department of Health [Information on Novel Coronavirus](#). Attendees travelling to the Pre-Bid Conference from outside of New York State shall review and self-implement restrictions or requirements which may be in place at the time of travel. Current travel advisories and restrictions can be found at [NYSDOH Covid-19 Travel Advisory](#). It is the responsibility of the traveler to adhere to New York State guidelines and restrictions.

Attachment A

Section III – Bidding Information and Requirements

SECTION III

Bidding Information and Requirements

ARTICLE 1 - Address for Notices

It is understood and agreed between the parties that Department's Representative(s) for the implementation of this Agreement, or for approval and direction called for therein, shall be the individual(s) named in Article 2 of Section IV, "Supplementary Bidding Information and Requirements."

Whenever it is provided in this Agreement that notice shall be given or other communications sent to Department, such notices or communications shall be delivered or sent to the Project Manager at the address set forth in Article 2 of Section IV, "Supplementary Bidding Information and Requirements." However, the Bid submittal should be addressed as stated in *Article 3 – Bid Instruction* below.

ARTICLE 2 - Interpretation of Bidding Documents

No interpretation of the meaning of the Bidding Documents will be made orally: all questions regarding the intent or meaning of the Bidding Documents shall be submitted in writing to the Project Manager at the address set forth in Article 2 of Section IV, "Supplementary Bidding Information and Requirements". The reply to the same, when deemed necessary, will be made available by Addenda. To be given consideration, all inquiries must be received in writing at the address set forth in Article 2 of Section IV, "Supplementary Bidding Information and Requirements", at least ten (10) days prior to the date fixed for the opening of Bids, or by the date indicated by Department. Any and all interpretations, and any supplemental instructions will be in the form of written Addenda made available in electronic format. Failure of any Bidder to receive any such Addenda shall not relieve said Bidder from any obligation under its Bid as submitted. All Addenda so issued shall become part of the Bidding Documents.

All pre-bid inquiries answered by means other than Addenda shall not be binding.

ARTICLE 3 - Bid Instructions

Department invites sealed Bids, on the forms attached hereto and submitted in the envelopes provided to: New York State Department of Environmental Conservation, Division of Management and Budget Services, Bureau of Expenditures, 625 Broadway, 10th Floor, Albany, New York, 12233-5027.

The outside of the envelope must bear the name and address of the Bidder, the Site Name, Site Number and Contact Number from the cover of the Contract Documents and specification book, and be clearly marked as "Bid."

Department may consider non-responsive any Bid not prepared and submitted in accordance with the provisions hereof, may waive any informalities or irregularities in any bid, or may reject any or all Bids. Bids that are illegible or that contain any omission, erasures, alterations, additions, conditions, or items not called for in the Bidding Documents, or that contain other irregularities of any kind, may be rejected as non-responsive. The failure or omission of any Bidder to obtain or examine any form, instrument, document or Bidding Documents, or any part thereof, shall in no way relieve any Bidder from any obligation in respect to its Bid. Complete sets of Bidding Documents shall be used in preparing Bids; neither Department nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

Department is responsible for providing Addenda only to those persons or firms listed as having attended the mandatory Pre-Bid Conference.

Department and Engineer make copies of Bidding Documents available only for the purpose of obtaining Bids on the Work and do not authorize any other use of the Bidding Documents.

Each Bid must be submitted on the official form which is furnished by Department. All blank spaces in the Bid must be filled in as noted, and no change shall be made in the phraseology of the Bid or in the items mentioned therein.

The Bidder shall sign, in the space provided in the Bid form, with his or her usual signature. An officer of a corporation or a member of a partnership signing for the Bidder, shall place his or her signature and title after the word "By" under the name of the Contractor. The same procedure shall apply to the Bid of a joint venture by two or more Bidders; however, if the signature is by an agent or attorney-in-fact for the parties of the joint venture, then the Bid shall be accompanied by evidence of his or her authority to act on behalf of all parties of the joint venture.

The Bidder shall complete that portion of the Bid form requesting a statement of the Addenda which have been received, by Addenda number and date. If no Addenda have been received, insert the word, "NONE." Failure to complete this portion of the Bid form may result in a bid being declared non-responsive at Department's option.

Each Bid shall specify in words and figures, the correct gross sum, in the manner hereafter described for which the Work shall be performed according to the Bidding Documents together with a unit price expressed in words and figures for each separate items for which such a price is required. The lowest Bid shall be determined by Department on the basis of the total sum for which the entire Work will be performed, arrived at by a correct computation of all items specified in the Bidding Documents at the prices stated in the Bid. Department reserves the right to reject any Bid in which the Bid prices appear to constitute an unbalanced Bid for the work.

In the event there is a discrepancy in any Bid between the unit prices and the extended totals, the unit prices shall govern. In the event there is a discrepancy in any Bid between the prices written in figures and the unit or lump sum prices written in words, the prices written in words shall govern. Department may reject as non-responsive bids which do not contain a price for every numbered item contained in the Bid form, or may insert a zero for every numbered item that doesn't contain a price.

Unless Department gives instructions to the contrary, the Bidder shall use no more than three decimal places in the cents column under unit Bid price items. If Bidder uses more than three decimal places without such instructions, Department may round off the Bid item to three decimal places.

The Bidder is responsible for examining supplemental information which is available for inspection, upon request, at the address for notices in Article 1 of this Section.

Department will not accept any Bid which has been transmitted via Facsimile, Telephone, Telegraph or which has been received after the designated bid opening time except where there is evidence that the bid arrived on time, but was mishandled by the Department. A late Bid will be returned unopened with notification of the reason for non-acceptance.

Bids will only be accepted from persons or firms who have attended the mandatory Pre-Bid Conference.

Permissible Contacts During a Procurement and Prohibition of Inappropriate Lobbying Influence - Pursuant to State Finance Law §§139-j and §139-k, this contract includes and imposes certain restrictions on communications between a Governmental Entity and an Offerer/Bidder during the procurement process. An Offerer/bidder is restricted from making contacts from the earliest notice of intent to solicit bids through final award and approval of the Procurement Contract by the Department of Environmental Conservation (Department) and, if applicable, Office of the State Comptroller ("restricted period") to other than designated staff unless it is a contact that is included among certain statutory exceptions set forth in State Finance Law §139-j(3)(a). Designated staff, as of the date hereof, is identified on page I-1 of Section I, Advertisement and Notice to Bidders. Department employees are also required to obtain certain information when contacted during the restricted period and make a determination of the responsibility of the Offerer/bidder pursuant to these two statutes. Certain findings of non-responsibility can result in rejection for contract award and in the event of two findings within a four (4) year period, the Offerer / Bidder is debarred from obtaining governmental Procurement Contracts. Further information about these requirements, including a copy of the new lobbying law, can be found at <http://www.ogs.state.ny.us/aboutogs/regulations/defaultAdvisoryCouncil.html> .

ARTICLE 4 - Modification or Withdrawal of Bid

Permission will not be given to modify or explain by letter, telegram, telephone or otherwise, any Bid after it has been deposited with Department except that a Bid may be withdrawn, modified, and resubmitted prior to the date and time for opening the Bids. After such date and time, no Bid may be withdrawn by a Bidder except as provided by law, and provided further that: 1.) the Bidder files a duly signed written notice of a Bid mistake with Department within two (2) business days after the day of the Bid opening, and 2.) within three (3) business days thereafter demonstrates to the reasonable satisfaction of Department that there has been a material and substantial mistake in the preparation of the Bid. If these two conditions are not met, then the bid bond would be forfeited.

Prior to submittal of Bid, a Bidder may alter or correct a unit price, or a lump sum item, which has been entered on the Bid form by crossing out the entry, entering the new figure above or below the crossed-out entry, and initialing on the line of change. The crossing out of entries shall be with ink, or typed. All new entries and initials shall be legibly handwritten with ink, or typed. Any ambiguity arising from entries altered or corrected on the Bid Form may be cause for Department's rejection of the Bid as non-responsive.

If the Bid is made by an individual, the business address shall be given. If made by a corporation, the names and business addresses of the president, secretary and treasurer shall be given. If made by a partnership, the names and business addresses of the partners shall be given.

Department reserves the right to disqualify Bids, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices upon the part of the Bidder.

All Bids submitted by an individual, a firm or partnership, a corporation or association, which submits more than one Bid for the same Work under the same or different name shall be rejected.

ARTICLE 5 - Required Bid Submittals

The following are to be submitted within the time periods indicated. At the option of Department, failure to make or amend a submittal will constitute proof that the Bidder has abandoned all rights and interests in the contract; that the Bid Security is forfeited to Department as liquidated damages; and that the Work may be awarded to another Bidder in a manner consistent with Law.

- a) The following items are to accompany Contractor's Bid submitted to Department as required in Article 3. The applicable forms and instructions can be found in Section V – Consolidated Bid Form Acknowledgements, Article 1:
 - Form of Bid (completed and endorsed)

- Bid Bond or Certified Check
 - Offerer Disclosure of Prior Non-Responsibility Determinations (completed and endorsed)
 - Vendor Assurance of No Conflict of Interest or Detrimental Effect (endorsed)
 - In the case of a legally constituted joint venture, the bidders must submit a copy of the written joint venture agreement with their bid. Each member can only be part of one (1) joint venture. The agreement shall clearly define the relationship and services to be performed by each member, identify the authorized representative for each member, designate the lead principal participant, provide proof of insurance, identify percent equity share held by each member, and include any other relevant information.
 - The Bidder must also submit a statement signed by the Bidder's authorized representative acknowledging that such entities will be required to provide evidence of joint and several liability for the Bidder's obligations under the Contract. If the entity is an LLC, a statement signed by the bidder's authorized representative acknowledging that such entities will be required to provide guarantees of the Bidder's obligations under the Contract.
 - If the joint venture has not yet been legally formed, then the Bidder must submit a description of the proposed legal structure and draft copies of the underlying documents, including: a) all significant terms of the joint venture or partnership, including the rules relative to the administration of the joint venture, limited liability company or partnership, including dealing with deadlock situations; b) description of how the joint venture, limited liability company or partnership will operate administratively and technically; and c) a teaming agreement or comparable document setting forth the equity member's agreement to form the organization.
- b) The following items shall be submitted to the Project Manager within five (5) days of notification that the Bidder is the apparent low Bidder. The applicable forms and instructions can be found in Section V – Consolidated Bid Form Acknowledgements, Article 2:
- Off-site permitted facility to receive material along with a copy of the facilities permit
 - Plan of Operations (Work Plan) and Progress Schedule, Health and Safety Plan, Sampling Plan, and QA/QC Plan
 - Statement of Surety's intent, complete and signed by a duly authorized surety company licensed to do business in the State of New York

- A description of projects completed by Bidder documenting its experience in this type of work
 - Completed NYS Vendor Responsibility Questionnaire (CCA-2) or an affidavit of no change (if appropriate). If the forms are filed using OSC's online VendRep System, a letter certifying that the forms have been so completed and submitted must be sent to the Project Manager. In the case of a joint venture, each member will be required to complete and submit a NYS Vendor Responsibility Questionnaire or an affidavit of no change (if appropriate). (Must be bound separately if submitting a paper copy of the Vendor Responsibility Questionnaire.)
 - The Contractor agrees to submit an MWBE Utilization Plan and Work Force Utilization Plan either prior to or at the time of the execution of the contract. The Contractor agrees to use such MWBE Utilization Plan for the performance of MWBE's on the Contract Pursuant to the prescribed MWBE goals.
 - An Authorizing Resolution stating that a certain individual has the authority to sign the Contract on behalf of the firm.
 - Endorsed Executive Order No. 177 Certification (Anti-Discriminatory Policies and Practices)
 - Any other information that demonstrates the Bidder's ability to perform the work described herein
 - Low bidders may be asked to submit additional information to demonstrate competency
- c) The following items shall be submitted to the Project Manager within 14 days from the date of the Notice of Intent to Award letter from Department. The applicable forms and instructions can be found in Section V – Consolidated Bid Form Acknowledgements, Article 3:
- Executed Agreement (four (4) endorsed originals)
 - Performance Bond with Power of Attorney & Surety Financial Statement (original and three copies)
 - Labor & Materials Bond with Power of Attorney & Surety Financial Statement (original and three copies)
 - Bid Breakdown of Items (original) (see Article 12 below)
 - Certificates of Insurance (original)

- Consultant/Contractor Detailed M/WBE-EEO Utilization Plan (original). If the forms are filed using the Department's electronic M/WBE System, a letter certifying that the forms have been so completed and submitted must be sent to the Project Manager.
- Service-Disabled Veteran-Owned Business (SDVOB) Utilization Plan (original) as detailed in Appendix D

ARTICLE 6 - Bid Security and Bonds

Bid Security shall be made payable to Department in an amount not less than five (5) percent (5%) of the Bidder's gross sum Bid. The Bid Security shall be in the form of either a certified or bank check upon an incorporated bank or trust company, or a Bid Bond issued by a surety satisfactory to Department.

Department will accept only Bonds from a surety company licensed to write Bonds of such character and amount under the laws of New York State and which are listed on the U.S. Treasury Department Circular 570.

Attorneys-in-fact who sign Bonds shall file with such Bonds a certified copy of their Power of Attorney to sign Bonds and to conduct business in the State of New York.

The Bid Security of a Bidder awarded a Contract for the Work will be retained until such Bidder has executed the Agreement and furnished the required bonds and insurance, whereupon the Bid Security will be returned. If the Bidder fails to execute and deliver the Agreement, other required documents and furnish the required bonds and insurance within fourteen (14) days after the Notice of Intent to Award, Department may annul the Notice of Intent to Award, and the Bid Security of that Bidder will be forfeited to Department. The Bid Security of any Bidder whom Department believes to have a reasonable chance of receiving the award may be retained by Department until the earlier of the 45th day after the Bid opening or seven (7) days after the Effective Date of the Agreement, whereupon Bid Security furnished by such Bidders will be returned. Bid Security of other Bidders will be returned after the Bid opening.

ARTICLE 7 - Approval of "or Equal" or Substitution Equipment, Systems or Items

There shall be no approval given by Department or Engineer during the bidding period or prior to Award of Contract for any "or equal" or substitution equipment, systems or items.

ARTICLE 8 - Other Contracts and Occupancy

Department may award other contracts in connection with this Work. Contractor shall not have exclusive occupancy of the real property within or adjacent to the limits of the Work.

In case of interference between the operations of utility owners and different contractors, Department will be the sole judge of the rights of each contractor and the sequence of work necessary to expedite the completion of the entire Project. In all such cases, Department's decision shall be accepted as final.

ARTICLE 9 - Taxes

Department is exempt from the payment of sales and compensating use taxes of the State of New York and of cities and counties on all materials, equipment and supplies sold to Department pursuant to this Contract. Also exempt from such taxes are purchases by Contractor and its Subcontractors of materials, equipment and supplies to be sold to Department pursuant to this Contract, including tangible personal property to be incorporated in any structure, building, or other real property forming part of the Project. These taxes are therefore not to be included in the Bid. The cost of all other taxes under the Contract shall be included in the Bid prices for the several items of the Contract.

ARTICLE 10 - Experience and Financial Statements

In accordance with New York State Executive Order No. 170, a Contract shall only be awarded to a responsible Bidder capable of performing and completing the Work in a satisfactory manner. The NYS Vendor Responsibility Questionnaire, instructions for which are included in Section V, "Bid Forms and Attachments" must be completed and submitted by the apparent low Bidder within five (5) days after the apparent low Bidder has been so notified.

Failure of the apparent low Bidder to timely submit the complete, properly executed questionnaire within five (5) days may result in disqualification.

Before Department will consent to any subcontracts at or over \$10,000, unless otherwise agreed to by the Department, the proposed subcontractor must submit the complete, properly executed "NYS Vendor Responsibility Questionnaire" through Contractor. Any delay in the progression of work caused by the failure of a subcontractor to comply with these requirements will be attributable to Contractor and any additional costs will be Contractor's responsibility.

The low Bidder shall demonstrate its responsibility to perform and complete Work by submitting a statement of its experience and the experience of any Subcontractor which the low Bidder intends to use to perform the Work. Department may require the low Bidder to further demonstrate its responsibility to perform and complete Work by submitting an additional experience and financial statement or information seven (7) days after bid opening or within seven (7) days of Department request, which shall include at a minimum, information pertaining to the Bidder's financial resources. The submitted financial information shall be certified by a Certified Public Accountant, and shall be submitted in the form required by Department. This can also apply to Contractor's Subcontractors.

In the case of a joint venture, each member must meet the experience requirements specified in Article 17 of this Section. A bid cannot be submitted by a Bidder, including a joint venture, where the Bidder or one of the members of a joint venture has less than three (3) years satisfactory experience in construction of the work to be performed, unless the Bidder or member of a joint venture is a successor in interest to a pre-existing company which meets the required minimum of three (3) years satisfactory experience in construction of the work to be performed.

All on-site personnel are required to have 40-hour Occupational Safety and Health Administration (OSHA) training plus a current eight-hour refresher, baseline medical monitoring, plus a current yearly physical, and training and current fit testing for respirator use if applicable.

Additionally, the successful Contractor must be compliant with Section X – Standard Specifications, SPEC 01 35 29 – Contractor’s Health and Safety Plan and the OSHA Standards and Regulations contained in Title 29, Code of Federal Regulations, Part 1910 and 1926 (20 CFR 1910 and 1926) and subsequent additions and/or modifications, the New York State Labor Law Section 876 (Right-to-Know Law), the Standard Operating Safety Guidelines by the United States Environmental Protection Agency (EPA), Office of Emergency and Remedial Response and the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH, OSHA, USCG, and EPA) provide the basis for the safety and health program. Additional specifications within this section are in addition to OSHA regulations and reflect the positions of both the EPA and the National Institute for Occupational Safety and Health (NIOSH) regarding procedures required to ensure safe operations at abandoned hazardous waste disposal sites.

ARTICLE 11 - Preliminary Progress Schedule

The Preliminary Progress Schedule shall consist of three (3) copies of a narrative description and a time-scaled critical path method diagram or bar chart diagram as specified in Section X – Standard Specifications, SPEC 01 32 16 Progress Schedule. The narrative in the Preliminary Progress Schedule shall describe the order in which Bidder proposes to perform the Work pursuant to the specified Contract Time(s) and Work sequence conditions indicated in or required by the Bidding Documents. It shall also indicate proposed starting and completion dates for Work expressed in terms of days elapsed from the Notice to Proceed associated with each division of the Specifications within each major structure or geographical area of Work. Activities shall further identify significant submittals, approvals and associated deliveries, significant testing, major Department responsibilities, and responsibilities of affected utilities and third parties. The narrative shall include monthly percentages of completion for the Work in relation to the rate of progress anticipated in the Preliminary Progress Schedule.

ARTICLE 12 - Bid Breakdown

The Bid breakdown shall be submitted by the apparent low Bidder within fourteen (14) days after the date of the Notice of Intent to Award letter. Discrepancies, ambiguities or conflicts in the Bid breakdown shall be resolved in accordance with the terms and conditions set forth in Article 8.10 of Section VIII the General Conditions.

A Bidder submitting a Bid breakdown and awarded a Contract for the Work agrees and understands that those prices for separable parts of the Work disclosed on the Bid breakdown, where they are applicable and determined to be reasonable by Department may be used for the purposes of: a.) measurement and payment, b.) increase(s) or decrease(s) in the Contract Price due to adjustments in quantities to the separable parts of the Work, and c.) Change Orders or Proposed Change Orders which add or deduct like Work.

ARTICLE 13 - Subsurface and Technical Information

If boring logs and other subsurface information were made available for the inspection of Bidders, please note that such data were obtained with reasonable care and were recorded in good faith by Department, Engineer or the Design Engineer.

The soil and rock descriptions shown are as determined by a visual inspection of the samples from the various explorations unless otherwise noted. The observed water levels and/or water conditions indicated thereon are as recorded at the time of the exploration. These levels and/or conditions may vary considerably, according to the prevailing climate, rainfall and other factors, including the passage of time.

Similarly, data concerning leachate were obtained with reasonable care and recorded in good faith. The location and concentrations of leachate may vary considerably according to the prevailing climate, rainfall and other factors, including the passage of time. Bidders may rely upon accuracy of the subsurface technical data as to where (location) and when (exact time) data was obtained; but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof.

When reports showing data obtained by investigations and tests at the site by Department, Engineer or the Design Engineer are included with the Bidding Documents, or made available to Bidders as set forth in the Bidding Documents, it is expressly understood and agreed that technical data, but not any non-technical data, interpretations or opinions contained in such reports, are incorporated by reference into the Contract Documents. Bidders may rely upon the accuracy of all such technical data contained in such reports as to where (location) and when (exact time) such technical data was obtained, unless the Bidding Documents limit any other basis upon which such technical data may be relied upon. It is further expressly understood and agreed that the use of any technical data contained in such reports is subject to all of the conditions and limitations set forth in the Bidding Documents.

Subsurface and technical information is made available to Bidders in good faith so that they may be aware of the information utilized for design and estimating purposes.

Department makes no representations or warranties, express or implied, as to the completeness of this information or data, nor is such disclosure intended as a substitute for personal investigations, interpretations, and judgment of the Bidder.

ARTICLE 14 - Underground Facilities

The locations of Underground Facilities were ascertained with reasonable care and recorded in good faith from various sources, including the records of municipal and other public service corporations, and therefore such locations may only be approximate. Department does not assume responsibility for the accuracy or completeness of such locations.

ARTICLE 15 - Examination of Bidding Documents and Site

It is the responsibility of each Bidder, before submitting a Bid to: a.) examine the Bidding Documents thoroughly, b.) visit and visually inspect the site during the Pre-Bid Conference required pursuant to Article 3 of Section IV, "Supplementary Bidding Information and Requirements," c.) become familiar with local conditions that may affect cost, schedule, performance or furnishing of the Work, d.) become familiar with applicable Laws that may in any manner affect cost, schedule, performance or furnishing of the Work, e.) study and carefully correlate Bidder's observations with the Bidding Documents, and f.) notify the Project Manager identified in Article 1 of this Section promptly after discovering any conflicts, ambiguities, errors or inconsistencies in the Bidding Documents.

It is the responsibility of each Bidder to obtain any additional documents, information or data which pertain to the physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the site which may affect cost, schedule, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the Bidding Documents.

The submission of a Bid constitutes an incontrovertible representation by Bidder that Bidder has taken steps reasonably necessary to ascertain the nature and location of the Work, and that Bidder has investigated and accounted for in the preparation of the Bid: a.) Governmental requirements and all reasonably foreseeable general and local conditions that may affect cost, schedule, performance or furnishing of the Work. Examples of such conditions include: 1.) conditions bearing upon the transportation, disposal, handling and storage of materials, 2.) the availability and suitability of labor, water, electric power, telephone, sanitary services, and roads, 3.) weather, river stages, tides or similar conditions at or contiguous to the site, 4.) physical conditions of the site, and 5.) the character of equipment and facilities needed preliminary to and during Work performance, b.) character, quality and quantity of surface, subsurface and Underground Facilities at or contiguous to the site, insofar as this information is reasonably ascertainable from the Drawings and Specifications included as part of the Bidding Documents, from the reports referenced in the Supplementary Bid Information. and from

the documents, information and data regarding physical conditions at or contiguous to the site obtained by Bidder, and c.) Bidding Documents to be sufficient in scope and detail to indicate and convey understanding of all terms and conditions affecting cost, schedule, performance and furnishing of the Work.

Any Failure to take the actions described in this Article will not relieve that Bidder from responsibility for estimating properly the difficulty, cost of, and schedule for successfully performing the Work, or from performing the Work successfully without an increase in Contract Price or an extension in Contract Time.

Department, Engineer, or Design Engineer do not assume any responsibility for any conclusions or interpretations made by any Bidder based on the information made available by the Bidding Documents. Nor does Department, or Engineer assume any responsibility for any understanding reached or representation made concerning conditions which can affect the cost, schedule, progress, furnishing and performance of the Work prior to execution of the Contract, unless that understanding or representation is expressly stated in the Bidding Documents.

In an itemized contract, the estimate of quantities of work to be done and materials to be furnished is approximate and is given only as a basis of calculation upon which the award of the contract is to be made. Department does not assume any responsibility that the quantities estimated will be the actual quantities required; Contractor may not claim misunderstanding or deception because of such estimates of quantities or of the character of the work, location, or other condition pertaining thereto. Department may increase or diminish any or all of the quantities of work mentioned above or omit any of them, as deemed necessary or as being in the best interest of Department.

ARTICLE 16 - Subcontractors, Suppliers or Others

Unless otherwise agreed in writing by Department, Contractor shall subcontract no more than the percentage (%) of the total cost of the work under its contract as may be provided by the Contract Documents in Article 6 of Section IV, "Supplementary Bidding Information and Requirements". Procedures for approval of Subcontractors, Suppliers or other persons or organizations, after execution of the Agreement, are set forth in the General Conditions and the Supplementary Conditions.

ARTICLE 17 - Award of Contract

The Contract will be awarded to the lowest, responsive and responsible Bidder(s) that has prepared acceptable required submittals, in the opinion of Department, as stipulated in Article 5 of this Section.

To the extent permitted by applicable Law, Department reserves the right to reject any and all Bids, to waive any and all informalities or irregularities, to disregard all nonconforming, nonresponsive, or conditional Bids, or to re-advertise for Bids.

In order to be considered responsive, a Bid shall be completed, signed and be responsive in all respects to the Bidding Documents unless informalities are waived by Department.

In order to be considered responsible, a Bidder must establish to the complete satisfaction of Department and Engineer, as a minimum, that it has adequate and satisfactory experience and financial resources to meet the obligations under the Contract and award of the Contract would be in the best interest of the State. A Bidder's prior experience shall be considered satisfactory when among other factors, its performance of prior work was timely, of good quality, in compliance with any contract requirements including contracted costs and schedule, and in compliance with applicable Law. The Bidder must have a minimum of three (3) years satisfactory experience in construction of the work to be performed. This experience must include, but not be limited to, the excavation, transportations, and handling of hazardous waste and contaminated soil/sediment. Experience must also include the handling and treatment of contaminated water generated from hazardous waste operations. For work to be deemed satisfactory, the work must have been performed with required oversight from United States Environmental Protection Agency (USEPA), Department, or an equivalent state environmental regulatory agency (i.e., New Jersey DEP, Pennsylvania DER, etc). Brownfield cleanup work qualifies for the experience requirement. The bidder cannot meet the minimum experience requirements through the use of subcontractor(s).

Department may conduct such investigations as it deems necessary to assist in the evaluation of any Bid and to establish the responsibility in terms of satisfactory experience and financial ability of the Bidder, and of any proposed subcontractors. Department may reject the Bid of any Bidder which it deems not to be responsible and may reject performance of Work by any Subcontractor which it deems is not responsible.

It is the intention of Department that the work will be awarded within 45 calendar days after the opening of bids to the lowest responsive, responsible Bidder whose bid conforms to the requirements of the Contract Documents. Bids may not be withdrawn, altered or revoked during this 45-day period except as provided by law and specified within Article 4 of this Section. Even after the expiration of such 45-day period, Department may accept a Bid and award the work to any Bidder whose bid has not been unequivocally withdrawn or revoked prior to the mailing of written Notice of the Award to the successful Bidder. For purposes of the preceding sentence, withdrawal or revocation of a Bid shall not occur until Department receives an unequivocal written statement to that effect.

ARTICLE 18 - Time is of the Essence

Time is of the essence for the performance of Work required by the Contract Documents.

ARTICLE 19 - Applicability of Federal, State and Local Law

Any Bid and any Contract awarded pursuant to a Bid shall be subject to and governed by applicable Law.

It is the responsibility of each Bidder to be informed of and comply with federal, state and local Laws, affecting the cost, schedule, progress, performance or furnishing of the Work. This requirement includes, but is not limited to, applicable regulations concerning minimum wages, nondiscrimination in employment, affirmative action, protection of public and employee safety and health, environmental protection, fire protection and permits, and fees and licensing.

ARTICLE 20 - M/WBE and EEO Requirements

The M/WBE and EEO provisions of Appendix B are required provisions for this contract. The Bidder is required to comply with State regulations 9NYCRR Part 543 entitled, "Requirements and Procedures Regarding Business Participation Opportunities for Minorities and Women on State Contracts."

The selected Bidder shall be required to make good-faith efforts to subcontract at least the percentage stipulated in Section VII of Appendix B, of the contract price to NYS Certified Minority Business Enterprise(s) (MBE) and Women Business Enterprise(s) (WBE), respectively.

In accordance with Executive Law Article 15-A, Department is required to make available the NYS Directory of Certified Minority and Women Owned Business Enterprises. Empire State Development has put the Minority and Women's Business Development Directory on the Internet at www.ny.newnycontracts.com . Support will be available from 9:00 a.m. to 5:00 p.m., Monday through Friday, except for NYS holidays. If assistance is needed call (855) ESD-4MWBE or (855) 373-4692. For additional information and assistance regarding NYS Certified M/WBE's, please contact the Department's Minority and Women's Business Programs Unit at (518) 402-9240.

Pursuant to New York State Executive Law Article 15-A, and the attending rules and regulations, an approvable M/WBE Utilization Plan and Work Force Utilization Plan shall be required prior to or at the time of the execution of the Contract.

Contractor shall be required to provide equal opportunities to minorities and women with regard to all jobs necessary for the performance of work or contracts required by the project. In doing so, Contractor agrees to make good-faith efforts to employ minorities and women for at least the percentage stipulated in Section VII of Appendix B, of the work force hours required for the completion of the project. Different occupational category work force participation goals may be used to meet these overall goals for work force participation. Contractor shall not discriminate against employees or applicants for employment because of race, creed, color, national origin, sex, age, disability, or marital status, and shall undertake or continue existing programs of affirmative action to ensure that minority group persons and women are afforded equal opportunity without discrimination. Such programs shall include, but not be limited to, recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff,

termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training.

As required by Department, Contractor shall request of each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding and which is involved in the performance of the contract with the Agency to furnish a written statement that such employment agency, labor union, or representative shall not discriminate because of race, creed, color, national origin, sex, age, disability, or marital status, and that such union or representative will cooperate in the implementation of Contractor's obligations hereunder.

Contractor shall include the provisions of Section VII of Appendix B in every subcontract or purchase order in such a manner that the subcontractor shall be required to comply with such provisions with respect to its work in conjunction with the contract with Department.

ARTICLE 21 – Participation Requirements for New York State Certified Service-Disabled Veteran-Owned Businesses

Article 17-B of the New York State Executive Law provides for more meaningful participation in public procurement by certified Service-Disabled Veteran-Owned Businesses (SDVOBs), thereby further integrating such businesses into New York State's economy. The Department recognizes the need to promote the employment of service-disabled veterans and to ensure that certified service-disabled veteran-owned businesses have opportunities for maximum feasible participation in the performance of Department contracts.

In recognition of the service and sacrifices made by service-disabled veterans and in recognition of their economic activity in doing business in New York State, Bidders are strongly encouraged and expected to consider SDVOBs in the fulfillment of the requirements of the Contract. Such participation may be as subcontractors or suppliers, as protégés, or in other partnering or supporting roles. To obtain more information regarding the utilization of SDVOBs including how to find and contact them, please use the contact information below or go to the Division of Service Disabled Veteran's Business Development (DSDVBD) website at: <https://ogs.ny.gov/Veterans/default.asp>.

The contractor must make good faith efforts to subcontract a goal of six (6) percent (%) of the contract amount to New York State Certified Service-Disabled Veteran-Owned Businesses (SDVOBs), for purposes of providing meaningful participation by SDVOBs. Appendix D further defines the SDVOB provisions required by Executive Law, Article 17B.

ARTICLE 22 - Permissible Contacts During a Procurement and Prohibition of Inappropriate Lobbying Influence

Chapter 1 of the Laws of 2005, as amended by Chapter 596 of the Laws of 2005 (collectively referred to as the "Lobbying Law"), makes major changes to the Legislative

Law and State Finance Law relative to lobbying on government procurements. More specifically, the Lobbying Law creates two new sections in the State Finance Law: Section 139-j addresses restrictions on “contacts” during the procurement process; and Section 139-k addresses the disclosure of contacts and the responsibility of offerer(s)¹ during the procurement process. The Lobbying Law applies to all procurements initiated on or after January 1, 2006. In this regard, a procurement means a contract or agreement involving an annual expenditure in excess of \$15,000 for a commodity, service, technology, public work, or construction; purchase, sale or lease of real property; or revenue contract.

In conformity with the Lobbying Law, during a procurement’s restricted period² the only New York State Department of Environmental Conservation (Department) officer(s) or employee(s) that the offerer may “contact” is/are the Department designated contact person(s) for that procurement. In this regard, “contact” means any oral, written, or electronic communication under circumstances where a reasonable person would infer that the communication was intended to influence a procurement. Exceptions to this rule include:

- § submission of a written proposal in response to an RFP, IFB or any other solicitation method;
- § submission of written questions as part of an RFP, IFB or other solicitation method where all written questions and written responses will be provided to all offerer(s);
- § participation in a pre-proposal or pre-bid conference scheduled as part of an RFP, IFB or other solicitation process;
- § written complaints by an offerer that the Department designated contact for a procurement fails to respond to in a timely manner;
- § negotiations with the Department following tentative award;
- § contacts between designated Department staff and offerer to request the review of a contract award; and
- § communications with the Department regarding an appeal, protest or other review of a procurement, participation in an administrative or judicial proceeding regarding a procurement, and complaints regarding a procurement made to the Attorney General, Inspector General, District Attorney, or State Comptroller.

An offerer shall not, under any circumstances, attempt to influence a Department procurement in a way that violates or attempts to violate: Public Officers Law Section 73(5), relating to gifts intended to influence; or Public Officers Law Section 74, relating to the code of ethics for employees of state agencies, public authorities and public benefit corporations, members of the New York State Legislature, and Legislative employees.

¹ Individual or entity, or any employee, agent, consultant or person acting on behalf of such individual or entity, that contacts the Department about a procurement during the restricted period.

² The period of time commencing with the earliest public notice, advertisement or solicitation of a Request for Proposals (RFP), Invitation for Bids (IFB), solicitation of proposals or any other method for soliciting responses from offerers intending to result in a procurement contract by the Department, and ending with the final contract award and approval by the Department, and the Office of the State Comptroller (if required).

An offerer who contacts the Department designated contact person for a procurement during the restricted period must be prepared to provide the following information: name, address, telephone number, place of principal employment and occupation of the person or organization making the contact, and whether the person/organization making the contact is the offerer or is retained, employed or designated by or on behalf of the offerer to appear before or contact the Department about the procurement.

An offerer that submits a proposal, bid or other response to a Department RFP, IFB or other solicitation method must: certify that it understands and agrees to comply with these guidelines regarding permissible contacts during a procurement and the prohibition of inappropriate lobbying influence; and disclose whether any governmental entity has, within the prior four years, found the offerer non-responsible due to a violation of the Lobbying Law or the intentional provision of false or incomplete information. Further, all Department procurement contracts will contain: a certification by the offerer that all information provided to the Department with respect to the Lobbying Law is complete, true and accurate; and a provision authorizing the Department to terminate the contract in the event such information is found to be intentionally false or incomplete.

The Department will investigate all allegations of violations of the Department guidelines regarding permissible contacts during a procurement and the prohibition of inappropriate lobbying influence. A finding that an offerer has knowingly and willfully committed such a violation may result in a determination that the offerer and its subsidiaries are non-responsible and therefore ineligible for award of the procurement contract. A second determination of non-responsibility for such a violation within four (4) years of the first such determination may render the offerer and its subsidiaries ineligible to submit a bid or proposal or be awarded a procurement contract for four (4) years from the date of the second determination. The Department will notify the New York State Office of General Services (OGS) of any determination of non-responsibility or debarments due to violations of the Lobbying Law.

If you require further guidance on the new Lobbying Law, you are encouraged to visit the Advisory Council on Procurement Lobbying website at the following address: <http://www.ogs.state.ny.us/aboutOgs/regulations/defaultAdvisoryCouncil.html>, where Frequently Asked Questions (FAQ's) and answers adopted by the council have been posted. A copy of the new Procurement Lobbying Law is also available on this website.

ARTICLE 23 – Diesel Emissions Reduction Act 2006

In 2007, New York State passed legislation establishing the Diesel Emissions Reduction Act 2006 (DERA). This Act amended the Environmental Conservation Law (ECL) by adding Section 19-0323 which requires the use of best available retrofit technology (BART) and ultra-low sulfur diesel fuel (ULSD) for heavy duty vehicles owned or operated by, including on behalf of, state agencies and state or regional public authorities. The Department has promulgated regulations (6 NYCRR Part 248) to provide guidance on provisions of the law. The regulations may be found on the Department's website at <http://www.dec.ny.gov/regs/2492.html>.

The Contractor must comply with the specifications and provisions of ECL Section 19-0323 and 6 NYCRR Part 248, which require the use of Best Available Retrofit Technology (BART) and Ultra Low Sulfur Diesel (ULSD), unless specifically waived by the Department. Qualifications for a waiver under this law will be the responsibility of the Contractor.

ARTICLE 24 – Environmental Protection Fund Acknowledgment

If applicable, in recognition of a portion of the Department funds utilized for any work completed under this Contract, the Contractor agrees to acknowledge in any communication to the public, that such funding was provided from the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

Article 25 – Executive Order 177

Executive Order No. 177, Prohibiting State Contracts with Entities that Support Discrimination, orders that New York State’s government will not do business with entities that promote or tolerate discrimination or infringement on the civil rights and liberties of New Yorkers. New York State is dedicated to ensuring that all individuals are treated equally, regardless of their age, race, creed, color, national origin, sexual orientation, gender identity, military status, sex, marital status, disability, or other protected basis. To that end, New York has enacted numerous laws, regulations, and policies, and will continue to aggressively enforce its strong protections against discrimination to the maximum extent allowable by law.

In order to comply with this order, the Contractor is required to complete the Executive Order No. 177 Certification which certifies that it does not have institutional policies or practices that fail to address the harassment and discrimination of individuals on the basis of their age, race, creed, color, national origin, sex, sexual orientation, gender identity, disability, marital status, military status, or other protected status under the Human Rights Law.

Article 26 – Sexual Harassment Prevention Certification

State Finance Law §139-I requires bidders on state procurements to certify that they have a written policy addressing sexual harassment prevention in the workplace and provide annual sexual harassment training (that meets the minimum requirements of section two hundred one-g of the NYS Labor Law and Department of Labor’s model policy and training standards) to all its employees.

Where competitive bidding is required pursuant to statute, rule or regulation, every bid made to the state or any public department or agency of the state must contain the following statement:

“By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all of its employees. Such policy shall, at a minimum, meet the requirements of section two hundred one-g of the labor law.”

Bids that do not contain the certification will not be considered for award; provided however, that if the bidder cannot make the certification, the bidder shall provide a signed statement with their bid detailing the reasons why the certification cannot be made. After review and consideration of such statement, the Department may reject the bid or may decide that there are sufficient reasons to accept the bid without such certification.

Bidders are required to sign and submit the Sexual Harassment Prevention Certification form, included in Section V, Article 1(g). If the bidder cannot make the certification then a signed statement must be submitted with the bid detailing the reasons why the certification cannot be made.

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Attachment B

Section V – Bid Forms and Acknowledgements

SECTION V

Bid Forms and Acknowledgements

Site Name: Saranac lake Gas Company

Site Number: 516008

ARTICLE 1(a) - Contract Bid Form and Acknowledgment for Remediation of Contaminated Soil at the Saranac Lake Gas Company site.

The Bidder hereby declares that either personally or through authorized representative(s), Bidder has carefully examined all Bidding Documents and has personally or through authorized representative(s) inspected the actual location of the work, together with the local sources of supply; and understands all terms and conditions of Bidding Documents. Bidder further understands that in signing this Bid, the right to plead any misunderstanding regarding the same is waived.

Pursuant to and in compliance with the Bidding Documents, the Bidder hereby offers to furnish all labor, materials, supplies, equipment and other facilities and appurtenances, necessary or proper for, or incidental to, the construction and completion of this Contract, as required by and in strict compliance with the applicable provisions of all Contract Documents, for the following unit and/or lump sum prices.

The undersigned shall meet the required submittal time periods listed in Article 5 - Required Bid Submittals of Section III - Bidding Information and Requirements.

The undersigned hereby designates the following office as the office to which such Notice of Intent to Award and Notice of Award may be emailed, mailed, or delivered:

Attention:	
Company Name:	
Street Address:	
City, State, Zip (+4):	
Email Address:	
Phone Number:	

BID

New York State Department of Environmental Conservation

Site Name: Saranac Lake Gas Company

Site Number: 516008

<i>Payment Item Number</i>	<i>Description</i>	<i>Unit</i>	<i>Estimated Quantity</i>	<i>Unit or Lump Sum Price</i>		<i>Total Amount (\$)</i>
				<i>Words</i>	<i>Figures</i>	
LS-1	Site Preparation	LS	1			
LS-2	Activities in Support of Excavation on The Railroad Property	LS	1			
LS-3	Activities in Support of Excavation Adjacent to Brandy Brook	LS	1			
LS-4	Site Restoration	LS	1			
LS-6	Brandy Brook Restoration	LS	1			
UP-1	Site Services	Calendar Day	184			
UP-2	Health and Safety	Working Day	132			
UP-3	Excavation of Materials	CY	7,997			
UP-4	Solidification	CY	36,940			

Contractor Authorized Representative

Contractor Name

Date

BID

New York State Department of Environmental Conservation

Site Name: Saranac Lake Gas Company

Site Number: 516008

<i>Payment Item Number</i>	<i>Description</i>	<i>Unit</i>	<i>Estimated Quantity</i>	<i>Unit or Lump Sum Price</i>		<i>Total Amount (\$)</i>
				<i>Words</i>	<i>Figures</i>	
UP-5	Construction Water Management, Treatment, Sampling and Discharge	gallon	4,665,600			
UP-6	Soil Chemical Sampling and Analysis	Each	68			
UP-7	Non-Hazardous MGP Remediation Waste Off-Site Transportation and Disposal	Ton	10,603			
UP-8	Hazardous MGP Remediation Waste Off-Site Transportation and Disposal	Ton	751			
UP-9	Cleared and Demolition Debris Materials Off-Site Transportation and Disposal	Ton	1,827			
UP-10	Backfill and Grade with Reusable Fill	CY	6,513			
UP-11	Backfill and Grade with Imported Soil	CY	2,646			
<p>Grand Total Bid: \$ _____ <i>(Price in figures)</i></p>						

Contractor Authorized Representative

Contractor Name

Date

ARTICLE 1(b) Bidder's/Proposer's Certification

Non-Collusive Bidding and Nondiscrimination in Employment in Northern Ireland MacBride Fair Employment Principles and State Ethics Law Principles and Procurement Lobbying Law

BY SUBMISSION OF THIS BID/PROPOSAL, AND BY SIGNING HEREUNDER THE BIDDER/ PROPOSER, AND EACH PERSON SIGNING ON BEHALF OF SUCH PARTY CERTIFIES, AND IN THE CASE OF A JOINT BID/PROPOSAL, EACH PARTY THERETO CERTIFIES AS TO ITS OWN ORGANIZATION, UNDER PENALTY OF PERJURY, THAT TO THE BEST OF HIS/HER KNOWLEDGE AND BELIEF:

A. Non Collusion, State Finance Law §139-d

- 1) The prices in this Bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor;
- 2) Unless otherwise required by law, the prices which have been quoted in this Bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to opening, directly or indirectly, to any other Bidder or to any competitor; and
- 3) No attempt has been made or will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a Bid for the purpose of restricting competition.

B. MacBride Fair Employment Principles, State Finance Law §165(5)

- 1) it or any individual or legal entity in which the Bidder/Proposer holds a ten-percent (10%) or greater ownership interest, or any individual or legal entity that holds a 10% or greater ownership in the Bidder/Proposer, either: (answer yes or no to one or both of the following, as applicable).

- 2) Has business operations in Northern Ireland:

Yes or No (check answer) If yes, complete #3

- 3) Shall take lawful steps in good faith to conduct any business operations that it has in Northern Ireland in accordance with the MacBride Fair Employment Principles relating to non-discrimination in employment and freedom of workplace opportunity, regarding such operations in Northern Ireland and shall permit independent monitoring of its compliance with such Principles.

Yes or No (check answer)

C. State Ethics Law Provision

By submittal of this bid, the undersigned hereby certifies, for and on behalf of the bidder, that he is familiar with the following provisions of the State Ethics Law provisions applicable to post employment restrictions affecting former state employees: POL §73(8)(a)(i) the two year ban, and §73(8)(a)(ii), the life time bar, and that submittal of this bid is not in violation of either provision, and that no violation will occur by entering into a contract or in performance of the contractual services, and further that the bidder recognizes that the Department may rely upon this certification.

Except as follows: (attach information if needed)

(Bidder/Proposer is to make full disclosure of any circumstances which could affect its ability to perform in complete compliance with the cited laws. Any questions as to the applicability of these provisions should be addressed to the New York State Joint Commission on Public Ethics, 540 Broadway, Albany, NY 12207 or by phone (518) 408-3976.

D. Procurement Lobbying Affirmation

The Undersigned affirms that it understands and agrees to comply with the procedures of the New York State Department of Environmental Conservation relative to permissible contacts as required by State Finance Law §139-j (3) and §139-j (6) (b).

Print Name, Title

Signature, Date

ARTICLE 1(c) – Bid Security (Page to Attach)

If Bid Security is a Bid Bond, use Bid Bond form and provide certified power of attorney.

ARTICLE 1(d) - Bid Bond

Know all men by these presents, that we, the undersigned _____, as Principal, and _____, as Surety, are hereby held and firmly bound unto New York State Department of Environmental Conservation in the penal sum of _____ for the payment of which, will and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns. Signed this ____ day of _____ 20____.

The condition of the above obligation is such that whereas the Principal has submitted to New York State Department of Environmental Conservation certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the Remediation of Contaminated Soil, at the Saranac Lake Gas Company site, Contract No. D011909, Site No. 516008

Now, Therefore

- a) If said Bid shall be rejected, or in the alternate,
- b) If said Bid shall be accepted and the principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for the faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid.

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligation of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bids; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Corporate Seal(s) – Principal & Surety
(If no seal, write “No Seal” and sign)

By _____
Principal (Print Name and Title)

Principal (Signature and Date)

By _____
Surety (Print Name and Title)

Surety (Signature and Date)

ARTICLE 1(e) - Offerer Disclosure of Prior Non-Responsibility Determinations
(Page 1 of 2)

Name of Individual or Entity Seeking to Enter into the Procurement Contract:

Name: _____

Address: _____

Name and Title of Person Submitting this Form:

Name: _____

Title: _____

Contract Procurement Number: D011909

Date: _____

1. Has any Governmental Entity made a finding of non-responsibility regarding the individual or entity seeking to enter into the Procurement Contract in the previous four years?

