TOWN OF PLYMOUTH
PROCUREMENT DIVISION
11 LINCOLN STREET
PLYMOUTH, MASSACHUSETTS 02360

RFP 21535, STRUCTURAL TESTS AND INSPECTIONS SERVICES AT PLYMOUTH SOUTH HIGH SCHOOL

Issued:	July 9, 2015
Due:	July 24, 2015, at 11:30 A.M.

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TOWN OF PLYMOUTH
11 Lincoln Street
Plymouth, Massachusetts 02360

July 9, 2015

REQUEST FOR PROPOSALS 21535

A. INVITATION

Proposals are requested by the Town of Plymouth for structural tests and inspections services at specified locations within approximately 122 acres at Plymouth South High School, 490 Long Pond Road, Plymouth.

The RFP is available online at http://www.plymouth-ma.gov/current-bids and in the Procurement Office, 11 Lincoln St, Plymouth, MA, 02360. The office hours are M-F 7:30 a.m.-4:00 p.m. Before travelling to the Procurement Office, call first for availability of the RFP at 508-747-1620 x210.

Proposals are to be submitted by 11:30 a.m., Friday, July 24, 2015. Postmarks will not be considered. Proposers must submit separate non-price (technical) and price proposals.

Seven (7) hard copies and one (1) single-file electronic version (in Adobe Acrobat format on a CD-ROM) of a non-price proposal must be submitted in a sealed envelope indicating the proposer's name and address and clearly marked in the lower left hand corner:

PSHS Structural Tests and Inspections
Non-Price Proposal 21535

One (1) hard copy and one (1) single-file electronic version (in Adobe Acrobat format on a CD-ROM) of the price proposal must be submitted in a sealed envelope that indicates the proposer's name and address and clearly marked in the lower left hand corner:

PSHS Structural Tests and Inspections
Price Proposal 21535

Proposers can submit on either Part A, Part B or Both Parts.

Proposals for this Contract are subject to the provisions of Massachusetts General Laws (MGL) Chapter 30B § 1(e), as amended.

B. GENERAL CONDITIONS

1. All words, signatures and figures submitted on the bid shall be in ink. Proposals which are conditional, obscure or which contain additions not called for, erasures, alterations or irregularities may be rejected. More than one proposal from the same proposer will not be considered.

2. Ownership of Documents: Once submitted to the Town, all proposals, materials, drawings, plans, etc. shall become the property of the Town and may be disposed of without notification and shall be considered public information. These documents shall be provided by proposers in electronic and paper formats as set forth above.

3. The proposer selected shall comply with all applicable local, federal and state laws and regulations in the performance of the work contemplated in the RFP, including, but not limited to, prevailing wage requirements under Chapter 149 if and to the extent applicable. All requirements of such laws and regulations are incorporated in this RFP by reference.

4. Purchases made by the Town are exempt from taxes and any prices proposed to the Town must exclude any taxes. Tax exemption certificates will be furnished upon request.

5. The proposer selected will be an independent contractor, and shall not be considered an employee of the Town and will not receive any benefits of an employee.

6. Verbal orders are not binding on the Town and work done without formal Purchase Order or Contract are at the risk of the Seller or Contractor and may result in an unenforceable claim.

7. The Town of Plymouth reserves the right to reject all proposals, to waive technicalities, to advertise for new proposals, and to split awards as may be deemed to be in the best interests of the Town contract or contracts will be awarded by the Town within thirty (30) business days after opening proposals.

C. CONTRACT PERIOD

The contract period shall be for approximately three (3) years from the issuance of a Notice to Proceed. The timeframe for this project will be from approximately August 2015 through August 2018.

D. RULE FOR AWARD

The Contract will be awarded to the responsible and responsive proposer offering the most advantageous proposal, taking into consideration price and all evaluation criteria set forth in this RFP.

E. BACKGROUND

The Town will be constructing a new high school through the Massachusetts School Building Authority on the site of the existing Plymouth South High School. The site is comprised of approximately 122 acres. The proposed building has a total gross floor area of approximately 248,000 sf, with 3 stories and no basement.

F. SCOPE OF WORK AND SPECIFICATIONS

The Town of Plymouth hereby solicits proposals from qualified testing and inspecting firms to provide structural tests and inspections services. The services shall include, but are not limited to the following, and should be separated into two parts in their proposals:

Inspection, Testing and Quality Control: A program of Inspection and Testing will be established by the Structural Engineer of record (SER) who will direct the implementation of tests carried out by the testing agency selected. Materials and workmanship will be subjected to inspection and testing in the mill, shop, and/or field by the SER and/or the selected testing agency.