Yes No (If yes, answer questions 2.– 4., if no, go to question 5.)

2. Was the basis for the finding of non-responsibility due to a violation of State Finance Law §139-j?

Yes No

3. Was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a Governmental Entity?

Yes No

4. If you answered yes to any of the above questions, please provide details regarding the finding of non-responsibility below.

Governmental Entity: _____

Date of Finding of Non-responsibility: _____

Basis of Finding of Non-Responsibility: Provide details under separate cover, endorse, date and provide marked as Supplement to Article 1(e).

ARTICLE 1(e) - Offerer Disclosure of Prior Non-Responsibility Determinations
(Page 2 of 2)

5. Has any Governmental Entity or other governmental agency terminated or withheld a Procurement Contract with the above-named individual or entity due to the intentional provision of false or incomplete information?

Yes No (If yes, provide details below.)

Governmental Entity: _____

Date of Termination or Withholding of Contract: _____

Basis of Termination or Withholding: Provide details under separate cover, endorse, date and provide marked as Supplement to Article 1(e).

Offerer Certification:

Offerer certifies that all information provided to the New York State Department of Environmental Conservation with respect to State Finance Law §139-k is complete, true and accurate.

Signature: _____

Date: _____

Name: _____

Title: _____

This form must be signed by an authorized executive or legal representative and returned with the bid/proposal.

**ARTICLE 1(f) – Vendor Assurance of No Conflict of Interest or Detrimental Effect
(Page 1 of 2)**

The Firm offering to provide services pursuant to this Procurement/Contract, as a contractor, joint venture contractor, subcontractor, or consultant, attests that its performance of the services outlined in this Procurement/Contract does not and will not create a conflict of interest with nor position the Firm to breach any other contract currently in force with the State of New York.

Furthermore, the Firm attests that it will not act in any manner that is detrimental to any State project on which the Firm is rendering services. Specifically, the Firm attests that:

1. The fulfillment of obligations by the Firm, as proposed in the response, does not violate any existing contracts or agreements between the Firm and the State;
2. The fulfillment of obligations by the Firm, as proposed in the response, does not and will not create any conflict of interest, or perception thereof, with any current role or responsibility that the Firm has with regard to any existing contracts or agreements between the Firm and the State;
3. The fulfillment of obligations by the Firm, as proposed in the response, does not and will not compromise the Firm's ability to carry out its obligations under any existing contracts between the Firm and the State;
4. The fulfillment of any other contractual obligations that the Firm has with the State will not affect or influence its ability to perform under any contract with the State resulting from this Procurement;
5. During the negotiation and execution of any contract resulting from this Procurement, the Firm will not knowingly take any action or make any decision which creates a potential for conflict of interest or might cause a detrimental impact to the State as a whole including, but not limited to, any action or decision to divert resources from one State project to another;
6. In fulfilling obligations under each of its State contracts, including any contract which results from this Procurement, the Firm will act in accordance with the terms of each of its State contracts and will not knowingly take any action or make any decision which might cause a detrimental impact to the State as a whole including, but not limited to, any action or decision to divert resources from one State project to another;
7. No former officer or employee of the State who is now employed by the Firm, nor any former officer or employee of the Firm who is now employed by the State, has played a role with regard to the administration of this contract procurement in a manner that may violate section 73(8)(a) of the State Ethics Law; and

**ARTICLE 1(f) – Vendor Assurance of No Conflict of Interest or Detrimental Effect
(Page 2 of 2)**

8. The Firm has not and shall not offer to any employee, member or director of the State any gift, whether in the form of money, service, loan, travel, entertainment, hospitality, thing or promise, or in any other form, under circumstances in which it could reasonably be inferred that the gift was intended to influence said employee, member or director, or could reasonably be expected to influence said employee, member or director, in the performance of the official duty of said employee, member or director or was intended as a reward for any official action on the part of said employee, member or director.

Firms responding to this Procurement/Contract should note that the State recognizes that conflicts may occur in the future because a Firm may have existing or new relationships.

The State will review the nature of any such new relationship and reserves the right to terminate the contract for cause if, in its judgment, a real or potential conflict of interest cannot be cured.

Signature: _____

Date: _____

Name: _____

Title: _____

This form must be signed by an authorized executive or legal representative and returned with the bid/proposal.

ARTICLE 1(g) – Sexual Harassment Prevention Certificate Form

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all of its employees. Such policy shall, at a minimum, meet the requirements of section two hundred one-g of the labor law.

Company Name: _____

Signature: _____

Print Name and Title: _____

Date: _____

If the above certification cannot be made, the bidder must submit a signed statement below detailing the reasons why the certification cannot be made.

Company Name: _____

Signature: _____

Print Name and Title: _____

Date: _____

ARTICLE 2(a) - Statement of Surety's Intent

To: **New York State Department of Environmental Conservation**

We have reviewed the Bid of:

(Contractor)

Having its place of business at:

(Address)

For the Project:
Remediation of Contaminated Soil
Saranac Lake Gas Company, Site No. 516008

Bids for which will be received on _____ (Bid Opening Date) and wish to advise that should this Bid of Contractor be accepted and the Contract awarded to Contractor, it is our present intention to become surety on the Performance Bond and Labor and Material Payment Bond required by the Contract.

Any arrangement for the Bonds required by the Contract is a matter between Contractor and ourselves and we assume no liability to Department or third parties if for any reason we do not execute the requisite bonds.

We, the undersigned, are duly licensed to do business in the State of New York.

Attest, and Attach Power of Attorney:

Corporate Seal

(If no seal, write "No Seal" and sign)

Surety Name, Title

Surety's Authorized Signature(s), Date

Telephone Number and email address for Bonding Company

Telephone Number and email address for Bonding Broker

Article 2(b) - M/WBE-EEO Utilization Plan and Work Force Utilization

Contractor must submit M/WBE-EEO Utilization Plan after being issued Notice of Intent to Award in accordance with Article 5c. of Section III. Quarterly reporting is required throughout the term of the contract and Contractors will receive quarterly reminders from the M/WBE-EEO compliance unit.

Contractors are invited to file the required forms online or may choose to complete and submit paper forms. Instructions are available at: <http://www.dec.ny.gov/about/48854.html>

If submitting paper forms, The M/WBE-EEO Utilization Plan and/or quarterly reports shall be sent directly to:

NYS Department of Environmental Conservation
Division of Management and Budget Services
Minority and Women's Business Programs Unit
625 Broadway, 10th Floor
Albany, New York 12233-5028

Contractors opting to file electronic forms can obtain the appropriate forms from the website. The Contractor will be able to amend the forms either online, through the quarterly report process, or by contacting the M/WBE-EEO compliance specialist.

M/WBE Directory on the Internet

Empire State Development has put the Minority and Women-Owned Business Directory on the Internet. The Internet address is <https://ny.newnycontracts.com/>. Support will be available from 9:00 a.m. to 5:00 p.m., Monday through Friday, except for NYS holidays. If assistance is needed, call (855)-ESD-4MWBE or (855)-373-4692.

Article 2 (c) - Instructions for Completing the New York State Vendor Responsibility Questionnaire CCA-2

- Please Read Before Completing Questionnaire -

Contractors must submit a Vendor Responsibility Questionnaire CCA-2 form after being announced the low bidder for any competitively bid contract of \$10,000 or more, or when proposed for subcontract work valued at \$10,000 or more. The Department may require additional information deemed necessary for its review.

Contractors are invited to file the required Vendor Responsibility Questionnaire online via the New York State VendRep System or may choose to complete and submit a paper questionnaire. To enroll in and use the New York State VendRep System, see the VendRep System Instructions available at: <http://www.osc.state.ny.us/vendrep/systeminit.htm> or go directly to the VendRep System online at <https://portal.osc.state.ny.us>. For direct VendRep System user assistance, the Office of the State Comptroller's Help Desk may be reached at 866-370-4672 or 518-408-4672 or by email at helpdesk@osc.state.ny.us. Contractors opting to file a paper questionnaire can obtain the appropriate questionnaire from the VendRep website www.osc.state.ny.us/vendrep or contact the Office of the State Comptroller's Help Desk.

The enrollment process in the VendRep System can take several days. Contractors are encouraged to enroll prior to submitting bids to ensure meeting the timeframes for certification.

Contractors electing to file the Vendor Responsibility Questionnaire online shall certify to the Department, via a letter, within the timeframe designated in the Instructions to Bidders, that the questionnaire has been updated. The Contractor will be able to supply any additional information requested by the Department, by updating the online questionnaire and notifying the Department via letter, that it has been recertified.

Throughout the contract term, the Contractor is required to notify the Department in writing of any changes in Contractor's vendor responsibility disclosure related to the Contractor commencing bankruptcy proceedings; filings against the Contractor for relief under bankruptcy; Contractor making general assessment for benefit of creditors; a Court appointing a party to take charge of the Contractor's property; Contractor's inability to pay debts; or the Contractor being found in violation of laws and regulations of any public body having jurisdiction.

If the Contractor elects to file a paper copy directly with the Department, a completed original CCA-2 Form must be submitted within the timeframe designated in the Instructions to Bidders. Submit completed questionnaires marked "**CONFIDENTIAL**" to:

NYS Department of Environmental Conservation
Division of Environmental Remediation
Brianna Scharf, Project Manager
625 Broadway, 12th Floor
Albany, New York 12233-7017

Article 2 (d) – Authorizing Resolution

The Contractor is required to submit an Authorizing Resolution stating that a certain individual has the authority to sign the Contract on behalf of the firm.

ARTICLE 2(e) – Executive Order No. 177 Certification

The New York State Human Rights Law, Article 15 of the Executive Law, prohibits discrimination and harassment based on age, race, creed, color, national origin, sex, pregnancy or pregnancy-related conditions, sexual orientation, gender identity, disability, marital status, familial status, domestic violence victim status, prior arrest or conviction record, military status or predisposing genetic characteristics.

The Human Rights Law may also require reasonable accommodation for persons with disabilities and pregnancy-related conditions. A reasonable accommodation is an adjustment to a job or work environment that enables a person with a disability to perform the essential functions of a job in a reasonable manner. The Human Rights Law may also require reasonable accommodation in employment on the basis of Sabbath observance or religious practices.

Generally, the Human Rights Law applies to:

- all employers of four or more people, employment agencies, labor organizations and apprenticeship training programs in all instances of discrimination or harassment;
- employers with fewer than four employees in all cases involving sexual harassment; and,
- any employer of domestic workers in cases involving sexual harassment or harassment based on gender, race, religion or national origin.

In accordance with Executive Order No. 177, the Bidder hereby certifies that it does not have institutional policies or practices that fail to address the harassment and discrimination of individuals on the basis of their age, race, creed, color, national origin, sex, sexual orientation, gender identity, disability, marital status, military status, or other protected status under the Human Rights Law. Executive Order No. 177 and this certification do not affect institutional policies or practices that are protected by existing law, including but not limited to the First Amendment of the United States Constitution, Article 1, Section 3 of the New York State Constitution, and Section 296(11) of the New York State Human Rights Law.

Contractor: _____

Signature: _____

Name: _____

Title: _____

Date: _____

ARTICLE 3(a) - Instructions for Insurance

Please refer to Contract Documents Section VIII, Article 4, and any Addenda if applicable, for the types and amounts of insurance required for this contract, as well as the necessary forms and endorsement requirements.

Should you require any assistance with fulfilling these requirements, please contact Andrew Lindberg in the Department's Bureau of Contract & Grant Development by phone at 518-402-9240 or by e-mail at andrew.lindberg@dec.ny.gov . She will assist you by further explaining the insurance requirements or contacting your insurance company directly. Please include the contract number D011909 in the subject line of all correspondence.

If you do not require assistance, please:

1. Request that your insurance provider note the Department's specific contract number D011909 in the Description of Operations box on the ACORD form.
2. List the following address on the Workers' Compensation and Disability Benefits Certificates as Entity Requesting Proof of Coverage and on the ACORD forms and endorsements as the Certificate Holder:

State of New York and the NYS Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau E
Brianna Scharf, Project Manager
625 Broadway, 12th Floor
Albany, NY 12233-7017

3. Submit all required insurance certificates and applicable endorsements to the following address:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau E
Brianna Scharf, Project Manager
625 Broadway, 12th Floor
Albany, NY 12233-7017

ARTICLE 3(b) - Instruction for Performance Bond and Labor and Material Payment Bond

- 1) The performance bond and the labor and material payment bond are to be only submitted by the bidder who receives the Notice of Intent to Award letter from Department.
- 2) Use the forms that are included in the Contract Documents. **DO NOT RETYPE THE FORMS.**
- 3) Attach a **SEPARATE** certified power of attorney and surety financial statement to **EACH** bond (i.e., one set attached to performance bond and one set attached to labor and material payment bond)
- 4) Performance Bond and Labor and Materials Payment Bond must be secured by the surety and notarized within three (3) days of the date the Contractor signs the agreement.

ARTICLE 3(c) - Performance Bond (page 1 of 3)

Date Bond Executed: _____

NYSDEC-DER Site Number: 516008

Date Contract Executed by Principal: _____

Principal: (Name and Address)

Surety (Name and Address - Indicate State of incorporation and location of principal office)

Full and Just Sum of Bond

(Express in Words)

(Express in Numbers)

Know all men by these presents, that we, the **Principal** and **Surety**, above named, are held and firmly bound unto the New York State Department of Environmental Conservation for and on behalf of the People of the State of New York, hereinafter called the Department, in full and just sum of the amount stated above, good and lawful money of the United States of America, to the payment of which said sum, well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the **Principal** has entered into a certain written contract with the Department, covering the project and specification above;

Now, Therefore, the condition of this obligation is such, that if the **Principal** shall well, truly and faithfully comply with and perform all of the terms, covenants and conditions of said contract on their (his, its) part to be kept and performed, according to the true intent and meaning of said contract, and shall protect the Department and the People of the State of New York against, and pay any and all amounts, damages, costs and judgments which may or shall be recovered against the Department or the State of New York may be called upon to pay to any person or corporation by reason of any damages arising or growing out of the doing of said work, or the repair or maintenance thereof, or the manner of doing the same, or the neglect of the **Principal**, or their (its) agents or servants, or the improper performance of the work by the **Principal**, or their (its) agents or servants, or the infringement of any patent or patent rights by reason of the use of materials furnished or work done as aforesaid or otherwise, then this obligation shall be null and void, otherwise to remain in full force and virtue.

ARTICLE 3(c) - Performance Bond (page 2 of 3)

And the **Surety**, for value received, hereby stipulates and agrees, if requested to do so by the department to fully perform and complete the work mentioned and described in the contract and specifications, pursuant to the terms, conditions and covenants thereof, if for any cause, the **Principal** fails or neglects to so fully perform and complete the work; and the **Surety** further agrees to commence the work of completion within twenty days after notice thereof from the Department, and to complete the work with all due diligence.

And the **Surety**, for value received hereby stipulates and agrees that no change, extension, alteration or addition to the terms of this contract or specifications, accompanying the same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension, alteration or addition.

In Testimony Whereof, the **Principal**, and the authorized officers of the **Surety** have caused this instrument to be signed and sealed on the date shown above.

Signed, sealed and delivered in the presence of:

Corporate Seal of Principal (if a Corporation)

Principal Organization

By _____
Print Name, Title

Signature, Date

Surety

Business Address

By _____
Print Name, Title

Corporate Seal of Surety Company

Signature, Date

Attest _____
Print Name, Title

Signature, Date

ARTICLE 3(d) - Labor and Material Payment Bond (page 1 of 3)

Date Bond Executed: _____

NYSDEC-DER Site Number: 516008

Date Contract Executed By Principal: _____

Principal: (Name and Address)

Surety (Name and Address - Indicate State of incorporation and location of principal office)

Full and Just Sum of Bond

(Express in Words)

(Express in Numbers)

Know all men by these presents, That We, the **Principal** and the **Surety** above named, are held and firmly bound unto the Department of Environmental Conservation for and on behalf of the People of the State of New York, in full and just sum of the amount stated above, good and lawful money of the United States of America, to the payment of which said sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the **Principal** has entered into a certain written contract with the Department of Environmental Conservation, covering the project and specification indicated above.

Now, Therefore, the condition of this obligation is such, that if the **Principal** shall promptly pay all moneys due to all persons furnishing labor and materials to him or his subcontractors in the prosecution of the work provided for in the contract, then this obligation shall be void, otherwise to remain in full force and effect;

Provided, however, that the Comptroller of the State of New York having required the **Principal** to furnish this bond in order to comply with the provisions of Section 137 of the State Finance Law, all rights and remedies on this bond shall inure solely to such persons and shall be determined in accordance with the provisions, conditions and limitations of said Section to the same extent as if they were copied at length herein; and

ARTICLE 3(d) - Labor and Material Payment Bond (page 2 of 3)

Further, provided, that the place of trial of any action on this bond shall be in the county in which the contract was to be performed, or if the contract was to be performed in more than one county, then in any such county, and not elsewhere.

In Testimony Whereof, the **Principal** and the authorized officers of the **Surety** have caused this instrument to be signed and sealed on the date shown above.

Signed, sealed and delivered in the presence of:

Principal Organization

Corporate Seal of Principal (if a Corporation)

By _____
Print Name, Title

Signature, Date

Surety

Business Address

By _____
Print Name, Title

Corporate Seal of Surety Company

Signature, Date

Attest _____
Print Name, Title

Signature, Date

ARTICLE 3(e) – SDVOB Utilization Plan

Contractor must submit a Service-Disabled Veteran-Owned Business (SDVOB) Utilization Plan after being issued a Notice of Intent to Award in accordance with Section III, Article 5.c. Quarterly reporting is required throughout the term of the contract.

For additional information regarding the SDVOB Utilization Plan and quarterly reporting including information on how to obtain the forms, the contractor should contact the Department's SDVOB lead, Mark Krisanda at:

Mark Krisanda
Bureau of Contract and Grant Development
New York State Department of Environmental Conservation
625 Broadway, 10th Floor
Albany, NY 12233-1080

Phone: 518-402-9240

Email: Mark.Krisanda@dec.ny.gov

Attachment C

Specification 31 32 13 Solidification

SECTION 31 32 13

SOLIDIFICATION

PART 1– GENERAL

1.1 SCOPE OF WORK

- A. This section includes the minimum requirements for the solidification treatment of impacted materials as shown on Construction Contract Drawings, using two mixing methods to achieve solidification. Solidification includes in-situ solidification (ISS) within the Former MGP Property and solidification of excavated and subsequently relocated materials from outside the ISS limits by ex-situ solidification followed by incorporation into a solidified mass to be covered.
- B. The solidification work consists of furnishing all plant, labor, equipment, and materials and performing all operations including a design mix program, pilot scale test and quality control testing as required to solidify the subsurface and relocated soils as specified herein. The lateral and vertical extent of in-situ solidification/treatment and areas to be relocated to the treatment area are shown on the Construction Contract Drawings. Debris greater than 12 inches in diameter must be either reduced in size or removed prior to conducting solidification, or as required by the selected equipment's limitations and capability. The completed solidification project shall be a cured homogeneous mixture of amendment and the ISS and Ex-Situ Solidified soils meeting performance requirements. The solidification work may be accomplished by mixing amendments and soil/debris (soil) dry or by wet mixing.
- C. Equipment used to complete the solidification work may include, but is not limited to, excavators with mixing head attachments and auger mixing equipment, grout mixing plants, Frac tanks or liquid holding tanks and transport equipment. ISS shall be performed with auger mixing and Ex-Situ Mixing shall be performed using a mixing head on an excavator or other ENGINEER/DEPARTMENT approved approach. The use of excavator mounted equipment is not allowed for the ISS which requires auger mixing method involving the use of a crane-mounted rotary table (turntable) or a track-mounted earth drill rig to rotate a minimum 6-foot diameter cutting head, or equivalent, capable of achieving the depths shown on the Contract Drawings. The auger head shall have the capability to discharge grout that is pumped through the center stem of the auger. The cutting blades and mixing blades shall be configured to blend soils and grout into a homogenous mixture. CONTRACTOR shall demonstrate the efficacy and compliance with all performance requirements of all mixing approaches to be used, through completion of an acceptable Site-specific pilot test program.

1.2 REFERENCE STANDARDS

- A. The following is a list of Standards which will be referenced in this Specification, the most current applies. Such referenced Standards shall be considered part of these Specifications as if fully repeated herein.

<u>REFERENCE</u>	<u>TITLE OF DESCRIPTION</u>
ACI 211	Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
ASTM D1633	Unconfined Compressive Strength (UCS).
ASTM C 150	Portland Cement.
ASTM C-94	Standard Specification for Ready-Mixed Concrete.
ASTM C-1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement.
ASTM D-5084	Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (permeability)

- B. The following document provides general guidance related to solidification and may be used to provide supplemental guidance/information on items not included in this Section, as determined by ENGINEER/DEPARTMENT.
1. "Development of Performance Specifications for Solidification/Stabilization", Interstate Technology & Regulatory Council (ITRC) Solidification/Stabilization Team, July 2011.

1.3 SUBMITTALS

- A. Qualifications – The Solidification CONTRACTOR shall demonstrate through submission at a minimum at least five ISS projects of similar scope, size, and depth where successful solidification of the contaminated material was achieved, at least one of the projects shall be where manufactured coal gas residuals including free-phase product were successfully solidified, and at least three with similar performance requirements as apply to this Project, demonstrating successful soil treatment using in-situ and ex-situ solidification techniques with equipment similar to that to be used for this Project. The experience shall be held by at least the CONTRACTOR's Project Manager or Superintendent and/or mixing equipment operators that will perform the Work described in this Section. This experience shall include, but not necessarily be limited to:
1. The design, execution and use of a design mix program to identify the most appropriate proposed mix design to be used in a pilot scale test to solidify soils and meet performance requirements for ISS and Ex-Situ solidification of all

- site materials within the limits shown on the Construction Contract Drawings.
2. The design, execution and implementation of a pilot test on site to refine the proposed mix design, equipment and operational parameters to successfully solidify soil requiring solidification, producing the CONTRACTOR's Mix Design(s).
 3. The preparation uses and control of the injection of grout in a controlled documentable way.
 4. Methods required to properly mix (in-situ and ex-situ) the amendments (and additives, as required) to produce the CONTRACTOR's Mix Design(s).
 5. Laying out the progression of treatment and materials management to achieve cover subgrades while maintaining performance requirements.
 6. Knowledge of construction equipment and material to be used in the Work.
 7. Required field quality assurance/quality control testing, documentation and reporting.
 8. The careful controlled metering and mixing of the amendments, rate of treatment and the grout addition rate, supervision and ensuring that the solidification treatment has been properly mixed and interconnected to form a homogeneous mass.
 9. The use of odor, vapor and dust control measures for site contaminants and reagents.
 10. The CONTRACTOR shall submit the name, qualifications and contact information for the third-party geotechnical testing laboratory.
- B. Work Plan – The CONTRACTOR shall submit a preconstruction work plan for review and approval by the ENGINEER at least 14 business days prior to the start of work under this section. The work plan shall include the following items:
1. Schedule: A schedule in sufficient detail to identify the major segments of the work. Starting and ending dates for all major work items shall be clearly identified.
 2. Solidification/treatment Method: A detailed description of the methods of construction which shall include the method of advancing treatment, method of measuring, mixing and application of amendment (wet mixing) grout mixing and monitoring, rate of advancement, and the minimum gallons [based on proposed cement to water ratio] of grout per treatment area or volume. Include description of the required electronic mix metering and control systems as well as equipment monitoring to thoroughly document the location and elevation of all solidification operations. Provide a solidification Plan, showing excavation extents for material to be stabilized ex-situ and auger layout, including vertical and horizontal extent beyond the limits required on the Contract Drawings to ensure complete stabilization of the materials identified on the Contract Drawings as requiring solidification.
 3. Equipment: A list of major equipment by type and capacity. This may include excavator, grout mixer, batch plant, mixer heads, demo heads, augers, grout injectors, storage silos, electronic mix metering and control system, electronic location and elevation documentation system and transport equipment.

4. Drawings: The following drawings shall be provided by the CONTRACTOR:
 - a. Equipment Arrangement - the locations of all equipment including that required to mix raw materials in.
 - b. Process and Instrumentation Diagram - a process and instrumentation diagram showing the flow of all raw materials and the size of all pumps and associated equipment required to conduct operations.
 - c. Material Treatment Plan - the approximate location of treatment units and their dimensions (and/or coordinates) should be provided along with the estimated rate of treatment.
 - d. Sequencing/Phasing Plan – the approximate location of stockpiled soils (to be re-used as part of the cover system), mixing operations, solidification operations, solidified materials, and water treatment, considering limited space for these operations and limits on relocation of materials/operations. Solidified material shall not be relocated, to achieve cover system subgrade, after 48-hours of grout addition, unless approved by the ENGINEER.
 - e. Solidification Plan, showing excavation extents for material to be stabilized ex-situ and auger layout for ISS, including vertical and horizontal extent beyond the limits required on the Contract Drawings to ensure complete stabilization of the materials identified on the Contract Drawings as requiring solidification. Include the proposed sequencing plan, describing when excavation and Ex-Situ solidification of materials will occur and when the ISS work will occur, such that all requirements will be achieved.
5. Material Certificates – The following material certificates shall be provided by the CONTRACTOR:
 - a. Cement: The CONTRACTOR shall submit the manufacturer's catalog certificate and specification prior to shipment of any cement, and certificate of compliance for each lot or shipment of cement upon arrival on site regarding compliance with ASTM C150 (Type I/II).
 - b. Bentonite: The CONTRACTOR shall submit the manufacturer's catalog certificate and specification prior to shipment of any bentonite, and certificate of compliance for each lot or shipment of bentonite upon arrival on site regarding conformance with ACI Specification 13A, Section 10.
 - c. Grout: (if applicable) The CONTRACTOR shall supply testing results in accordance with ACI 211 verifying the proper water to cement ratio and unit weight.
 - d. Slag: (if applicable) The CONTRACTOR shall submit for certificates each lot or shipment of slag upon arrival at the Site showing conformance with NYSDOT Specification 711-12. Slag material that are considered Technically Enhanced Naturally Occurring Radioactive Material (TENORM) are prohibited from the Site.
 - e. Water: The CONTRACTOR shall submit a certificate that water used in ready mix grout supplied to the Site meets the requirements of ASTM C-

1602. Indicate the source of the water.
- f. Additives: Submit a manufacturer's catalog certificate and specification prior to shipment of any additives, and a certificate of conformance for each lot or shipment of additive upon arrival on site.
- C. Quality Control Plan – The QC Plan shall be submitted along with the work plan for review and approval.
1. The plan shall include a list of test methods and minimum standards the CONTRACTOR plans to implement to gauge the quality of the work during construction, including grout density (if applicable), depth/elevation measurements, densities of mixed materials, pocket penetrometer testing of mixed materials, coring, permeability testing and UCS testing.
 2. The plan shall address the physical properties and manufacturer's stated properties for all permanent materials including manufacturer's certifications of quality, mill certificates, gradation test data, etc.
 3. The plan shall state when all quality control data will be submitted to the ENGINEER and the correction procedures to be employed in the case of substandard results.
 4. The plan shall include the electronic mixing, metering location and elevation control/documentation systems to be implemented throughout the solidification process. The simple addition of dry reagents and water followed by mixing will not be permitted, unless approved in-advance in writing by the DEPARTMENT.
- D. Daily Reports – The CONTRACTOR's daily reports shall include:
1. For in-place ISS:
 - a. Identification of column(s) solidified
 - b. Top and bottom elevations of column(s)
 - c. Volume and mass of column(s)
 - d. Volume of grout used
 - e. Mass of solidify reagent
 - f. Obstructions encountered
 - g. Number and identification of samples collected
 - h. Grout QC data
 - i. Reporting of any testing results from laboratory
 - j. Progress drawing indicating columns stabilized to date
 2. For ex-situ solidification:
 - a. Volume and mass of material treated
 - b. Volume of grout
 - c. Mass of solidify reagent
 - d. Number and identification of samples collected
 - e. Grout QC data
 - f. Reporting of any testing results from laboratory
 - g. location of placement of ex-situ material

PART 2 – PRODUCTS

2.1 MATERIALS REQUIREMENTS

- A. Provided below are general guidelines for evaluating the quality of raw materials to be used in the process. The CONTRACTOR may propose alternative materials, material quality standards, and test methods for the raw materials.
- B. Cement – If used in preparing grout, cement shall conform to ASTM Designation C150, "Requirements for Portland Type I/II", or as identified in the CONTRACTOR's Mix Design. The cement shall be adequately protected from moisture and contamination while in transit. Cement shall be stored in supersacks or silos or other appropriate bulk storage container. Reclaimed cement or cement containing lumps or deleterious matter shall not be used and shall be removed from the Site.
- C. Grout – The pumpable mixture of pozzolanic material and other approved additives added to the subsurface will be referred to as grout. The purpose of the grout is to solidify subsurface and/or ex-situ soils to produce a low permeability mass with minimum UCS in areas shown on Construction Contract Drawings. In addition, when cured, the subsurface solidified matrix shall be capable of supporting construction equipment, backfill and the four-foot-thick earthen final cover.
- D. Water – Fresh water, free of deleterious substances that adversely affect the properties of the grout, shall be used for ready mixed grout. Potential water sources shall be tested by the CONTRACTOR prior to beginning the construction, as part of design mix program and pilot testing to assure that the water is of suitable characteristics for grout preparation. Water shall meet ASTM C -1602 standards. Water may be available from a hydrant along Payeville Road, in accordance with utility Owner requirements.
- E. Slag – If used, Ground Granulated Blast-Furnace Slag shall conform with New York State Department of Transportation (NYSDOT) Specification 711-12. Slag materials that are considered Technically Enhanced Naturally Occurring Radioactive Material (TENORM) are prohibited from the Site.
- F. Additives (Optional) – Admixtures (other than Cement), including proprietary chemicals such as softening agents, dispersants, reagents, retarders or plugging or bridging agents may be added to the water or the grout to permit efficient use of materials and proper workability of the grout. Additives shall not result in additional site contaminants or concentrations and shall be clearly and scientifically demonstrated as such by the CONTRACTOR and approved by the ENGINEER/DEPARTMENT. Provide documentation related to use precautions, handling, health and safety requirements, notifications for use, storage/handling, known/suspected effects to the environment/humans, use limitations, prior State or

Federal approvals and CONTRACTOR use experience and possible concerns. No additives shall be used prior to informing, and gaining approval from, the ENGINEER.

2.2 EQUIPMENT

- A. General – The CONTRACTOR shall furnish the equipment for construction of the facilities necessary to complete the solidification work. The CONTRACTOR’S equipment shall be of the type and capacity to complete the work in an efficient manner and shall be maintained in operable condition at all times.
- B. Equipment used to complete the solidification work may include, but is not limited to, excavators with mixing head attachments and/or auger mixing equipment, grout mixing plants, Frac tanks or liquid holding tanks and transport equipment. ISS shall be performed with auger mixing and Ex-Situ Mixing shall be performed using a mixing head on an excavator or other approved and demonstrated solidification approach, through completion of an acceptable Site-specific pilot test program as approved by the ENGINEER/DEPARTMENT.
- C. Grout Mixing Plant (Optional) – The CONTRACTOR shall provide a grout mixing plant containing the necessary equipment for preparing the grout including a high-shear/high speed colloidal mixer capable of producing a stable grout mixture. If no grout mixing plant is to be provided, provide mix information on pre-mixed grout from facility, meeting the requirements of ASTM C-94.
- D. Quality Control Data – Submit all quality control data in accordance with approved Quality Control Plan.
- E. The work plan shall include a plan for corrective measures to be taken in the event performance requirements are not met in a specific area.
- F. Dry materials used in the grout mixing, if stored on site, shall be stored in silos and fed via a calibrated rotary valve [screw feeder] to the colloidal mixer(s) for agitation and circulation. If dry materials are delivered to the Site in supersacks, the material shall be adequately protected from weather.
- G. If applicable, calibration of mixing components shall be done at the start of the project and weekly thereafter. The screw feeders or rotary valve shall be calibrated against time to deliver a predetermined weight. Water shall be controlled by flow meter, weight and/or by the volume level indicators in the colloidal mixer. The specific gravity of the grout shall be determined during the design mix program and pilot test for double checking grout proportions. Grout volumes from the mixing plant shall be monitored by a flow meter capable of measuring liquids containing high solids or other acceptable method.

- H. Solidification Equipment – Solidification equipment must be capable of delivering and mixing solidification reagents such that uniform dispersion of reagents occurs, producing a uniform product meeting performance requirement.
- I. Environmental Control Equipment – Environmental control equipment shall be on site and ready for use as required (prior to the pilot and full-scale solidification) and consist of the following: odor and emissions control foam, water sprays (misting), a dust hood on the bucket of the loader, and the perimeter odor masking system to regulate and reduce the amount of potentially toxic emissions while exposed MGP impacted soils are present, treating with solidification agents and curing.

PART 3 – EXECUTION

3.1 EXECUTION OF WORK

- A. General – The solidification area shall be constructed within the boundary shown on Construction Contract Drawings and in accordance with these specifications unless otherwise approved. No solidification shall occur outside the limits shown on the Construction Contract Drawings. When auger mixing equipment is used and subsurface obstructions are encountered that prevent the auger mixing equipment from penetrating to the specified depth, the location and depth penetrated by the auger mixing equipment shall be identified and marked. See below for additional information related to obstructions.
- B. Horizontal Alignment – The solidification treatment areas shall be carefully staked out prior to beginning construction. The advancement of solidification treatment shall be set according to surveyed reference points in accordance with the approved work plan. A three-dimensional surface will be provided by the ENGINEER that represents the MGP-impacted material limits as shown on the Construction Contract Drawings. CONTRACTOR shall use this to establish the minimum horizontal extents of solidification, as shown on the Construction Contract Drawings.
- C. Vertical Alignment – The CONTRACTOR shall establish vertical survey control prior to beginning construction for use throughout mixing operations. The use of GPS guided and electronically documented mixing, shall be completed in accordance with the approved work plan.
- D. Mixing Speed – (if applicable) The mixing speed of reagents shall be adjusted to accommodate a constant rate of mixing based on the degree of mixing difficulty.

- E. Grout Take – (if applicable) The grout take per measured unit of solidified soil will be adjusted to the requirements of the design mix. Positive displacement pumps will be used to transfer the grout from the mix plant to the active treatment area.
- F. Performance Requirements:
1. Permeability (k) of no greater than 1×10^{-5} centimeters per second (cm/sec) for any single test and a geometric mean value of all final test results of no greater than 1×10^{-6} cm/sec (see Table in Subsection 3.3F for additional details).
 2. Unconfined Compressive Strength (UCS) of not less than 30 psi at 28 days (see Table in Subsection 3.4F for additional details).
 3. Cores, using a Geoprobe or HQ coring with a wireline in no longer than 5-foot samples shall be collected at the minimum frequency listed in the Table in Subsection 3.4F and tested as described in Subsection 3.4D. Close communication with the ENGINEER and the DEPARTMENT is required during coring and core inspection by the ENGINEER to assure adequate core samples are available for QC purposes. Abandon core holes by backfilling with grout using the tremie method.
- G. Remixing – In the event the soil mix has not: 1. adequately incorporated site contaminants into a homogeneous mix as evidenced through testing conducted by the ENGINEER; or 2. through additional field testing by the ENGINEER indicating likely failure to meet k or UCS requirements; or 3. achieved the specified k or UCS requirements at 28 days, the CONTRACTOR shall retreat this material per the direction of the ENGINEER at no additional cost to the project to meet this minimum performance requirements.
- H. Obstructions - In the event that an obstruction is encountered prior to achieving the target anticipated depths, the ENGINEER shall be notified immediately. The CONTRACTOR shall be prepared to remove obstructions encountered if deemed necessary by the ENGINEER during ISS activities.
1. If obstruction cannot be removed within 30 minutes of commencing removal efforts, the Engineer will either consider the ISS column or cell complete, pending location of the cell, or direct the contractor to continue to attempt to remove the obstruction. The first 30 minutes of obstruction removal is not considered extra Work and is to be included in the base unit price for ISS. The 30 minutes will start when the equipment required for obstruction removal is in-place and removal begins.
 2. If an obstruction is too large to be removed within 30 minutes and is located at a distance of at least one times the diameter of an auger from the lateral limits of solidification, the obstruction shall be left in-situ. If the obstruction is located at the edge of the limits of solidification, the ENGINEER may extend the limits of solidification to fully encompass the obstruction. If lateral limits are extended the additional solidification will be conducted at

the same unit rate as indicated in the contractor's bid.

3. In a circumstance where the lateral extents cannot be extended, and additional effort must be taken to remove the obstruction, the additional effort will be billed on a time and material basis using prevailing wage rates included in Section XIII of the bid documents and equipment blue book values. Costs for the additional time and materials effort shall be limited to cost for the operator(s) and equipment required to remove the obstruction.

3.2 DESIGN MIX PROGRAM

- A. Prior to the pilot test, a design mix program shall be designed, executed and recommendations made for the pilot test and full-scale operations.
- B. The design mix program shall be conducted using materials from the Site and materials similar to those to be used in the pilot test and full-scale operations. The ENGINEER/DEPARTMENT will provide direction on where samples (soil, groundwater, and mix water) shall be taken for testing purposes. Sample collection shall be completed by the CONTRACTOR, as described in the work plan. Sample collection may require an excavator and/or drill rig to generate the required volume of material, which shall be determined by the CONTRACTOR.
- C. The design mix program shall consider mixing equipment, soils to be solidified (ISS and Ex-Situ mixed), and all factors that may impact the full-scale operations.
- D. Document the program in a report which provides all information needed for the CONTRACTOR to select an efficient and effective mix that meets project requirements. Include the following in the report, at a minimum: sample locations and descriptions, mixed proportions (using the same units to be used in full scale operations), reagents, additives, and water information, field QC testing descriptions and results (slump, viscosity, flow cone, etc.), permeability and USC after a 28-day of curing period, and an estimate of the swell expected (report final volume/in-situ volume). The use of early set time strengths may be used as indicators of 28-day strengths; however, 28-day UCS and permeability requirements will still apply. Submit the report for information.
- E. Use the results of the design mix program to inform the pilot and full-scale operations.

3.3 PILOT TEST

- A. Prior to full scale operation, a pilot test shall be conducted. The pilot test shall be conducted using the same equipment, method mix design to be used during full scale operations (i.e., ISS and Ex-Situ Mixing). The location for the pilot test shall be and agreed upon between the ENGINEER and CONTRACTOR. The pilot test may assess a range of grout mixes; however, one of the pilot tests mixes meeting

project requirements shall be used in full scale operations for each type of mixing equipment.

- B. For Ex-Situ Mixing, the pilot test shall be conducted in one or more test units not smaller than 10 cy each within and using materials from within the area shown on Construction Contract Drawings at the test location (within MGP Impacted soils). Pilot If only limited bucket mixing is proposed for the excavated soils. Ex-Situ mixing shall separately include materials from above and below the groundwater table such that the variety of conditions expected during full-scale mixing are simulated. After completion of soil mixing, a core from the center of the test plot shall be conducted as described in Subsection 3.4E. The core shall not be conducted within the first 48 hours of completion of soil/grout mixing and shall be conducted at a similar cure time as full-scale operations cores.
- C. For ISS, the pilot test shall consist of at-least three ISS columns, and at-least one solidification of excavated soils (i.e., Ex-Situ) if a different mixing method is to be employed. After completion of soil mixing, a core from the center of each column shall be conducted in accordance with Subsection 3.4E. The core shall not be conducted within the first 48 hours of completion of soil/grout mixing and shall be conducted at a similar cure time as full-scale operations cores.
- D. If the 28-day laboratory results from the pilot test indicate that the soil mixtures do not meet the performance requirements specified in Section 3.1 F, the contractor shall revise the mix design and repeat the pilot test at no additional cost to DEPARTMENT. Soils solidified during the initial Pilot Test will need to be re-mixed during full scale mixing to meet project requirements.

3.4 QUALITY CONTROL AND RECORDS

- A. General – The CONTRACTOR shall be responsible to ensure that all work is performed to the standards established, herein, subject to review and inspection by the ENGINEER. All quality control records, routine tests, observations, and measurements shall be available for inspection by the ENGINEER. All quality control testing shall be at the expense of the CONTRACTOR. CONTRACTOR is obligated to provide ENGINEER with required test cylinders for independent laboratory testing. Cylinder specimens will be collected under the inspection of the ENGINEER and will as close as possible represent the sample on which the CONTRACTOR performs its performance testing.
- B. Submittals – The CONTRACTOR shall make timely submittals of all information required by Section 2.0 to the ENGINEER.
- C. Materials – The CONTRACTOR shall submit data, tests, manufacturers' certificates, etc., to document the compliance of all materials to specifications determined by the CONTRACTOR in the Quality Control Plan

- D. Mixed Soil – Samples of the solidified/treated soil for permeability and UCS testing will be taken each day; but not less than 1 sample for every 500 cubic yards of material treated by each method used. The CONTRACTOR shall devise and implement procedures to correlate specific samples to specific treatment areas. Sufficient samples shall be collected to make up at-least three molds for quality control testing and additional two molds to serve as backup samples. The soil mix shall be placed in suitable molds, rodded to remove trapped air pockets, placed in a plastic bag that contains sufficient moisture to keep the mixture damp, and stored within a heated enclosure.
- E. Core samples for visual inspection by the ENGINEER or the DEPARTMENT shall be conducted at a rate of one sample per 5,000 square feet of solidified/treated area but no less than one per day for Ex-Situ Mixing and one per day of ISS mixing. The coring shall be conducted prior to complete curing of a treated area by either Geoprobe, HQ coring with a wireline and extracting a sample. Coring shall be performed at a minimum of when 25%, 50%, 75% and 100% of solidification is complete. The samples will be visually inspected for the following five criteria by the ENGINEER:
1. Visible nonaqueous-phase liquid (NAPL)
 2. Non-mechanical induced cracking within the core
 3. Percent of core sample recovered. If less than 60% of the core material is recovered from any of the coring runs, one (1) new core hole shall be drilled adjacent to the previous location. If the recovery from the adjacent core hole continues to be less than 60%, the CONTRACTOR shall consult with the ENGINEER and provide acceptable samples for QC purposes.
 4. NAPL coating on drilling/sampling tools
 5. NAPL in drill wash tub.
 6. Observation of any of the above five criteria may require additional coring and/or corrective action, as directed by the ENGINEER/DEPARTMENT, at no additional cost to the DEPARTMENT. The first step to determining whether corrective action is required will be to complete additional coring around the area of concern and determine if identified NAPL within the solidified mass is encapsulated, thus eliminating NAPL mobility and impact to the surrounding environment. If NAPL is detected in the additional borings, particularly on the edges of the solidified monolith, or at the bottom of the solidified monolith, corrective actions may be necessary in order to fully encapsulate the source area. Corrective actions shall be performed by the CONTRACTOR at no additional cost to the DEPARTMENT.
- F. Laboratory Testing – Samples shall be transported to an independent geotechnical laboratory for testing once the samples have sufficient strength so as to not adversely affect the properties. One sample from each core sample location described in Subsection 3.4 E shall be tested for the following:

Requirements for Solidified Material

Test Name	Method	Sample Frequency	Required Result
Hydraulic Conductivity (permeability)	ASTM D5084	Pilot Test (PT): One per auger column and one per Ex-Situ Mixing method Full-Scale (FS): 1 per 500 CY (minimum of 1 test per treatment unit/day/mixing method)	PT: less than (<) 1×10^{-6} cm/sec FS: Maximum of 1×10^{-5} cm/sec; and geometric mean of all final tests < 1×10^{-6} cm/sec.
Unconfined Compressive Strength (UCS)	ASTM D1633	PT: One per column and one per Ex-Situ Mixing Method FS: 1 per 500 CY; (minimum of 1 test per treatment unit/day/mixing method)	PT: greater than (>) 30 psi FS: greater than (>) 30 psi
Coring	Geoprobe or HQ Core with wireline	PT: One per column and one per Ex-Situ Mixing Method FS: 1 per 5,000 sf, each, ISS and Ex-Situ Mixing method	Visual criteria described in Subsection 3.4. E and laboratory testing described in this subsection.

Notes:

1. Failure to achieve the above criteria may require additional coring and/or corrective action, as directed by the ENGINEER/DEPARTMENT, at no additional cost to the DEPARTMENT. Corrective actions may be necessary in order to fully solidify the source area. Corrective actions shall be performed by the CONTRACTOR at no additional cost to the DEPARTMENT.
 2. Treatment Unit = the solidified material produced in one day using the same equipment, grout mix, grout addition rate or soil characteristics (above/below groundwater), such that different results would be expected, for in-situ or ex-situ solidification. Multiple units may be produced in a single day of work, for example if consistent in-situ solidification occurs (one unit); plus ex-situ solidification occurs for two different materials requiring different grout addition rates (two units, minimum) (i.e., one above the water table and one from below the water table) on the same day; then there would be a total of at-least three units that require testing due to the different expected results based on mixing methods and material characteristics.
 3. CY =cubic yards
 4. cm/sec =centimeters per second
 5. psi = pounds per square inch
- G. All test results shall be reported to the ENGINEER as soon as they become available from the laboratory. If initial sample test results do not meet criteria, a backup sample shall be tested. Final determination of which sample result is considered representative shall be made by the ENGINEER.

- H. Records: CONTRACTOR shall maintain records for all testing, measurements, observations, and inspections. Quality Control Reports shall be submitted to the ENGINEER each day on a form acceptable to the ENGINEER. These reports shall list all test results, measurements, and observations made and/or received by the CONTRACTOR for that day. Records shall also include as-constructed drawings of ISS column locations and solidified unit locations in three-dimensions and identification numbers

+ + END OF SECTION + +

Attachment D

Section XII – Measurement and Payment

SECTION XII

MEASUREMENT FOR PAYMENT

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section covers the methods and procedures that the DEPARTMENT will use to measure the CONTRACTOR'S work and provide payment. This general outline of the measurement and payment features will not, in any way, limit the Responsibility of the CONTRACTOR for making a thorough investigation of the Contract Documents to determine the scope of the work included in each bid task.
- B. Payment will be made to the CONTRACTOR in accordance with the specified methods of measurement and the unit or lump sum prices stipulated in the accepted bid. Payment will constitute complete compensation for all work required by the Contract Documents including all costs of accepting the general risks, liabilities and obligations, expressed or implied. Payment under all tasks will include, but necessarily be limited to, compensation for furnishing all supervision, labor, equipment, overhead, profit, material, services, applicable taxes, and for performing all other related work required. No other payment will be made.
- C. No payment will be made for work performed by the CONTRACTOR to replace defective work, work which is not required by the Contract Documents, work outside the limits of the Contract and additional work necessary due to actions of the CONTRACTOR, unless ordered by the ENGINEER in writing.
- D. For unit price items, the CONTRACTOR shall be paid for the actual amount of work accepted and for the actual amount of materials in place during the period of construction. After the work is completed and before final payment is made, the ENGINEER or CONTRACTOR as specified in the pay items will make final measurements to determine the quantities of the various items of work accepted as the basis for final payment. The CONTRACTOR shall accept compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced by the Contract.
- E. For lump sum items, the CONTRACTOR will be paid based on actual work accepted until the work item is completed. Upon completion of the item, 100 percent of the lump sum price may be paid, subject to the terms of the Agreement. The pay items listed below describe the measurement of and payment for the Work to be done under the respective items listed in the Bid as outlined in the approved

schedule of values.

- F. All units of measurement shall be standard United States convention, as applied to the specific items of work by tradition and as interpreted by the ENGINEER. Each unit or lump sum price stated in the Bid shall constitute full compensation, as herein specified, for each item of the Work completed.

1.2 ENGINEER'S ESTIMATE OF QUANTITIES

- A. The Estimated quantities for unit price items, as listed in the bid schedule, are only approximate and are included solely for the purposes of the comparison of bids. The ENGINEER does not expressly, or by implication, agree that the nature of the materials encountered or required shall correspond therewith and reserves the right to increase or decrease any such quantity or to eliminate any quantity as the ENGINEER may deem necessary.

1.3 INCIDENTAL ITEMS

- A. Except for the items designated hereunder for Measurement and Payment, the costs of items necessary to complete the work as specified are considered incidental to the items specified for Measurement and Payment. The costs of incidental items shall be included in the prices of items specified for Measurement and Payment.

1.4 QUANTITIES

- A. The Estimated quantities indicated in the Bid Schedule are the quantities for the evaluation of bids. The actual quantities of items to be paid for on a unit price basis may vary significantly from the quantities indicated in the Bid Schedule.

1.5 RELATED PROVISIONS SPECIFIED ELSEWHERE

- A. Payment to CONTRACTOR: Refer to General Conditions and Contract Agreement Section 6.
- B. Changes in the Contract Price: Refer to General Conditions and Contract Agreement Section 6.

1.6 SUBMITTALS

- A. Bid Breakdowns/Schedule of Values: Submit in accordance with Section VIII, Article 1.4, 1.6 and Article 13.

1.7 MEASUREMENT

- A. Under this Contract, the CONTRACTOR shall provide all labor, equipment, and materials and shall complete all work as shown and described in the Contract Documents and as directed by the ENGINEER, in accordance with the expressed intent of the contract to secure a complete construction of a functionally complete project. The bid items described in Part 3 BID ITEMS shall together include all work set forth in the Contract Documents or required to properly complete the work. Any necessary work that is not described shall be considered included in the item to which it properly belongs. Where used in the Contract Documents, the word “including” (“includes”, “include”) shall mean “including (includes, include) but not restricted to”. Each item includes:
1. All labor, material, equipment, plant services, bonds and insurance, tests, adjustments, warranties, overhead, and other expenses required to perform the work.
 2. All accessories, manuals, and services pertinent to the proper installation of materials and equipment.
 3. All accessories, manuals, and services pertinent to the proper start-up, operation, and maintenance of materials and equipment.
- B. Lump Sum Items: Measurement of all Lump Sum Items will be on a total job basis.
1. The quantities of work performed under lump sum items will not be measured except for the purpose of determining reasonable interim payments. Interim payments will be made in accordance with the estimated value of work performed and found acceptable as determined by the ENGINEER, or as specified in this section.
 2. Where indicated for a lump sum item, the CONTRACTOR shall provide a schedule of values per Subpart 1.06 of this Section. The schedule of values shall include a breakdown of major cost items included within the lump sum in sufficient detail to document specific costs of all items included in the lump sum item. The schedule of values shall be provided to the ENGINEER prior to initiation of work.
 3. Measurement for Progress Payments of all lump sum items will be on a percent complete basis as established in the General Conditions and Section VI, Article 9.
- C. Unit Price Items: Where items are specified to be measured on a unit basis, measurement will be of each particular unit as specified.
1. Volume Basis - Where items are specified to be measured on a volume basis, the volume will be determined on an in-place basis (prior to construction for excavation / solidification purposes or after placement and compaction for imported fill) between the existing and final ground surfaces or grade lines shown on the drawings. If no tolerance is specified, the tolerance shall be interpreted to be 0.00 foot.

2. Area Basis - Where items are specified to be measured on an area basis, the area will be measured as the actual surface area within the specified limits based on a plan view. If a specified width of an item is indicated, the area will be determined by the actual length along the centerline multiplied by the specified width. No adjustments will be made for the required overlap of materials.
3. Length Basis - Where items are specified to be measured on a length basis, the length will be measured as the actual length along the centerline within specified limits based on a plan view. No adjustments will be made for the required overlap of materials
4. Weight Basis - Where items are specified to be measured on a weight basis, the weight will be measured based on certified weigh scale tickets obtained from a weigh scale certified by the County Office of Weights and Measures and approved by the ENGINEER. The weights shall be taken in the presence of a DEPARTMENT representative. When the weight is per ton, trucks shall be weighed entering the site and exiting the site, using either an on-site or off-site scale. The measured tonnage will be the difference between the measured truck weight upon entering and exiting the certified weight scale.

D. Measurement and payment will be made only for work that has been acceptably performed within the limits shown on the Construction Contract Drawings and in conformance with the Contract Specifications, as specified, or ordered by the ENGINEER.

1.8 DESCRIPTION OF BID ITEMS

A. Bid Item LS-1: Site Preparation

1. Bid Item LS-1 shall be the bid lump sum price for the completion of performance of Site Preparation in accordance with the Contract Documents.
2. Provide all labor, materials, equipment, and incidentals necessary for the work described below, in accordance with Specification Section 01 11 13 – Summary of Work, Section 01 14 19 – Use of Site, Section 01 35 53 – Site Security, Section 01 45 28 – Chemical Sampling and Analysis, Section 01 51 05 – Temporary Facilities and Controls, Section 01 52 11 – Engineer’s Field Office, Section 01 52 13 – Field Trailer, Section 01 71 23 – Field Engineering, Section 34 78 13 – Portable Truck Scale, Section 01 55 26 – Traffic Control, Section 01 55 29 – Storage of Material, Section 01 57 26 – Dust and Odor Control, Section 01 71 33 – Protection of the Work and Property, Section 02 51 00 – Decontamination Procedures, Section 02 72 00 – Construction Water Management, and Section 31 25 00 – Erosion and Sediment Control, and described below but not limited to:
 - a. Mobilization of personnel, equipment, and project facilities.
 - b. Establish all temporary utilities and services including electric service, mobile phone, internet access, sanitary facilities, and potable water.

- c. Provide ENGINEER and CONTRACTOR field offices and support areas.
- d. Permitting.
- e. Project work plans (Construction Work Plan, Health and Safety Plan and Contractor Quality Control Plan).
- f. Schedules, submittals (shop drawings), and record drawings.
- g. Bonds and insurance.
- h. Surveying required for initial field verification, establishing horizontal and vertical control and providing construction layout.
- i. Clearing trees and brush within the limit of clearing delineation on the Construction Contract Drawings. Note that most tree clearing of trees larger than 3-inches at breast height (DBH) has been completed prior to the start of this Project. Stumps and roots were not grubbed and will require removal under this Item unless contained within the MGP Waste limits. Additional trees larger than 3-inches in diameter” may require clearing by CONTRACTOR, which can only be completed between November 11 and March 31st, prior to full mobilization, as approved by the ENGINEER.
- j. Grubbing vegetation within the MGP Waste limits is not included under this Item. Refer to Bid Item 6.
- k. Select demolition of building, foundations, concrete pads, asbestos containing materials, and other miscellaneous construction of demolition debris items encountered within the excavation limits.
- l. Other preparation work not specifically included in other items including compliance with applicable regulatory requirements; preconstruction and construction period planning; scheduling, submittals, reporting, administration, and documentation; quality control; environmental protection; and spill control.
- m. Providing vehicle decontamination pads.
- n. Installing required erosion and sedimentation controls including but not limited to stabilized construction accesses, silt fence, augmented silt fence, hay bales, and stone check dams.
- o. Installing and maintaining temporary access roads.
- p. Installing temporary project signage.
- q. Installing temporary fencing and barricades.
- r. Installing soil stockpile containment areas and contractor equipment and materials staging areas.
- s. Providing an on-site truck scale.
- t. Collect necessary samples and conduct a solidification mix study and conduct a solidification pilot scale test in accordance with Specification Section 01 11 00 – Summary or Work and Section 31 32 13 – Solidification.
- u. Augmenting temporary facilities and controls as required for supporting the sequence of project work.

- v. Repair of damage to local roads, railroads as required.
 - w. Removing temporary facilities and controls when the work associated with them is complete, and properly disposing the materials off-site.
 - x. Demobilization of project personnel, equipment, and project facilities.
 - y. Project closeout.
 - z. Final site cleanup.
3. The CONTRACTOR shall submit a separate bid breakdown (See Paragraph 1.06 of this Section) that shows the individual costs required to complete this Bid Item.
 4. Measurement for payment for Bid Item LS-1 shall be the bid lump sum price for the above Site Preparation items completed as documented and approved by the ENGINEER.

B. Bid Item LS-2: Activities in Support of Excavation on Railroad Property

1. Bid Item LS-2 shall be the bid lump sum price for the completion of Sheeting and Shoring activities; and installation, testing, maintaining, inspecting and removing temporary sanitary sewer line bypass in accordance with the Contract Documents.
2. Provide all labor, materials, equipment, and incidentals necessary for the work described below in accordance with Specification Section 31 00 00 – Earthwork, Section 31 01 50 – Shoring (Sheeting and Bracing), and Section 31 25 00 – Erosion and Sediment Control, and described below but not limited to:
 - a. Installing sheeting and bracing indicated on the Construction Contract Drawings designed by the ENGINEER to support excavations at designated locations along Brandy Brook.
 - b. Installing CONTRACTOR designed sheeting and shoring for locations proposed by the CONTRACTOR to conduct the Work, including cofferdams for brook diversion, bulkheads for barge unloading, or supporting excavations at locations other than the designated locations. CONTRACTOR designed sheeting and shoring will include but not limited to:
 - i. Completing geotechnical investigations including testing, as required by the CONTRACTOR’s Engineer in supporting the design of the sheeting and shoring systems.
 - ii. Designing a sheeting and shoring systems by a New York State licensed professional engineer for cofferdams, bulkheads, and/or sheeting to conduct excavations or at the perimeter of the excavation limits, and/or to support other infrastructure deemed at risk due to adjacent excavation.
 - c. Installing system(s).
 - d. Removing system(s) where required.
 - e. Cutting sheeting to leave sheets a minimum of 3 feet below grade and leaving systems in place where allowed or directed.

- f. Installing, testing and removing the temporary bypass system for the existing sanitary sewer line, and repairs due to CONTRACTOR caused damage.
 - g. Refer to Item 1 for additional railroad related items.
 - 3. The CONTRACTOR shall submit a separate bid breakdown (See Paragraph 1.06 of this Section) that lists the individual costs required to complete this bid item as well as miscellaneous items not specified elsewhere that are necessary for proper completion of the work (provide detail).
 - 4. Measurement for payment for Bid Item LS-2 shall be the bid lump sum price for the above Sheeting and Shoring System items completed as documented and approved by the ENGINEER.
- C. Bid Item LS-3: Activities in Support of Excavation Adjacent to Brandy Brook
- 1. Bid Item LS-3 shall be the bid lump sum price for the completion of Sheeting and Shoring activities; bypass pumping flow around a portion of Brandy Brook; and temporary relocation of Restoration Area to a Temporary on-site Nursery in accordance with the Contract Documents.
 - 2. Provide all labor, materials, equipment, and incidentals necessary for the work described below in accordance with Specification Section 31 00 00 – Earthwork, Section 31 01 50 – Shoring (Sheeting and Bracing), and Section 31 25 00 – Erosion and Sediment Control, and described below but not limited to:
 - a. Installing sheeting and bracing indicated on the Construction Contract Drawings designed by the ENGINEER to support excavations at designated locations along Brandy Brook.
 - b. Installing CONTRACTOR designed sheeting and shoring for locations proposed by the CONTRACTOR to conduct the Work, including cofferdams for brook diversion, bulkheads for barge unloading, or supporting excavations at locations other than the designated locations. CONTRACTOR designed sheeting and shoring will include but not limited to:
 - c. Completing geotechnical investigations including testing, as required by the CONTRACTOR’s Engineer in supporting the design of the sheeting and shoring systems.
 - d. Designing a sheeting and shoring systems by a New York State licensed professional engineer for cofferdams, bulkheads, and/or sheeting to conduct excavations or at the perimeter of the excavation limits, and/or to support other infrastructure deemed at risk due to adjacent excavation.
 - e. Installing system(s).
 - f. Removing system(s) where required.
 - g. Cutting sheeting to leave sheets a minimum of 3 feet below grade and leaving systems in place where allowed or directed.
 - h. Passive diversion or active pumping systems to convey the base flow of Brandy Brook around the active limit of work.

- i. Installing and maintaining erosion controls associated with the diverted flow.
 - j. Providing contingency measures to handle surges associated with stormwater discharges.
 - k. Providing means and methods to limit stormwater run-on during work to minimize the generation of construction water.
 - l. Temporary relocation of Restoration Area to be disturbed to a temporary on-site Nursery, maintenance, and re-planting in the Restoration Area, including replacement of damaged/lost trees and plants at no additional cost to the DEPARTMENT.
3. The CONTRACTOR shall submit a separate bid breakdown (See Paragraph 1.06 of this Section) that lists the individual costs required to complete this bid item as well as miscellaneous items not specified elsewhere that are necessary for proper completion of the work (provide detail).
 4. Measurement for payment for Bid Item LS-3 shall be the bid lump sum price for the above Sheeting and Shoring System; bypass pumping flow around a portion of Brandy Brook; and temporary relocation of Restoration Area to a Temporary on-site Nursery, as documented and approved by the ENGINEER.

D. Bid Item LS-4: Site Restoration

1. Bid Item LS-4 shall be the bid lump sum price for completion of Upland Area Restoration activities in accordance with the Contract Documents.
2. Provide all labor, materials, equipment, and incidentals necessary for the work described below, in accordance with Specification Section 31 00 00 – Earthwork, Section 31 25 00 – Erosion and Sediment Control, Section 32 92 26 – Seeding and Soil Supplements, Section 32 93 00 – Exterior Plants, and described below but not limited to:
 - a. Restoration of disturbed upland areas with topsoil and seeding.
 - b. Borrow source testing of topsoil – geotechnical, soil nutrient, and chemical testing of material meeting unrestricted use criteria
 - c. Nutrient analysis testing for topsoil.
 - d. Providing and installing topsoil.
 - e. Seeding and installing erosion control matting along all drainage ways and slopes, as required.
 - f. Seeding and mulching all vegetated areas.
 - g. Staging and storing topsoil on-site as required to coordinate with construction sequence.
 - h. Provide and install new (or salvaged, if possible, as approved by the DEPARTMENT) chain link fence and gates on the OU01 property.
3. The CONTRACTOR shall submit a separate bid breakdown (See Paragraph 1.06 of this Section) that shows the individual costs required to complete this Bid Item.
4. Measurement for payment for Bid Item LS-4 shall be the bid lump sum price for Upland Area Restoration as documented and approved by the ENGINEER.

E. Bid Item LS-5: Brandy Brook Restoration

1. Bid Item LS-5 shall be the bid lump sum price for completion of Brandy Brook Restoration activities in accordance with the Contract Documents.
2. Provide all labor, materials, equipment, and incidentals necessary for the work described below, in accordance with the restoration details on the Construction Contract Drawings and Specification Section 01 57 00 – Temporary tributary Bypass System, Section 31 00 00 – Earthwork, Section 31 25 00 – Erosion and Sediment Control, Section 32 92 26 – Seeding and Soil Supplements, Section 32 93 00 – Exterior Plants, and described below but not limited to:
 - a. Geotechnical and chemical borrow source testing of stream bed material and topsoil, as required.
 - b. Nutrient analysis testing for topsoil.
 - c. Relocate Wetland Topsoil and vegetation from temporary Nursery, and supplement with imported Wetland Topsoil meeting unrestricted use criteria and supplemental vegetation.
 - c. Providing and installing stream bed material, as required.
 - d. Providing and installing rock with soil and vegetation, as required.
 - f. Providing and installing fiber rolls, as required.
 - g. Providing and installing brush mattresses, as required.
 - h. Installing log cribbing and log diverter using on-site clearing debris to the extent practical, as required.
 - i. Providing and installing boulders in the stream bed, as required.
 - j. Live staking, as required.
 - k. Seeding and mulching banks, as required.
 - l. Planting banks with shrubs, as required.
3. The Contractor shall submit a separate bid breakdown (See Paragraph 1.06 of this Section) that shows the individual costs required to complete this Bid Item.
4. Measurement for payment for Bid Item LS-5 shall be the bid lump sum price for Brandy Brook Restoration as documented and approved by the ENGINEER.

F. Bid Item UP-1: Site Services

1. Bid Item UP-1 shall be the bid unit price per calendar day for Site Services performed in accordance with the Contract Documents.
2. Provide all labor, materials, equipment, and incidentals necessary for each calendar day of site services in accordance with Standard Specification Section 01 35 29 – Contractor’s Health and Safety Plan, Specification Section 00 33 00 – Existing Conditions, Section 01 11 00 – Summary of Work, Section 01 35 43 – Environmental Protection Procedures, Section 01 35 53 – Site Security, Section 01 45 00 – Contractor Quality Control, Section 01 45 28 – Chemical Sampling and Analysis, Section 01 50 00 – Temporary Facilities and Controls, Section 34 78 13 – Portable Truck Scale, and Section 01 55 26 –

Traffic Control, Section 01 57 26 – Dust and Odor Control, Section 01 71 23 - Field Engineering and Surveying, Section 01 71 33 – Protection of the Work and Property, Section 31 01 50 – Shoring (Sheeting and Bracing), and described below but not limited to:

- a. Site Security.
- b. Controlling on-site access and traffic, including equipment and material delivery.
- c. Site access roadway maintenance.
- d. Maintaining soil stockpile containment areas and contractor equipment and materials staging areas.
- e. Completing training and providing flaggers and/or other requirements of the railroad for working within its right of way.
- f. Maintaining all constructed temporary facilities and controls.
- g. Cleaning the project site and disposing CONTRACTOR generated solid waste.
- h. Coordinating with the Village of Saranac Lake and residential property owners/tenants.
- i. Compliance with permits.
- j. Attending project meetings.
- k. Providing Site Superintendence.
- l. Providing quality control management.
- m. Maintaining vehicle decontamination pads including collection and analysis of decontamination verification samples.
- n. Maintenance of temporary utilities and services.
- o. Sanitary facilities maintenance.
- p. Performing an existing conditions assessment of buildings and infrastructure adjacent to the work.
- q. Perform vibration monitoring during sheeting installation work, as required.
- r. Perform nuisance control and monitoring as required during the execution of the work
- s. Surveying required for ongoing work to provide quality control field measurements and supporting the calculation of measurement for payment.
- t. CONTRACTOR personnel working within the railroad row work will need to complete appropriate railroad safety training meeting Adirondack Scenic Railroad and/or NYSDOT requirements. The railroad is regulated by NYSDOT.
- u. Conduct pre- and post-construction inspections and documentation (video and pictures) of the rail alignment condition with the CONTRACTOR, ENGINEER, and NYSDOT Representative. Restoration of the alignment and repair of any rail faculties damaged or impacted by the work. For additional requirements for working in the

railroad ROW, refer to drawing C-306 of the Construction Contract Drawings.

- v. Completing survey of the final remediated site in accordance with Part 1.04.E of Specification 01 71 23 and related work specified elsewhere in the Contract.
 - w. Providing completed as-built survey to the ENGINEER for review and approval.
3. Measurement for payment for Bid Item UP-1: Site Services shall be paid the bid unit price for each calendar day beginning with initiation of site services, and ending with substantial completion or at the end of the Contract Time specified in Contract Documents Section VI Article 6.1, whichever is sooner. Payment shall be unit price bid for each individual item described above as submitted in the Contractor's bid breakdown. A fifty percent reduction in payment would occur for each calendar day that operation and/or maintenance of any item included in this Bid Item was unsatisfactory or unused as determined by the ENGINEER.

G. Bid Item UP-2: Health and Safety

1. Bid Item UP-2 shall be the bid unit price per working day for Health and Safety activities performed in accordance with the Contract Documents.
2. Provide all labor, materials, equipment and incidentals necessary for each calendar day for health and safety during proper execution of the Contract and in accordance with Standard Specification Section 01 35 29 – Contractor's Health and Safety Plan, Supplemental Specification Section 01 11 13 – Summary of Work, Section 01 50 00 – Temporary Facilities and Controls, Section 01 57 26 – Dust and Odor Control, and Section 02 51 00 – Decontamination Procedures, and as described below but not limited to:
 - a. Providing a Health and Safety Officer.
 - b. Providing and maintaining personnel decontamination facilities.
 - c. Providing and maintaining personnel health and safety equipment.
 - d. Providing emergency response.
 - e. Sampling, analyzing, and handling/disposing personal protective equipment (PPE) and remediation wastes not specifically included in other bid items.
 - f. Air monitoring as required by the Community Air Monitoring Program (CAMP). Collecting samples up and downwind of the Site, testing for the required parameters, and reporting laboratory results.
3. Measurement for payment for Bid Item UP-2: Health and Safety shall be paid the bid unit price for each working day the HASP has been adhered to in the opinion of the ENGINEER. Work included in this item shall be by calendar day ending at substantial completion or at the end of the Contract Time specified in Contract Documents Section VI Article 6.1, whichever is sooner. All daily maintenance costs for health and safety are part of this Bid Item

including everything required for the HASP. A reduction in the payment for this item will occur for each day the CONTRACTOR fails to adhere (in the opinion of the Engineer) to the HASP. There would be a one hundred (100) percent reduction in this Bid Item for days where no remediation work occurs in the exclusion zone. No payment will be made for Sundays and holidays specified in Contract Documents Section XIII.

F. Bid Item UP-3: Excavation of Materials

1. Bid Item UP-3 shall be the bid unit price per cubic yard for excavation activities associated with MGP Impacted and non-MGP Impacted Soil and Debris Excavation within and beyond the Former MGP Property including grubblings, debris and soil excavation; and segregation, processing, management and control of stockpiles of suitable soil for reuse in the covers within the former MGP Property in accordance with the Contract Documents.
2. Provide all labor, materials, equipment, and incidentals necessary for the work described below in accordance with Specification Section 01 45 28 – Chemical Sampling and Analysis, Section 01 50 00 – Temporary Facilities and Controls, Section 01 57 26 – Dust and Odor Control, Section 01 71 23 – Field Engineering and Surveying, Section 01 74 19 – Waste Removal, Handling, and Storage, Section 02 72 00 – Construction Water Management, Section 31 00 00 – Earthwork, 31 23 19 – Dewatering, and Section 31 25 00 – Erosion and Sediment Control , and described below but not limited to:
 - a. Providing, managing, and maintaining construction dewatering facilities including collection sumps, pump systems, conveyance (piping) systems, and storage systems as required to conduct excavation activities in relatively dry conditions.
 - a. Sheet piling systems for cofferdam purposes shall be included in Bid Items 4 and 5.
 - b. Excavating soil within the horizontal and vertical limits identified on the Construction Contract Drawings.
 - c. Segregation of Wetland Topsoil from the Restoration Area for use in the Temporary Nursery, as part of Bid Item 5.
 - d. Handling and segregation of excavated suitable soil for stockpiling and reuse from unsuitable soil/debris for waste characterization and stockpiling, to minimize disposal quantities and hazardous waste.
 - e. Dust and odor control during excavation and handling.
 - f. Segregating unsuitable non-hazardous soil/debris from unsuitable hazardous soil/debris based on waste characterization testing results.
 - g. Excavation and removal of obstructions identified during in-situ solidification activities.
 - h. Segregation and management of the waste types defined in Section 01 74 19 – Waste Removal, Handling, and Storage, to minimize overall disposal cost.

- i. Dewatering and/or stabilization to meet off-site disposal requirements, as necessary.
3. Measurement for payment of Bid Item UP-3 shall be the bid unit price for each cubic yard of material excavated in accordance with the Contract Documents. Volume measurement shall be determined on an in-place basis survey prior to (for existing grade) and after the excavation (for excavation extents) of material including grubbing, as documented and approved by the ENGINEER.

G. Bid Item UP-4: Solidification (including design mix program and pilot scale test)

1. Bid Item UP-4 shall be the bid unit price per cubic yard for Solidification activities in accordance with the Contract Documents and based on the proven pilot scale test.
2. Provide all labor, materials, equipment, and incidentals necessary for the work described in accordance with Specification Section 01 11 00 – Summary or Work and Section 31 32 13 –Solidification, shown on the Construction Contract Drawings
3. The CONTRACTOR shall submit a separate bid breakdown (See Paragraph 1.06 of this Section) that lists the individual costs required to complete this bid item as well as miscellaneous items not specified elsewhere that are necessary for proper completion of the work (provide detail).
4. Measurement for payment for Bid Item UP-4 shall be the bid unit price for each cubic yard of Solidification (including design mix program and pilot scale test) completed as documented and approved by the ENGINEER. Volume measurement shall be determined on an in-place basis by survey prior to (for existing grades) solidification, during solidification (for bottom grades or grades at refusal in the effect of an obstruction that cannot be removed) and after solidification to include relocated materials that have been solidified and tested in accordance with the Contract Documents, as documented and approved by the ENGINEER. Volume shall include any solidification conducted outside the lateral limits shown in the Contract Drawings, as deemed necessary by the ENGINEER in order to solidify around obstructions that cannot be easily removed.

H. Bid Item UP-5: Construction Water Treatment, Sampling and Discharge or Transportation and Disposal

1. Bid Item UP-5 shall be the bid unit price per gallon for Construction Water Treatment and Disposal or Transportation and Disposal activities in accordance with the Contract Documents.
2. Provide all labor, materials, equipment, and incidentals necessary for the work described below in accordance with Specification Section 01 45 28 – Chemical Sampling and Analysis, Section 01 74 19 – Waste Removal, Handling, and Storage, Section 02 72 00 – Construction Water Management, Section 02 81 00 – Off-Site Transportation and Disposal, Section 31 00 00 – Earthwork, and Section 31 23 19 – Dewatering, and described below but not limited to the

activities associated with the available construction water disposal options, including on-site storage as necessary:

- a. Storage, treatment, testing and discharge to surface water under a State Pollutant Discharge Elimination System (SPDES) permit equivalent:
 - i. Coordinating with the DEPARTMENT and the ENGINEER, as required.
 - ii. Furnishing an on-site treatment system capable of treating construction water to concentrations meeting the DEPARTMENT requirements for surface water discharge.
 - iii. Treating construction water generated throughout the duration of the work to the standards required for surface water discharge.
 - iv. Providing a safe and secure means to discharge treated construction water to surface water.
 - v. Performing treatment system start-up.
 - vi. Completing prove-out of the treatment system to demonstrate its capability to meet the performance requirements of the Contract Documents.
 - vii. Performing all testing requirements at the prescribed frequencies.
 - viii. Maintaining the system throughout the contract duration.
 - ix. Decommissioning, decontaminating, and deconstructing the treatment system at the end of the contract duration.
 - x. Demobilizing all components of the treatment system from the site.
 - b. Offsite Disposal:
 - i. Waste characterization testing.
 - ii. Pumping construction water into trucks.
 - iii. Transporting material to an approved off-site disposal facility.
 - iv. Off-loading construction water at the disposal facility.
3. The CONTRACTOR shall submit a separate bid breakdown (See Paragraph 1.06 of this Section) that lists the individual costs required to complete this bid item as well as miscellaneous items not specified elsewhere that are necessary for proper completion of the work (provide detail).
 4. Measurement for payment for Bid Item UP-5 shall be the bid unit price per gallon for Construction Water Treatment as measured by an on-site flow meter, or for Transportation and Disposal as indicated by the receiving facility or calculated based on weights and as documented and approved by the ENGINEER.

I. Bid Item UP-6: Soil Chemical Sampling and Analysis

1. Bid Item UP-6 shall be the bid unit price per each sample taken for Soil & Sediment Chemical Sampling and Analysis in accordance with the Contract Documents.
2. Provide all labor, materials, equipment and incidentals necessary for conducting chemical sampling and analysis of soil samples in accordance with Specification Section 01 45 28 – Chemical Sampling and Analysis and

described below but not limited to:

- a. Collecting confirmation samples at the specified frequency within completed excavation areas, expedited turn-around-time testing results for the required parameters, and reporting laboratory results as required.
 - b. Additional confirmation sampling, testing, and reporting for over-excavation areas due to exceedances of the cleanup objectives.
3. Measurement for payment of Bid Item UP-6: Soil & Sediment Chemical Sampling and Analysis shall be the bid unit price for each sample collected, analyzed, and laboratory results submitted to the ENGINEER for approval.
- J. Bid Item UP-7: Non-Hazardous MGP Remediation Waste Off-Site Transportation and Disposal
1. Bid Item UP-7 shall be the bid unit price per ton for Non-Hazardous MGP Remediation Waste Off-Site Transportation and Disposal in accordance with the Contract Documents.
 2. Provide all labor, materials, equipment, and incidentals necessary for the work described below in accordance with Specification Section 01 35 43 – Environmental Protection Procedures, Specification Section 01 74 19 – Waste Removal, Handling, and Storage and Section 02 81 00 – Off-Site Transportation and Disposal and described below but not limited to:
 - a. Waste characterization testing and documentation.
 - b. Loading non-hazardous material into trucks for transport.
 - c. Transporting non-hazardous material to an approved licensed off-site disposal facility.
 - d. Off-loading non-hazardous material at disposal facility.
 3. Measurement for payment for Bid Item UP-7 shall be the bid unit price for each ton of Non-Hazardous MGP Remediation Waste, disposed at the approved disposal facility. Weight measurement shall be by certified scale and documented by certified weight ticket issued by the disposal facility. Certified weight tickets shall be submitted to the ENGINEER for comparison to on-site weight measurement prior to payment approval.
- K. Bid Item UP-8: Hazardous MGP Remediation Waste Off-Site Transportation and Disposal
1. Bid Item UP-8 shall be the bid unit price per ton for Hazardous MGP Remediation Waste Off-Site Transportation and Disposal in accordance with the Contract Documents.
 2. Provide all labor, materials, equipment, and incidentals necessary for the work described below in accordance with Specification Section 01 35 43 – Environmental Protection Procedures, Specification Section 01 74 19 – Waste Removal, Handling, and Storage and Section 02 81 00 – Off-Site Transportation and Disposal and described below but not limited to:
 - a. Waste characterization testing and documentation.
 - b. Loading hazardous material into trucks for transport.

- c. Transporting hazardous material to an approved licensed off-site disposal facility.
 - d. Off-loading hazardous soil/sediment and associated grubbings at disposal facility.
 3. Measurement for payment for Bid Item UP-8 shall be the bid unit cost price for each ton of Hazardous MGP Remediation Waste, disposed at the approved disposal facility. Weight measurement shall be by certified scale and documented by certified weight ticket issued by the disposal facility. Certified weight tickets shall be submitted to the ENGINEER for comparison to on-site weight measurement prior to payment approval.
- L. Bid Item UP-9: Cleared and Demolition Debris Materials Off-Site Transportation and Disposal
 1. Bid Item UP-9 shall be the bid unit price per ton for Cleared and Demolition Debris Materials Off-Site Transportation and Disposal in accordance with the Contract Documents. Cleared and demolition debris materials for this bid item include cleared trees and shrubs (note that larger trees – i.e. greater than 3 inches at breast height will be removed prior to this Project); whole sections or pieces of stormwater culverts, pavement, miscellaneous construction and demolition debris, and other debris waste items. This item excludes the minor clearing and select demolition activities covered in Bid Item 2.
 2. Provide all labor, materials, equipment, and incidentals necessary for each ton of Cleared and Demolition Debris Materials transported and disposed off-site in accordance with Specification Section 01 74 19 – Waste Removal, Handling, and Storage and Section 02 81 00 – Off-Site Transportation and Disposal and described below.
 - a. Loading cleared vegetation from cleared areas into waste containers/trucks.
 - b. Processing (breaking down) and loading demolished concrete and debris into waste containers/trucks.
 - c. Processing (breaking down) and loading other miscellaneous construction and demolition debris encountered or generating during the work into waste containers/trucks.
 - d. Transporting and disposing debris off-site at an approved licensed disposal facility.
 - e. Documentation and disposal fees.
 3. Measurement for payment of Bid Item UP-9: Cleared and Demolition Debris Materials Off-Site Transportation and Disposal shall be the bid unit price for each ton of material disposed at the approved disposal facility, including Land Clearing Debris, C&D Debris, and Metal Waste. Weight measurement shall be by certified scale and documented by certified weight ticket issued by the disposal facility. Certified weight tickets shall be submitted to the ENGINEER for comparison to on-site weight measurement prior to payment approval.

M. Bid Item UP-10: Backfill and Grade with Reusable Fill

1. Bid Item UP-10 shall be the bid unit price per cubic yard for Reusable Fill in accordance with the Contract Documents.
2. Provide all labor, materials, equipment, and incidentals necessary for each cubic yard of Reusable Fill from segregated stockpiles, and backfilled in completed excavations, subgrade and in the cover system within the former MGP Property in accordance with Specification Section 01 45 28 – Chemical Sampling and Analysis, Section 01 71 23 – Field Engineering and Surveying, Section 31 00 00 – Earthwork, Section 31 25 00 – Erosion and Sediment Control, and described below.
 - a. Geotechnical testing of stockpiled soil.
 - b. Processing the soil, if required.
 - c. Relocating soil within the site.
 - d. Staging and storing soil on-site as required to coordinate with construction sequence.
 - e. Placing soil in lifts, grading, and compacting soil to the limits shown on the Construction Contract Drawings.
 - f. Field testing for compaction.
3. Measurement for payment of Bid Item UP-10 shall be the bid unit price for each cubic yard of each type of suitable Reused material, placed and compacted in accordance with the Contract Documents. Volume measurement shall be determined on an in-place basis by survey prior to and after placement and compaction, as documented and approved by the ENGINEER.

N. Bid Item UP-11: Backfill and Grade with Imported Soil

1. Bid Item UP-11 shall be the bid unit price per cubic yard for OU01 Backfill Material in accordance with the Contract Documents.
2. Provide all labor, materials, equipment, and incidentals necessary for each cubic yard of OU3 Backfill Material purchased, transported, and backfilled in completed dredged areas in accordance with Specification Section 01 71 23 – Field Engineering and Surveying, and Section 31 00 00 Earthwork, Section 31 25 00 – Erosion and Sediment Control and described below.
 - a. Geotechnical and chemical testing of borrow sources meeting commercial use criteria.
 - b. Processing the backfill material, if required.
 - c. Delivering backfill material to the site.
 - d. Staging and storing backfill material on-site as required to coordinate with construction sequence.
 - e. Placing soil in lifts, grading, and compacting soil to the limits shown on the Construction Contract Drawings.
 - f. Field testing for compaction.
 - g. Loading backfill material into scows and placing backfill into completed dredge limits shown on the Construction Contract Drawings.

- h. This Item includes placement of a barrier/demarcation layer as shown on the Construction Contract Drawings or as directed by the ENGINEER. Limits of installed barrier/demarcation layer shall be surveyed prior to placement of cover soils.
3. Measurement for payment of Bid Item UP-11 shall be the bid unit price for each cubic yard of each type of Backfill Material delivered and placed in accordance with the Contract Documents. Volume measurement shall be determined on an in-place basis by survey prior to and after placement and compaction, as documented and approved by the ENGINEER.

PART 2 – (NOT USED)

PART 3 – (NOT USED)

++END OF SECTION++

Attachment E

In-Situ Solidification Preliminary Bench Scale Mix Study Report

**IN-SITU SOLIDIFICATION
PRELIMINARY BENCH SCALE MIX STUDY REPORT
OPERABLE UNIT OU01**

**SARANAC LAKE GAS COMPANY, INC
SITE NO. 516008**

WORK ASSIGNMENT NO. D007619-50

Prepared for:

**New York State Department of Environmental Conservation
Albany, New York**

Prepared by:

**MACTEC Engineering and Geology, P.C.
Portland, Maine**

MACTEC: 3611191237

AUGUST 2020

IN-SITU SOLIDIFICATION
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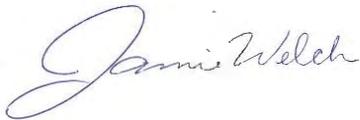
MACTEC Engineering and Geology, P.C.
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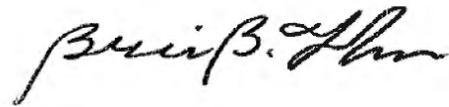
August 2020

Submitted by:

Reviewed by:



Jamie Welch
Project Manager



Brian B. Johnson
Sr. Associate Engineer

TABLE OF CONTENTS

IN-SITU SOLIDIFICATION PRELIMINARY BENCH SCALE MIX STUDY REPORT OPERABLE UNIT OU01 SARANAC LAKE GAS COMPANY, INC

<u>Section</u>	<u>Description</u>	<u>Page</u>
	GLOSSARY OF ACRONYMS AND ABBREVIATIONS	ii
1.0	Introduction.....	1-1
2.0	STUDY SUMMARY.....	2-1
2.1	PHASE 1: MATERIAL CHARACTERIZATION.....	2-1
2.2	PHASE 2: SLURRY/GROUT MIXING AND TESTING	2-5
2.3	PHASE 3: SOIL-GROUT MIXING AND TESTING	2-7
3.0	CONCLUSIONS AND RECOMMENDATIONS	3-1
4.0	REFERENCES	4-1

List of Figures

Figure 1: OU01 Pre-Design Investigation Areas

List of Tables

Table 1: Phase 1 Summary of Material (Site Soil and Reagent) Characteristics

Table 2: Phase 2 Summary of Slurry/Grout Mixtures

Table 3: Phase 3 Summary of Soil-Grout Mixtures

List of Attachments

Attachment A: Phase 1 Laboratory Test Reports

Attachment B: Phase 2 Laboratory Test Reports

Attachment C: Phase 3 Laboratory Test Reports

Attachment D: Preliminary Swell Calculation

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BODR	Basis of Design Report
cm/sec	centimeters per second
DNAPL	Dense Non-Aqueous Phase Liquid
ft	feet
g/cm ³	grams per cubic centimeter
ISS	In-Situ Solidification
k	Hydraulic Conductivity
LNAPL	Light Non-Aqueous Phase Liquid
MACTEC	MACTEC Engineering and Geology, P.C.
MGP	Manufactured Gas Plant
NYSDEC	New York State Department of Environmental Conservation
pcf	pounds per cubic foot
PDI	Pre-Design Investigation
psi	pounds per square inch
RA	Remedial Action
RD	Remedial Design
RSA	RSA GEOLAB, LLC
sec/L	seconds per liter

1.0 INTRODUCTION

On behalf of the New York State Department of Environmental Conservation (NYSDEC), MACTEC Engineering and Geology, P.C. (MACTEC) has prepared this document to report the results of a preliminary bench-scale mix study (Study) to identify possible reagent additions to inform In-Situ Solidification (ISS) activities that can be reasonably expected to achieve Project Requirements. The Study was conducted in support of MACTEC’s remedial design for environmental remediation at Saranac Lake Gas Company Operable Unit 01 (Site # 516008) (Site) in the Village of Saranac Lake, Town of North Elba, New York. The Study generally consisted of mixing three representative Soil Samples with water collected during field activities in support of the 2019 Pre-Design Investigation (PDI) Report (MACTEC, 2020a) and reagents (Portland cement, bentonite, and calciment) to produce mixtures. These mixtures were then assessed for their ability to achieve Project Requirements of hydraulic conductivity (k) and unconfined compressive strength (UCS), using commonly used solidification reagent proportions. The Site constituents of potential concern are related to its former use as a Manufactured Gas Plant (MGP), which are assumed present in the samples used in this Study due to the fact that they contained Product (dense- and light-phase non-aqueous phase liquids [DNAPLs and LNAPLs, respectively]).

The Study was performed under NYSDEC Work Assignment (WA) Number D007619-50 in general accordance with MACTEC’s Scope of Work (MACTEC, 2019). The WA authorized MACTEC to perform PDI activities, including this Study, to inform the remedial design (RD). The RD includes project specifications and drawings for remedial action (RA) at the Site in accordance with the Superfund Standby Contract between MACTEC and the NYSDEC, Work Element III of Schedule 1.

MACTEC completed PDI activities in support of RA, which includes ISS of MGP-impacted materials identified at the Site. The PDI included collection of representative Site Soils, Mix Water, Site Water, and Product for use in this Study. MACTEC subcontracted with RSA GEOLAB, LLC, of Union, New Jersey (RSA) to complete the Study and provided direction throughout the study. The findings of this Study will be used to inform the RD (i.e., expected swelling from the ISS process for use in assessing material balances at the Site) and for bidding purposes (i.e., provide bidders with a preliminary mix design that is shown to be capable of achieving Project Requirements with materials tested), as summarized in the 30% Basis of Design Report (BODR)

(MACTEC, 2020b). Ultimately, the RA contractor will be responsible for performing a Design Mix Program and a Pilot Study, which will inform full-scale solidification activities to be implemented at the Site.

This Study was intended to identify potential mixing proportions to achieve the Performance Requirements identified for solidification at the Site. The Performance Requirements are as follows:

- Maximum k of 1×10^{-6} centimeters per second (cm/sec) after a 28-day curing period, using Site Water (refer to Section 2.1) as a permeant (ASTM D5084). Additional details are presented in the Basis of Design Report and specifications.
- Minimum USC (maximum within the linear elastic range, not peak) of 30 pounds per square inch (psi) after a 28-day curing period (ASTM D1633). Additional details are presented in the Basis of Design Report and specifications

2.0 STUDY SUMMARY

The scope of this Study was originally provided in a request for proposal, which was reviewed by NYSDEC and issued by MACTEC to six specialty laboratories. Based on the bids received, RSA Geolab, LLC in Union, NJ (RSA) was awarded the work, and Site Soil, Mix Water, and samples of NAPL were sent to RSA for testing. Site-specific soil and groundwater analytical data from the Remedial Investigation Report (MACTEC, 2015) was provided to RSA prior to testing for information and health and safety purposes.

The following phased/sequential approach was used to execute the Study, to allow flexibility during testing:

- Phase 1: Testing to determine material characterization.
- Phase 2a: Preparation and testing of grout mixes. Performed concurrently with Phase 3a.
- Phase 3a: Preparation and testing of soil-grout mixes. Performed concurrently with Phase 2a.
- Data assessment/evaluation from Phases 1, 2a, and 3a.
- Phase 2a – Supplemental: Preparation and testing of slurry and additional grout mixes based on the results of Phases 2a and 3a.
- Phase 3a – Supplemental: Preparation and testing of soil-grout mixes based on the results of Phases 2a and 3a. Performed concurrently with Phase 2a – Supplemental.
- Data assessment/evaluation from Phases 2a – Supplemental and 3a - Supplemental.
- Phase 2b: Preparation and testing of additional grout mixes based on the results from previous phases. Performed concurrently with Phase 3b.
- Phase 3b: Preparation and testing of additional soil-grout mixes based on the results from previous phases. Performed concurrently with Phase 2b.
- Final data evaluation and reporting.

2.1 PHASE 1: MATERIAL CHARACTERIZATION

The materials used in the Study, including site soils and reagents, were tested to assess their characteristics. The results are summarized in Table 1, and laboratory test reports are provided in Attachment A. The materials tested were as follows:

- Sakrete Portland Cement type I/II

- American Colloids Company Bentonite (an American Petroleum Institute Section 9 bentonite)
- Soil Type 1: Central Deep portion of the Site (Figure 1), contains approximately 3 percent DNAPL (MACTEC, 2020a). The sample was selectively collected during the PDI from the most contaminated interval at each boring/test pit and composited together from depths ranging from about 10 to 30 feet (ft) below ground surface (bgs). Approximately 16 gallons of sample was collected, sealed in five-gallon buckets, and sent to RSA for use in testing.
- Soil Type 2: Central Shallow portion of the Site (Figure 1), contains approximately 6 percent light and dense NAPL (MACTEC, 2020a). The sample was selectively collected during the PDI from the most contaminated interval at each boring/test pit and composited together from depths ranging from about 0 to 10 ft bgs. Approximately 16 gallons of sample was collected, sealed in five-gallon buckets, and sent to RSA for use in testing.
- Soil Type 3: North Central portion off the Site (Figure 1), where trace amounts of NAPL and MGP impacts exist. The sample was selectively collected from the most contaminated interval at each boring/test pit and composited together from depths ranging from about 0 to 6 ft bgs. Approximately 16 gallons of sample was collected, sealed in five-gallon buckets, and sent to RSA for use in testing.

Other materials used, but not tested independently in this Study, include the following:

- Site Water: The samples were collected from groundwater that accumulated in the bottom of TP-H8A on September 17, 2019 using a peristaltic pump. Samples were pumped into a five-gallon carboy and stored inside the site structure until transported to RSA for use in testing on September 27, 2019. Analytical samples were submitted to Eurofins TestAmerica for VOCs, SVOCS, PCBs, Pesticides, Oil/Grease, total metals, dissolved metals, chlorine, TDS, BOD, pH, TSS, and TOC, and the results are presented in the PDI Report (MACTEC, 2020a).
- Mix Water: The sample was collected on September 25, 2019 from a fire hydrant located between 9 and 35 Payeville Lane, directly across from the Site entrance. Analytical testing was not performed on Mix Water.
- Tap Water: taken from RSA laboratory water source, used in testing. Analytical analysis was not performed on Tap Water.

- DNAPL was collected from TW-702 using a peristaltic pump and sent to RSA for use in testing. Approximately 500 mL was collected. Groundwater was decanted to the extent possible, however DNAPL samples are considered mixed media samples. Samples were not submitted for analytical testing as there was insufficient sample volume.
- LNAPL was collected from TW-702 using a peristaltic pump and sent to RSA for use in testing. Approximately 500 mL was collected. Groundwater was decanted to the extent possible, however LNAPL samples are considered mixed media samples. Samples were not submitted for analytical testing as there was insufficient sample volume.

Soil, water, and NAPL samples were maintained by RSA at temperatures between 35 and 40 degrees fahrenheit when not in-use in sealed containers and homogenized as needed throughout testing.