SER Program of Inspection and Testing

Testing and Inspecting Services - 01 45 23

Testing Laboratory Services - 01 45 29

PSHS Geotechnical Report

Part A

1. Soils and Foundations - 31 00 00
2. Structural Fill (Prepared Fill) - 31 00 00

Part B

1. Cast-In-Place Concrete - 03 30 00
2. Unit Concrete Masonry and Exterior Wall Brick Veneer - 04 20 00
3. Structural Steel - 05 12 00
4. Steel Deck - 05 31 00
5. Structural Light Metal Framing Systems - 05 40 00
6. Stud Shear Connectors - 05 15 00
7. Metal Fabrications - 05 50 00

Part A and Part B specifications are available for viewing at Town Hall, 11 Lincoln Street, Plymouth, MA Procurement department and PPS Facilities office located at 10 Oak Street, Plymouth, MA.

Specifications are also available from the office of the architect, Ai3 Architects, 526 Boston Post Road, Wayland, MA 01778.

The intent of the Town is to have a structural testing and inspection firm available to work immediately when called upon according to the time notifications agreed upon during the time period the project is under construction.

G. SUPPLEMENTAL INFORMATION AND REQUIREMENTS

The Town of Plymouth reserves the right to waive any informality or defect in any proposal, to accept any proposal or parts thereof or reject any proposals, should it deem it to be in the best interest of the Town of Plymouth to do so. The Town reserves the right to revise

the contents of the proposal and to negotiate all aspects of this proposal and any future agreement with the successful firm of the Town's choice. The Town further accepts no responsibility for expenses which may be incurred in the preparation of such proposals. The selected firm shall be expected to comply with all applicable State and Federal laws in the performance of services. Submittals to the Town are considered public information. The Town has the right to disclose information contained in the submittals. The Town further reserves the right to photocopy, circulate or otherwise distribute any material submitted in response to the Request for Proposal (R.F.P.). Original materials which the consultant may wish returned shall be clearly marked to be returned to them.

The selection of the successful firm shall be made without regard to race, color, sex, age, religion, sexual preferences, handicap, political affiliation, veteran status, or national origin. The Town is an Equal Opportunity Employer.

The selected firm will be required to enter into an agreement with the Town of Plymouth for this project.

Any questions regarding the request for proposal shall be submitted in writing to the Owner's Project Manager at least seven (7) days prior to the deadline for submitting the request for proposal. Written answers to questions, which in the opinion of the Town may change or substantially clarify the request for proposal, will be submitted to all prospective firms.

H. SELECTION PROCESS

The Town's Procurement Officer shall not open the proposals publicly, but shall open them in the presence of one or more witnesses at the time specified in the RFP. Up to the date of completion of evaluations, the contents of the proposals shall remain confidential and shall not be disclosed to competing offerors. At the opening of proposals the Procurement Officer shall prepare a register of proposals which shall include the name of each offeror and the number of modifications, if any, received. The register of proposals shall be open for public inspection.

An evaluation team will be established by the Town to include the Owner's Project Manager, Architect, representative of the Building Committee and a representative of the School Department. This team will review and determine if the Technical Proposals meet the Minimum Quality Criteria set forth below, and the evaluation team shall then evaluate the proposals that meet such criteria according to the Comparative Evaluation Criteria in the RFP. Any proposal failing to meet the Minimum Quality Criteria will be eliminated from further review.

The Town may require public presentations of Technical Proposals by Proposers. If presentations are required, they shall be required of the three top-ranked proposers. The Town reserves the right to request or obtain additional information about any and all responses.

The evaluation team will review Technical Proposals that satisfy the Minimum Quality Criteria and, for each such proposal, shall create a written evaluation that shall specify:

(1) for each comparative evaluation criterion, a rating of each proposal as highly advantageous, advantageous, not advantageous, or unacceptable, and the reasons for the rating; and
(2) a composite rating for each proposal, and the reasons for the rating.

After evaluations have been completed, the Procurement Officer shall open the price proposals. The Contract will be awarded to the a responsive, responsible Proposer whose proposal is the most advantageous proposal taking into consideration price and the evaluation criteria set forth in the request for proposals within 30 days of receipt of proposals.

I. EVALUATION CRITERIA

All technical proposals that satisfy the Minimum Quality Criteria listed below shall proceed to evaluation according to the Comparative Evaluation Criteria listed below. Each Technical Proposal must address each of the points under the Minimum Quality Criteria and, for those proposals that satisfy such criterion and proceed to further evaluation, under the Comparative Evaluation Criteria. If presentations/interviews are required, the three top-ranked offerors will be invited. Any proposal failing to meet the Minimum Quality Criteria will be eliminated from further review.