Table 1: Phase 1 Summary of Material (Site Soil and Reagent) Characteristics

Test	Test Method	Test Parameter (units)	Phase 1(a) (Site Soils)			Phase 1(b) (Reagents)	
			Soil Type 1	Soil Type 2	Soil Type 3	Bentonite	Portland Cement
Particle-Size Analysis (Sieve & Hydrometer)	ASTM D6913/D7928	Maximum Size (mm)	< 9.525	< 25.4	< 19.05	-	-
		Gravel Size, > 4.75 mm (%)	0.6	7.9	4.5		
		Sand Size, 4.75 mm to 0.075 mm (%)	60.1	81.1	86.0		
		Silt Size, 0.075 mm to 0.005 mm (%)	28.8	6.0	6.3		
		Clay Size, < 0.005 mm (%)	10.5	5.0	3.2		
		USCS Classification	SM	SP-SM	SP-SM		
Moisture Content	ASTM D2216	Moisture Content (%)	26.5	14.8	11.5	-	-
Atterberg Limits	ASTM D4318	Atterberg Limits (%)	Non-Plastic	Non-Plastic	Non-Plastic	-	-
Hydraulic Conductivity ² (Constant Head Method)	ASTM D2434	Hydraulic Conductivity, k (cm/sec)	1.9 x 10 ⁻³	1.3 x 10 ⁻³	2.7 x 10 ⁻³	-	-
		Initial Dry / Wet Density (pcf) ³	96.5 / 119.6	95.4 / 111.8	101.7 / 114.1		
		Initial / Final Moisture Content (%)	24.0 / 25.3	17.2 / 22.1	12.2 / 20.9		
		Initial Void Ratio (-)	0.7243	0.7242	0.6462		
Specific Gravity	ASTM D854	Specific Gravity (-)	2.666	2.636	2.683	2.706	3.375
Organic Content	ASTM D2974	Organic Content (%)	1.13	3.01	1.30	-	-

Notes

1. Particle sizes are based on Unified Soil Classification System (USCS) and general geotechnical practice.
2. Hydraulic conductivity tests were performed on remolded samples compacted at natural moisture content using approximately 90-percent of ASTM D698 compaction effort and permeated with Site Water.
3. pcf represents pounds per cubic foot.

2.2 PHASE 2: SLURRY/GROUT MIXING AND TESTING

Mixtures consisting of water and reagents were prepared in three Phases on a weight basis and subsequently tested by RSA (Phases 2a, 2a – Supplemental, and 2b). Mix proportions were specified by MACTEC. Herein, “slurry” refers to bentonite-water mixtures, and “grout” refers to bentonite-water-cement mixtures. Grout mixtures were allowed to cure for 3, 7, or 14 days prior to strength testing. Phase 2 mixes and testing results are summarized in Table 2, and laboratory testing reports are provided in Attachment B.

Phase 2a: Six grout mixtures, identified as G1a, G1b, G2a, G2b, G3a, and G3b, were made using the materials and proportions listed in Table 2. These six grouts were mixed and tested prior to subsequent testing in Phase 2a – Supplemental and Phase 2b. Cement and bentonite were added simultaneously (i.e., bentonite-water slurry was not allowed to hydrate for 24-hours prior to cement addition).

Phase 2a – Supplemental: Following Phase 2a, two slurry mixtures (G2a Slurry and G2b Slurry) were made to assess the impacts of allowing bentonite-water slurry to hydrate for 24-hours on slurry viscosity and density. Following slurry testing, cement was added to the slurries to make grout mixtures G2a and G2b to assess the impacts of using 24-hour hydrated bentonite-water slurry on grout viscosity, density, and strength. Three other grout mixtures (GX, GY, and GZ) were made to assess the impact of DNAPL and LNAPL addition on grout strength.

Phase 2b: Two grout mixtures (G2a and G4a) were made based on the results of Phase 2a and Phase 2a – Supplemental. The grouts were made with Tap Water (insufficient amount of Mix Water remained) and hydrated bentonite-water slurry.

Table 2: Phase 2 Summary of Slurry/Grout Mixtures

Phase	Slurry/Grout Mix Designation	Slurry/Grout Mix Proportions (by weight)						Slurry/Grout Mixture Test Results							
		Water		Reagents ²		Site Product ¹		Marsh Funnel Viscosity API RP 13B 1		Density ³ ASTM D4380		Pocket Penetrometer Unconfined Compressive Strength ⁶		Unconfined Compressive Strength (UCS) ASTM D1633	
		Tap	Mix ¹	Cement	Bentonite	DNAPL	LNAPL	Initial ³ (sec/L)	24 Hours ⁴ (sec/L)	Initial ³ (g/cm ³)	24 Hours ⁴ (g/cm ³)	3 Day (psi)	7 Day (psi)	Bulk Density (pcf)	14 Day, Peak (psi)
2a	G1a	-	1	1	-	-	-	31.03	-	1.50	-	> 62.5	> 62.5	-	-
	G1b	-	1.5	1	-	-	-	28.69	-	1.28	-	> 62.5	> 62.5	-	-
	G2a	-	1	1	0.025	-	-	36.69	-	1.51	-	> 62.5	> 62.5	-	-
	G2b	-	1.5	1	0.025	-	-	29.04	-	1.37	-	> 62.5	> 62.5	-	-
	G3a	-	1	1	0.05	-	-	37.06	-	1.52	-	> 62.5	> 62.5	-	-
	G3b	-	1.5	1	0.05	-	-	31.47	-	1.40	-	> 62.5	> 62.5	-	-
2a-Supplemental	G2a Slurry	-	1	-	0.025	-	-	28.84	28.93	1.01	1.01	-	-	-	-
	G2a	-	1	1	0.025	-	-	-	69.44	-	1.51	> 62.5	> 62.5	-	-
	G2b Slurry	-	1.5	-	0.025	-	-	28.19	28.23	1.01	1.01	-	-	-	-
	G2b	-	1.5	1	0.025	-	-	-	34.16	-	1.35	> 62.5	> 62.5	-	-
	GX	-	0.5	1	-	-	-	-	-	-	-	-	-	122.6	1,339
	GY	-	0.5	1	-	0.1	-	-	-	-	-	-	-	114.3	1,070
2b	GZ	-	0.5	1	-	-	0.1	-	-	-	-	-	-	118.3	1,369
	G2a	1	-	1	0.025	-	-	-	70.09	-	1.51	> 62.5	> 62.5	-	-
	G4a	0.75	-	1	0.025	-	-	-	> 600 ⁵	-	1.63	> 62.5	> 62.5	-	-

Notes

1. Mix Water and Site Product were provided by MACTEC.
2. Reagents were provided by RSA and were identified in Phase 1.
3. Testing performed on freshly mixed slurry/grout.
4. Testing performed on slurry/grout 24-hours following bentonite-water mixing.
5. 6 mL collected in 600 seconds.
6. > 62.5 psi indicates strength is greater than 62.5 psi (maximum strength reading of pocket penetrometer instrument).

2.3 PHASE 3: SOIL-GROUT MIXING AND TESTING

Soil-grout mixtures, consisting of the grouts made in Phase 2 (Section 2.2) and specific Soil Types (Section 2.1), were prepared on a weight basis and subsequently tested by RSA in two Phases (3a and 3b). Mix proportions were provided by MACTEC. The soil-grout mixtures were prepared using the materials and mix proportions presented in Table 3 and allowed to cure for 3, 7, 14, or 28 days prior to testing. A summary of test results is provided in Table 3 and laboratory test reports are provided in Attachment C.

Phase 3a: In Phase 3a, 15 soil-grout mixtures were prepared (samples 1 through 15), with the addition of Site Water and NAPL to conservatively add liquids that may not have been present in the soil samples.

Phase 3a - Supplemental: In Phase 3a - Supplemental, three soil-grout mixtures were prepared (samples 5, 12, and 15 from Phase 3a) using 24-hour hydrated bentonite-water slurry, with the addition of Tap Water to conservatively add liquids that may not have been present in the soil samples.

Phase 3b: In Phase 3b, nine soil-grout mixtures were prepared (samples 16 through 24) based on the results of Phase 3a. Calciment was added to three of the mixtures to dry the soil-grout mixtures and assess its impacts on soil-grout strength and hydraulic conductivity.

Table 3: Phase 3 Summary of Soil-Grout Mixtures

Phase	Lab Sample No.	Soil Grout Mix Components			Soil Grout Mix Proportions (by weight)		Additional Mix Materials and Proportions (by weight)					Bulk Density (pcf)	Pocket Penetrometer Unconfined Compressive Strength ⁷			Unconfined Compressive Strength (UCS) ⁹ ASTM D1633			Hydraulic Conductivity (k) ^{8,9} ASTM D5084	
		Soil Type ¹	Grout Mix ²	Grout Mix Proportions	Wet Soil ³	Grout	Site Water ^{4,5}	Tap Water	Site Product ⁵		Calciment ⁶		3 Day (psi)	7 day (psi)	14 day (psi)	Bulk Density (pcf)	14 Day, Peak (psi)	28 Day, Peak (psi)	Bulk Density (pcf)	28 Day (cm/sec)
									DNAPL	LNAPL										
3a	1	1	G1a	1:1:0	20	2.0	0.3	-	0.03	-	-	120.8	0	3.5	13.9	123.1, 120.6 ¹⁰	-	2.69, 7.03 ¹⁰	122.4	2.06 x 10 ⁻⁶
	2	1	G2a	1:1:0.025	20	2.0	0.3	-	0.03	-	-	123.5	0	0	3.5	124.1	-	1.65	130.0	3.68 x 10 ⁻⁶
	3	1	G2b	1.5:1:0.025	20	2.5	0.3	-	0.03	-	-	124.0	0	0	0	122.1	-	1.52	123.8	3.55 x 10 ⁻⁶
	4	2	G1a	1:1:0	20	2.0	0.3	-	-	0.03	-	124.3	38.2	>62.5	>62.5	124.1, 124.2 ¹⁰	-	13.1, 16.15 ¹⁰	124.0	9.15 x 10 ⁻⁷
	5	2	G2a	1:1:0.025	20	2.0	0.3	-	-	0.03	-	124.9	10.4	24.3	>62.5	119.2, 125.0 ¹⁰	-	4.76, 2.78 ¹⁰	119.7	3.99 x 10 ⁻⁶
	6	2	G3a	1:1:0.05	20	2.0	0.3	-	-	0.03	-	106.9	0	0	3.5	105.2	-	1.14	106.9	1.06 x 10 ⁻⁶
	7	2	G1b	1.5:1:0	20	2.5	0.3	-	-	0.03	-	123.2	24.3	>62.5	>62.5	124.9, 123.1 ¹⁰	-	7.59, 17.17 ¹⁰	123.0	2.20 x 10 ⁻⁶
	8	2	G2b	1.5:1:0.025	20	2.5	0.3	-	-	0.03	-	110.5	0	0	6.9	107.7	-	1.26	107.3	2.16 x 10 ⁻⁶
	9	2	G3b	1.5:1:0.05	20	2.5	0.3	-	-	0.03	-	117.6	0	0	3.5	116.6	-	2.00	115.4	3.10 x 10 ⁻⁶
	10	3	G1a	1:1:0	20	2.0	0.3	-	-	-	-	131.8	3.5	10.4	17.4	122.9, 131.6 ¹⁰	-	3.03, 4.41 ¹⁰	125.6	4.14 x 10 ⁻⁶
	11	3	G2a	1:1:0.025	20	2.0	0.3	-	-	-	-	128.6	0	0	13.9	125.1	-	1.44	124.7	3.91 x 10 ⁻⁶
	12	3	G2b	1.5:1:0.025	20	2.5	0.3	-	-	-	-	118.9	0	0	10.4	118.9	-	2.15	100.7	2.43 x 10 ⁻⁶
	13	1	G1a	1:1:0	10	2.0	0.15	-	0.015	-	-	122.2	0	3.5	31.25	124.8	-	31.47	128.9	3.75 x 10 ⁻⁶
	14	1	G2a	1:1:0.025	10	2.0	0.15	-	0.015	-	-	113.8	0	52.1	>62.5	115.9, 113.9 ¹⁰	-	1.22, 20.19 ¹⁰	113.9	1.88 x 10 ⁻⁶
	15	1	G2b	1.5:1:0.025	10	2.5	0.15	-	0.015	-	-	123.5	24.3	>62.5	>62.5	124.8	-	56.83	125.7	1.78 x 10 ⁻⁶
3a-Supplemental ¹¹	5	2	G2a	1:1:0.025	20	2.0	-	0.3	-	-	-	-	0	0	3.5	119.7	3.58	-	120.5	1.01 x 10 ⁻⁶
	12	3	G2b	1.5:1:0.025	20	2.5	-	0.3	-	-	-	-	0	0	0	124.7	2.56	-	124.6	3.79 x 10 ⁻⁶
	15	1	G2b	1.5:1:0.025	10	2.5	-	0.15	-	-	-	-	>62.5	>62.5	>62.5	124.0	31.14	-	125.9	7.71 x 10⁻⁷
3b ¹¹	16	1	G2a	1:1:0.025	10	2.0	-	-	-	-	0.5	-	-	>62.5	>62.5	126.2	-	271.0	126.1	4.17 x 10⁻⁷

Phase	Lab Sample No.	Soil Grout Mix Components			Soil Grout Mix Proportions (by weight)		Additional Mix Materials and Proportions (by weight)					Bulk Density (pcf)	Pocket Penetrometer Unconfined Compressive Strength ⁷			Unconfined Compressive Strength (UCS) ⁹ ASTM D1633			Hydraulic Conductivity (k) ^{8,9} ASTM D5084	
		Soil Type ¹	Grout Mix ²	Grout Mix Proportions	Wet Soil ³	Grout	Site Water ^{4,5}	Tap Water	Site Product ⁵		Calciment ⁶		3 Day (psi)	7 day (psi)	14 day (psi)	Bulk Density (pcf)	14 Day, Peak (psi)	28 Day, Peak (psi)	Bulk Density (pcf)	28 Day (cm/sec)
									DNAPL	LNAPL										
	17	1	G2a	1:1:0.025	10	2.0	-	-	-	-	-	-	-	>62.5	>62.5	127.0	-	192.4	128.1	5.52 x 10⁻⁷
	18	1	G4a	0.75:1:0.025	10	2.5	-	-	-	-	-	-	-	>62.5	>62.5	126.1	-	378.1	125.8	1.96 x 10⁻⁷
	19	2	G2a	1:1:0.025	10	2.0	-	-	-	-	0.5	-	-	>62.5	>62.5	117.4	-	131.6	115.4	5.02 x 10⁻⁷
	20	2	G2a	1:1:0.025	10	2.0	-	-	-	-	-	-	-	13.9	>62.5	119.3	-	63.5	118.5	7.91 x 10⁻⁷
	21	2	G4a	0.75:1:0.025	10	2.5	-	-	-	-	-	-	-	>62.5	>62.5	119.6	-	150.2	119.2	4.89 x 10⁻⁷
	22	3	G2a	1:1:0.025	10	2.0	-	-	-	-	0.5	-	-	>62.5	>62.5	124.2	-	196.5	125.7	4.98 x 10⁻⁷
	23	3	G2a	1:1:0.025	10	2.0	-	-	-	-	-	-	-	>62.5	>62.5	124.5	-	140.9	127.5	7.89 x 10⁻⁷
	24	3	G4a	0.75:1:0.025	10	2.5	-	-	-	-	-	-	-	>62.5	>62.5	125.7	-	243.4	125.6	3.19 x 10⁻⁷

Notes

- Soil Types are identified in Phase 1.
- Bold text indicates mix meets or exceeds the cement: water ratio with bentonite recommended in Section 3 and/or Performance Requirements were met for the given mix.
- Wet soil at as received moisture content.
- Site Water is described in Phase 1.
- Site Water and Site Product were provided by MACTEC.
- Calciment supplied to RSA by Mintek Resources, Inc.
- > 62.5 psi indicates strength is greater than 62.5 psi (maximum strength reading of pocket penetrometer instrument).
- Hydraulic conductivity tests were performed at a net confining stress of 10 psi, and after at-least 90-percent consolidation. Soft, uncompacted samples may have required stepped confining pressures to limit sample deformation. Used laboratory tap water as permeant.
- Photographs were taken of test samples, before and after UCS and hydraulic testing.
- Test performed on Pocket Penetrometer specimen.
- Soil-grout mixtures prepared using 24-hour hydrated bentonite-water slurry.

3.0 CONCLUSIONS AND RECOMMENDATIONS

The findings of this Study will be used to inform the RD (i.e., estimated swelling from the ISS process for use in assessing material balances at the Site) and for bidding purposes (i.e., provide bidders with a preliminary mix design that is shown to be capable of achieving Project Requirements with the materials tested). Ultimately, the RA contractor will be responsible for performing a Design Mix Program and Pilot Study, which will inform final solidification activities to be implemented at the Site. Information produced by this study for the RD are as follows:

- Saturated in-situ soil unit weight of 120 pounds per cubic foot (pcf) for all soil types.
- Grout mix (for all soil types) proportions, by weight:
 - Water: 1
 - Portland Cement (Type I/II): 1
 - Bentonite (Section 9): 0.025
- Soil-grout mix (for all soil types) proportions, by weight:
 - Saturated soil: 10
 - Grout: 2
- Volumetric swell of 25 percent (relative to in-situ soil) following soil-grout mixing (preliminary swell calculation provided in Attachment D).

The RA contractor should consider the following items during performance of their Design Mix Program and Pilot Study:

- Allow bentonite-water slurry to hydrate for 24-hours prior to cement addition to help keep cement particles in suspension during curing.
- Addition of Site Water to soil-grout mixtures (during mix study) to replace water drained from free-draining soils during sampling (i.e., saturated soils versus laboratory received moisture) to represent saturated (i.e., below groundwater table) soil conditions.
- Addition of Site Product to soil-grout mixtures (during mix study) if Site Soils used in RA contractor's Mix Study Program are not representative of in-situ conditions relative to maximum NAPL present. Approximate in-situ NAPL percentages for each Site Soil Type are provided in Section 2.1.

- The results for Sample 15 in Phase 3a – Supplemental indicate that Performance Requirements can potentially be met using a lower cement:water ratio grout mix than indicated above (tap water was added to the soil-grout mix as well). This grout mix was only mixed/tested with Soil Type 1. Based on the results from Phase 3b, soil type does not appear to have a significant impact on soil-grout strength or hydraulic conductivity. However, the RA contractor should consider mixing and testing lower cement:water grouts with all soil types in their Design Mix Program if pumpability of the grout mix is expected to be a concern.
- The addition of calciment increased strength by approximately 40 to 50 percent and reduced hydraulic conductivity by approximately 25 to 37 percent.
- Variations in soil water content significantly impact strength and, to a lesser degree, hydraulic conductivity, which may be compensated for through the addition of calciment in dry form.
- Adjustment of volumetric swell percentage following pilot study, prior to importing backfill material.

4.0 REFERENCES

MACTEC, 2015. Remedial Investigation Report– Saranac Lake Gas Company Site #516008. Prepared for New York State Department of Environmental Conservation, Albany, New York. January 2015.

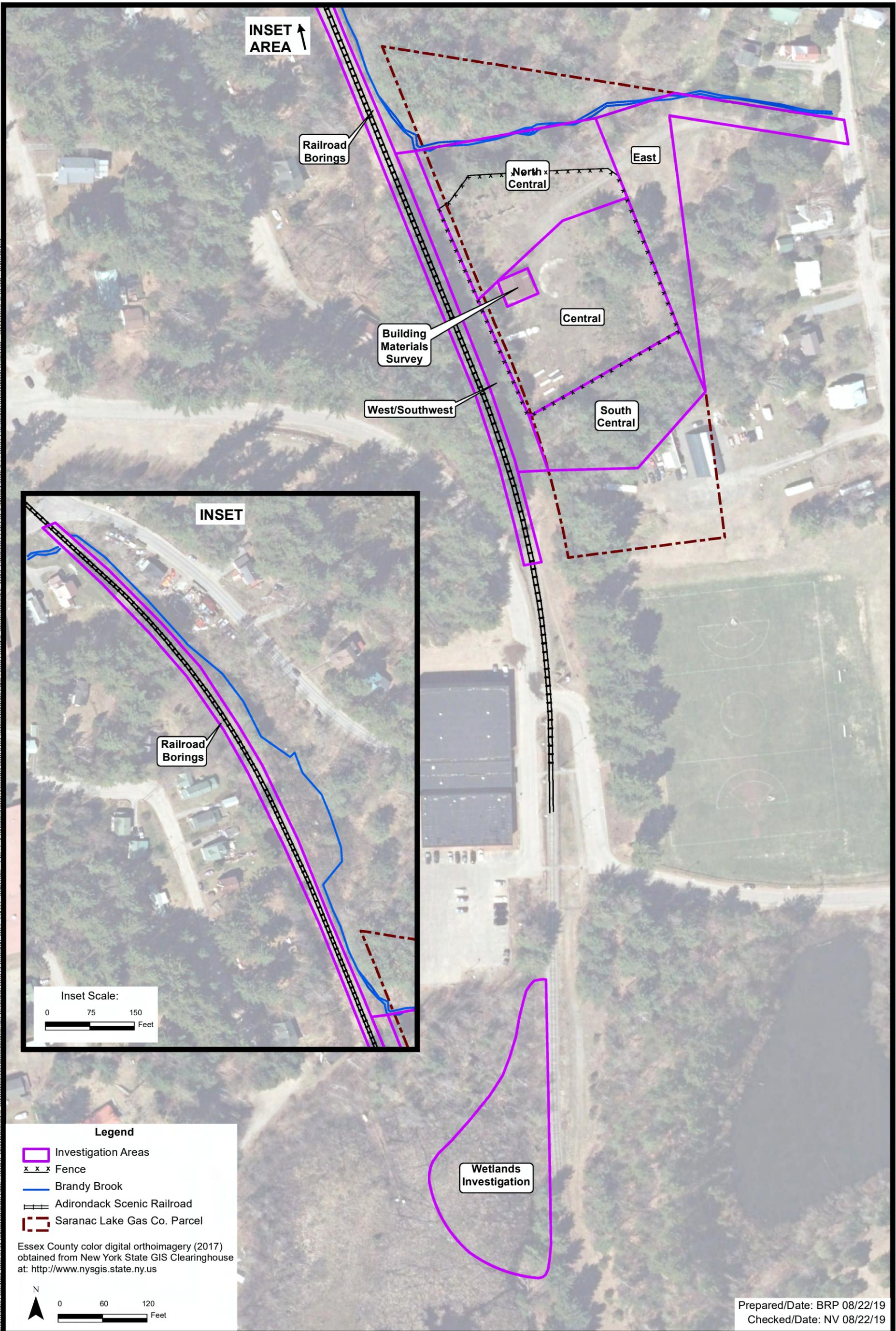
MACTEC Engineering and Geology, P.C. (2019). Request for Proposal, Saranac Lake OU01 (Site No. 516008) Remedial Design, In-situ Stabilization Bench Scale Study. May 2019.

MACTEC Engineering and Geology, P.C. (2020a). Pre-Design Investigation Field Activities Report, Operable Unit OU01, Saranac Lake Gas Company, Inc., Site No. 516008. April 2020.

MACTEC Engineering and Geology, P.C. (2020b). Remedial Design Basis Report, Operable Unit OU01, Saranac Lake Gas Company, Inc., Site No. 516008. April 2020.

FIGURES

Document: P:\Projects\Invest\Contract 0007619\Projects\Saranac Lake - RD\4.0_Deliverables\4.5_Data\Bases\GIS\Map Documents\Pre-Design\OU01\Pre-Design_0111_11x17P_Inset.mxd PDE: P:\Projects\Invest\Contract 0007619\Projects\Saranac Lake - RD\4.0_Deliverables\4.2_Work_Bases\OU01\BDI\BDI\Figures\Figure_4.1_0101_Pre-Design_Investigation_Areas.cdf 08/22/2019 8:19 AM - hrian.net



INSET AREA ↑

Railroad Borings

North Central

East

Building Materials Survey

Central

West/Southwest

South Central

INSET

Railroad Borings

Inset Scale:



Legend

- Investigation Areas
- Fence
- Brandy Brook
- Adirondack Scenic Railroad
- Saranac Lake Gas Co. Parcel

Essex County color digital orthoimagery (2017) obtained from New York State GIS Clearinghouse at: <http://www.nysgis.state.ny.us>



Prepared/Date: BRP 08/22/19
Checked/Date: NV 08/22/19

NYSDEC Site # 516008
Saranac Lake Gas Co., Inc.
Saranac Lake, New York



OU01 Pre-Design
Investigation Areas
Project 3611191237

Figure 1

ATTACHMENT A

PHASE 1 LABORATORY TEST REPORTS



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAgeolab.com

Letter of Transmittal

Date: 10-10-19

Job No.: 912

Lab Log: 19-376

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)

Samples: Soil Type I, Soil Type II, Soil Type III, Cement, Bentonite

Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D2434 Permeability (recompacted) (Soil Type I, II, & III)
- ASTM D854 Specific Gravity (Cement & Bentonite)

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: _____

Dr. Raza S. Ahmed
President RSA Geolab, LLC

RSA's Geolab's Geotechnical Laboratory testing was performed and results reported in accordance with ASTM standards and accepted industry standards. No other representations or warranties either express or implied are given. RSA Geolab, LLC neither accepts responsibility for nor makes claim to the final use and purpose of the material tested.

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RSA Geolab

PERMEABILITY TEST BY CONSTANT HEAD METHOD ASTM D2434

Project: Saranac Lake OU01 (Site No. 516008) Proj. #: 912
 Client: Wood PLC/Mactec Date: 10-10-19
 Sample ID: Soil Type I
 Description: Grayish Brown silty sand

Unit Weight Determination:

Diameter, D	11.35 cm	Height of Mold	8.25 in.
Area, A	101.2 cm ²	Height from top of Mold	1.25 in.
Length, L	11.43 cm	Height of Sample, H, in.	7.00 in.

	Initial (lbs.)	Final (lbs.)	Dry (lbs.)	<u>Moisture Content</u>	
Soil & Tare	7.60	8.78	7.23	Initial:	24.0 %
Tare	0.00	1.10	1.10	Final:	25.3 %
Soil	7.60	7.68	6.13		
				Density	96.49 pcf
				Dry, W	

Void Ratio, e: 0.7243
 Specific Gravity: 2.6663

Test #	Manometers		Head, h cm	Q ml	t sec.	Q/At	h/L	Temp C	k cm/s
	h1	h2							
1	44.1	42.1	2.0	26	900	0.0003	0.17	0.965	1.575E-03
	44.1	42.1	2.0	25	900	0.0003	0.17	0.965	1.514E-03
	44.1	42.1	2.0	25	900	0.0003	0.17	0.965	1.514E-03
2	44.7	42.1	2.6	36	900	0.0004	0.23	0.965	1.677E-03
	44.7	42.1	2.6	36	900	0.0004	0.23	0.965	1.677E-03
	44.7	42.1	2.6	35	900	0.0004	0.23	0.965	1.631E-03
3	45.1	42.1	3.0	46	900	0.0005	0.26	0.965	1.857E-03
	45.1	42.1	3.0	46	900	0.0005	0.26	0.965	1.857E-03
	45.1	42.1	3.0	45	900	0.0005	0.26	0.965	1.817E-03
4	45.6	42.2	3.4	55	900	0.0006	0.30	0.965	1.959E-03
	45.6	42.2	3.4	54	900	0.0006	0.30	0.965	1.924E-03
	45.6	42.2	3.4	54	900	0.0006	0.30	0.965	1.924E-03
5	46.3	42.2	4.1	66	900	0.0007	0.36	0.965	1.950E-03
	46.3	42.2	4.1	66	900	0.0007	0.36	0.965	1.950E-03
	46.3	42.2	4.1	65	900	0.0007	0.36	0.965	1.920E-03
6	47.3	42.3	5.0	92	900	0.0010	0.44	0.965	2.229E-03
	47.3	42.3	5.0	91	900	0.0010	0.44	0.965	2.204E-03
	47.3	42.3	5.0	91	900	0.0010	0.44	0.965	2.204E-03
									Average
Remarks: Recompact sample (equal to 90% ASTM D698, as received MC). Tested with site water.									1.855E-03

RSA Geolab

PERMEABILITY TEST BY CONSTANT HEAD METHOD ASTM D2434

Project: Saranac Lake OU01 (Site No. 516008) Proj. #: 912
 Client: Wood PLC/Mactec Date: 10-10-19
 Sample ID: Soil Type II
 Description: Grayish Brown poorly graded sand with silt

Unit Weight Determination:

Diameter, D	11.35 cm	Height of Mold	8.25 in.
Area, A	101.2 cm ²	Height from top of Mold	1.25 in.
Length, L	11.43 cm	Height of Sample, H, in.	7.00 in.

	Initial (lbs.)	Final (lbs.)	Dry (lbs.)	<u>Moisture Content</u>		
Soil & Tare	7.10	8.50	7.16	Initial:	17.2 %	
Tare	0.00	1.10	1.10	Final:	22.1 %	
Soil	7.10	7.40	6.06			
				Density	95.39 pcf	
				Dry, W		

Void Ratio, e: 0.7242
 Specific Gravity: 2.6357

Test #	Manometers		Head, h cm	Q ml	t sec.	Q/At	h/L	Temp C	k cm/s
	h1	h2							
1	44.5	42.5	2.0	21	900	0.0002	0.17	0.955	1.259E-03
	44.5	42.5	2.0	20	900	0.0002	0.17	0.955	1.199E-03
	44.5	42.5	2.0	20	900	0.0002	0.17	0.955	1.199E-03
2	44.9	42.5	2.4	26	900	0.0003	0.21	0.955	1.299E-03
	44.9	42.5	2.4	26	900	0.0003	0.21	0.955	1.299E-03
	44.9	42.5	2.4	25	900	0.0003	0.21	0.955	1.249E-03
3	45.5	42.6	2.9	31	900	0.0003	0.25	0.955	1.281E-03
	45.5	42.6	2.9	31	900	0.0003	0.25	0.955	1.281E-03
	45.5	42.6	2.9	30	900	0.0003	0.25	0.955	1.240E-03
4	46.1	42.6	3.5	38	900	0.0004	0.31	0.955	1.301E-03
	46.1	42.6	3.5	38	900	0.0004	0.31	0.955	1.301E-03
	46.1	42.6	3.5	38	900	0.0004	0.31	0.955	1.301E-03
5	46.6	42.6	4.0	45	900	0.0005	0.35	0.955	1.349E-03
	46.6	42.6	4.0	44	900	0.0005	0.35	0.955	1.319E-03
	46.6	42.6	4.0	44	900	0.0005	0.35	0.955	1.319E-03
6	47.6	42.6	5.0	58	900	0.0006	0.44	0.955	1.390E-03
	47.6	42.6	5.0	57	900	0.0006	0.44	0.955	1.367E-03
	47.6	42.6	5.0	57	900	0.0006	0.44	0.955	1.367E-03
									Average
Remarks: Recompact sample (equal to 90% ASTM D698, as received MC). Tested with site water.									1.295E-03

RSA Geolab

PERMEABILITY TEST BY CONSTANT HEAD METHOD ASTM D2434

Project: Saranac Lake OU01 (Site No. 516008) Proj. #: 912
 Client: Wood PLC/Mactec Date: 10-10-19
 Sample ID: Soil Type III
 Description: Pale Brown poorly graded sand with silt

Unit Weight Determination:

Diameter, D	11.35 cm	Height of Mold	8.25 in.
Area, A	101.2 cm ²	Height from top of Mold	1.25 in.
Length, L	11.43 cm	Height of Sample, H, in.	7.00 in.

	Initial (lbs.)	Final (lbs.)	Dry (lbs.)	<u>Moisture Content</u>	
Soil & Tare	7.25	8.91	7.56	Initial:	12.2 %
Tare	0.00	1.10	1.10	Final:	20.9 %
Soil	7.25	7.81	6.46		
				Density	101.69 pcf
				Dry, W	

Void Ratio, e: 0.6462
 Specific Gravity: 2.6827

Test #	Manometers		Head, h cm	Q ml	t sec.	Q/At	h/L	Temp C	k cm/s
	h1	h2							
1	45.0	43.0	2.0	43	900	0.0005	0.17	0.947	2.556E-03
	45.0	43.0	2.0	43	900	0.0005	0.17	0.947	2.556E-03
	45.0	43.0	2.0	42	900	0.0005	0.17	0.947	2.496E-03
2	45.5	43.0	2.5	55	900	0.0006	0.22	0.947	2.615E-03
	45.5	43.0	2.5	55	900	0.0006	0.22	0.947	2.615E-03
	45.5	43.0	2.5	54	900	0.0006	0.22	0.947	2.568E-03
3	46.1	43.1	3.0	67	900	0.0007	0.26	0.947	2.655E-03
	46.1	43.1	3.0	67	900	0.0007	0.26	0.947	2.655E-03
	46.1	43.1	3.0	66	900	0.0007	0.26	0.947	2.615E-03
4	46.5	43.1	3.4	77	900	0.0008	0.30	0.947	2.692E-03
	46.5	43.1	3.4	77	900	0.0008	0.30	0.947	2.692E-03
	46.5	43.1	3.4	76	900	0.0008	0.30	0.947	2.657E-03
5	47.1	43.1	4.0	95	900	0.0010	0.35	0.947	2.823E-03
	47.1	43.1	4.0	94	900	0.0010	0.35	0.947	2.793E-03
	47.1	43.1	4.0	94	900	0.0010	0.35	0.947	2.793E-03
6	48.2	43.2	5.0	130	900	0.0014	0.44	0.947	3.091E-03
	48.2	43.2	5.0	130	900	0.0014	0.44	0.947	3.091E-03
	48.2	43.2	5.0	128	900	0.0014	0.44	0.947	3.043E-03
									Average
Remarks: Recompact sample (equal to 90% ASTM D698, as received MC). Tested with site water.									2.722E-03

RSA Geolab
SPECIFIC GRAVITY TESTS
 ASTM D854

10-Oct-19

CLIENT: Wood PLC
 MACTEC
 PROJECT: Saranac Lake OU01 (Site No. 516008)

PROJECT NO.: 912

SAMPLE	Bentonite API Section 9	Type II Portland Cement		
DEPTH				
DATE	08-Oct-19			
PYCNOMETER NO.	B	2		
1. TARE AND DRY SOIL	123.16	127.56		
2. TARE WEIGHT	87.41	92.20		
3. WT. DRY SOIL	35.75	35.36	0.00	0.00
4. TEMP	23.5	23.6		
5. WT. PYC SOIL	358.18	365.42		
6. WT. PYC. AT TEMP	335.63	340.53		
7. AW (5-6)	22.55	24.89	0.00	0.00
8. SP. GR. = $3/(6-(5-3))$	2.7083	3.3773	0	0
9. TEMP. CORRECTION	0.9992	0.9992		
10. SPEC. GRAVITY	2.7062	3.3746	0.0000	0.0000

PERFORMED BY: MF
 COMPUTED BY: KH

CHECKED BY: KP



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAGEOLAB.com

Letter of Transmittal

Date: 10-3-19

Job No.: 912

Lab Log: 19-376

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)

Samples: Soil Type I, Soil Type II, Soil Type III

Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D2216 Moisture Content
- ASTM D4318 Atterberg Limits
- ASTM D422 Sieve & Hydrometer Analysis
- ASTM D854 Specific Gravity

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: _____

Dr. Raza S. Ahmed
President RSA Geolab, LLC

RSA's Geolab's Geotechnical Laboratory testing was performed and results reported in accordance with ASTM standards and accepted industry standards. No other representations or warranties either express or implied are given. RSA Geolab, LLC neither accepts responsibility for nor makes claim to the final use and purpose of the material tested. RSA Geolab, LLC owns all rights, title and interest of the work product. This report is intended for client's sole and exclusive use and not for the benefit of others and may not be used or relied upon by others. These documents must be considered proprietary information and should not be reproduced without the written approval of RSA Geolab, LLC.

RSA Geolab		MOISTURE CONTENTS	
		TEST METHOD ASTM D-2216	
CLIENT:	Wood PLC MACTEC	DATE:	03-Oct-19
PROJECT:	Saranac Lake OU01 (Site No. 516008)	PROJECT #	912

HOLE #/ SAMPLE #	Soil Type I	Soil Type II	Soil Type III		
DEPTH					
WET WGT. + tare (gms.)	1740.2	1594.0	1504.2		
DRY WGT. + tare (gms.)	1378.4	1390.1	1350.1		
WGT. WATER (gms.)	361.8	203.9	154.1	0.0	0.0
TARE (gms.)	13.0	13.0	13.0		
DRY WGT. (gms.)	1365.4	1377.1	1337.1	0.0	0.0
MOISTURE CONTENT	26.5%	14.8%	11.5%		

HOLE #/ SAMPLE #					
DEPTH					
WET WGT. + tare (gms.)					
DRY WGT. + tare (gms.)					
WGT. WATER (gms.)	0.0	0.0	0.0	0.0	0.0
TARE (gms.)					
DRY WGT. (gms.)	0.0	0.0	0.0	0.0	0.0
MOISTURE CONTENT					

Performed by: EE Entered by: KH Checked by: KP

RSA Geolab
SPECIFIC GRAVITY TESTS
 ASTM D854

03-Oct-19

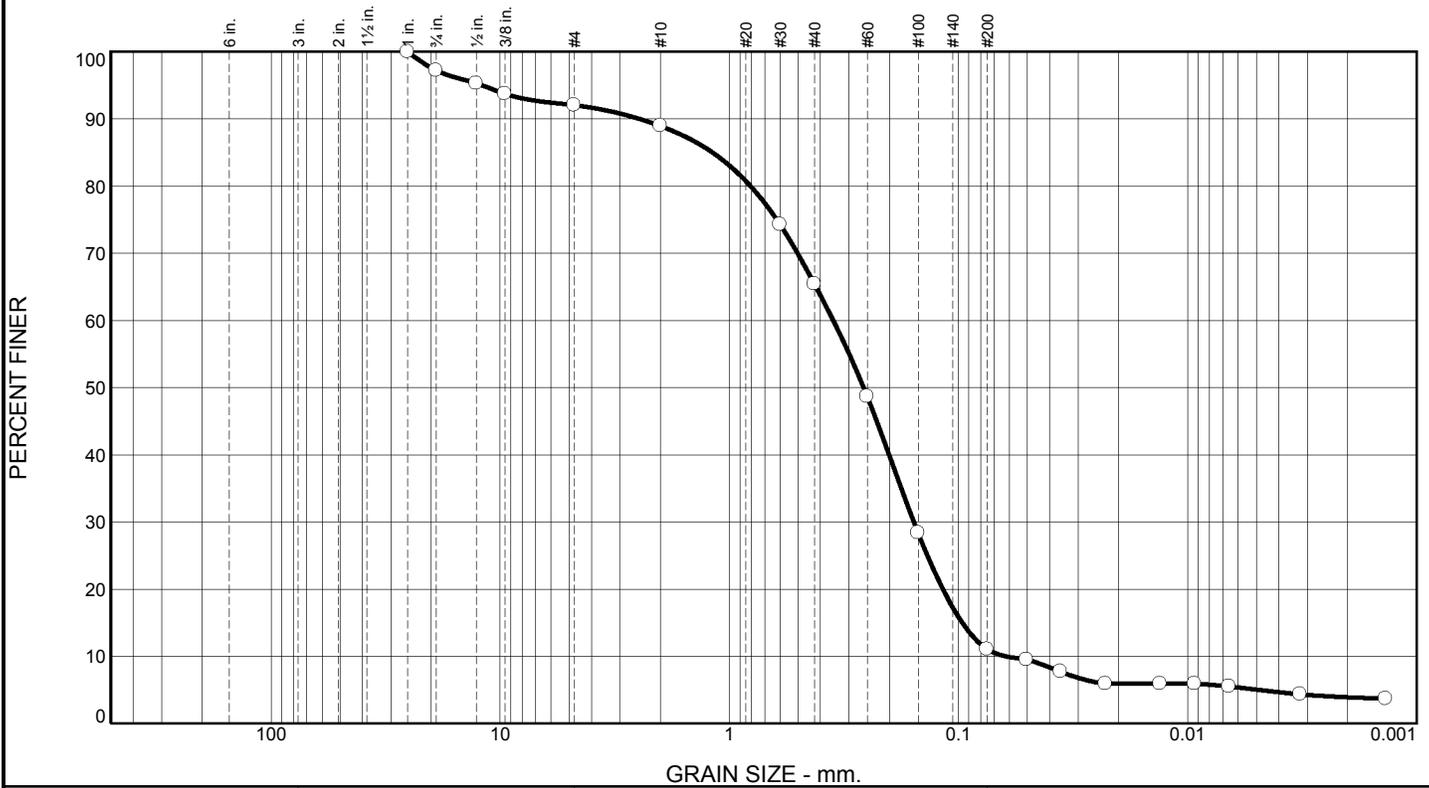
CLIENT: Wood PLC PROJECT NO.: 912
 MACTEC
 PROJECT: Saranac Lake OU01 (Site No. 516008)

SAMPLE	Soil Type I	Soil Type II	Soil Type III	
DEPTH				
DATE	29-Sep-19			
PYCNOMETER NO.	2	5	B	
1. TARE AND DRY SOIL	127.61	124.35	124.47	
2. TARE WEIGHT	92.23	89.27	87.45	
3. WT. DRY SOIL	35.38	35.08	37.02	0.00
4. TEMP	23.3	23.3	23.3	
5. WT. PYC SOIL	362.62	359.39	358.84	
6. WT. PYC. AT TEMP	340.50	337.61	335.61	
7. AW (5-6)	22.12	21.78	23.23	0.00
8. SP. GR. = $3/(6-(5-3))$	2.6682	2.6376	2.6846	0
9. TEMP. CORRECTION	0.9993	0.9993	0.9993	
10. SPEC. GRAVITY	2.6663	2.6357	2.6827	0.0000

PERFORMED BY: MF
 COMPUTED BY: KH

CHECKED BY: KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.8	5.1	3.1	23.6	54.4	6.0	5.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	97.2		
.5	95.3		
.375	93.7		
#4	92.1		
#10	89.0		
#30	74.3		
#40	65.4		
#60	48.7		
#100	28.4		
#200	11.0		

Material Description

Grayish Brown poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D ₉₀ = 2.4544	D ₈₅ = 1.1817	D ₆₀ = 0.3517
D ₅₀ = 0.2591	D ₃₀ = 0.1566	D ₁₅ = 0.0964
D ₁₀ = 0.0628	C _u = 5.60	C _c = 1.11

Classification

USCS= SP-SM AASHTO= A-2-4(0)

Remarks

* (no specification provided)

Sample Number: Soil Type II

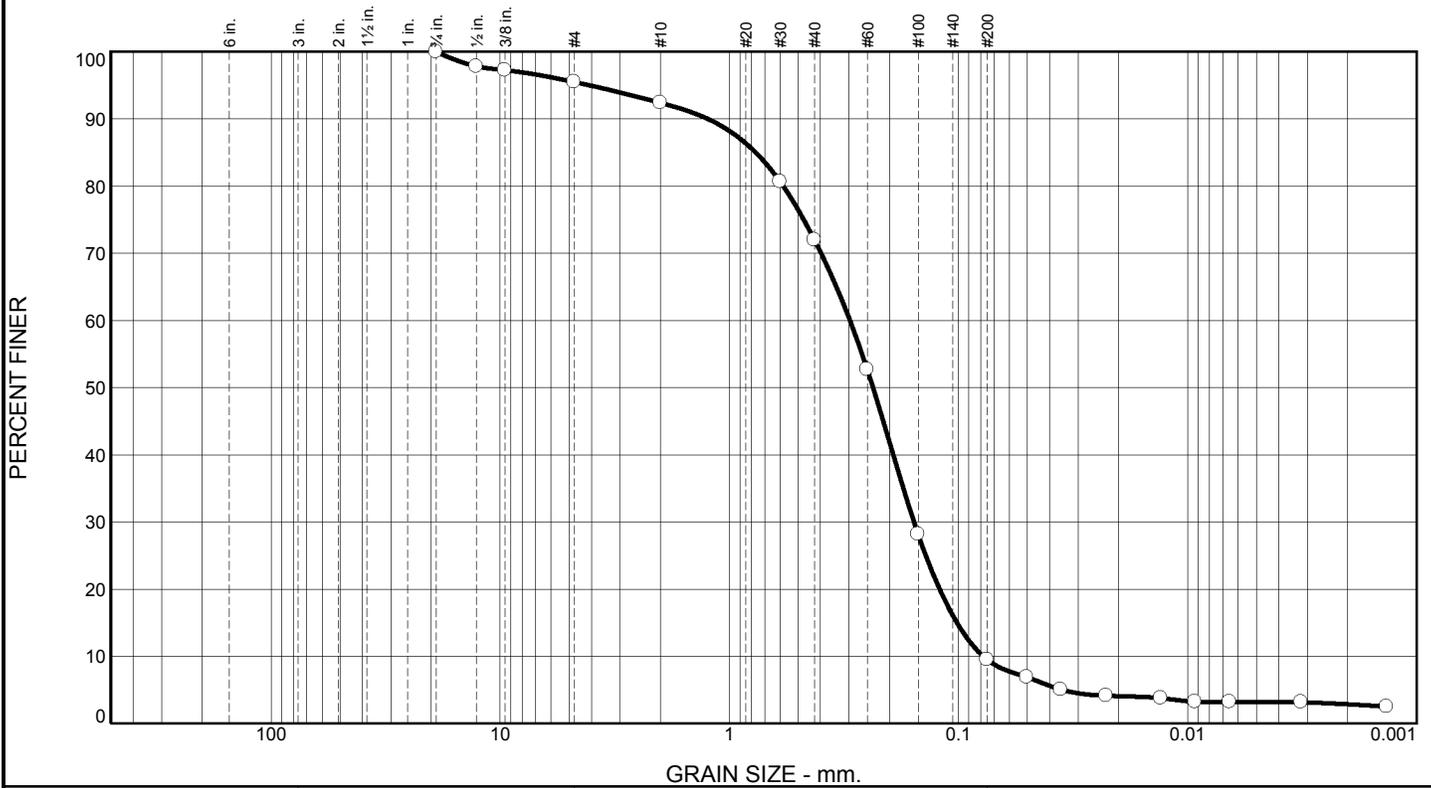
Date: 10-3-19

<p>RSA Geolab</p> <p>Union, New Jersey</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC</p> <p>Project No: 912</p> <p style="text-align: right;">Figure</p>
--	--

Tested By: MF

Checked By: KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.5	3.1	20.4	62.5	6.3	3.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	97.8		
.375	97.3		
#4	95.5		
#10	92.4		
#30	80.7		
#40	72.0		
#60	52.7		
#100	28.2		
#200	9.5		

Material Description

Pale Brown poorly graded sand with silt

PL= NP **Atterberg Limits** LL= NV PI= NP

Coefficients

D ₉₀ = 1.2363	D ₈₅ = 0.7659	D ₆₀ = 0.2973
D ₅₀ = 0.2358	D ₃₀ = 0.1563	D ₁₅ = 0.1017
D ₁₀ = 0.0782	C _u = 3.80	C _c = 1.05

Classification

USCS= SP-SM AASHTO= A-3

Remarks

* (no specification provided)

Sample Number: Soil Type III

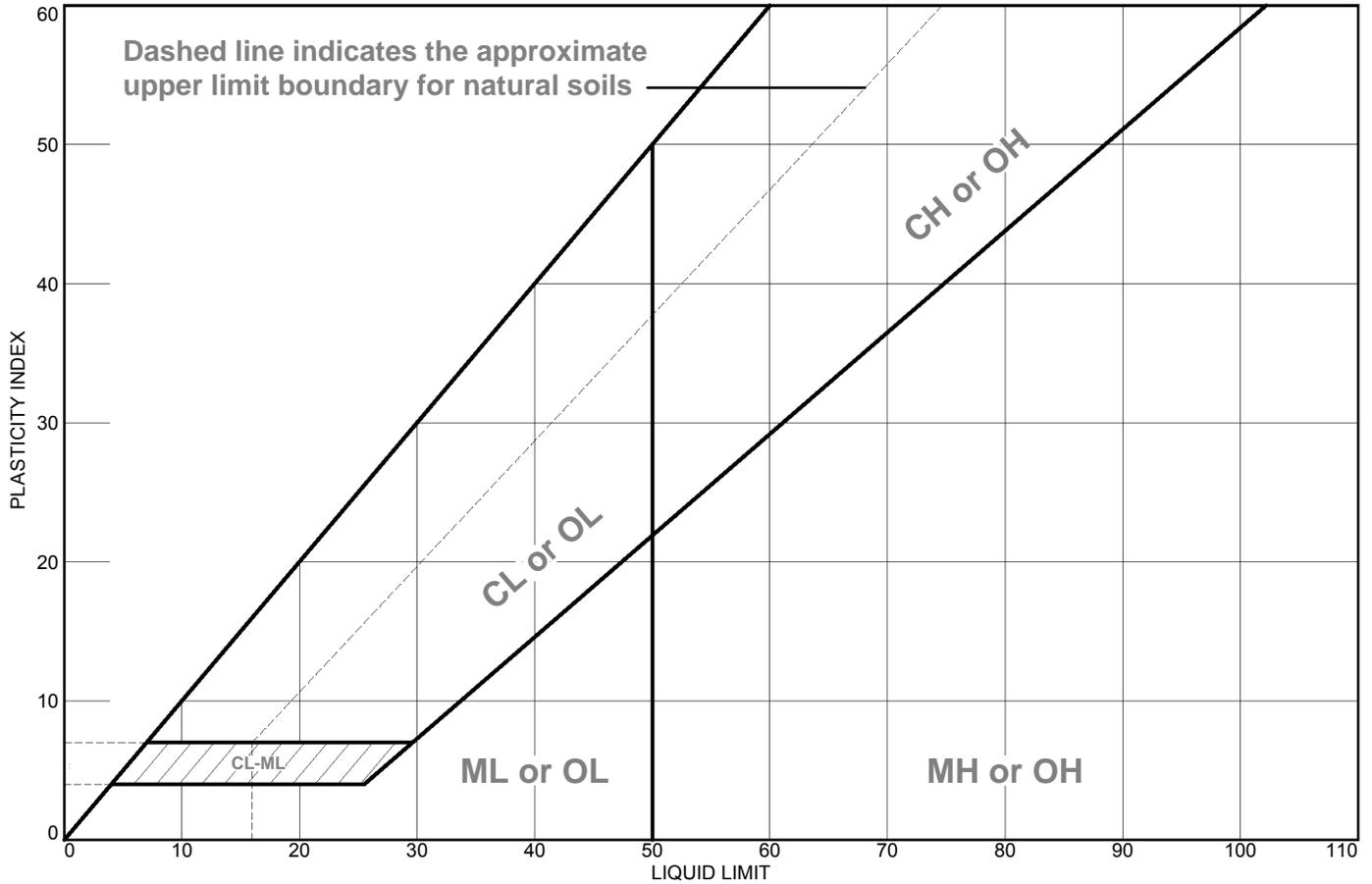
Date: 10-3-19

<p>RSA Geolab</p> <p>Union, New Jersey</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC</p> <p>Project No: 912</p> <p style="text-align: right;">Figure</p>
--	--

Tested By: MF

Checked By: KP

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish Brown silty sand	NV	NP	NP	92.9	39.3	SM
■	Grayish Brown poorly graded sand with silt	NV	NP	NP	65.4	11.0	SP-SM
▲	Pale Brown poorly graded sand with silt	NV	NP	NP	72.0	9.5	SP-SM

Project No. 912 **Client:** Wood PLC
Project: MACTEC

● Sample Number: Soil Type I
■ Sample Number: Soil Type II
▲ Sample Number: Soil Type III

RSA Geolab
 Union, New Jersey

Remarks:

●10-3-19

Figure

Tested By: MF _____ Checked By: KP _____



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAGEOLAB.com

Letter of Transmittal

Date: 1-3-20

Job No.: 912

Lab Log: 19-548

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)
Phase 1 Supplemental Testing

Samples: Soil Type I, Soil Type II, Soil Type III, Water:Cement mixes

Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D2974 Organic Content (Soil Type I, II, & III)
- ~~ASTM D1633 Unconfined Compression (Water:Cement mixes) (3 tests)~~

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: _____

Dr. Raza S. Ahmed
President RSA Geolab, LLC

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RSA Geolab

MOISTURE CONTENT (ASTM D2216)/
LOSS ON IGNITION (ASTM D2974)

Project: Saranac Lake OU01 (Site No. 516008) Project #: 912
Phase 1 Supplemental Testing
Client: Wood PLC/Mactec Date: 1-3-20

HOLE #/ SAMPLE #	Type 1	Type 2	Type 3			
DEPTH						
WET WGT. + TARE (gm)	578.4	482.9	479.1			
DRY WGT. + TARE (gm)	496.5	422.8	400.3			
WGT. WATER (gms.)	81.9	60.1	78.8	0.0	0.0	0.0
TARE (gms.)	15.2	13.2	15.2			
DRY WGT. (gms.)	481.3	409.6	385.1	0.0	0.0	0.0
MOISTURE CONTENT (%)	17.0	14.7	20.5	0.0	0.0	0.0
OVEN DRIED SAMPLE + TARE (gms.)	109.79	108.09	78.56			
AFTER IGNITION SAMPLE + TARE (gms.)	109.14	106.56	77.89			
LOSS ON IGNITION (gms.)	0.65	1.53	0.67	0.00	0.00	0.00
TARE (gms.)	52.09	57.20	26.96			
INITIAL WGT. OF OVEN DRIED SAMPLE (gms.)	57.70	50.89	51.60	0.00	0.00	0.00
LOSS ON IGNITION (%)	1.13	3.01	1.30	0.00	0.00	0.00

Performed by: MF Entered by: KH Checked by: KP

ATTACHMENT B

PHASE 2 LABORATORY TEST REPORTS



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAgeolab.com

Letter of Transmittal

Date: 11-4-19

Job No.: 912

Lab Log: 19-376

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)

Samples: Grout Mix G1a,G1b,G2a,G2b,G3a,G3b

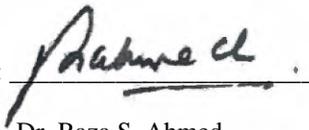
Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D4380 Density of Bentonitic Slurries
- ASTM D6910 Marsh Funnel Viscosity (API RP 13B-1)
- Pocket Penetrometer

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: 
Dr. Raza S. Ahmed
President RSA Geolab, LLC

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RSA Geolab

GROUT MIX TESTING

Project: Saranac Lake OU01 (Site No. 516008)

Proj. No. 912

Tested by: **MF**

Client: Wood PLC/Mactec

Date: 11-4-19

Entered by: **KH**

Checked by: **KP**

Sample	Density of Bentinitic Slurries ASTM D4380 (g/cm ³)	Marsh Funnel Viscosity API RP 13B-1/ASTM D6910 (sec/L)	Pocket Penetrometer (TSF)	
			After 3 Days Curing	After 7 Days Curing
Grout Mix G1a	1.50	31.03	>4.5	>4.5
Grout Mix G1b	1.28	28.69	>4.5	>4.5
Grout Mix G2a	1.51	36.69	>4.5	>4.5
Grout Mix G2b	1.37	29.04	>4.5	>4.5
Grout Mix G3a	1.52	37.06	>4.5	>4.5
Grout Mix G3b	1.40	31.47	>4.5	>4.5

Remarks: Grout Mix G1a water:cement 1:1 by wt.
 Grout Mix G1b water:cement 1.5:1 by wt.
 Grout Mix G2a water:cement:bentonite 1:1:0.025 by wt.
 Grout Mix G2b water:cement:bentonite 1.5:1:0.025 by wt.
 Grout Mix G3a water:cement:bentonite 1:1:0.05 by wt.
 Grout Mix G3b water:cement:bentonite 1.5:1:0.05 by wt.



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAGEOLAB.com

Letter of Transmittal

Date: 1-3-20

Job No.: 912

Lab Log: 19-548

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)
Phase 2 Supplemental Testing

Samples: Water:Bentonite:Cement mixes

Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D4380 Density of Bentonitic Slurries (6 tests)
- ASTM D6910 Marsh Funnel Viscosity (6 tests)
- Pocket Penetrometer (4 tests)

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: _____

Dr. Raza S. Ahmed
President RSA Geolab, LLC

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RSA Geolab

DENSITY (ASTM D4380)/VISCOSITY (ASTM D6910)/
POCKET PENETROMETER

Project: Saranac Lake OU01 (Site No. 516008)

Project #: 912

Phase 2 Supplemental Testing

Client: Wood PLC/Mactec

Date: 1-3-20

SAMPLE	Density of Bentonitic Slurry g/cm ³	Marsh Funnel Viscosity sec/L	Pocket Penetrometer TSF	
			3 day	7 day
G2a - before hydration mix water:bentonite (1:0.025)	1.009	28.84	NA	NA
G2b - before hydration mix water:bentonite (1.5:0.025)	1.005	28.19	NA	NA
G2a - after 24 h hydration mix water:bentonite (1:0.025)	1.009	28.93	NA	NA
G2b - after 24 h hydration mix water:bentonite (1.5:0.025)	1.005	28.23	NA	NA
G2a - after cement addition mix water:bentonite:cement (1:0.025:1)	1.505	69.44	>4.5	>4.5
G2b - after cement addition mix water:bentonite:cement (1.5:0.025:1)	1.346	34.16	>4.5	>4.5

Remarks: Cement: Portland Type I/II

Performed by:

MF

Entered by:

KH

Checked by: KP



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAGEOLAB.com

Letter of Transmittal

Date: 1-3-20

Job No.: 912

Lab Log: 19-548

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)
Phase 1 Supplemental Testing

Samples: Soil Type I, Soil Type II, Soil Type III, Water:Cement mixes

Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ~~• ASTM D2974 Organic Content (Soil Type I, II, & III)~~
- ASTM D1633 Unconfined Compression (Water:Cement mixes) (3 tests)

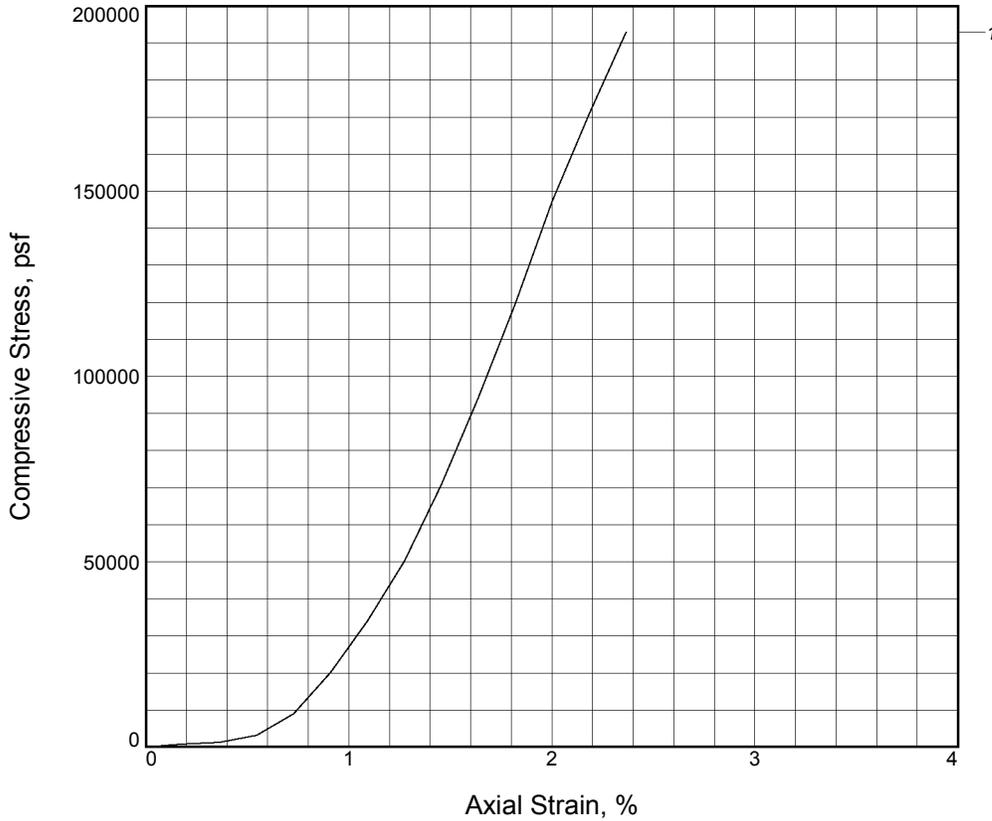
Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: _____

Dr. Raza S. Ahmed
President RSA Geolab, LLC

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	192902		
Undrained shear strength, psf	96451		
Failure strain, %	2.4		
Strain rate, in./min.	0.050		
Water content, %	N/A		
Wet density, pcf	122.6		
Dry density, pcf	N/A		
Saturation, %	N/A		
Void ratio	N/A		
Specimen diameter, in.	3.00		
Specimen height, in.	5.50		
Height/diameter ratio	1.83		

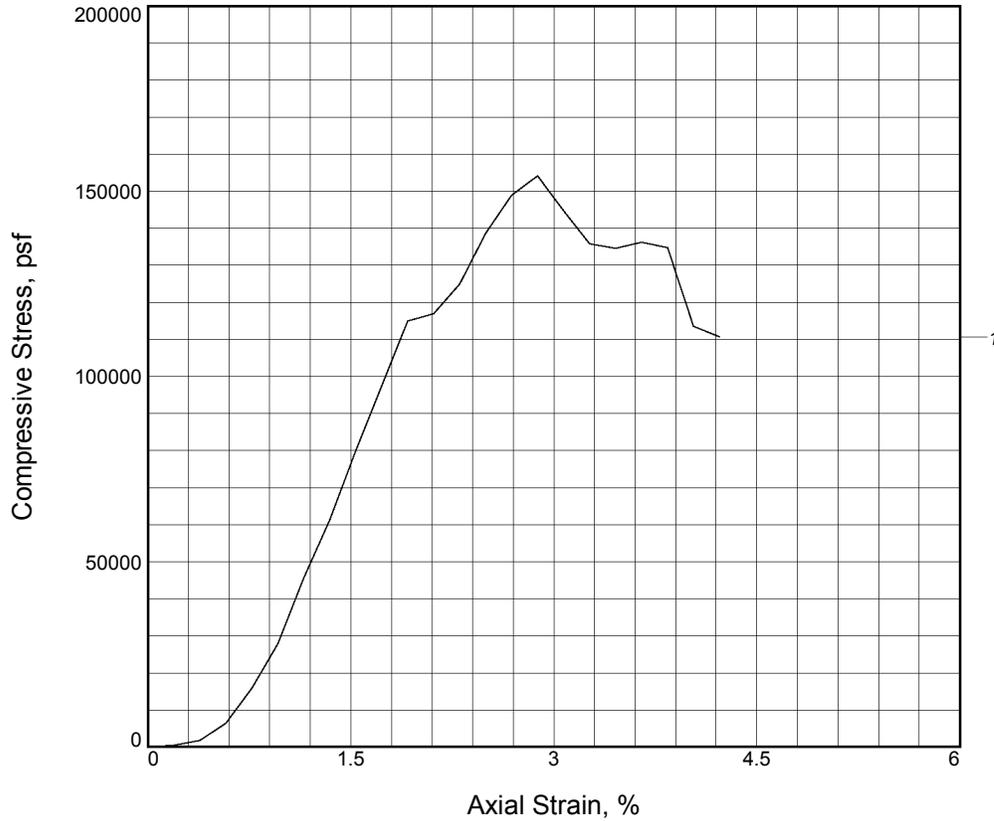
Description: Cement: Portland Type I/II

LL =	PL =	PI =	Assumed GS=	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 1-3-20 Remarks: Tested after 14 days curing</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Phase 1 Supplemental Testing Location: Water:Cement (0.5:1) by wt.</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	154122		
Undrained shear strength, psf	77061		
Failure strain, %	2.9		
Strain rate, in./min.	0.050		
Water content, %	N/A		
Wet density, pcf	114.3		
Dry density, pcf	N/A		
Saturation, %	N/A		
Void ratio	N/A		
Specimen diameter, in.	3.01		
Specimen height, in.	5.21		
Height/diameter ratio	1.73		

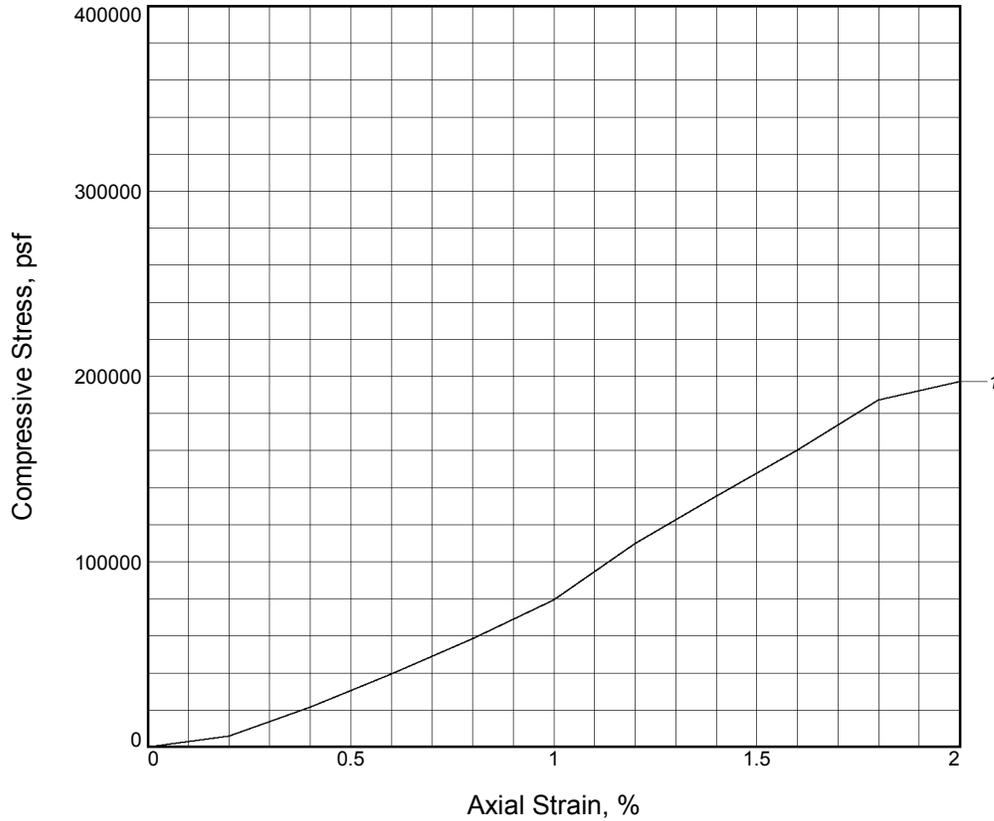
Description: Cement: Portland Type I/II

LL =	PL =	PI =	Assumed GS=	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 1-3-20 Remarks: Tested after 14 days curing</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 1 Supplemental Testing</p> <p>Location: Water:Cement:DNAPL (0.5:1:0.1) by wt.</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	197228			
Undrained shear strength, psf	98614			
Failure strain, %	2.0			
Strain rate, in./min.	0.050			
Water content, %	N/A			
Wet density, pcf	118.3			
Dry density, pcf	N/A			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	3.01			
Specimen height, in.	5.00			
Height/diameter ratio	1.66			

Description: Cement: Portland Type I/II

LL =	PL =	PI =	Assumed GS=	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 1-3-20 Remarks: Tested after 14 days curing</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 1 Supplemental Testing</p> <p>Location: Water:Cement:LNAPL (0.5:1:0.1) by wt.</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAGEOLAB.com

Letter of Transmittal

Date: 1-22-20

Job No.: 912

Lab Log: 19-548

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)
Phase 2 Supplemental Testing

Samples: Grout testing

Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D4380 Density of Bentonitic Slurries (2 tests)
- ASTM D6910 Marsh Funnel Viscosity (2 tests)
- Pocket Penetrometer (4 tests)

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: _____

Dr. Raza S. Ahmed
President RSA Geolab, LLC

RSA's Geolab's Geotechnical Laboratory testing was performed and results reported in accordance with ASTM standards and accepted industry standards. No other representations or warranties either express or implied are given. RSA Geolab, LLC neither accepts responsibility for nor makes claim to the final use and purpose of the material tested. RSA Geolab, LLC owns all rights, title and interest of the work product. This report is intended for client's sole and exclusive use and not for the benefit of others and may not be used or relied upon by others. These documents must be considered proprietary information and should not be reproduced without the written approval of RSA Geolab, LLC.

RSA Geolab

DENSITY (ASTM D4380)/VISCOSITY(ASTM D6910)/
POCKET PENETROMETER

Project: Saranac Lake OU01 (Site No. 516008)

Project #: 912

Phase 2 Supplemental Testing

Client: Wood PLC/Mactec

Date: 1-22-20

SAMPLE	Density of Bentonitic Slurry g/cm ³	Marsh Funnel Viscosity sec/L	Pocket Penetrometer TSF	
			3 day	7 day
G2a Tap water : Bentonite : Cement (1 : 0.025 : 1) (4000g : 100g : 4000g)	1.505	70.09	>4.5	>4.5
G4a Tap water : Bentonite : Cement (0.75 : 0.025 : 1) (3000g : 100g : 4000g)	1.629	~6ml collected in 600 secs	>4.5	>4.5

Remarks: 1. Cement: Portland Type I/II
2. laboratory Tap water used (as replacement for Mix water)

Performed by: EE/MF

Checked by: KP

ATTACHMENT C

PHASE 3 LABORATORY TEST REPORTS



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAgeolab.com

Letter of Transmittal

Date: 12-9-19

Job No.: 912

Lab Log: 19-376

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)

Samples: Grout Mix Phase 3a Testing

Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D1633 Unconfined Compression (15 tests)
- ASTM D5084 Permeability (recompacted) (15 tests)
- Pocket Penetrometer (45 tests)
- Photographs (60)

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: _____

Dr. Raza S. Ahmed
President RSA Geolab, LLC

RSA's Geolab's Geotechnical Laboratory testing was performed and results reported in accordance with ASTM standards and accepted industry standards. No other representations or warranties either express or implied are given. RSA Geolab, LLC neither accepts responsibility for nor makes claim to the final use and purpose of the material tested. RSA Geolab, LLC owns all rights, title and interest of the work product. This report is intended for client's sole and exclusive use and not for the benefit of others and may not be used or relied upon by others. These documents must be considered proprietary information and should not be reproduced without the written approval of RSA Geolab, LLC.

RSA Geolab

GROUT MIX TESTING

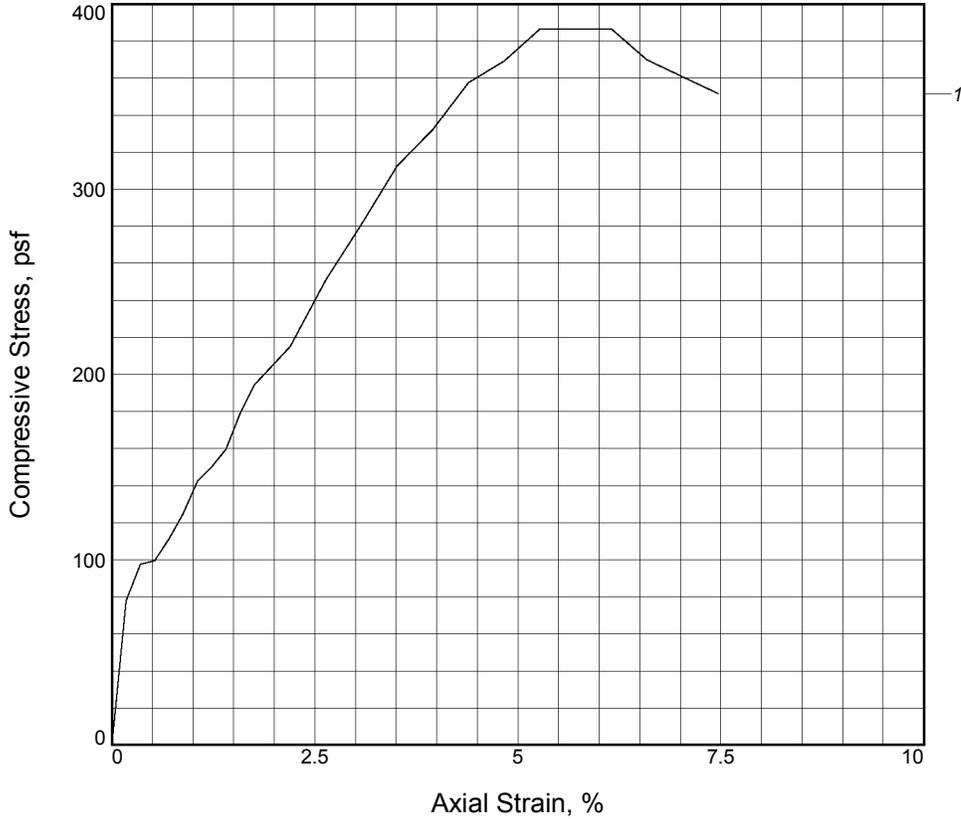
Project: Saranac Lake OU01 (Site No. 516008)
Phase 3a
Client: Wood PLC/Mactec

Proj. No. 912
Date: 12-9-19

S#	Sample				Pocket Penetrometer (TSF)		
	Wet Soil	Grout Mix	Site Water	Product Type	After 3 Days	After 7 Days	After 14 Days
	Mix Ratios (by Wt.)				Curing	Curing	Curing
1	Type 1 20	G1a 2.0	0.30	DNAPL 0.03	0	0.25	1.00
2	Type 1 20	G2a 2.0	0.30	DNAPL 0.03	0	0	0.25
3	Type 1 20	G2b 2.5	0.30	DNAPL 0.03	0	0	0
4	Type 2 20	G1a 2.0	0.30	LNAPL 0.03	2.75	>4.5	>4.5
5	Type 2 20	G2a 2.0	0.30	LNAPL 0.03	0.75	1.75	>4.5
6	Type 2 Type 1	G3a 2.0	0.30	LNAPL 0.03	0	0	0.25
7	Type 2 20	G1b 2.5	0.30	LNAPL 0.03	1.75	>4.5	>4.5
8	Type 2 20	G2b 2.5	0.30	LNAPL 0.03	0	0	0.5
9	Type 2 20	G3b 2.5	0.30	LNAPL 0.03	0	0	0.25
10	Type 3 20	G1a 2.0	0.30	NA	0.25	0.75	1.25
11	Type 3 20	G2a 2.0	0.30	NA	0	0	1.00
12	Type 3 20	G2b 2.5	0.30	NA	0	0	0.75
13	Type 1 10	G1a 2.0	0.15	DNAPL 0.015	0	0.25	2.25
14	Type 1 10	G2a 2.0	0.15	DNAPL 0.015	0	3.75	>4.5
15	Type 1 10	G2b 2.5	0.15	DNAPL 0.015	1.75	>4.5	>4.5

Tested by: MF
Entered by: KH
Checked by: KP

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	387			
Undrained shear strength, psf	193			
Failure strain, %	6.2			
Strain rate, in./min.	0.050			
Water content, %	25.0			
Wet density, pcf	123.1			
Dry density, pcf	98.5			
Saturation, %	94.9			
Void ratio	0.7114			
Specimen diameter, in.	3.03			
Specimen height, in.	5.69			
Height/diameter ratio	1.88			

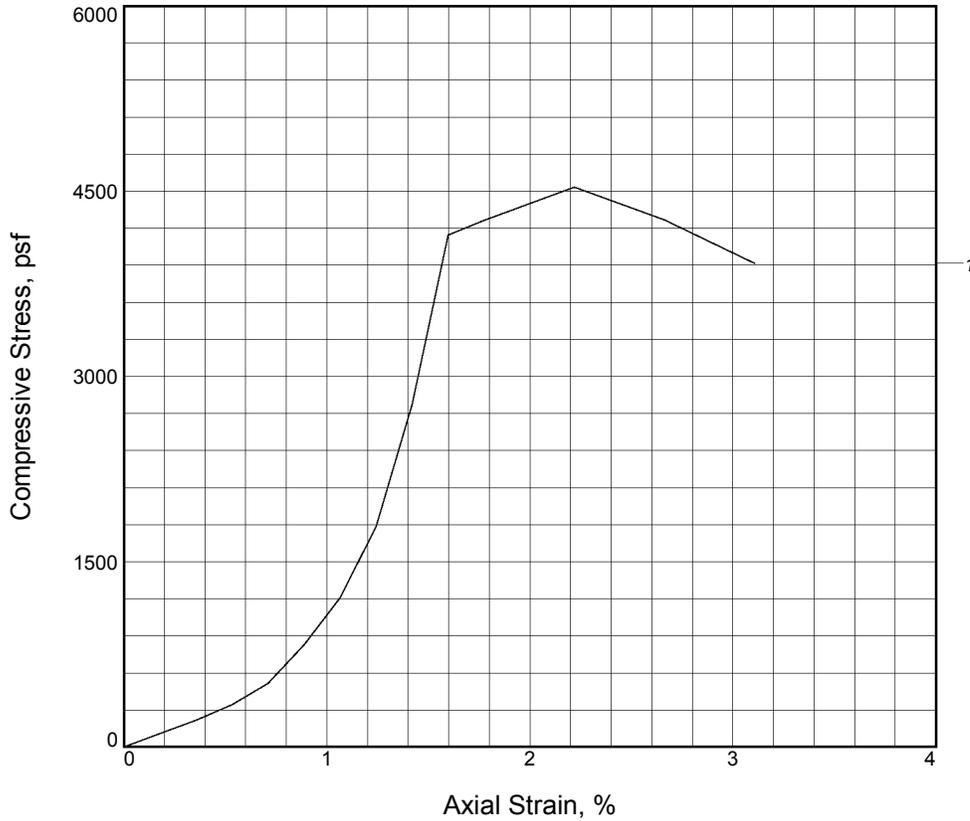
Description: 20:2.0:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured in mold (no compaction) and tested after curing 28 days.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 1:G1a:Site Water:DNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	4532		
Undrained shear strength, psf	2266		
Failure strain, %	2.2		
Strain rate, in./min.	0.050		
Water content, %	23.1		
Wet density, pcf	124.8		
Dry density, pcf	101.4		
Saturation, %	94.1		
Void ratio	0.6618		
Specimen diameter, in.	3.01		
Specimen height, in.	5.63		
Height/diameter ratio	1.87		

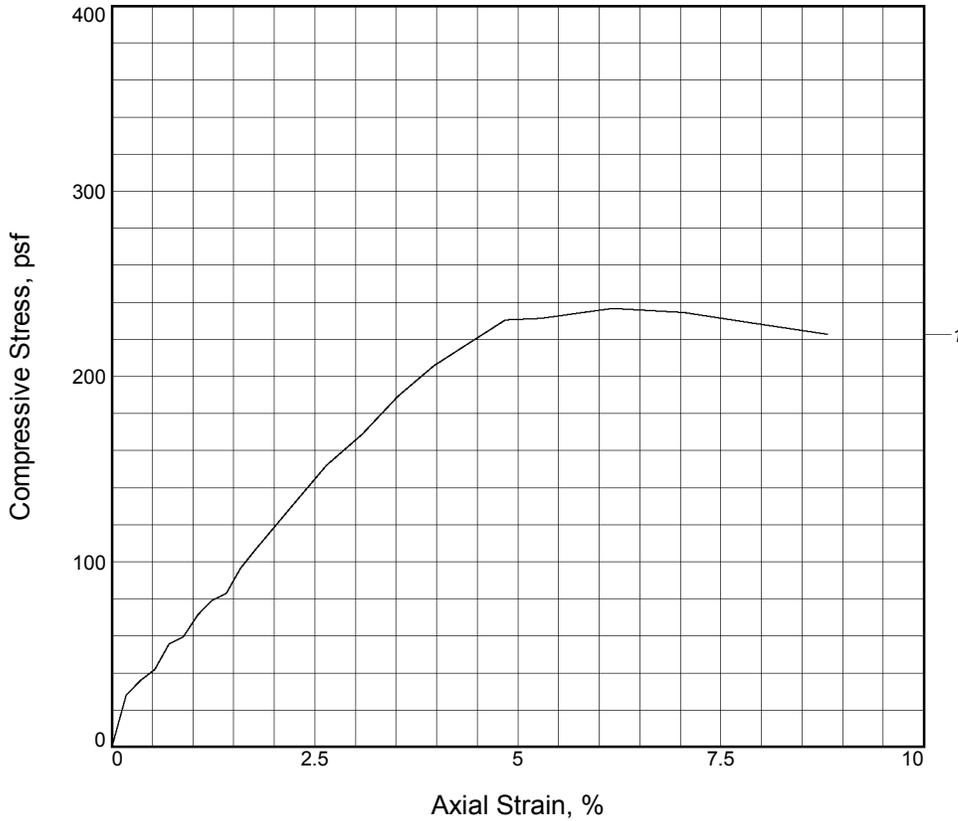
Description: 10:2.0:0.15:0.015 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 1:G1a:Site Water:DNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	237		
Undrained shear strength, psf	118		
Failure strain, %	6.2		
Strain rate, in./min.	0.050		
Water content, %	22.5		
Wet density, pcf	124.1		
Dry density, pcf	101.3		
Saturation, %	91.4		
Void ratio	0.6641		
Specimen diameter, in.	3.03		
Specimen height, in.	5.67		
Height/diameter ratio	1.88		

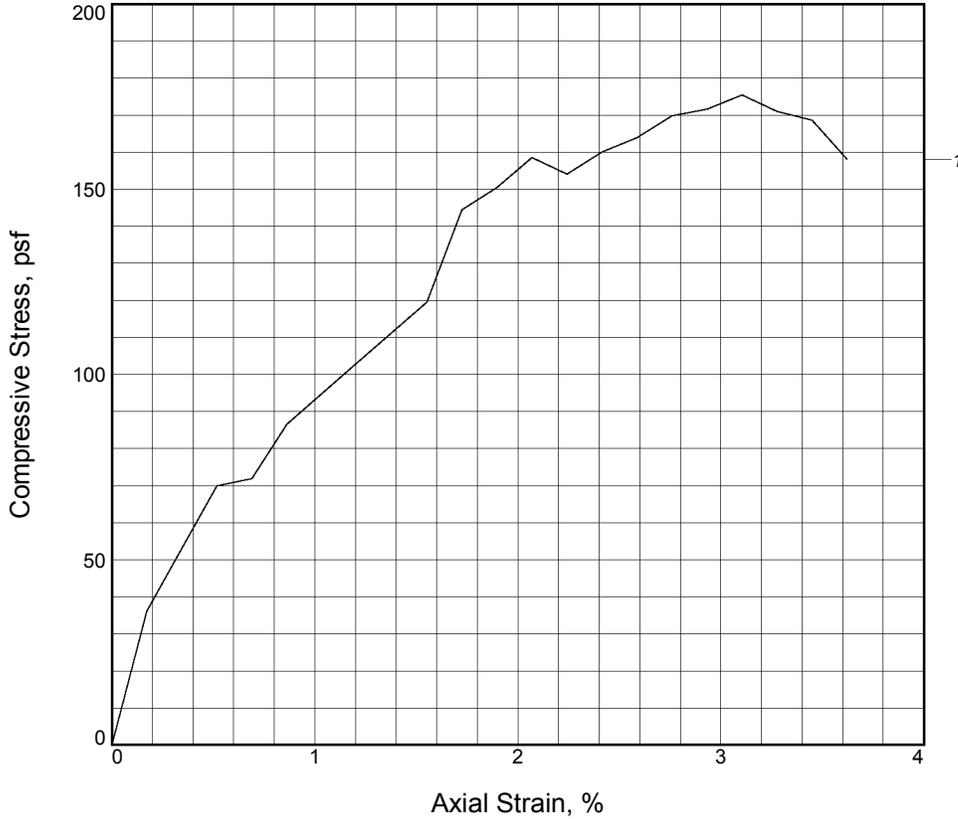
Description: 20:2.0:0.3:0.03 mix by weight

LL = **PL =** **PI =** **Assumed GS= 2.7** **Type: ASTM D1633**

<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 1:G2a:Site Water:DNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	175		
Undrained shear strength, psf	88		
Failure strain, %	3.1		
Strain rate, in./min.	0.050		
Water content, %	22.4		
Wet density, pcf	115.9		
Dry density, pcf	94.7		
Saturation, %	77.7		
Void ratio	0.7798		
Specimen diameter, in.	2.93		
Specimen height, in.	5.80		
Height/diameter ratio	1.98		

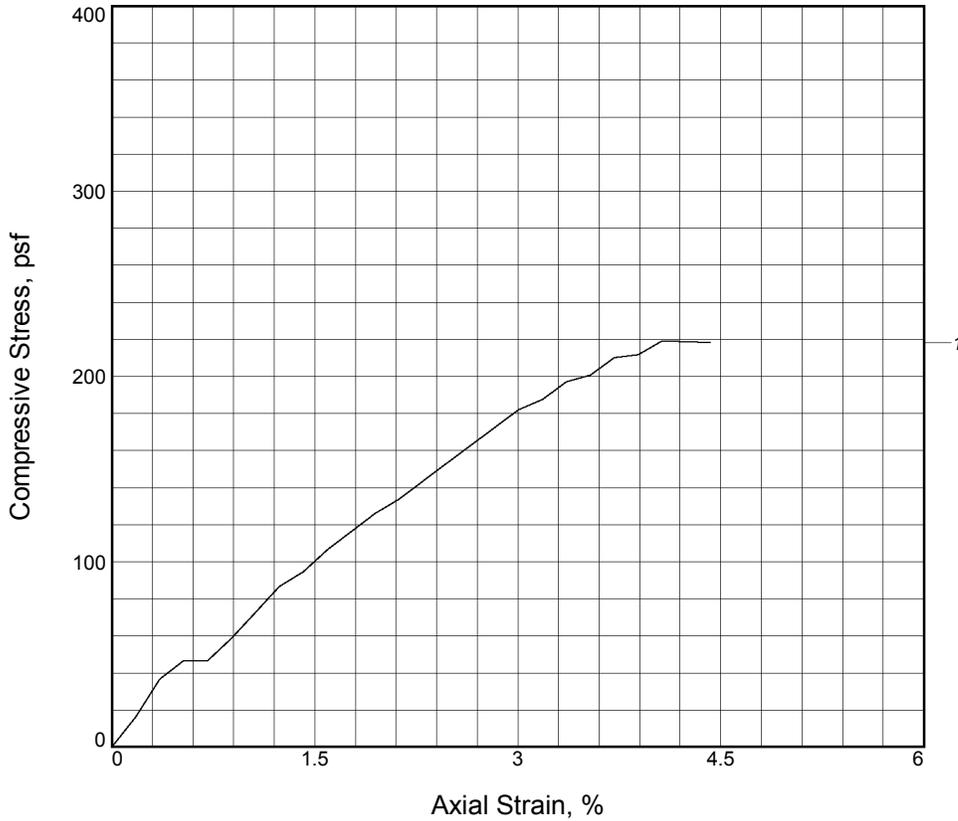
Description: 10:2.0:0.15:0.015 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 1:G2a:Site Water:DNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	219		
Undrained shear strength, psf	110		
Failure strain, %	4.1		
Strain rate, in./min.	0.050		
Water content, %	23.0		
Wet density, pcf	122.1		
Dry density, pcf	99.2		
Saturation, %	89.1		
Void ratio	0.6984		
Specimen diameter, in.	3.00		
Specimen height, in.	5.66		
Height/diameter ratio	1.89		

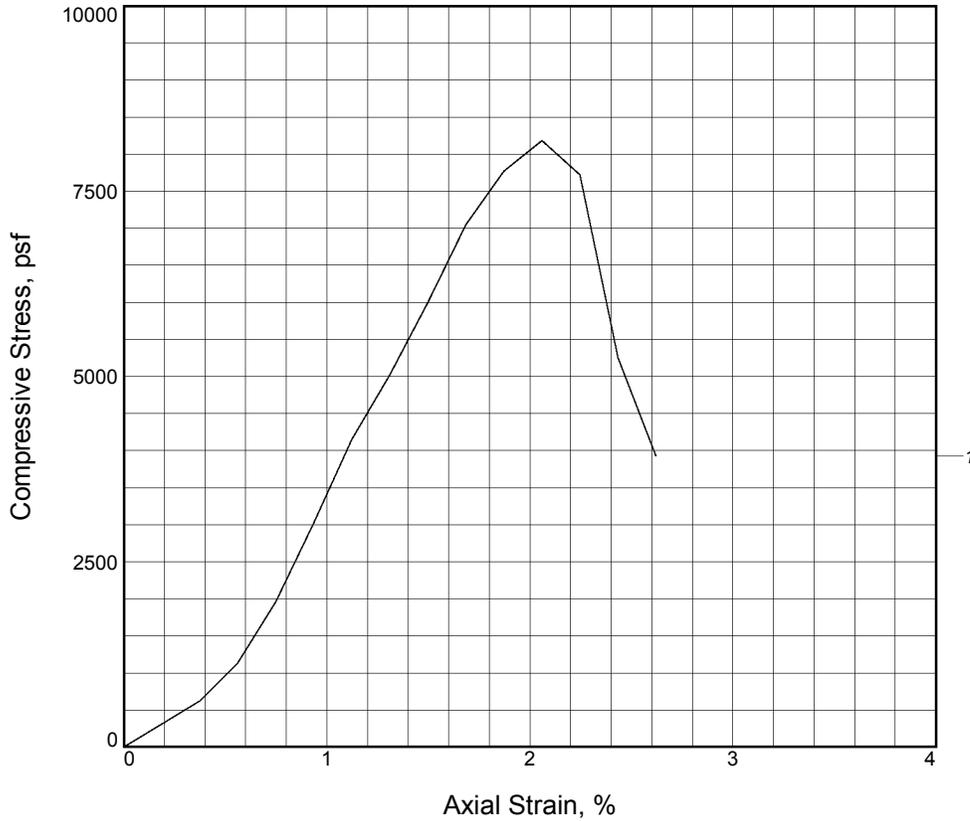
Description: 20:2.5:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 1:G2b:Site Water:DNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	8184		
Undrained shear strength, psf	4092		
Failure strain, %	2.1		
Strain rate, in./min.	0.050		
Water content, %	22.9		
Wet density, pcf	124.8		
Dry density, pcf	101.6		
Saturation, %	93.6		
Void ratio	0.6597		
Specimen diameter, in.	2.97		
Specimen height, in.	5.34		
Height/diameter ratio	1.80		

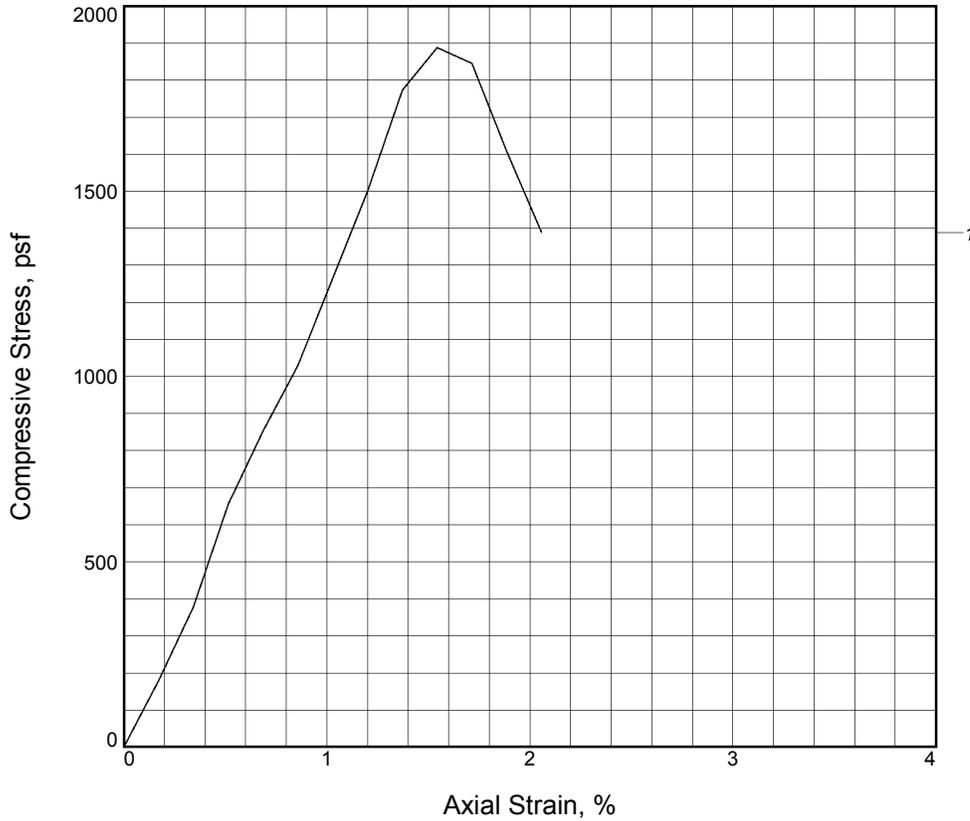
Description: 10:2.5:0.15:0.015 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 1:G2b:Site Water:DNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	1888			
Undrained shear strength, psf	944			
Failure strain, %	1.5			
Strain rate, in./min.	0.050			
Water content, %	18.7			
Wet density, pcf	124.1			
Dry density, pcf	104.5			
Saturation, %	82.4			
Void ratio	0.6126			
Specimen diameter, in.	3.03			
Specimen height, in.	5.83			
Height/diameter ratio	1.92			