1. MINIMUM QUALITY CRITERIA

Each proposer must meet all the following minimum criteria in order to be considered for further evaluation:

a. complete proposal response, signed, and all requested submittals provided;

b. has a minimum of ten (10) years of experience preparing testing reports of this nature;

c. expertise and experience as related to the state and federal standards for public schools, municipal projects and the Massachusetts School Building Authority by demonstrating completion of at least five (5) similar projects;

2. COMPARATIVE EVALUATION CRITERIA

The following ratings will be used to measure the relative merits of each proposal, which has met the Minimum Evaluation Criteria established above. Those proposals that do not meet the Minimum Criteria will be judged Unacceptable.

Highly advantageous - proposal excels on a specific criterion;

Advantageous - proposal fully meets the evaluation standard, which has been specified;

Not advantageous - proposal does not fully meet the evaluation standard, is unclear and/or incomplete.

The following criteria will be used for comparative purposes:

	Highly Advantageous	**Advantageous**	**Not Advantageous**
1. Thorough understanding of state and federal standards	Has successfully completed 10 or more similar projects	Has successfully completed 5 to 9 similar projects	Less than five similar projects
2. Years of experience in structural testing and inspecting	More than ten	Six to ten	Five or less
3. Number of PE on staff and qualified staff available to provide structural testing and inspections	More than Seven	Three to Seven	Three or less
4. Current Workload	Availability on a days notice	Availability on two days notice	Availability on three days' notice

J. MISCELLANEOUS ARTICLES

1. All questions regarding the project or the specifications must be submitted in writing to Pamela D. Hagler, Procurement Officer, via email to phagler@townhall.plymouth.ma.us or faxed to 508-830-4133. Questions must be received no later than five (5) days before the deadline for receipt of proposals. At the discretion of the Town, questions will be answered by written addenda. Proposers are instructed not to contact staff with questions and may not rely upon oral responses to questions.

2. The Procurement Officer shall unconditionally accept a proposal without alteration or correction, except as provided in this paragraph. An offeror may correct, modify, or withdraw a proposal by written notice received in the office designated in the invitation for proposals prior to the time and date set for the proposal opening. After proposal opening, an offeror may not change the price or any

other provision of the proposal in a manner prejudicial to the interests of the governmental body or fair competition. The Procurement Officer shall waive minor informalities or allow the offeror to correct them. If a mistake and the intended proposal are clearly evident on the face of the proposal, the Procurement Officer shall correct the mistake to reflect the intended correct proposal and so notify the offeror in writing, and the offeror may not withdraw the proposal. An offeror may withdraw a proposal if a mistake is clearly evident on the face of the proposal but the intended correct proposal is not similarly evident.

3. The Contractor shall carry and continuously maintain until completion of the Contract, insurance as specified below and in such form as shall protect him performing work covered by this Contract, or the Town of Plymouth and its employees, agents and officials, from all claims an liability for damages for bodily injury, including accidental death, and for property damage, which may arise from operations under this Contract. The Contractor covenants and agrees to hold the Town and its employees, agents and officials harmless from loss or damage due to claims for personal injury and/or property damage arising from, or in connection with operations under this Contract.

A. Except as otherwise stated, the amounts of such insurance shall be for each policy, not less than:

(1) **General Liability** of at least $1,000,000 Bodily Injury and Property Damage Liability, Combined Single Limit with a $3,000,000 Annual Aggregate Limit. **The Town and shall be named as an "Additional Insured".** Products and Completed Operations should be maintained for up to 3 years after the completion of the project.

(2) **Automobile Liability** (applicable for any contractor who has an automobile operating exposure) of at least $1,000,000 Bodily Injury and Property Damage per accident. **The Town shall be named as an "Additional Insured".**

(3) **'Workers' Compensation Insurance** as required by law, including Employers Liability Part B.

(4) **Property Coverage** for materials and supplies being transported by the contractor as the Town's Property Contract provides coverage for personal property within 1,000 feet of the premises.

(5) **Umbrella Liability** of at least $5,000,000/ occurrence, $5,000,000/aggregate. **The Town shall be named as an Additional Insured.**

(6) **Architects and Engineers Professional Liability** of at least $1,000,000/occurrence, $3,000,000 aggregate.

B. All policies shall be so written that the Owner will be notified of cancellation or restrictive amendment at least

fifteen (15) days prior to the effective date of such cancellation or amendment. A certificate from the Contractor's Insurance Carrier showing at least the coverage and limits of liability specified above and expiration date shall be filed with the Owner before operations are begun.