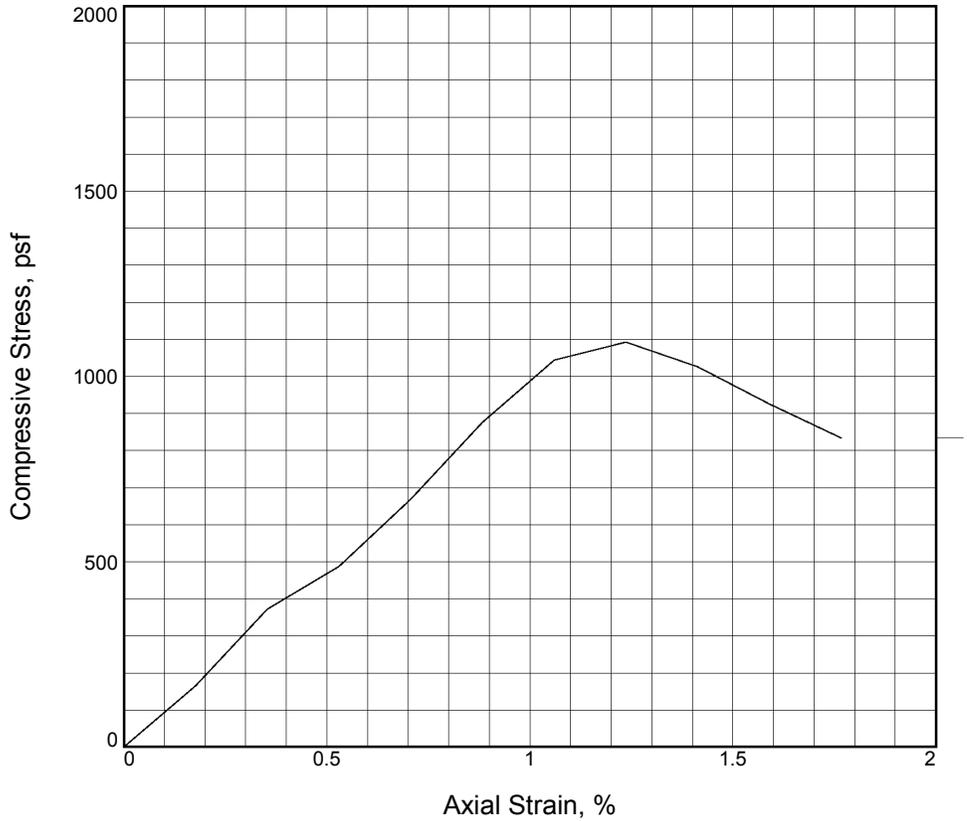
Description: 20:2.0:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 2:G1a:Site Water:LNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	1093			
Undrained shear strength, psf	546			
Failure strain, %	1.2			
Strain rate, in./min.	0.050			
Water content, %	21.5			
Wet density, pcf	124.9			
Dry density, pcf	102.8			
Saturation, %	90.7			
Void ratio	0.6391			
Specimen diameter, in.	3.00			
Specimen height, in.	5.66			
Height/diameter ratio	1.89			

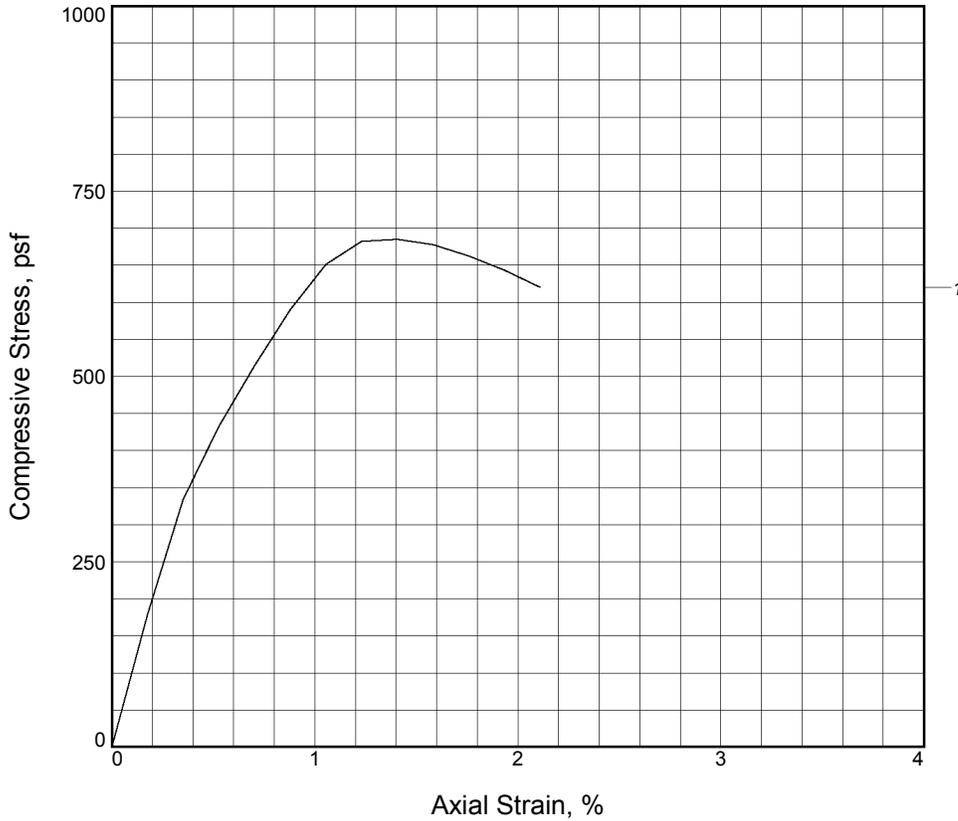
Description: 20:2.5:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912</p> <p>Date Sampled: 12-9-19</p> <p>Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC</p> <p>Location: Type 2:G1b:Site Water:LNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
--	--

Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	685		
Undrained shear strength, psf	343		
Failure strain, %	1.4		
Strain rate, in./min.	0.050		
Water content, %	23.6		
Wet density, pcf	119.2		
Dry density, pcf	96.5		
Saturation, %	85.3		
Void ratio	0.7476		
Specimen diameter, in.	3.00		
Specimen height, in.	5.69		
Height/diameter ratio	1.89		

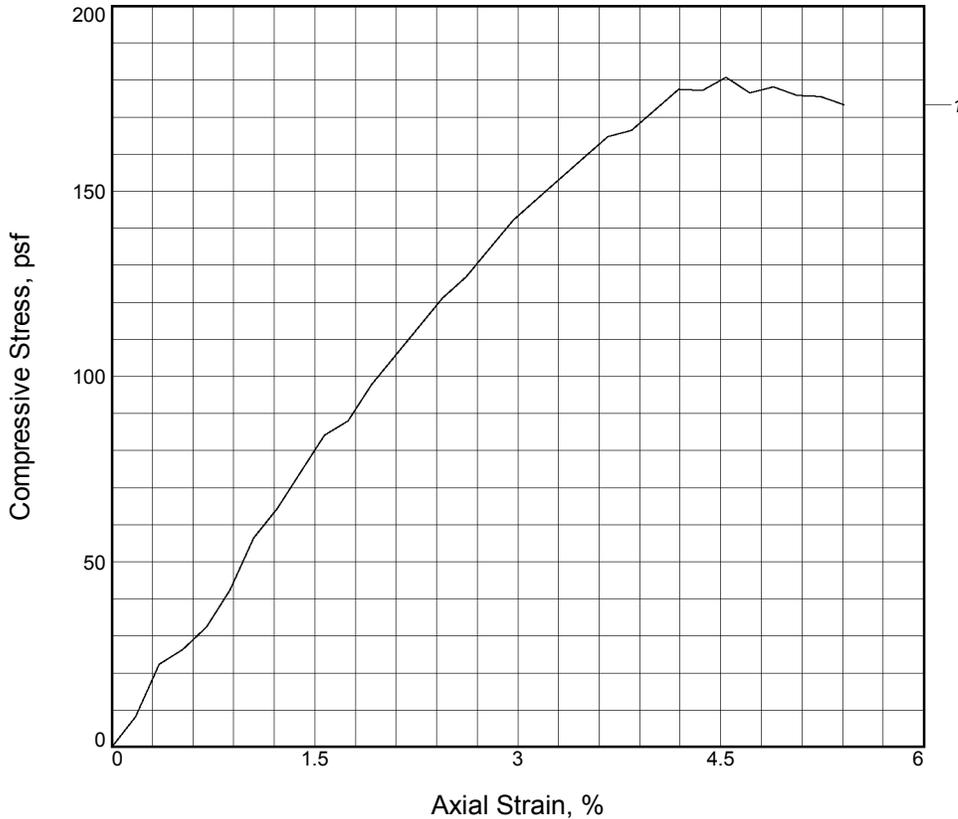
Description: 20:2.0:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 2:G2a:Site Water:LNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
---	--

Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	181		
Undrained shear strength, psf	90		
Failure strain, %	4.5		
Strain rate, in./min.	0.050		
Water content, %	35.6		
Wet density, pcf	107.7		
Dry density, pcf	79.4		
Saturation, %	85.6		
Void ratio	1.1216		
Specimen diameter, in.	3.00		
Specimen height, in.	5.73		
Height/diameter ratio	1.91		

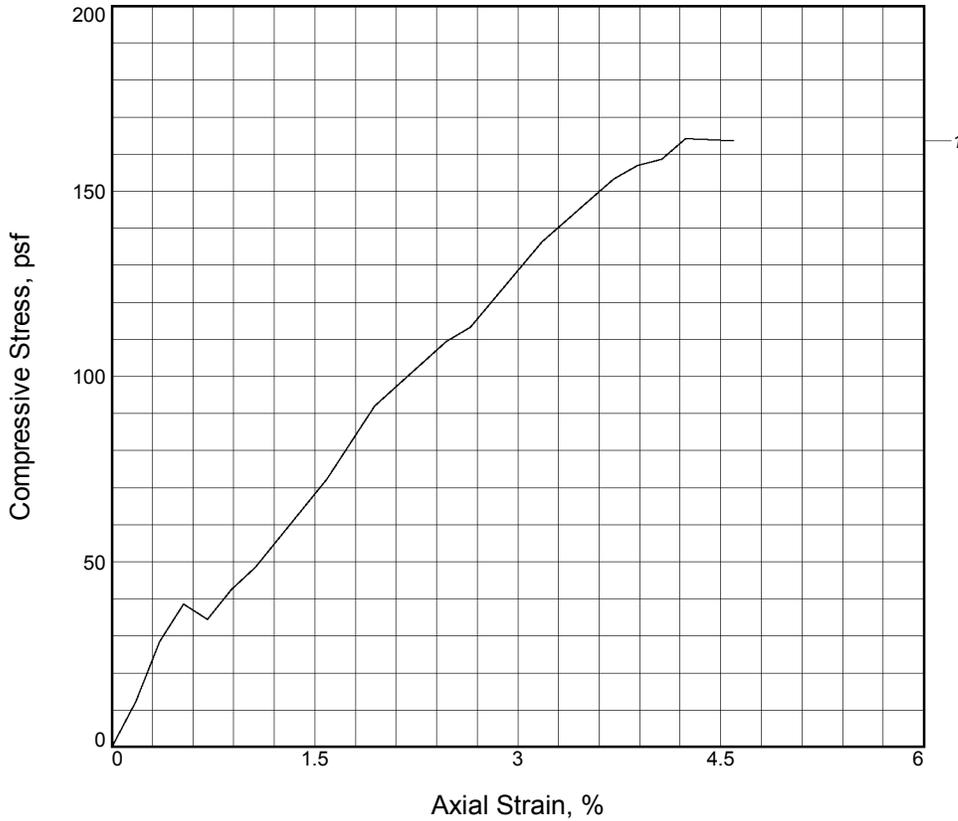
Description: 20:2.5:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 2:G2b:Site Water:LNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
---	--

Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	164			
Undrained shear strength, psf	82			
Failure strain, %	4.2			
Strain rate, in./min.	0.050			
Water content, %	35.5			
Wet density, pcf	105.2			
Dry density, pcf	77.6			
Saturation, %	81.8			
Void ratio	1.1712			
Specimen diameter, in.	3.00			
Specimen height, in.	5.66			
Height/diameter ratio	1.89			

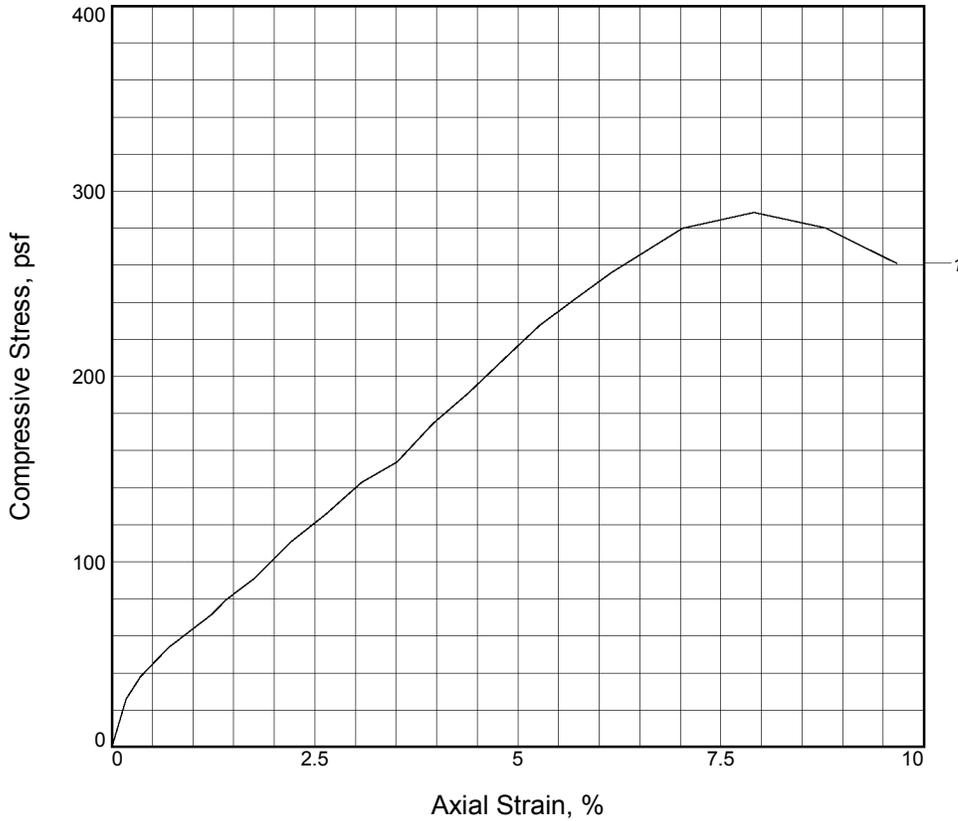
Description: 20:2.0:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 2:G3a:Site Water:LNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	288		
Undrained shear strength, psf	144		
Failure strain, %	7.9		
Strain rate, in./min.	0.050		
Water content, %	27.4		
Wet density, pcf	116.6		
Dry density, pcf	91.5		
Saturation, %	87.9		
Void ratio	0.8418		
Specimen diameter, in.	3.01		
Specimen height, in.	5.69		
Height/diameter ratio	1.89		

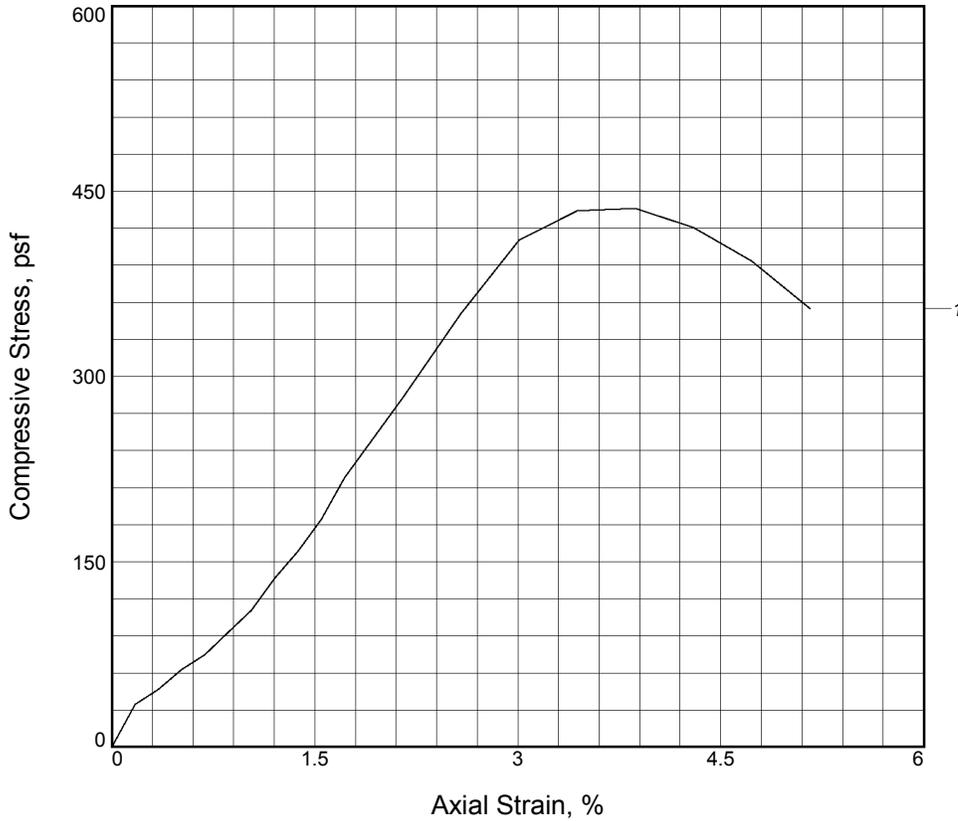
Description: 20:2.5:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 2:G3b:Site Water:LNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	436		
Undrained shear strength, psf	218		
Failure strain, %	3.9		
Strain rate, in./min.	0.050		
Water content, %	20.2		
Wet density, pcf	122.9		
Dry density, pcf	102.2		
Saturation, %	84.1		
Void ratio	0.6489		
Specimen diameter, in.	3.00		
Specimen height, in.	5.82		
Height/diameter ratio	1.94		

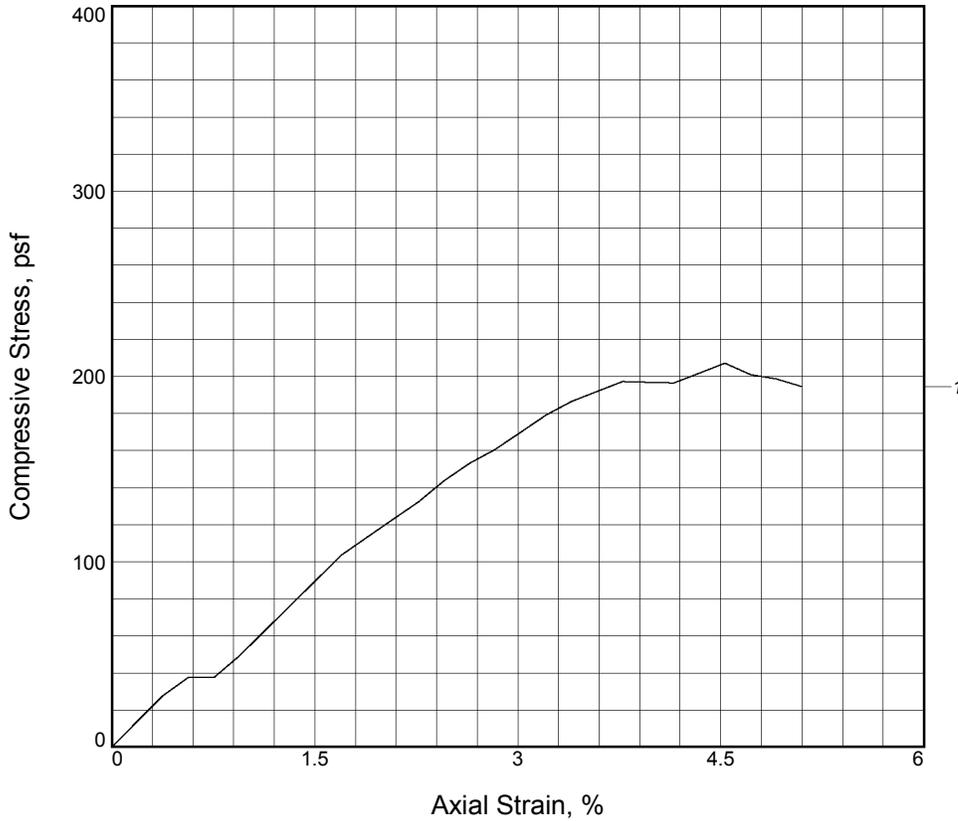
Description: 20:2.0:0.3 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 3:G1a:Site Water</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	207			
Undrained shear strength, psf	104			
Failure strain, %	4.5			
Strain rate, in./min.	0.050			
Water content, %	23.1			
Wet density, pcf	125.1			
Dry density, pcf	101.6			
Saturation, %	94.7			
Void ratio	0.6590			
Specimen diameter, in.	3.04			
Specimen height, in.	5.30			
Height/diameter ratio	1.75			

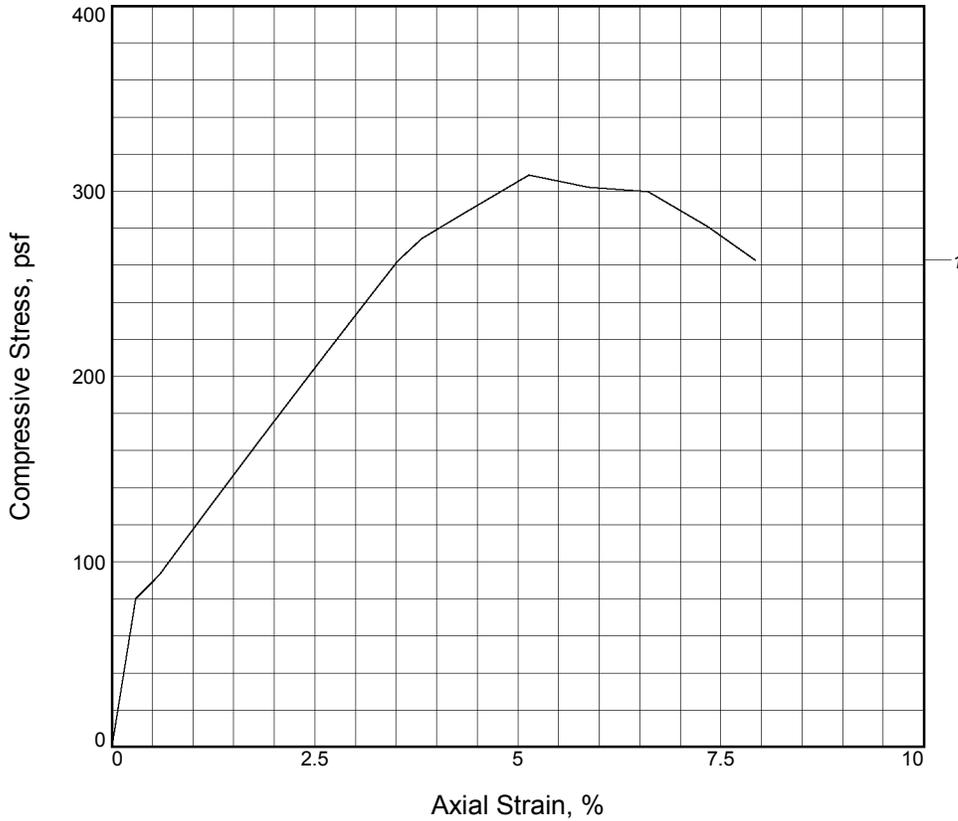
Description: 20:2.0:0.3 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 3:G2a:Site Water</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	309		
Undrained shear strength, psf	154		
Failure strain, %	5.1		
Strain rate, in./min.	0.050		
Water content, %	23.5		
Wet density, pcf	118.9		
Dry density, pcf	96.3		
Saturation, %	84.6		
Void ratio	0.7503		
Specimen diameter, in.	2.03		
Specimen height, in.	3.41		
Height/diameter ratio	1.68		

Description: 20:2.5:0.3 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-9-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 3:G2b:Site Water</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 1: G1a: Site Water: DNAPL (10:2:0:0.15:0.015 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 6 Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.561	2.991
2.	5.562	2.993
3.	5.559	2.990
4.	5.563	2.989
5.	5.564	2.994

Weight of Specimen:

Initial Weight	<u>1322.6</u> Grams
	<u>2.913</u> Lbs.
Final Weight	<u>1311.7</u> Grams
	<u>2.889</u> Lbs.
Dry Weight	<u>1085.1</u> Grams
	<u>2.390</u> Lbs.

Avg.	<u>5.562</u> In	Ave.	<u>2.991</u> In	Moisture Content:
	<u>14.127</u> CM		<u>7.598</u> CM	Initial
Area	<u>7.028</u> In ²		<u>45.343</u> CM ²	Final
Volume	<u>39.089</u> In ³		<u>0.023</u> Cft.	Density, Wet Initial
Density, Wet Final:	<u>127.84</u> pcf			Density, Dry
Back Pressure:	<u>90</u> psi			Eff. Confining Pressure
Saturation:	<u>100</u> %			<u>10</u> psi
Specific Gravity: (Assumed)	<u>2.72</u>			K <u>Q x L x Rt</u> 20°C h x A x t

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.127	14.127	14.127	14.127
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	45.343	45.343	45.343	45.343
t Sec.	490	500	505	515
K 20 cm/sec	3.840E-06	3.763E-06	3.726E-06	3.654E-06

K
20 Avg. cm/sec 3.746E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3a Entered by: KH
 Client: Wood PLC/Mactec Date: 12-9-19 Checked by: KP

Sample: Type 1: G1a: Site Water: DNAPL (20:2.0:0.3:0.03 mix ratio by wt.) Cell 5
 Remarks: Mix poured in mold (no compaction) and tested after 28 days curing. Panel 4

Dimensions of Specimen :

	Length (Inches)		Diameter (Inches)
1.	5.087	1.	3.005
2.	5.090	2.	3.001
3.	5.088	3.	3.009
4.	5.085	4.	3.006
5.	5.086	5.	3.008

Weight of Specimen:

Initial Weight	<u>1159.9</u>	Grams
	<u>2.555</u>	Lbs.
Final Weight	<u>1119.3</u>	Grams
	<u>2.465</u>	Lbs.
Dry Weight	<u>925.2</u>	Grams
	<u>2.038</u>	Lbs.

Avg. 5.087 In Ave. 3.006 In Moisture Content:

12.921 CM 7.635 CM

Initial 25.37 %

Final 20.98 %

Area 7.096 In² 45.780 CM²

Volume 36.098 In³ 0.021 Cft.

Density, Wet Initial 122.41 pcf

Density, Wet Final: 118.12 pcf

Density, Dry 97.64 pcf

Back Pressure: 90 psi Efft. Confining Pressure 10 psi

Saturation: 102 %

Specific Gravity: 2.72 K $\frac{O \times L \times Rt}{h \times A \times t}$
 (Assumed) 20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	12.921	12.921	12.921	12.921
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	45.780	45.780	45.780	45.780
t Sec.	805	820	835	850
K 20 cm/sec	2.118E-06	2.079E-06	2.041E-06	2.005E-06

K
20 Avg. cm/sec 2.061E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 1: G2a: Site Water: DNAPL (10:2:0:0.15:0.015 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 1 Panel 5

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	3.090	3.006
2.	3.089	3.002
3.	3.091	3.004
4.	3.089	3.005
5.	3.092	3.002

Weight of Specimen:

Initial Weight	<u>655.0</u> Grams
	<u>1.443</u> Lbs.
Final Weight	<u>629.8</u> Grams
	<u>1.387</u> Lbs.
Dry Weight	<u>524.1</u> Grams
	<u>1.154</u> Lbs.

Avg.	<u>3.090</u> In	Ave.	<u>3.004</u> In
	<u>7.849</u> CM		<u>7.630</u> CM
Area	<u>7.087</u> In ²		<u>45.719</u> CM ²
Volume	<u>21.899</u> In ³		<u>0.013</u> Cft.

Moisture Content:

Initial	<u>24.98</u> %
Final	<u>20.17</u> %

Density, Wet Final: 109.56 pcf

Back Pressure: 90 psi

Saturation: 100 %

Specific Gravity: 2.72
(Assumed)

Density, Wet Initial: 113.94 pcf

Density, Dry: 91.17 pcf

Efft. Confining Pressure: 10 psi

K $\frac{Q \times L \times Rt}{h \times A \times t}$
20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	7.849	7.849	7.849	7.849
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	45.719	45.719	45.719	45.719
t Sec.	540	550	555	565
K 20 cm/sec	1.920E-06	1.885E-06	1.868E-06	1.835E-06

K
20 Avg. cm/sec

1.877E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 1: G2a: Site Water: DNAPL (20:2.0:0.3:0.03 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 6 Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>		<u>Diameter (Inches)</u>
1.	5.265	1.	3.002
2.	5.268	2.	3.005
3.	5.270	3.	3.010
4.	5.266	4.	3.008
5.	5.269	5.	3.006

Weight of Specimen:

Initial Weight	<u>1276.3</u> Grams
	<u>2.811</u> Lbs.
Final Weight	<u>1230.8</u> Grams
	<u>2.711</u> Lbs.
Dry Weight	<u>1045.6</u> Grams
	<u>2.303</u> Lbs.

Avg.	<u>5.268</u> In	Ave.	<u>3.006</u> In	Moisture Content:
	<u>13.380</u> CM		<u>7.636</u> CM	Initial
Area	<u>7.098</u> In ²		<u>45.792</u> CM ²	Final
Volume	<u>37.389</u> In ³		<u>0.022</u> Cft.	Density, Wet Initial
Density, Wet Final:	<u>125.41</u> pcf			Density, Dry
Back Pressure:	<u>90</u> psi			Eff. Confining Pressure
Saturation:	<u>102</u> %			<u>10</u> psi
Specific Gravity: (Assumed)	<u>2.72</u>			K <u>Q x L x Rt</u> 20°C h x A x t

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	13.380	13.380	13.380	13.380
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.792	45.792	45.792	45.792
t Sec.	225	235	245	255
K 20 cm/sec	3.921E-06	3.754E-06	3.601E-06	3.460E-06

K
20 Avg. cm/sec 3.684E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 1: G2b: Site Water: DNAPL (10:2.5:0.15:0.015 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 6 Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>		<u>Diameter (Inches)</u>
1.	5.472	1.	3.001
2.	5.470	2.	3.000
3.	5.471	3.	3.000
4.	5.471	4.	3.001
5.	5.472	5.	3.001

Weight of Specimen:

Initial Weight	<u>1276.6</u> Grams
	<u>2.812</u> Lbs.
Final Weight	<u>1268.6</u> Grams
	<u>2.794</u> Lbs.
Dry Weight	<u>1030.0</u> Grams
	<u>2.269</u> Lbs.

Avg.	<u>5.471</u> In	Ave.	<u>3.001</u> In	Moisture Content:
	<u>13.897</u> CM		<u>7.622</u> CM	Initial
Area	<u>7.071</u> In ²		<u>45.622</u> CM ²	Final
Volume	<u>38.689</u> In ³		<u>0.022</u> Cft.	Density, Wet Initial
Density, Wet Final:	<u>124.91</u> pcf			Density, Dry
Back Pressure:	<u>90</u> psi			Eff. Confining Pressure
Saturation:	<u>100</u> %			<u>10</u> psi
Specific Gravity: (Assumed)	<u>2.72</u>			K <u>0 x L x Rt</u> 20°C h x A x t

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	13.897	13.897	13.897	13.897
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	45.622	45.622	45.622	45.622
t Sec.	1005	1025	1045	1060
K 20 cm/sec	1.830E-06	1.795E-06	1.760E-06	1.735E-06

K
20 Avg. cm/sec 1.780E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 1: G2b: Site Water: DNAPL (20:2.5:0.3:0.03 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 9 Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.590	2.996
2.	5.592	2.993
3.	5.596	2.994
4.	5.594	2.992
5.	5.595	2.993

Weight of Specimen:

Initial Weight	<u>1279.0</u> Grams
	<u>2.817</u> Lbs.
Final Weight	<u>1197.8</u> Grams
	<u>2.638</u> Lbs.
Dry Weight	<u>1013.6</u> Grams
	<u>2.233</u> Lbs.

Avg.	<u>5.593</u> In	Ave.	<u>2.994</u> In
	<u>14.207</u> CM		<u>7.604</u> CM
Area	<u>7.038</u> In ²		<u>45.409</u> CM ²
Volume	<u>39.369</u> In ³		<u>0.023</u> Cft.

Moisture Content:

Initial	<u>26.18</u> %
Final	<u>18.17</u> %

Density, Wet Final: 115.90 pcf

Back Pressure: 90 psi

Saturation: 102 %

Specific Gravity: 2.72
(Assumed)

Density, Wet Initial: 123.76 pcf

Density, Dry: 98.08 pcf

Efft. Confining Pressure: 10 psi

K $\frac{Q \times L \times Rt}{h \times A \times t}$
20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.207	14.207	14.207	14.207
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.409	45.409	45.409	45.409
t Sec.	255	260	270	280
K 20 cm/sec	3.705E-06	3.634E-06	3.499E-06	3.374E-06

K
20 Avg. cm/sec

3.553E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 2: G1a: Site Water: LNAPL (20:2.0:0.3:0.03 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 9 Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>		<u>Diameter (Inches)</u>
1.	2.605	1.	3.035
2.	2.607	2.	3.034
3.	2.604	3.	3.035
4.	2.606	4.	3.033
5.	2.607	5.	3.034

Weight of Specimen:

Initial Weight	<u>613.2</u> Grams
	<u>1.351</u> Lbs.
Final Weight	<u>614.2</u> Grams
	<u>1.353</u> Lbs.
Dry Weight	<u>512.5</u> Grams
	<u>1.129</u> Lbs.

Avg.	<u>2.606</u> In	Ave.	<u>3.034</u> In	Moisture Content:
	<u>6.619</u> CM		<u>7.707</u> CM	Initial
				<u>19.65</u> %
Area	<u>7.231</u> In ²		<u>46.649</u> CM ²	Final
				<u>19.84</u> %
Volume	<u>18.842</u> In ³		<u>0.011</u> Cft.	Density, Wet Initial
				<u>123.98</u> pcf
Density, Wet Final:	<u>124.18</u> pcf			Density, Dry
				<u>103.62</u> pcf
Back Pressure:	<u>90</u> psi			Eff. Confining Pressure
				<u>10</u> psi
Saturation:	<u>99</u> %			
Specific Gravity: (Assumed)	<u>2.72</u>			K 20°C
				<u>Q x L x Rt</u> h x A x t

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	6.619	6.619	6.619	6.619
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	46.649	46.649	46.649	46.649
t Sec.	920	930	940	955
K 20 cm/sec	9.314E-07	9.214E-07	9.116E-07	8.972E-07

K
20 Avg. cm/sec 9.154E-07

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 2: G1b: Site Water: LNAPL (20:2.5:0.3:0.03 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 5 Panel 5

Dimensions of Specimen :

	Length (Inches)		Diameter (Inches)
1.	4.158	1.	3.002
2.	4.157	2.	3.003
3.	4.156	3.	3.001
4.	4.156	4.	3.002
5.	4.158	5.	3.001

Weight of Specimen:

Initial Weight	<u>949.8</u> Grams
	<u>2.092</u> Lbs.
Final Weight	<u>936.2</u> Grams
	<u>2.062</u> Lbs.
Dry Weight	<u>762.7</u> Grams
	<u>1.680</u> Lbs.

Avg.	<u>4.157</u> In	Ave.	<u>3.002</u> In	Moisture Content:
	<u>10.559</u> CM		<u>7.625</u> CM	Initial
Area	<u>7.077</u> In ²		<u>45.658</u> CM ²	Final
Volume	<u>29.419</u> In ³		<u>0.017</u> Cft.	Density, Wet Initial
Density, Wet Final:	<u>121.23</u> pcf			Density, Dry
Back Pressure:	<u>90</u> psi			Eff. Confining Pressure
Saturation:	<u>100</u> %			<u>10</u> psi
Specific Gravity: (Assumed)	<u>2.72</u>			K $\frac{O \times L \times Rt}{h \times A \times t}$ 20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	10.559	10.559	10.559	10.559
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	45.658	45.658	45.658	45.658
t Sec.	620	630	640	655
K 20 cm/sec	2.253E-06	2.217E-06	2.182E-06	2.132E-06

K
20 Avg. cm/sec 2.196E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3a Entered by: KH
 Client: Wood PLC/Mactec Date: 12-9-19 Checked by: KP

Sample: Type 2: G2a: Site Water: LNAPL
 (20:2.0:0.3:0.03 mix ratio by wt.) Cell 4
 Remarks: Mix poured in mold (no compaction) and tested after 28 days curing. Panel 4

Dimensions of Specimen :

	Length (Inches)	Diameter (Inches)
1.	3.377	3.007
2.	3.378	3.006
3.	3.376	3.006
4.	3.376	3.007
5.	3.378	3.006

Weight of Specimen:

Initial Weight	<u>753.2</u> Grams
	<u>1.659</u> Lbs.
Final Weight	<u>727.0</u> Grams
	<u>1.601</u> Lbs.
Dry Weight	<u>601.2</u> Grams
	<u>1.324</u> Lbs.

Avg. 3.377 In Ave. 3.006 In Moisture Content:

8.578 CM 7.636 CM Initial 25.28 %

Area 7.099 In² 45.798 CM² Final 20.92 %

Volume 23.973 In³ 0.014 Cft. Density, Wet Initial 119.69 pcf

Density, Wet Final: 115.53 pcf Density, Dry 95.54 pcf

Back Pressure: 90 psi Efft. Confining Pressure 10 psi

Saturation: 101 %

Specific Gravity: 2.72 (Assumed) K $\frac{O \times L \times Rt}{h \times A \times t}$
 20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	8.578	8.578	8.578	8.578
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	45.798	45.798	45.798	45.798
t Sec.	275	280	285	295
K 20 cm/sec	4.113E-06	4.040E-06	3.969E-06	3.834E-06

K
 20 Avg. cm/sec 3.989E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3a Entered by: KH
 Client: Wood PLC/Mactec Date: 12-9-19 Checked by: KP

Sample: Type 2: G2b: Site Water: LNAPL
 (20:2.5:0.3:0.03 mix ratio by wt.) Cell 4
 Remarks: Mix poured in mold (no compaction) and tested after 28 days curing. Panel 4

Dimensions of Specimen :

	Length (Inches)		Diameter (Inches)
1.	5.783	1.	3.026
2.	5.785	2.	3.026
3.	5.789	3.	3.028
4.	5.790	4.	3.030
5.	5.785	5.	3.029

Weight of Specimen:

Initial Weight	<u>1173.6</u>	Grams
	<u>2.585</u>	Lbs.
Final Weight	<u>1100.1</u>	Grams
	<u>2.423</u>	Lbs.
Dry Weight	<u>854.1</u>	Grams
	<u>1.881</u>	Lbs.

Avg. 5.786 In Ave. 3.028 In Moisture Content:

	<u>14.697</u>	CM		<u>7.691</u>	CM	Initial	<u>37.41</u>	%
Area	<u>7.200</u>	In ²		<u>46.453</u>	CM ²	Final	<u>28.80</u>	%

Volume 41.663 In³ 0.024 Cft. Density, Wet Initial 107.31 pcf

Density, Dry 78.10 pcf

Density, Wet Final: 100.59 pcf

Eff. Confining Pressure 10 psi

Back Pressure: 90 psi

Saturation: 102 %

Specific Gravity: 2.72
 (Assumed)

K $\frac{Q \times L \times Rt}{h \times A \times t}$
 20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.697	14.697	14.697	14.697
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	46.453	46.453	46.453	46.453
t Sec.	860	870	890	920
K 20 cm/sec	2.222E-06	2.196E-06	2.147E-06	2.077E-06

K
 20 Avg. cm/sec

2.161E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 2: G3a: Site Water: LNAPL (20:2.0:0.3:0.03 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 5 Panel 5

Dimensions of Specimen :

	<u>Length (Inches)</u>		<u>Diameter (Inches)</u>
1.	5.595	1.	3.026
2.	5.596	2.	3.025
3.	5.594	3.	3.024
4.	5.593	4.	3.021
5.	5.592	5.	3.020

Weight of Specimen:

Initial Weight	<u>1126.6</u> Grams
	<u>2.481</u> Lbs.
Final Weight	<u>1063.4</u> Grams
	<u>2.342</u> Lbs.
Dry Weight	<u>821.6</u> Grams
	<u>1.810</u> Lbs.

Avg.	<u>5.594</u> In	Ave.	<u>3.023</u> In
	<u>14.209</u> CM		<u>7.679</u> CM
Area	<u>7.178</u> In ²		<u>46.312</u> CM ²
Volume	<u>40.156</u> In ³		<u>0.023</u> Cft.

Moisture Content:

Initial	<u>37.12</u> %
Final	<u>29.43</u> %

Density, Wet Final: 100.88 pcf

Back Pressure: 90 psi

Saturation: 101 %

Specific Gravity: 2.72
(Assumed)

Density, Wet Initial: 106.88 pcf

Density, Dry: 77.94 pcf

Eff. Confining Pressure: 10 psi

K $\frac{Q \times L \times Rt}{h \times A \times t}$
20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.209	14.209	14.209	14.209
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	31.56	31.56	31.56	31.56
A Sq. cms	46.312	46.312	46.312	46.312
t Sec.	860	865	880	885
K 20 cm/sec	1.077E-06	1.071E-06	1.053E-06	1.047E-06

K
20 Avg. cm/sec

1.062E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 2: G3b: Site Water: LNAPL (20:2.5:0.3:0.03 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 1 Panel 5

Dimensions of Specimen :

	<u>Length (Inches)</u>		<u>Diameter (Inches)</u>
1.	5.691	1.	3.028
2.	5.690	2.	3.030
3.	5.692	3.	3.026
4.	5.689	4.	3.029
5.	5.693	5.	3.028

Weight of Specimen:

Initial Weight	<u>1241.6</u> Grams
	<u>2.735</u> Lbs.
Final Weight	<u>1167.2</u> Grams
	<u>2.571</u> Lbs.
Dry Weight	<u>958.7</u> Grams
	<u>2.112</u> Lbs.

Avg.	<u>5.691</u> In	Ave.	<u>3.028</u> In	Moisture Content:
	<u>14.455</u> CM		<u>7.692</u> CM	Initial
				<u>29.51</u> %
Area	<u>7.202</u> In ²		<u>46.465</u> CM ²	Final
				<u>21.75</u> %
Volume	<u>40.987</u> In ³		<u>0.024</u> Cft.	Density, Wet Initial
				<u>115.40</u> pcf
Density, Wet Final:	<u>108.48</u> pcf			Density, Dry
				<u>89.11</u> pcf
Back Pressure:	<u>90</u> psi			Eff. Confining Pressure
				<u>10</u> psi
Saturation:	<u>102</u> %			
Specific Gravity: (Assumed)	<u>2.72</u>			K
				$\frac{O \times L \times Rt}{h \times A \times t}$
				20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.455	14.455	14.455	14.455
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	46.465	46.465	46.465	46.465
t Sec.	590	600	615	620
K 20 cm/sec	3.184E-06	3.131E-06	3.055E-06	3.030E-06

K
20 Avg. cm/sec 3.100E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3a	Proj. No. 912	Tested by: MF
Client: Wood PLC/Mactec	Date: 12-9-19	Entered by: KH
Sample: Type 3: G1a: Site Water (20:2.0:0.3 mix ratio by wt.)		Checked by: KP
Remarks: Mix poured in mold (no compaction) and tested after 28 days curing.		Cell 1 Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.712	3.001
2.	5.713	3.004
3.	5.715	2.999
4.	5.710	3.005
5.	5.711	3.001

Weight of Specimen:

Initial Weight	<u>1333.4</u> Grams
	<u>2.937</u> Lbs.
Final Weight	<u>1308.5</u> Grams
	<u>2.882</u> Lbs.
Dry Weight	<u>1103.0</u> Grams
	<u>2.430</u> Lbs.

Avg.	<u>5.712</u> In	Ave.	<u>3.002</u> In
	<u>14.509</u> CM		<u>7.625</u> CM
Area	<u>7.078</u> In ²		<u>45.664</u> CM ²
Volume	<u>40.431</u> In ³		<u>0.023</u> Cft.

Moisture Content:

Initial	<u>20.89</u> %
Final	<u>18.63</u> %

Density, Wet Final: 123.29 pcf

Back Pressure: 90 psi

Saturation: 101 %

Specific Gravity: 2.72
(Assumed)

Density, Wet Initial 125.64 pcf

Density, Dry 103.93 pcf

Eff. Confining Pressure 10 psi

K $\frac{Q \times L \times Rt}{h \times A \times t}$
20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.509	14.509	14.509	14.509
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	45.664	45.664	45.664	45.664
t Sec.	450	460	470	475
K 20 cm/sec	4.264E-06	4.171E-06	4.083E-06	4.040E-06

K
20 Avg. cm/sec

4.139E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3a Entered by: KH
 Client: Wood PLC/Mactec Date: 12-9-19 Checked by: KP

Sample: Type 3: G2a: Site Water (20:2.0:0.3 mix ratio by wt.) Cell 8
 Remarks: Mix poured in mold (no compaction) and tested after 28 days curing. Panel 2
 Very Soft sample, slumped after removing from mold.

Dimensions of Specimen :

	<u>Length (Inches)</u>		<u>Diameter (Inches)</u>
1.	5.282	1.	2.989
2.	5.280	2.	3.040
3.	5.283	3.	3.042
4.	5.285	4.	3.138
5.	5.281	5.	3.139

Weight of Specimen:

Initial Weight	<u>1279.9</u>	Grams
	<u>2.819</u>	Lbs.
Final Weight	<u>1220.4</u>	Grams
	<u>2.688</u>	Lbs.
Dry Weight	<u>1041.3</u>	Grams
	<u>2.294</u>	Lbs.

Avg. 5.282 In Ave. 3.070 In Moisture Content:
13.417 CM 7.797 CM
 Initial 22.91 %

Area 7.400 In² 47.744 CM² Final 17.20 %

Volume 39.090 In³ 0.023 Cft. Density, Wet Initial 124.73 pcf

Density, Wet Final: 118.93 pcf Density, Dry 101.48 pcf

Back Pressure: 90 psi Efft. Confining Pressure 10 psi

Saturation: 103 %

Specific Gravity: 2.72 K 0 x L x Rt
 (Assumed) 20°C h x A x t

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	13.417	13.417	13.417	13.417
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	47.744	47.744	47.744	47.744
t Sec.	425	430	435	445
K 20 cm/sec	3.993E-06	3.947E-06	3.901E-06	3.814E-06

K
20 Avg. cm/sec

3.914E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3a Entered by: KH
 Client: Wood PLC/Mactec Date: 12-9-19 Checked by: KP

Sample: Type 3: G2b: Site Water (20:2.5:0.3 mix ratio by wt.) Cell 9
 Remarks: Mix poured in mold (no compaction) and tested after 28 days curing. Panel 5
 Very Soft sample, slumped during testing.

Dimensions of Specimen :

	<u>Length (Inches)</u>		<u>Diameter (Inches)</u>
1.	4.362	1.	3.005
2.	4.360	2.	3.006
3.	4.359	3.	3.001
4.	4.358	4.	3.007
5.	4.360	5.	3.004

Weight of Specimen:

Initial Weight	<u>817.2</u> Grams
	<u>1.800</u> Lbs.
Final Weight	<u>734.2</u> Grams
	<u>1.617</u> Lbs.
Dry Weight	<u>606.7</u> Grams
	<u>1.336</u> Lbs.

Avg. 4.360 In Ave. 3.005 In
11.074 CM 7.632 CM

Moisture Content:

Initial 34.70 %
 Final 21.02 %

Area 7.090 In² 45.744 CM²
 Volume 30.912 In³ 0.018 Cft.

Density, Wet Initial 100.71 pcf
 Density, Dry 74.77 pcf

Density, Wet Final: 90.48 pcf

Eff. Confining Pressure 10 psi

Back Pressure: 90 psi

Saturation: 103 %

K $\frac{Q \times L \times Rt}{h \times A \times t}$
 20°C

Specific Gravity: 2.72
 (Assumed)

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	11.074	11.074	11.074	11.074
Rt (Temp)	0.953	0.953	0.953	0.953
h cms	15.78	15.78	15.78	15.78
A Sq. cms	45.744	45.744	45.744	45.744
t Sec.	600	605	600	605
K 20 cm/sec	2.437E-06	2.417E-06	2.437E-06	2.417E-06

K
 20 Avg. cm/sec

2.427E-06



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAGEOLAB.com

Letter of Transmittal

Date: 12-18-19

Job No.: 912

Lab Log: 19-376

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)

Samples: Grout Mix Phase 3a Testing (Retest of Pocket Penetrometer samples)

Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D1633 Unconfined Compression (7 tests)

Regards,
RSA Geolab, LLC

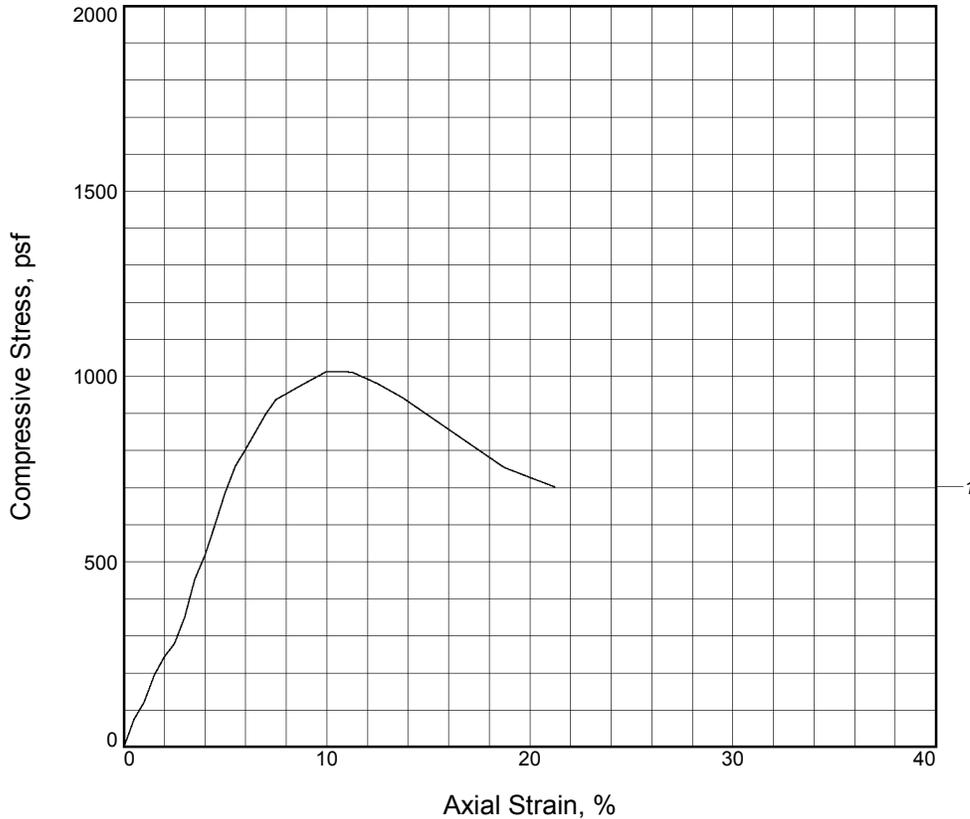
Remarks: If you have any questions, please call 908-964-0786.

Signed: _____

Dr. Raza S. Ahmed
President RSA Geolab, LLC

RSA's Geolab's Geotechnical Laboratory testing was performed and results reported in accordance with ASTM standards and accepted industry standards. No other representations or warranties either express or implied are given. RSA Geolab, LLC neither accepts responsibility for nor makes claim to the final use and purpose of the material tested. RSA Geolab, LLC owns all rights, title and interest of the work product. This report is intended for client's sole and exclusive use and not for the benefit of others and may not be used or relied upon by others. These documents must be considered proprietary information and should not be reproduced without the written approval of RSA Geolab, LLC.

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	1013			
Undrained shear strength, psf	507			
Failure strain, %	10.0			
Strain rate, in./min.	0.050			
Water content, %	23.1			
Wet density, pcf	120.6			
Dry density, pcf	98.0			
Saturation, %	86.5			
Void ratio	0.7207			
Specimen diameter, in.	1.98			
Specimen height, in.	2.00			
Height/diameter ratio	1.01			

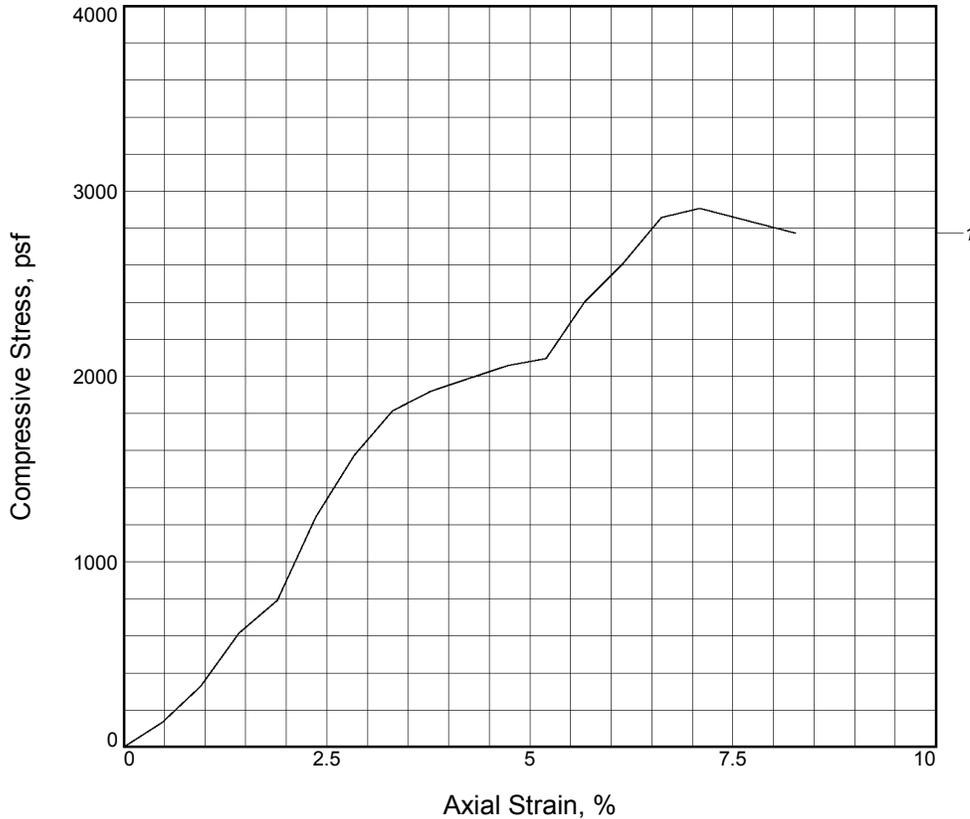
Description: 20:2.0:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912</p> <p>Date Sampled: 12-18-19</p> <p>Remarks: Mix poured in mold (no compaction) and tested after curing 28 days. Retest from Pocket Penetrometer sample.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC</p> <p>Location: Type 1:G1a:Site Water:DNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	2907			
Undrained shear strength, psf	1454			
Failure strain, %	7.1			
Strain rate, in./min.	0.050			
Water content, %	21.0			
Wet density, pcf	113.9			
Dry density, pcf	94.1			
Saturation, %	71.6			
Void ratio	0.7908			
Specimen diameter, in.	2.00			
Specimen height, in.	2.12			
Height/diameter ratio	1.06			

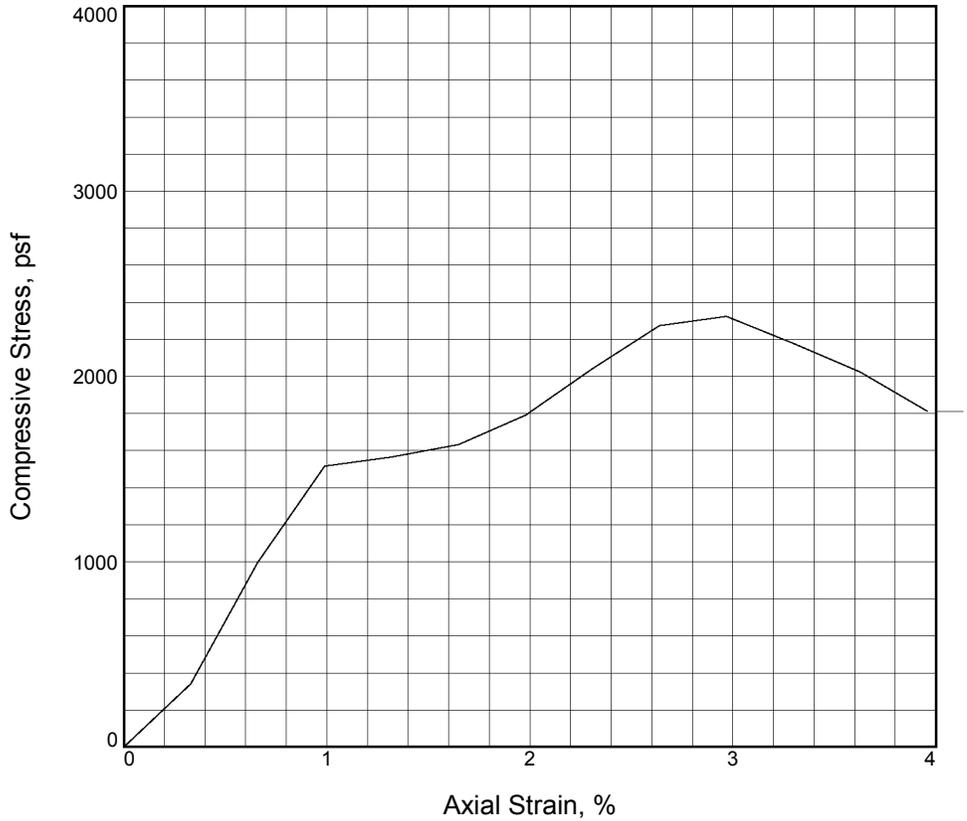
Description: 10:2.0:0.15:0.015 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912</p> <p>Date Sampled: 12-18-19</p> <p>Remarks: Mix poured into mold (no compaction) and tested after 28 days curing. Retest from Pocket Penetrometer sample.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC</p> <p>Location: Type 1:G2a:Site Water:DNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	2325		
Undrained shear strength, psf	1162		
Failure strain, %	3.0		
Strain rate, in./min.	0.050		
Water content, %	16.0		
Wet density, pcf	124.2		
Dry density, pcf	107.1		
Saturation, %	75.2		
Void ratio	0.5737		
Specimen diameter, in.	1.99		
Specimen height, in.	3.03		
Height/diameter ratio	1.52		

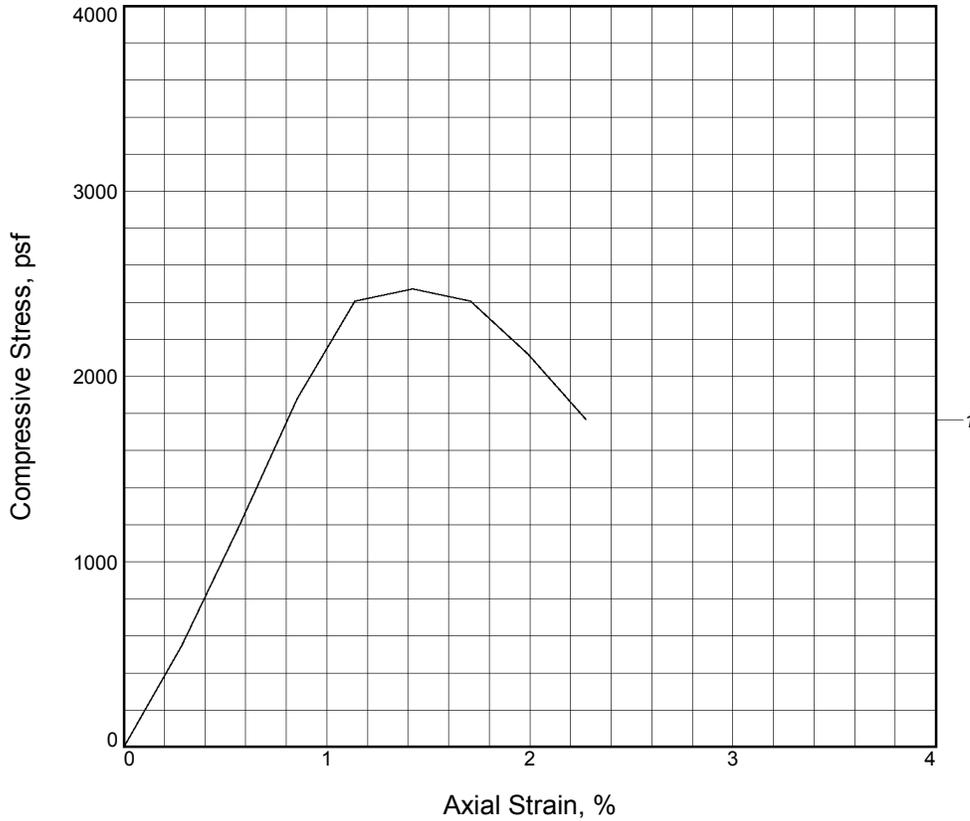
Description: 20:2.0:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 12-18-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing. Retest of Pocket Penetrometer sample.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 2:G1a:Site Water:LNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	2472			
Undrained shear strength, psf	1236			
Failure strain, %	1.4			
Strain rate, in./min.	0.050			
Water content, %	21.3			
Wet density, pcf	123.1			
Dry density, pcf	101.4			
Saturation, %	87.0			
Void ratio	0.6615			
Specimen diameter, in.	2.00			
Specimen height, in.	3.51			
Height/diameter ratio	1.76			

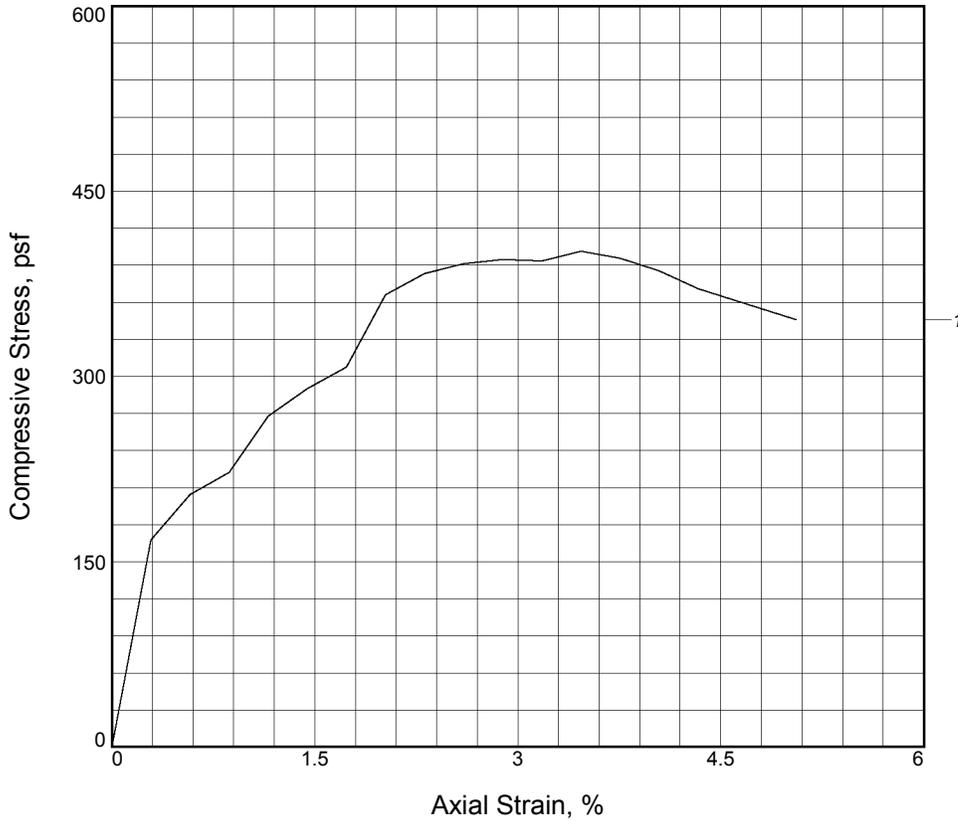
Description: 20:2.5:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-18-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing. Retest from Pocket Penetrometer sample.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 2:G1b:Site Water:LNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	401		
Undrained shear strength, psf	201		
Failure strain, %	3.5		
Strain rate, in./min.	0.050		
Water content, %	24.7		
Wet density, pcf	125.0		
Dry density, pcf	100.3		
Saturation, %	97.9		
Void ratio	0.6808		
Specimen diameter, in.	1.98		
Specimen height, in.	3.46		
Height/diameter ratio	1.75		

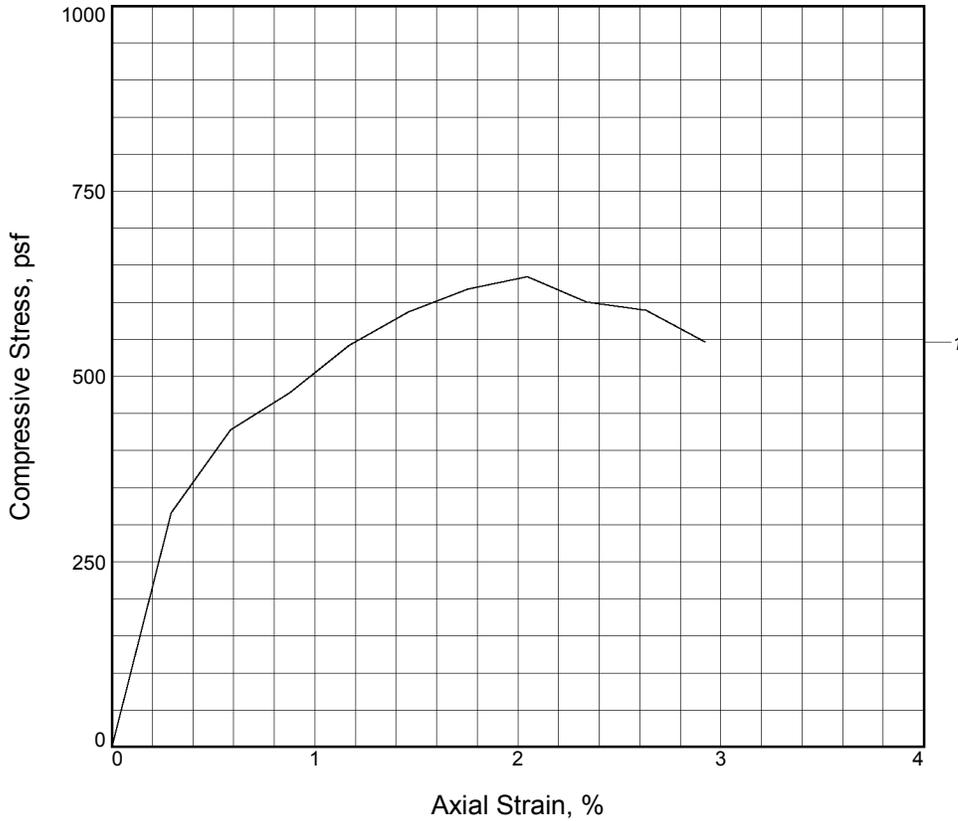
Description: 20:2.0:0.3:0.03 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-18-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing. Retest from Pocket Penetrometer sample.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 2:G2a:Site Water:LNAPL</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
--	--

Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	635			
Undrained shear strength, psf	317			
Failure strain, %	2.0			
Strain rate, in./min.	0.050			
Water content, %	17.9			
Wet density, pcf	131.6			
Dry density, pcf	111.6			
Saturation, %	94.8			
Void ratio	0.5107			
Specimen diameter, in.	1.97			
Specimen height, in.	3.42			
Height/diameter ratio	1.74			

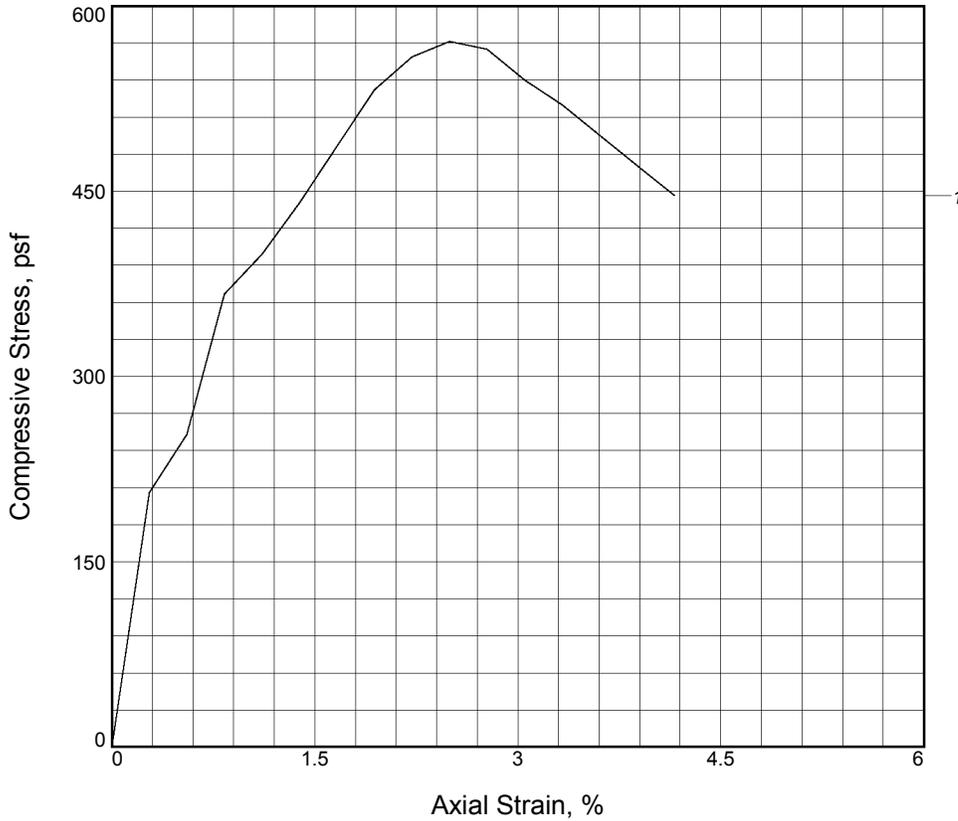
Description: 20:2.0:0.3 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912 Date Sampled: 12-18-19 Remarks: Mix poured into mold (no compaction) and tested after 28 days curing. Retest from Pocket Penetrometer sample.</p> <p>Figure _____</p>	<p>Client: Wood PLC Project: MACTEC Location: Type 3:G1a:Site Water</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
--	--

Tested By: MF/EE _____ **Checked By:** KP _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	571		
Undrained shear strength, psf	286		
Failure strain, %	2.5		
Strain rate, in./min.	0.050		
Water content, %	20.5		
Wet density, pcf	128.5		
Dry density, pcf	106.6		
Saturation, %	95.4		
Void ratio	0.5805		
Specimen diameter, in.	1.95		
Specimen height, in.	3.61		
Height/diameter ratio	1.85		

Description: 20:2.0:0.3 mix by weight

LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
-------------	-------------	-------------	------------------------	-------------------------

<p>Project No.: 912</p> <p>Date Sampled: 12-18-19</p> <p>Remarks: Mix poured into mold (no compaction) and tested after 28 days curing. Retest from Pocket Penetrometer sample.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC</p> <p>Location: Type 3:G2a:Site Water</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF/EE _____ **Checked By:** KP _____



RSA GEOLAB, LLC

1017 Greeley Avenue North
Union, New Jersey 07083
908-964-0786 (P)
www.RSAGEOLAB.com

Letter of Transmittal

Date: 1-3-20

Job No.: 912

Lab Log: 19-548

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Site No. 516008)
Phase 3 Supplemental Testing

Samples: Water:Grout:Soil mixes

Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D1633 Unconfined Compression (3 tests)
- ASTM D5084 Permeability (recompacted) (3 tests)
- Pocket Penetrometer (9 tests)
- Photographs (12)

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: _____

Dr. Raza S. Ahmed
President RSA Geolab, LLC

RSA Geolab
POCKET PENETROMETER

Project: Saranac Lake OU01 (Site No. 516008)
Phase 3 Supplemental Testing
Client: Wood PLC/Mactec

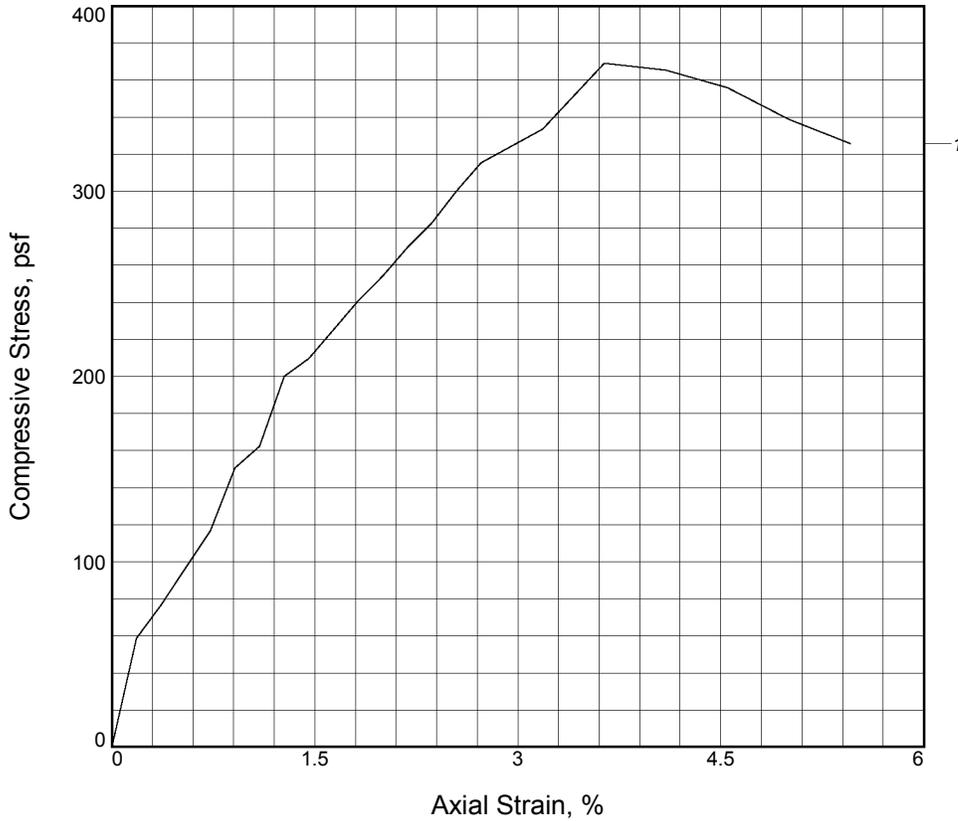
Project #: 912
Date: 1-3-20

S. No.	Sample			Strength Measured	Pocket Penetrometer		
	Wet Soil	Grout Mix	Tap Water		TSF		
	(weight added in grams)				3 day	7 day	14 day
5	Type 2 (7000)	G2a (700)	(105)	Along Length Along Radius	0 0	0 0	0.25 0
12	Type 3 (7000)	G2b (875)	(105)	Along Length Along Radius	0 0	0 0	0 0
15	Type 1 (7000)	G2b (750)	(105)	Along Length Along Radius	>4.5 2.5	>4.5 >4.5	>4.5 >4.5

Remarks: Insufficient Site water, tap water used instead.

Performed by: MF Entered by: KH Checked by: KP

UNCONFINED COMPRESSION TEST

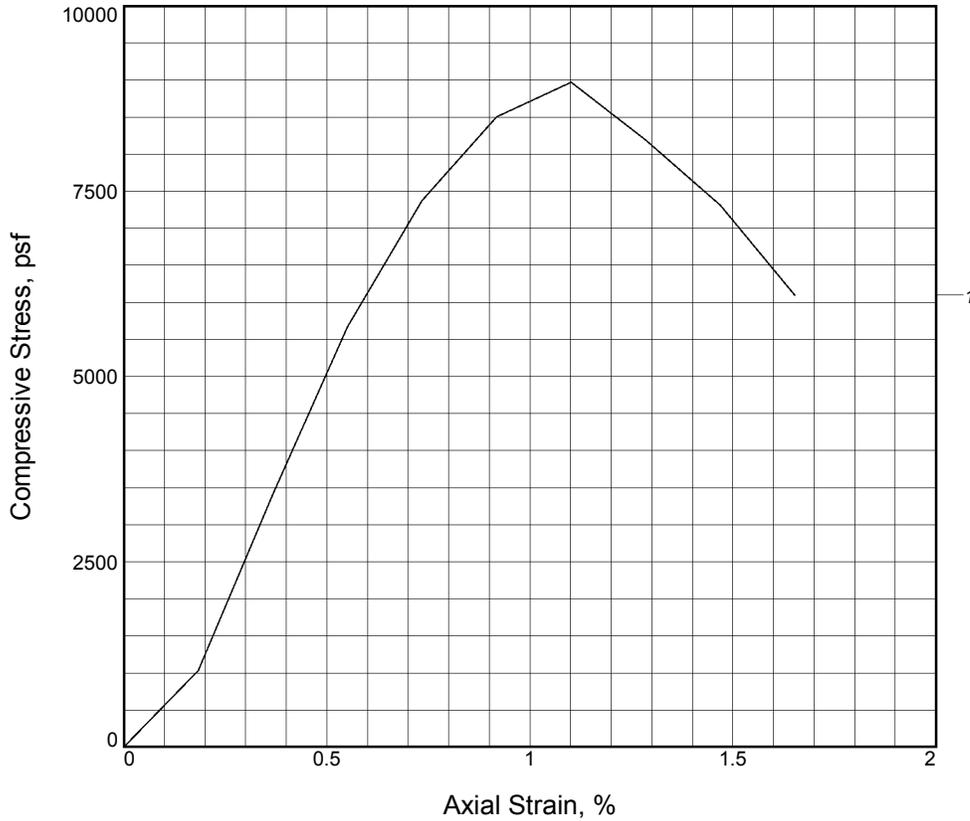


Sample No.	1		
Unconfined strength, psf	369		
Undrained shear strength, psf	185		
Failure strain, %	3.6		
Strain rate, in./min.	0.050		
Water content, %	25.8		
Wet density, pcf	124.7		
Dry density, pcf	99.2		
Saturation, %	112.3		
Void ratio	0.5739		
Specimen diameter, in.	3.01		
Specimen height, in.	5.50		
Height/diameter ratio	1.83		

Description:			
LL =	PL =	PI =	Assumed GS= 2.5 Type: ASTM D1633
Project No.: 912 Date Sampled: 1-3-20 Remarks: Tested after 14 days curing		Client: Wood PLC Project: MACTEC Phase 3 Supplemental Testing Location: Type 3 Soil:Grout Mix G2b:Tap Water (20:2.5:0.3) Sample Number: 12	
Figure _____		UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey	

Tested By: MF _____

UNCONFINED COMPRESSION TEST



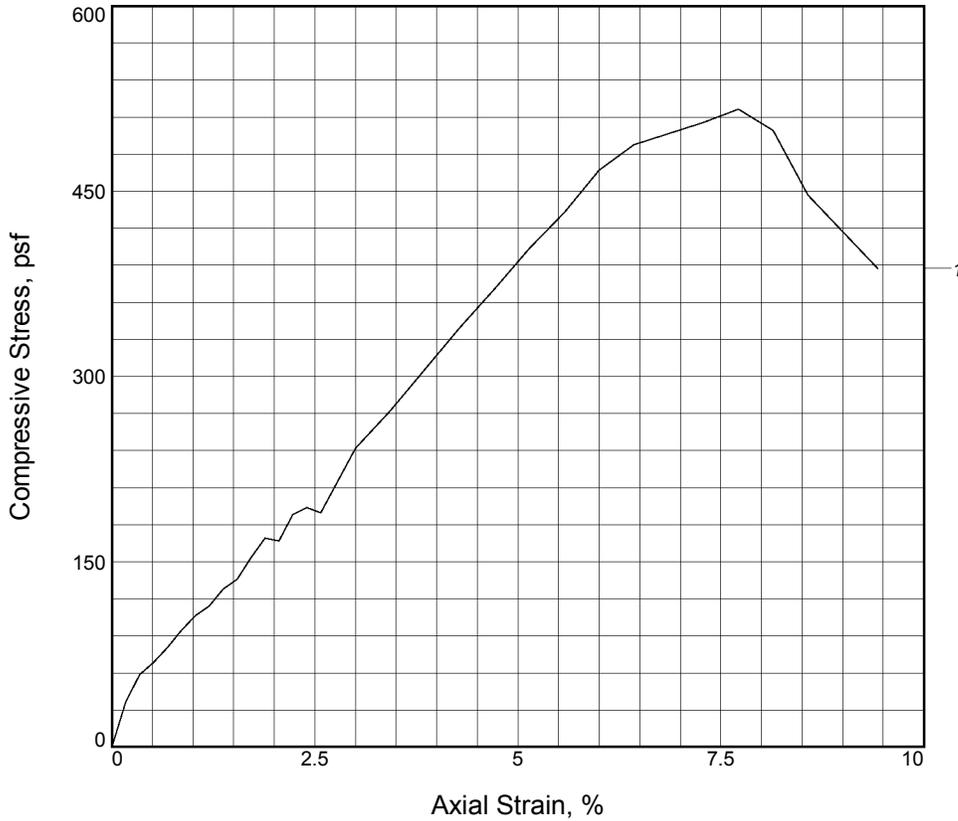
Sample No.	1			
Unconfined strength, psf	8970			
Undrained shear strength, psf	4485			
Failure strain, %	1.1			
Strain rate, in./min.	0.050			
Water content, %	23.9			
Wet density, pcf	124.0			
Dry density, pcf	100.1			
Saturation, %	106.7			
Void ratio	0.5589			
Specimen diameter, in.	3.01			
Specimen height, in.	5.45			
Height/diameter ratio	1.81			

Description:
LL = **PL =** **PI =** **Assumed GS= 2.5** **Type: ASTM D1633**

<p>Project No.: 912 Date Sampled: 1-3-20 Remarks: Tested after 14 days curing</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 3 Supplemental Testing</p> <p>Location: Type 1 Soil:Grout Mix G2b:Tap Water (10:2.5:0.15)</p> <p>Sample Number: 15</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	516		
Undrained shear strength, psf	258		
Failure strain, %	7.7		
Strain rate, in./min.	0.050		
Water content, %	21.1		
Wet density, pcf	119.7		
Dry density, pcf	98.9		
Saturation, %	91.2		
Void ratio	0.5784		
Specimen diameter, in.	3.01		
Specimen height, in.	5.83		
Height/diameter ratio	1.94		

Description:

LL =	PL =	PI =	Assumed GS= 2.5	Type: ASTM D1633
------	------	------	-----------------	------------------

<p>Project No.: 912</p> <p>Date Sampled: 1-3-20</p> <p>Remarks: Tested after 14 days curing</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 3 Supplemental Testing</p> <p>Location: Type 2 Soil:Grout Mix G2a:Tap Water (20:2:0.3)</p> <p>Sample Number: 5</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3 Supplemental Testing	Proj. No. 912	Tested by: MF/EE
Sample: 12 (Type 3 Soil:Grout Mix G2b:Tap Water) (20:2.5:0.3)	Date: 1-3-20	Entered by: KH
Remarks: Mix by weight. Tap water used as permeant.		Checked by: KP
		Cell 9
		Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.681	3.007
2.	5.684	3.006
3.	5.680	3.002
4.	5.679	3.008
5.	5.683	3.005

Weight of Specimen:

Initial Weight	<u>1318.4</u> Grams
	<u>2.904</u> Lbs.
Final Weight	<u>1263.8</u> Grams
	<u>2.784</u> Lbs.
Dry Weight	<u>1052.2</u> Grams
	<u>2.318</u> Lbs.

Avg.	<u>5.681</u> In	Ave.	<u>3.006</u> In
	<u>14.431</u> CM		<u>7.634</u> CM
Area	<u>7.095</u> In ²		<u>45.774</u> CM ²
Volume	<u>40.310</u> In ³		<u>0.023</u> Cft.

Moisture Content:

Initial	<u>25.30</u> %
Final	<u>20.11</u> %

Density, Wet Final: 119.44 pcf

Back Pressure: 90 psi

Saturation: 102 %

Specific Gravity: 2.5
(Assumed)

Density, Wet Initial 124.60 pcf

Density, Dry 99.44 pcf

Efft. Confining Pressure 10 psi

K $\frac{Q \times L \times Rt}{h \times A \times t}$
20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.431	14.431	14.431	14.431
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.774	45.774	45.774	45.774
t Sec.	250	260	270	275
K				
20 cm/sec	3.996E-06	3.842E-06	3.700E-06	3.632E-06

K
20 Avg. cm/sec

3.792E-06

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3 Supplemental Testing	Proj. No. 912	Tested by: MF/EE
Sample: 15 (Type 1 Soil:Grout Mix G2b:Tap Water) (10:2.5:0.15)	Date: 1-3-20	Entered by: KH
Remarks: Mix by weight. Tap water used as permeant.		Checked by: KP
		Cell 6
		Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>		<u>Diameter (Inches)</u>
1.	5.470	1.	3.001
2.	5.472	2.	3.004
3.	5.471	3.	3.005
4.	5.474	4.	3.002
5.	5.475	5.	3.002

Weight of Specimen:

Initial Weight	<u>1280.3</u> Grams
	<u>2.820</u> Lbs.
Final Weight	<u>1268.7</u> Grams
	<u>2.794</u> Lbs.
Dry Weight	<u>1036.8</u> Grams
	<u>2.284</u> Lbs.

Avg.	<u>5.472</u> In	Ave.	<u>3.003</u> In
	<u>13.900</u> CM		<u>7.627</u> CM
Area	<u>7.082</u> In ²		<u>45.689</u> CM ²
Volume	<u>38.754</u> In ³		<u>0.022</u> Cft.

Moisture Content:

Initial	<u>23.49</u> %
Final	<u>22.37</u> %

Density, Wet Final: 124.71 pcf

Back Pressure: 90 psi

Saturation: 100 %

Specific Gravity: 2.5
(Assumed)

Density, Wet Initial: 125.85 pcf

Density, Dry: 101.92 pcf

Efft. Confining Pressure: 10 psi

K $\frac{Q \times L \times Rt}{h \times A \times t}$
20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	13.900	13.900	13.900	13.900
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.689	45.689	45.689	45.689
t Sec.	1240	1245	1255	1260
K 20 cm/sec	7.774E-07	7.743E-07	7.681E-07	7.651E-07

K
20 Avg. cm/sec

7.712E-07

RSA Geolab, LLC

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01 (Site No. 516008) Phase 3 Supplemental Testing	Proj. No. 912	Tested by: MF/EE
Sample: 5 (Type 2 Soil: Grout Mix G2a: Tap Water) (20:2:0.3)	Date: 1-3-20	Entered by: KH
Remarks: Mix by weight. Tap water used as permeant.		Checked by: KP
		Cell 5
		Panel 5

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.854	3.007
2.	5.851	3.009
3.	5.850	3.010
4.	5.856	3.004
5.	5.853	3.005

Weight of Specimen:

Initial Weight	<u>1315.0</u> Grams
	<u>2.896</u> Lbs.
Final Weight	<u>1285.6</u> Grams
	<u>2.832</u> Lbs.
Dry Weight	<u>1080.4</u> Grams
	<u>2.380</u> Lbs.

Avg.	<u>5.853</u> In	Ave.	<u>3.007</u> In
	<u>14.866</u> CM		<u>7.638</u> CM
Area	<u>7.102</u> In ²		<u>45.817</u> CM ²
Volume	<u>41.564</u> In ³		<u>0.024</u> Cft.

Moisture Content:

Initial	<u>21.71</u> %
Final	<u>18.99</u> %

Density, Wet Final: 117.83 pcf

Density, Wet Initial	<u>120.52</u> pcf
Density, Dry	<u>99.02</u> pcf

Back Pressure: 90 psi

Eff. Confining Pressure 10 psi

Saturation: 102 %

Specific Gravity: 2.5
(Assumed)

K $\frac{Q \times L \times Rt}{h \times A \times t}$
20°C

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.866	14.866	14.866	14.866
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.817	45.817	45.817	45.817
t Sec.	1010	1020	1025	1035
K				
20 cm/sec	1.018E-06	1.008E-06	1.003E-06	9.933E-07

K
20 Avg. cm/sec

1.006E-06



1017 Greeley Ave N
Union, NJ 07083
908-964-0786
www.RSAGeolab.com

Letter of Transmittal

Date: 2-19-20

Job No.: 912

Lab Log: 19-548

Attention: Mr. Brian Johnson
Wood PLC/MACTEC
511 Congress Street
Portland, ME 04101

CC: Nathan Vogan

Re: Saranac Lake OU01 (Stie No. 516008)
Phase 3b Supplemental Testing

Sample(s): Grout Mix Phase 3b Supplemental Testing

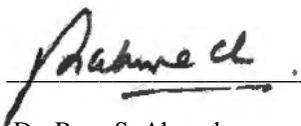
Dear Mr. Johnson,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D1633 Unconfined Compression (9 tests)
- ASTM D5084 Permeability (recompacted)(9 tests)
- Pocket Penetrometer Readings (18 tests)
- Photographs (36)

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: 
Dr. Raza S. Ahmed
President RSA Geolab, LLC

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POCKET PENETROMETER

Project: Saranac Lake OU01 (Site No. 516008)
 Phase 3 Supplemental Testing
 Client: Wood PLC/Mactec

Project No.: 912
 Date: 2-19-20

S. No.	Sample			Pocket Penetrometer Readings	
	Wet Soil	Grout Mix	Calciment	7 day	14 day
	(weight added in grams)				
16	Type 1 (4600)	G2a (920)	(230)	>4.5	>4.5
17	Type 1 (4600)	G2a (920)	NA	>4.5	>4.5
18	Type 1 (4600)	G4a (1150)	NA	>4.5	>4.5
19	Type 2 (4600)	G2a (920)	(230)	>4.5	>4.5
20	Type 2 (4600)	G2a (920)	NA	1	>4.5
21	Type 2 (4600)	G4a (1150)	NA	>4.5	>4.5
22	Type 3 (4600)	G2a (920)	(230)	>4.5	>4.5
23	Type 3 (4600)	G2a (920)	NA	>4.5	>4.5
24	Type 3 (4600)	G4a (1150)	NA	>4.5	>4.5

Remarks:

Performed by: MF Entered by: KH KP



1017 Greeley Ave N
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PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
 Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01(Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3b Supplemental Testing Entered by: KH
 Sample: 16 (Type 1 Soil:Grout Mix G2a:Calciment) Date: 2-19-20 Checked by: KP
 (10:2.0:0.5)
 Remarks: Mix by weight. Tap water used as permeant.
 Tested after curing 28 days. Cell 5
 Panel 4

Dimensions of Specimen :

	Length (Inches)	Diameter (Inches)
1.	5.914	3.005
2.	5.916	3.004
3.	5.915	3.004
4.	5.914	3.003
5.	5.912	3.004

Weight of Specimen:

Initial Weight	<u>1387.9</u> Grams
	<u>3.057</u> Lbs.
Final Weight	<u>1399.5</u> Grams
	<u>3.083</u> Lbs.
Dry Weight	<u>1127.2</u> Grams
	<u>2.483</u> Lbs.

Avg.	<u>5.914</u> In	Ave.	<u>3.004</u> In
	<u>15.022</u> CM		<u>7.630</u> CM
Area	<u>7.087</u> In ²		<u>45.725</u> CM ²
Volume	<u>41.917</u> In ³		<u>0.024</u> Cft.

Moisture Content:

Initial	<u>23.13</u> %
Final	<u>24.16</u> %

Density, Wet Final: 127.19 pcf

Density, Wet Initial: 126.14 pcf

Density, Dry: 102.44 pcf

Back Pressure: 90 psi

Eff. Confining Pressure: 10 psi

Saturation: 99 %

K = $\frac{Q \times L \times Rt}{h \times A \times t}$
 20°C

Specific Gravity: 2.7
 (Assumed)

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	15.022	15.022	15.022	15.022
Rt (Temp)	0.923	0.923	0.923	0.923
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.725	45.725	45.725	45.725
t Sec.	2290	2300	2310	2315
K				
20 cm/sec	4.196E-07	4.177E-07	4.159E-07	4.150E-07



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 www.RSAGEolab.com

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
 Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01(Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3b Supplemental Testing Entered by: KH
 Sample: 17 (Type 1 Soil:Grout Mix G2a) Date: 2-19-20 Checked by: KP
 (10:2.0)
 Remarks: Mix by weight. Tap water used as permeant.
 Tested after curing 28 days. Cell 9
 Panel 4

Dimensions of Specimen :

	Length (Inches)	Diameter (Inches)
1.	5.802	3.008
2.	5.798	3.006
3.	5.799	3.005
4.	5.796	3.005
5.	5.797	3.004

Weight of Specimen:

Initial Weight	<u>1383.3</u> Grams
	<u>3.047</u> Lbs.
Final Weight	<u>1386.2</u> Grams
	<u>3.053</u> Lbs.
Dry Weight	<u>1118.7</u> Grams
	<u>2.464</u> Lbs.

Avg.	<u>5.798</u> In	Ave.	<u>3.006</u> In
	<u>14.728</u> CM		<u>7.634</u> CM
Area	<u>7.095</u> In ²		<u>45.774</u> CM ²
Volume	<u>41.140</u> In ³		<u>0.024</u> Cft.

Moisture Content:

Initial	<u>23.65</u> %
Final	<u>23.91</u> %

Density, Wet Final: 128.36 pcf
 Back Pressure: 90 psi
 Saturation: 100 %
 Specific Gravity: 2.7
 (Assumed)

Density, Wet Initial: 128.09 pcf
 Density, Dry: 103.59 pcf
 Efft. Confining Pressure: 10 psi

$$K = \frac{Q \times L \times Rt}{20^\circ C \times h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.728	14.728	14.728	14.728
Rt (Temp)	0.923	0.923	0.923	0.923
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.774	45.774	45.774	45.774
t Sec.	1700	1705	1705	1715
K				
20 cm/sec	5.535E-07	5.519E-07	5.519E-07	5.487E-07



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PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
 Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01(Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3b Supplemental Testing Entered by: KH
 Sample: 18 (Type 1 Soil:Grout Mix G4a) Date: 2-19-20 Checked by: KP
 (10:2.5)
 Remarks: Mix by weight. Tap water used as permeant.
 Tested after curing 28 days. Cell 3
 Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.787	3.009
2.	5.790	3.010
3.	5.791	3.008
4.	5.790	3.009
5.	5.788	3.006

Weight of Specimen:

Initial Weight	<u>1359.1</u> Grams
	<u>2.994</u> Lbs.
Final Weight	<u>1362.8</u> Grams
	<u>3.002</u> Lbs.
Dry Weight	<u>1099.5</u> Grams
	<u>2.422</u> Lbs.

Avg.	<u>5.789</u> In	Ave.	<u>3.008</u> In
	<u>14.705</u> CM		<u>7.641</u> CM
Area	<u>7.108</u> In ²		<u>45.859</u> CM ²
Volume	<u>41.151</u> In ³		<u>0.024</u> Cft.

Moisture Content:

Initial	<u>23.61</u> %
Final	<u>23.95</u> %

Density, Wet Final: 126.16 pcf
 Back Pressure: 90 psi
 Saturation: 100 %
 Specific Gravity: 2.7
 (Assumed)

Density, Wet Initial: 125.82 pcf
 Density, Dry: 101.79 pcf
 Efft. Confining Pressure: 10 psi

$$K = \frac{Q \times L \times Rt}{h \times A \times t} \text{ at } 20^{\circ}\text{C}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.705	14.705	14.705	14.705
Rt (Temp)	0.923	0.923	0.923	0.923
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.859	45.859	45.859	45.859
t Sec.	4765	4775	4785	4790
K				
20 cm/sec	1.968E-07	1.964E-07	1.960E-07	1.958E-07



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PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
 Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01(Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3b Supplemental Testing Entered by: KH
 Sample: 19 (Type 2 Soil:Grout Mix G2a:Calciment) Date: 2-19-20 Checked by: KP
 (10:2.0:0.5)
 Remarks: Mix by weight. Tap water used as permeant.
 Tested after curing 28 days. Cell 6
 Panel 5

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.960	3.031
2.	5.961	3.029
3.	5.963	3.028
4.	5.959	3.032
5.	5.962	3.030

Weight of Specimen:

Initial Weight	<u>1301.6</u> Grams
	<u>2.867</u> Lbs.
Final Weight	<u>1324.2</u> Grams
	<u>2.917</u> Lbs.
Dry Weight	<u>1104.1</u> Grams
	<u>2.432</u> Lbs.

Avg.	<u>5.961</u> In	Ave.	<u>3.030</u> In
	<u>15.141</u> CM		<u>7.696</u> CM
Area	<u>7.211</u> In ²		<u>46.520</u> CM ²
Volume	<u>42.983</u> In ³		<u>0.025</u> Cft.

Moisture Content:

Initial	<u>17.89</u> %
Final	<u>19.93</u> %

Density, Wet Final: 117.36 pcf

Density, Wet Initial: 115.36 pcf

Density, Dry: 97.86 pcf

Back Pressure: 90 psi

Eff. Confining Pressure: 10 psi

Saturation: 100 %

K = $\frac{Q \times L \times Rt}{h \times A \times t}$
 20°C

Specific Gravity: 2.7
 (Assumed)

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	15.141	15.141	15.141	15.141
Rt (Temp)	0.923	0.923	0.923	0.923
h cms	31.56	31.56	31.56	31.56
A Sq. cms	46.520	46.520	46.520	46.520
t Sec.	1885	1895	1900	1905
K				
20 cm/sec	5.050E-07	5.023E-07	5.010E-07	4.997E-07



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PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
 Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01(Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3b Supplemental Testing Entered by: KH
 Sample: 20 (Type 2 Soil:Grout Mix G2a) Date: 2-19-20 Checked by: KP
 (10:2.0)
 Remarks: Mix by weight. Tap water used as permeant.
 Tested after curing 28 days. Cell 1
 Panel 5

Dimensions of Specimen :

	Length (Inches)	Diameter (Inches)
1.	5.758	3.033
2.	5.760	3.030
3.	5.762	3.029
4.	5.761	3.031
5.	5.759	3.029

Weight of Specimen:

Initial Weight	<u>1291.7</u> Grams
	<u>2.845</u> Lbs.
Final Weight	<u>1297.8</u> Grams
	<u>2.859</u> Lbs.
Dry Weight	<u>1101.4</u> Grams
	<u>2.426</u> Lbs.

Avg.	<u>5.760</u> In	Ave.	<u>3.030</u> In
	<u>14.630</u> CM		<u>7.697</u> CM
Area	<u>7.213</u> In ²		<u>46.533</u> CM ²
Volume	<u>41.544</u> In ³		<u>0.024</u> Cft.

Moisture Content:

Initial	<u>17.28</u> %
Final	<u>17.83</u> %

Density, Wet Final: 119.01 pcf

Density, Wet Initial: 118.45 pcf

Density, Dry: 101.00 pcf

Back Pressure: 90 psi

Eff. Confining Pressure: 10 psi

Saturation: 99 %

K = $\frac{Q \times L \times Rt}{h \times A \times t}$
 20°C

Specific Gravity: 2.7
 (Assumed)

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.630	14.630	14.630	14.630
Rt (Temp)	0.923	0.923	0.923	0.923
h cms	31.56	31.56	31.56	31.56
A Sq. cms	46.533	46.533	46.533	46.533
t Sec.	1155	1160	1165	1170
K				
20 cm/sec	7.961E-07	7.927E-07	7.893E-07	7.859E-07



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PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
 Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01(Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3b Supplemental Testing Entered by: KH
 Sample: 21 (Type 2 Soil:Grout Mix G4a) Date: 2-19-20 Checked by: KP
 (10:2.5)
 Remarks: Mix by weight. Tap water used as permeant.
 Tested after curing 28 days. Cell 1
 Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.896	3.018
2.	5.892	3.017
3.	5.891	3.020
4.	5.893	3.019
5.	5.894	3.019

Weight of Specimen:

Initial Weight	<u>1319.2</u> Grams
	<u>2.906</u> Lbs.
Final Weight	<u>1327.2</u> Grams
	<u>2.923</u> Lbs.
Dry Weight	<u>1126.8</u> Grams
	<u>2.482</u> Lbs.

Avg.	<u>5.893</u> In	Ave.	<u>3.019</u> In
	<u>14.969</u> CM		<u>7.667</u> CM
Area	<u>7.157</u> In ²		<u>46.171</u> CM ²
Volume	<u>42.175</u> In ³		<u>0.024</u> Cft.

Moisture Content:

Initial	<u>17.07</u> %
Final	<u>17.78</u> %

Density, Wet Final: 119.88 pcf

Density, Wet Initial: 119.16 pcf

Density, Dry: 101.78 pcf

Back Pressure: 90 psi

Eff. Confining Pressure: 10 psi

Saturation: 99 %

K = $\frac{Q \times L \times Rt}{h \times A \times t}$
 20°C

Specific Gravity: 2.7
 (Assumed)

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.969	14.969	14.969	14.969
Rt (Temp)	0.923	0.923	0.923	0.923
h cms	31.56	31.56	31.56	31.56
A Sq. cms	46.171	46.171	46.171	46.171
t Sec.	1930	1935	1940	1945
K				
20 cm/sec	4.913E-07	4.900E-07	4.887E-07	4.875E-07



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PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01(Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3b Supplemental Testing Entered by: KH
 Sample: 22 (Type 3 Soil:Grout Mix G2a:Calciment) Date: 2-19-20 Checked by: KP
 (10:2.0:0.5)
 Remarks: Mix by weight. Tap water used as permeant.
 Tested after curing 28 days.

Cell 6
 Panel 4

Dimensions of Specimen :

	Length (Inches)	Diameter (Inches)
1.	5.944	3.006
2.	5.941	3.010
3.	5.940	3.009
4.	5.943	3.009
5.	5.942	3.008

Weight of Specimen:

Initial Weight	<u>1393.1</u> Grams
	<u>3.069</u> Lbs.
Final Weight	<u>1405.2</u> Grams
	<u>3.095</u> Lbs.
Dry Weight	<u>1203.1</u> Grams
	<u>2.650</u> Lbs.

Avg.	<u>5.942</u> In	Ave.	<u>3.008</u> In
	<u>15.093</u> CM		<u>7.641</u> CM
Area	<u>7.108</u> In ²		<u>45.859</u> CM ²
Volume	<u>42.237</u> In ³		<u>0.024</u> Cft.

Moisture Content:

Initial	<u>15.79</u> %
Final	<u>16.80</u> %

Density, Wet Final: 126.74 pcf

Density, Wet Initial: 125.65 pcf

Density, Dry: 108.51 pcf

Back Pressure: 90 psi

Eff. Confining Pressure: 10 psi

Saturation: 98 %

K = $\frac{Q \times L \times Rt}{h \times A \times t}$
 20°C

Specific Gravity: 2.7
 (Assumed)

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	15.093	15.093	15.093	15.093
Rt (Temp)	0.923	0.923	0.923	0.923
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.859	45.859	45.859	45.859
t Sec.	1920	1930	1935	1940
K				
20 cm/sec	5.013E-07	4.987E-07	4.974E-07	4.961E-07



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PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
 Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01(Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3b Supplemental Testing Entered by: KH
 Sample: 23 (Type 3 Soil:Grout Mix G2a) Date: 2-19-20 Checked by: KP
 (10:2.0)
 Remarks: Mix by weight. Tap water used as permeant.
 Tested after curing 28 days. Cell 9
 Panel 4

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.808	3.009
2.	5.810	3.010
3.	5.811	3.009
4.	5.810	3.008
5.	5.807	3.011

Weight of Specimen:

Initial Weight	<u>1382.8</u> Grams
	<u>3.046</u> Lbs.
Final Weight	<u>1384.9</u> Grams
	<u>3.050</u> Lbs.
Dry Weight	<u>1204.9</u> Grams
	<u>2.654</u> Lbs.

Avg.	<u>5.809</u> In	Ave.	<u>3.009</u> In
	<u>14.755</u> CM		<u>7.644</u> CM
Area	<u>7.113</u> In ²		<u>45.890</u> CM ²
Volume	<u>41.321</u> In ³		<u>0.024</u> Cft.

Moisture Content:

Initial	<u>14.76</u> %
Final	<u>14.94</u> %

Density, Wet Final: 127.68 pcf

Density, Wet Initial: 127.49 pcf

Density, Dry: 111.09 pcf

Back Pressure: 90 psi

Eff. Confining Pressure: 10 psi

Saturation: 99 %

K = $\frac{Q \times L \times Rt}{h \times A \times t}$
 20°C

Specific Gravity: 2.7
 (Assumed)

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.755	14.755	14.755	14.755
Rt (Temp)	0.923	0.923	0.923	0.923
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.890	45.890	45.890	45.890
t Sec.	1185	1190	1195	1195
K				
20 cm/sec	7.936E-07	7.902E-07	7.869E-07	7.869E-07



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PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
 Constant Head Method (ASTM D5084)

Project: Saranac Lake OU01(Site No. 516008) Proj. No. 912 Tested by: MF
 Phase 3b Supplemental Testing Entered by: KH
 Sample: 24 (Type 3 Soil:Grout Mix G4a) Date: 2-19-20 Checked by: KP
 (10:2.5)
 Remarks: Mix by weight. Tap water used as permeant.
 Tested after curing 28 days. Cell 5
 Panel 5

Dimensions of Specimen :

	<u>Length (Inches)</u>	<u>Diameter (Inches)</u>
1.	5.860	3.012
2.	5.862	3.010
3.	5.861	3.011
4.	5.863	3.009
5.	5.861	3.012

Weight of Specimen:

Initial Weight	<u>1375.8</u> Grams
	<u>3.030</u> Lbs.
Final Weight	<u>1379.8</u> Grams
	<u>3.039</u> Lbs.
Dry Weight	<u>1192.6</u> Grams
	<u>2.627</u> Lbs.

Avg.	<u>5.861</u> In	Ave.	<u>3.011</u> In
	<u>14.888</u> CM		<u>7.647</u> CM
Area	<u>7.120</u> In ²		<u>45.933</u> CM ²
Volume	<u>41.731</u> In ³		<u>0.024</u> Cft.

Moisture Content:

Initial	<u>15.36</u> %
Final	<u>15.70</u> %

Density, Wet Final: 125.96 pcf

Density, Wet Initial: 125.59 pcf

Density, Dry: 108.87 pcf

Back Pressure: 90 psi

Eff. Confining Pressure: 10 psi

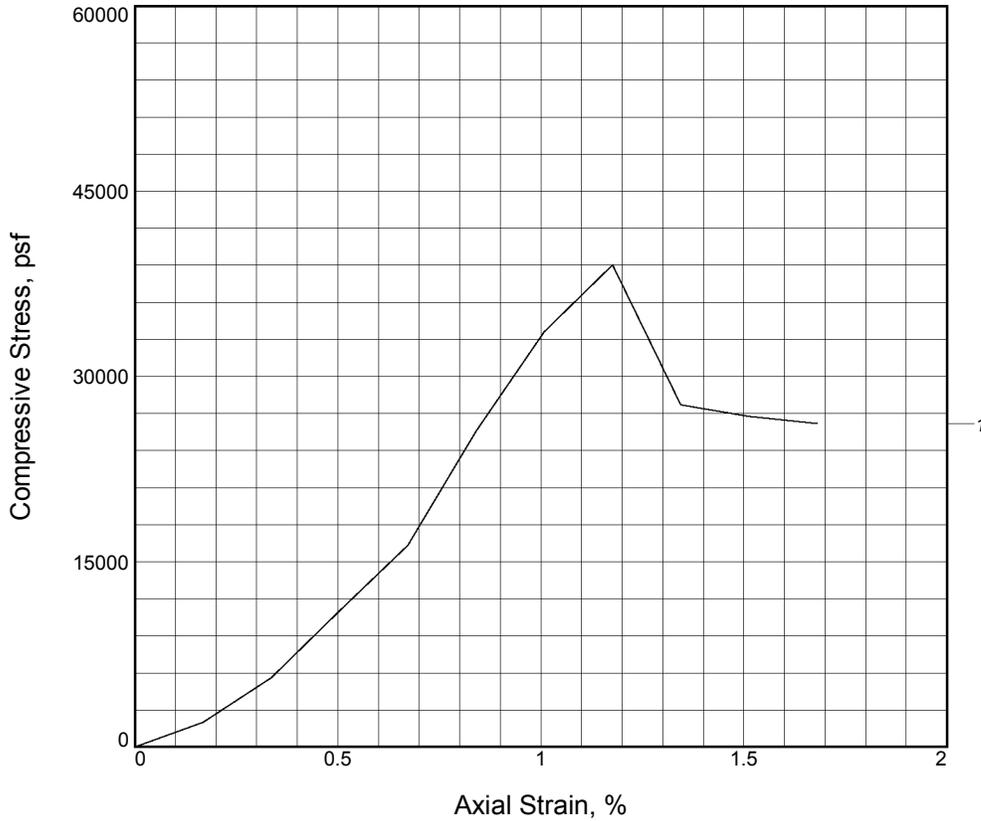
Saturation: 100 %

K = $\frac{Q \times L \times Rt}{h \times A \times t}$
 20°C

Specific Gravity: 2.7
 (Assumed)

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.10	0.10	0.10	0.10
L cms	14.888	14.888	14.888	14.888
Rt (Temp)	0.923	0.923	0.923	0.923
h cms	31.56	31.56	31.56	31.56
A Sq. cms	45.933	45.933	45.933	45.933
t Sec.	2955	2965	2970	2980
K				
20 cm/sec	3.208E-07	3.197E-07	3.192E-07	3.181E-07

UNCONFINED COMPRESSION TEST



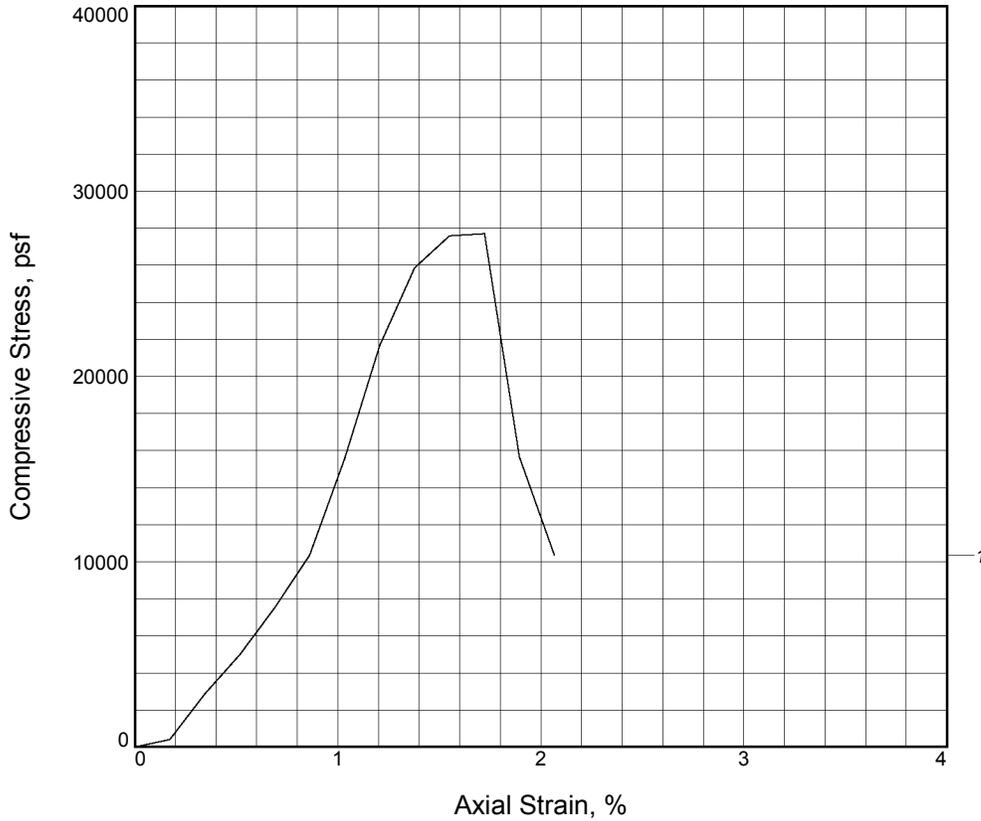
Sample No.	1		
Unconfined strength, psf	39031		
Undrained shear strength, psf	19516		
Failure strain, %	1.2		
Strain rate, in./min.	0.050		
Water content, %	23.2		
Wet density, pcf	126.2		
Dry density, pcf	102.5		
Saturation, %	97.1		
Void ratio	0.6450		
Specimen diameter, in.	3.01		
Specimen height, in.	5.95		
Height/diameter ratio	1.98		

Description:
LL = **PL =** **PI =** **Assumed GS= 2.7** **Type: ASTM D1633**

<p>Project No.: 912 Date Sampled: 2-19-20 Remarks: Tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 3b Supplemental Testing</p> <p>Location: Type 1 Soil:Grout Mix G2a:Calciment (10:2.0:0.5)</p> <p>Sample Number: 16</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

UNCONFINED COMPRESSION TEST



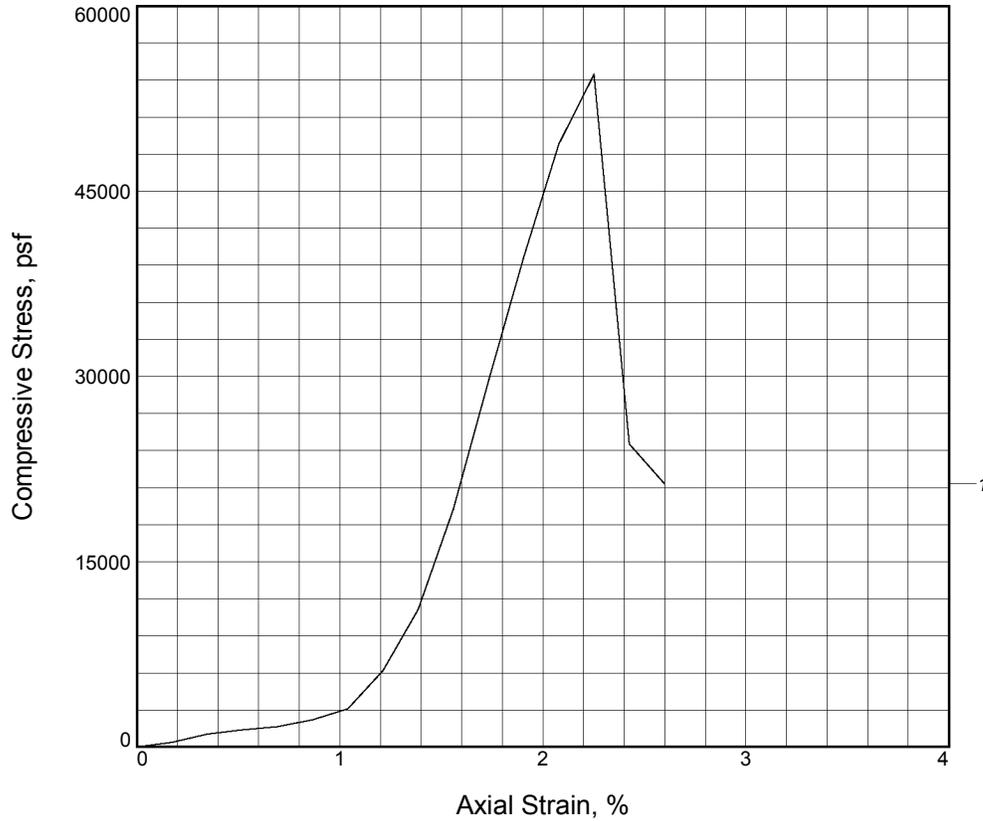
Sample No.	1			
Unconfined strength, psf	27703			
Undrained shear strength, psf	13851			
Failure strain, %	1.7			
Strain rate, in./min.	0.050			
Water content, %	23.2			
Wet density, pcf	127.0			
Dry density, pcf	103.0			
Saturation, %	98.7			
Void ratio	0.6360			
Specimen diameter, in.	3.01			
Specimen height, in.	5.81			
Height/diameter ratio	1.93			

Description:
LL = **PL =** **PI =** **Assumed GS= 2.7** **Type: ASTM D1633**

<p>Project No.: 912 Date Sampled: 2-19-20 Remarks: Tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 3b Supplemental Testing</p> <p>Location: Type 1 Soil:Grout Mix G2a (10:2.0)</p> <p>Sample Number: 17</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

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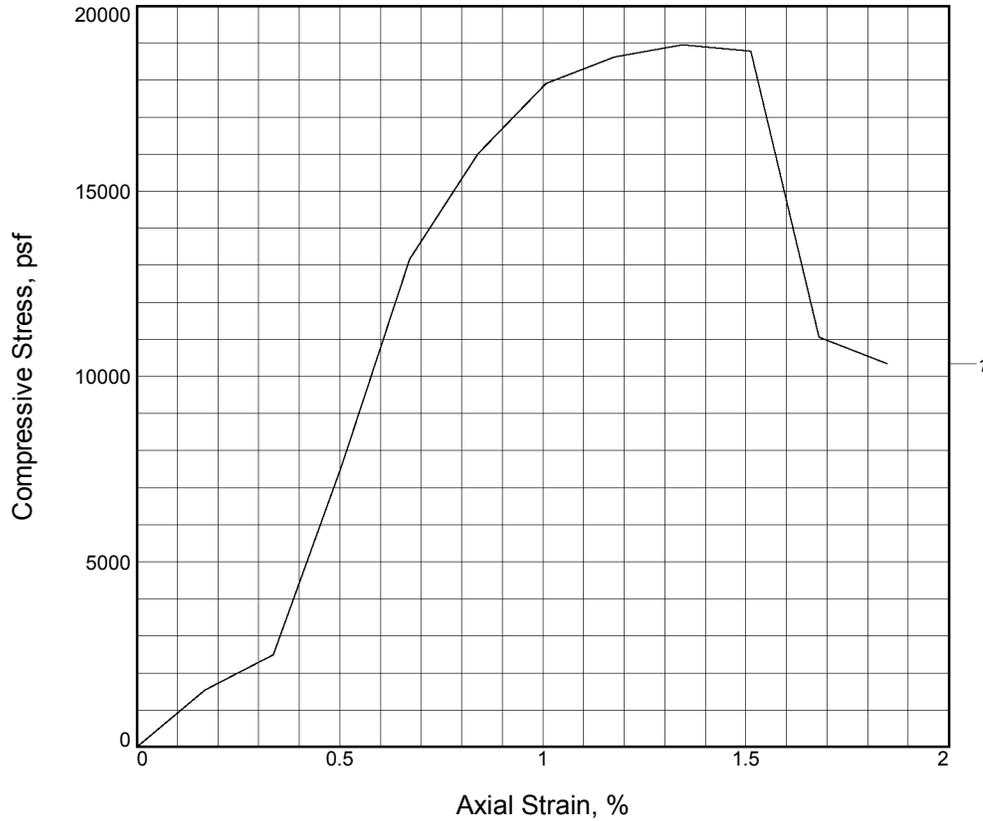
Sample No.	1		
Unconfined strength, psf	54444		
Undrained shear strength, psf	27222		
Failure strain, %	2.3		
Strain rate, in./min.	0.050		
Water content, %	22.8		
Wet density, pcf	126.1		
Dry density, pcf	102.6		
Saturation, %	96.0		
Void ratio	0.6423		
Specimen diameter, in.	3.01		
Specimen height, in.	5.77		
Height/diameter ratio	1.92		

Description:
LL = **PL =** **PI =** **Assumed GS= 2.7** **Type: ASTM D1633**

<p>Project No.: 912 Date Sampled: 2-19-20 Remarks: Tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 3b Supplemental Testing</p> <p>Location: Type 1 Soil:Grout Mix G4a (10:2.5)</p> <p>Sample Number: 18</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

UNCONFINED COMPRESSION TEST



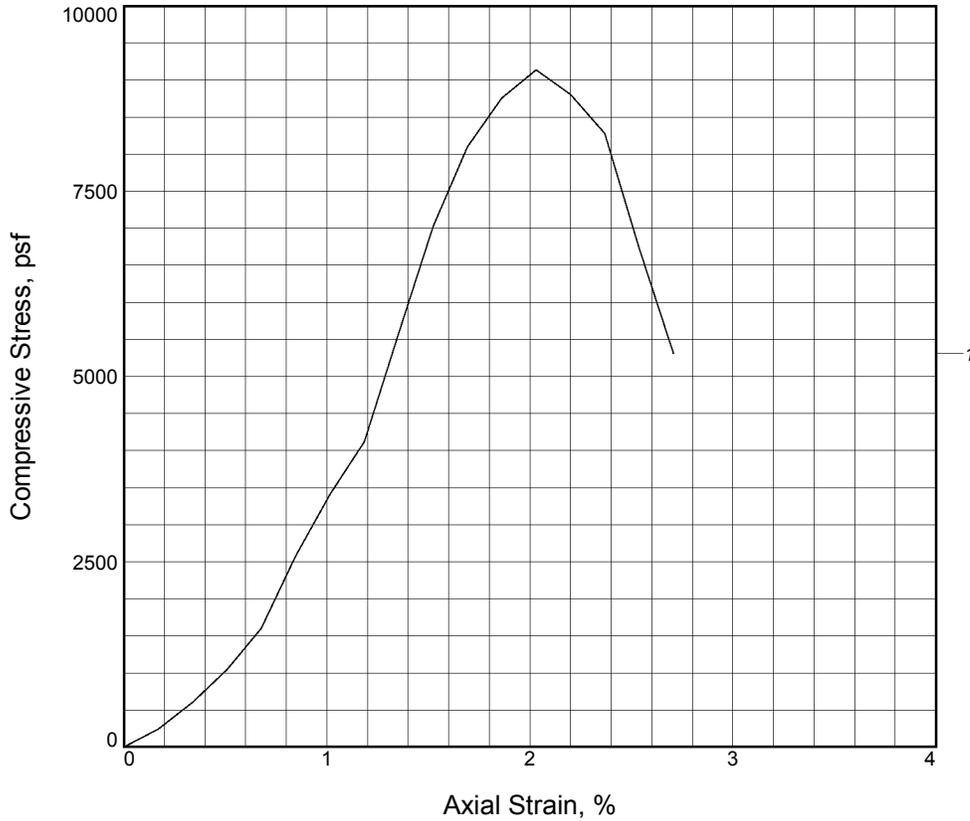
Sample No.	1			
Unconfined strength, psf	18950			
Undrained shear strength, psf	9475			
Failure strain, %	1.3			
Strain rate, in./min.	0.050			
Water content, %	17.9			
Wet density, pcf	117.4			
Dry density, pcf	99.6			
Saturation, %	69.7			
Void ratio	0.6921			
Specimen diameter, in.	3.00			
Specimen height, in.	5.95			
Height/diameter ratio	1.98			

Description:
LL = **PL =** **PI =** **Assumed GS= 2.7** **Type: ASTM D1633**

<p>Project No.: 912 Date Sampled: 2-19-20 Remarks: Tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 3b Supplemental Testing</p> <p>Location: Type 2 Soil:Grout Mix G2a:Calciment (10:2.0:0.5)</p> <p>Sample Number: 19</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	9137		
Undrained shear strength, psf	4568		
Failure strain, %	2.0		
Strain rate, in./min.	0.050		
Water content, %	17.2		
Wet density, pcf	119.3		
Dry density, pcf	101.8		
Saturation, %	71.0		
Void ratio	0.6561		
Specimen diameter, in.	3.02		
Specimen height, in.	5.91		
Height/diameter ratio	1.96		

Description:

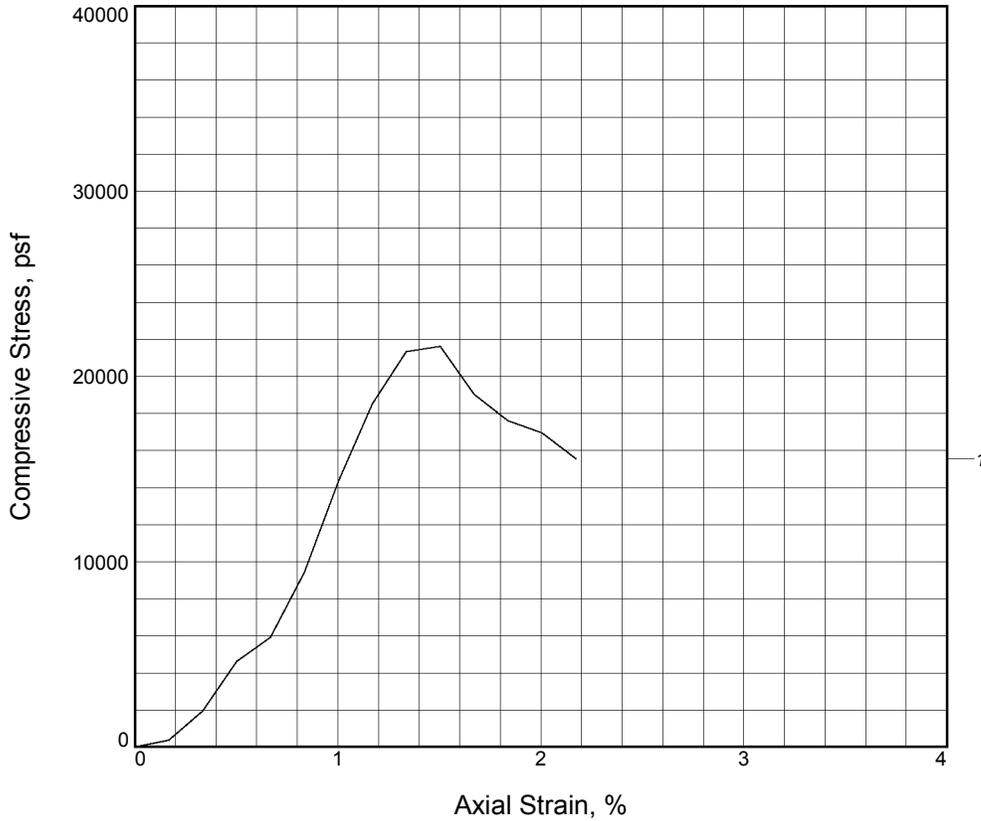
LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 2-19-20 Remarks: Tested after 28 days curing.</p>	<p>Client: Wood PLC Project: MACTEC Phase 3b Supplemental Testing Location: Type 2 Soil:Grout Mix G2a (10:2.0) Sample Number: 20</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Figure _____

Tested By: MF _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	21624		
Undrained shear strength, psf	10812		
Failure strain, %	1.5		
Strain rate, in./min.	0.050		
Water content, %	17.9		
Wet density, pcf	119.6		
Dry density, pcf	101.4		
Saturation, %	73.2		
Void ratio	0.6617		
Specimen diameter, in.	3.01		
Specimen height, in.	5.98		
Height/diameter ratio	1.99		

Description:

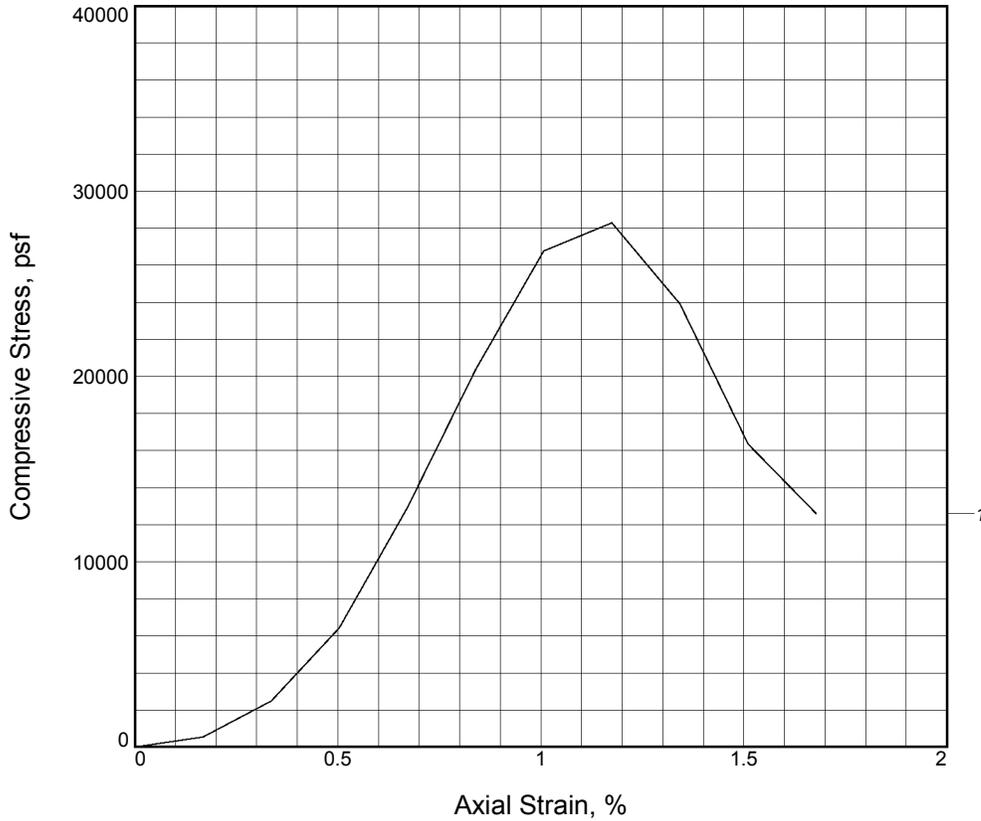
LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
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<p>Project No.: 912 Date Sampled: 2-19-20 Remarks: Tested after 28 days curing.</p>	<p>Client: Wood PLC Project: MACTEC Phase 3b Supplemental Testing Location: Type 2 Soil:Grout Mix G4a (10:2.5) Sample Number: 21</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Figure _____

Tested By: MF _____

UNCONFINED COMPRESSION TEST



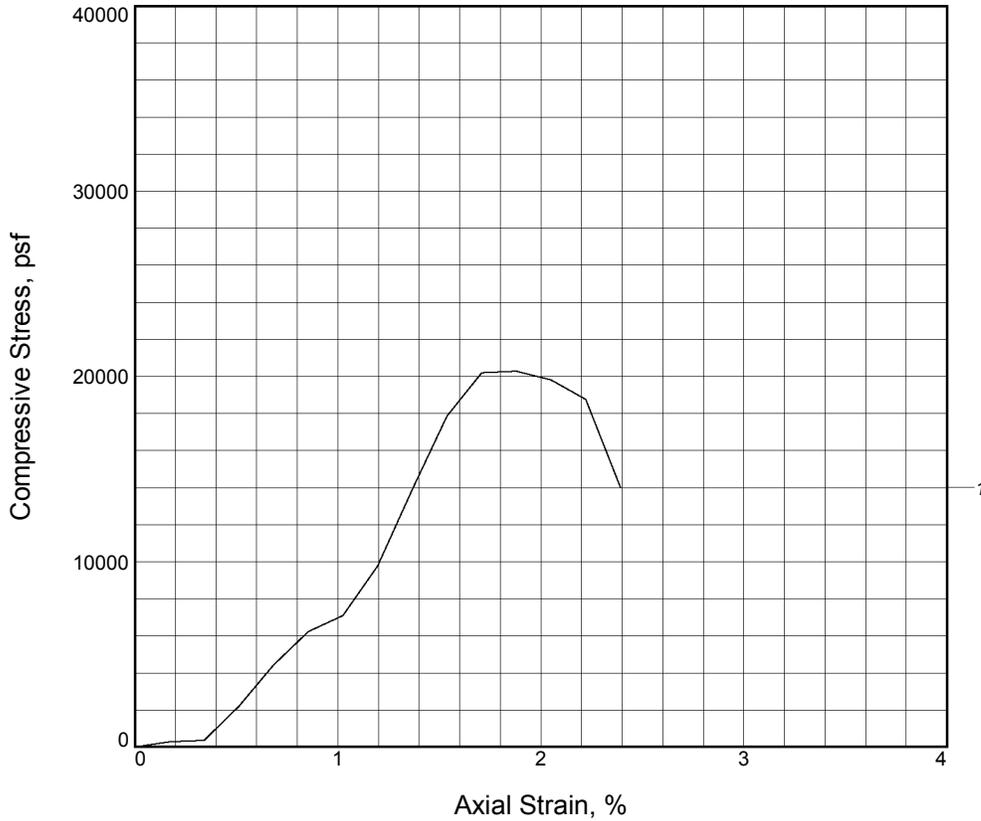
Sample No.	1		
Unconfined strength, psf	28295		
Undrained shear strength, psf	14147		
Failure strain, %	1.2		
Strain rate, in./min.	0.050		
Water content, %	15.1		
Wet density, pcf	124.2		
Dry density, pcf	107.8		
Saturation, %	72.6		
Void ratio	0.5630		
Specimen diameter, in.	3.02		
Specimen height, in.	5.96		
Height/diameter ratio	1.97		

Description:
LL = **PL =** **PI =** **Assumed GS= 2.7** **Type: ASTM D1633**

<p>Project No.: 912 Date Sampled: 2-19-20 Remarks: Tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 3b Supplemental Testing</p> <p>Location: Type 3 Soil:Grout Mix G2a:Calciment (10:2.0:0.5)</p> <p>Sample Number: 22</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

UNCONFINED COMPRESSION TEST

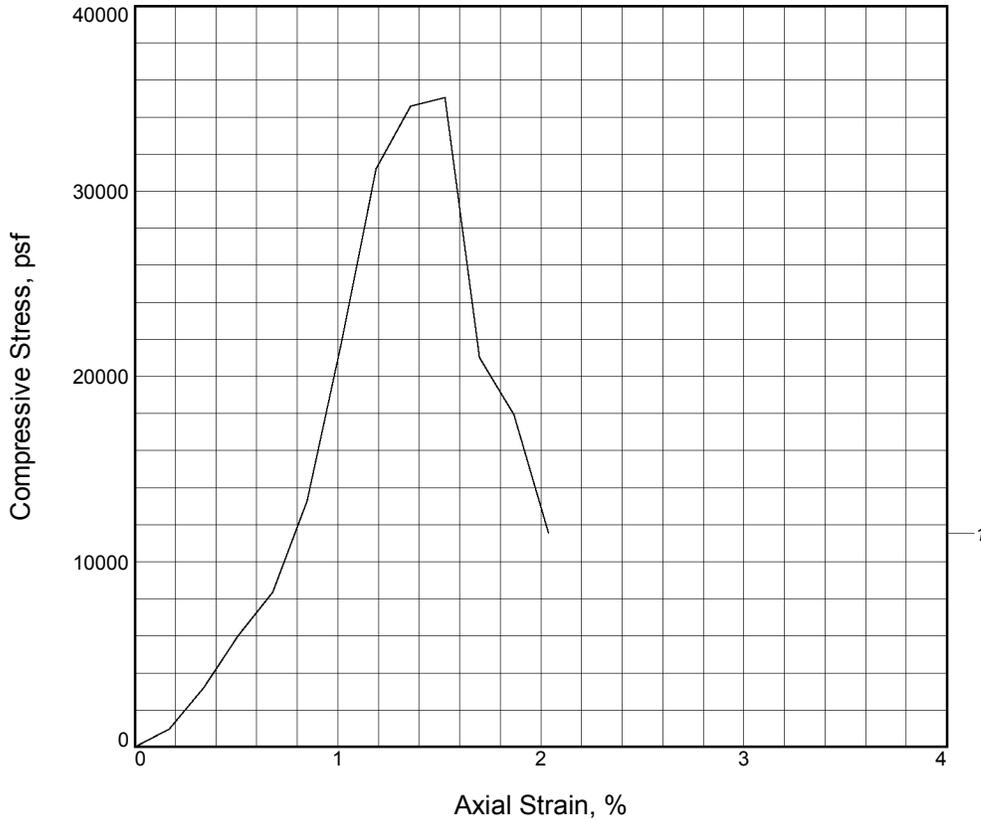


Sample No.	1			
Unconfined strength, psf	20284			
Undrained shear strength, psf	10142			
Failure strain, %	1.9			
Strain rate, in./min.	0.050			
Water content, %	15.9			
Wet density, pcf	124.5			
Dry density, pcf	107.4			
Saturation, %	75.4			
Void ratio	0.5690			
Specimen diameter, in.	3.02			
Specimen height, in.	5.85			
Height/diameter ratio	1.94			

Description:				
LL =	PL =	PI =	Assumed GS= 2.7	Type: ASTM D1633
Project No.: 912 Date Sampled: 2-19-20 Remarks: Tested after 28 days curing.			Client: Wood PLC Project: MACTEC Phase 3b Supplemental Testing Location: Type 3 Soil:Grout Mix G2a (10:2.0) Sample Number: 23	
Figure _____			UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey	

Tested By: MF _____

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, psf	35052		
Undrained shear strength, psf	17526		
Failure strain, %	1.5		
Strain rate, in./min.	0.050		
Water content, %	15.7		
Wet density, pcf	125.7		
Dry density, pcf	108.6		
Saturation, %	76.8		
Void ratio	0.5514		
Specimen diameter, in.	3.01		
Specimen height, in.	5.89		
Height/diameter ratio	1.96		

Description:
LL = **PL =** **PI =** **Assumed GS= 2.7** **Type: ASTM D1633**

<p>Project No.: 912 Date Sampled: 2-19-20 Remarks: Tested after 28 days curing.</p> <p>Figure _____</p>	<p>Client: Wood PLC</p> <p>Project: MACTEC Phase 3b Supplemental Testing</p> <p>Location: Type 3 Soil:Grout Mix G4a (10:2.5)</p> <p>Sample Number: 24</p> <hr/> <p style="text-align: center;">UNCONFINED COMPRESSION TEST RSA Geolab Union, New Jersey</p>
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Tested By: MF _____

ATTACHMENT D

PRELIMINARY SWELL CALCULATION

Preliminary Swell Calculation

Project: Saranac Lake OU1 ISS
 Date: 3/11/20
 By: NDL
 Checked: BBJ

Inputs

Conversion Factors

Mass 1 lb = 453.6 g pounds to grams
 Volume 1 cf = 28316.8 cc cubic feet to cubic centimeters

Soil Properties

$\gamma_{\text{soil}} = 120$ lb/cf = 1.92 g/cc saturated soil unit weight
 $V_{\text{total}} = 1$ cf = 28316.8 cc total volume
 $M_{\text{total}} = 120$ lb = 54431.0 g total mass
 $WC = 27$ % water content
 $M_{\text{soil}} = 87.6$ lb = 39734.7 g mass of soil
 $M_{\text{water}} = 32.4$ lb = 14696.4 g mass of water

Grout Properties

Grout Addition = 20 % by weight of saturated soil weight

$M_{\text{Grout}} = 24$ lb = 10886.2 g mass of grout

Cement = 1
 Water = 1
 Bentonite = 0.025
 Total = 2.025

$M_{\text{Cement}} = 11.9$ lb = 5375.9 g mass of cement
 $M_{\text{GroutWater}} = 11.9$ lb = 5375.9 g mass of grout water
 $M_{\text{Bentonite}} = 0.3$ lb = 134.4 g mass of bentonite

$SG_{\text{Cement}} = 3.37$ specific gravity of cement
 $SG_{\text{GroutWater}} = 1.00$ specific gravity of grout water
 $SG_{\text{Bentonite}} = 2.71$ specific gravity of bentonite

$V_{\text{Cement}} = 0.056$ cf = 1593.0 cc volume cement
 $V_{\text{GroutWater}} = 0.190$ cf = 5375.9 cc volume grout water
 $V_{\text{Bentonite}} = 0.002$ cf = 49.7 cc volume bentonite
 $V_{\text{Grout}} = 0.248$ cf = 7018.6 cc

Swell = 24.8 %