C. Such certificates shall not merely name the types of policy provided, but shall specifically refer to this Contract and shall state that such insurance is required by this Contract. The Contractor shall make no claims against the Town of Plymouth or its officers for any injury to any of his officers or employees or for damage to its trucks or equipment arising out of work contemplated by this Contract.

D. The Contractor shall, to the maximum extent permitted by law, indemnify and save harmless the Town of Plymouth, its officers, agents and employees from and against any and all damages, liabilities, actions, suits, proceedings, claims demands, losses, costs and expenses (including reasonable attorney's fees) that may arise out of or in connection with the work being performed or to be performed by the Contractor, his employees, agents, sub-contractors or materialmen. The existence of insurance shall in no way limit the scope of this indemnification. The Contractor further agrees to reimburse the Town of Plymouth for damage to its property caused by the Contractor, his employees, agents, sub-contractors or materialmen, including damages caused by his, its or their use of faulty, defective or unsuitable material or equipment, unless the damage is caused by the Town of Plymouth's gross negligence or willful misconduct.

4. The Successful Proposer shall not discriminate against any person on the grounds of race, color, marital status, physical disability, age, sex, sexual orientation, religion, ancestry, or national origin in any manner prohibited by the laws of the United States, the Commonwealth, or the Town of Plymouth.

5. Bid Status Information:
Addenda: If you received bid documents from the Town and provided the Town with an accurate email address or fax number for delivery of addenda, the Town intends to deliver notification of each addendum to you at such address or fax number, but the Town shall not be responsible for any failure of a bidder to receive any addenda for any reason. All addenda will be available on the Town's website at http://www.plymouth-ma.gov/current-bids.

Notwithstanding the foregoing, bidders are solely responsible to check for and confirm their receipt of any addenda in advance of the bid deadline.

A register of Proposals, when available, will be available on the Town's website at http://www.plymouth-ma.gov/bid-results.
Bid results will not be provided over the phone.

Notification of award of contract will be mailed to all bidders and/or posted on the Town's website.

OWNER/CONTRACTOR AGREEMENT

This Agreement made this the _____ Day of _____, 2015, by and between the Town of Plymouth, a municipal corporation, having an office at 11 Lincoln Street, Plymouth, Plymouth County, Massachusetts, acting by and through its Town Manager, thereunto duly authorized, hereinafter referred to as TOWN, and **(vendor)**, a **(entity type)**, with a usual place of business at **(address)** hereinafter referred to as CONTRACTOR.

The parties to this Agreement, in consideration of the mutual covenants and stipulations set out herein agree as follows:

1. The CONTRACTOR shall provide required services associated with a structural tests and inspections, in accordance with and upon the terms and prices outlined in the proposal submitted by the CONTRACTOR for Request for Proposal 21535, incorporated by reference and specifically made a part of this Agreement.

2. The cost of all labor, materials, and incidental expenses needed to accomplish said work shall not exceed the prices as shown in the proposal submitted by the CONTRACTOR.

3. The terms of this agreement shall expire on September 30, 2018.

4. Nothing in the Agreement shall preclude the TOWN from purchasing said services from another vendor should the CONTRACTOR fail to provide the TOWN with the specified services herein.

5. This Agreement merges and supersedes all prior understandings, agreements, discussions and correspondence and sets forth the entire understanding of the parties. This Agreement is to be construed as a Massachusetts contract, and is to take effect as a sealed instrument. It shall be binding upon the respective heirs, devisees, executors, administrators, successors and assigns of the parties, and may be canceled, modified or amended only by a written instrument executed by both the CONTRACTOR and the TOWN. The CONTRACTOR may not assign this Agreement or any rights hereunder without the prior written consent of the TOWN and any such attempted assignment shall be void ab initio.

6. In no case shall the CONTRACTOR act, hold itself out as, or permit anyone to consider it the employee of the TOWN. No agency shall be created between the CONTRACTOR and the TOWN as a result of the CONTRACTOR's performance of services hereunder and the relationship between the parties at all time shall be based on the CONTRACTOR being an independent contractor.

7. The CONTRACTOR acknowledges and agrees that it is responsible as an independent contractor for all operations under this Agreement and for all the acts of its agents and employees, and agrees that it will indemnify and hold harmless the TOWN, its officers, boards, committees and employees from any and all loss, damage, cost, charge, expense and claim which may be made against it or them or to which it or they may be subject by reason of any action, neglect, omission or default on the part of the CONTRACTOR or any of its agents or employees and will

pay promptly on demand all reasonable costs and expenses of the investigation and defense thereof including attorney's fees and expenses. This indemnification is not limited by a limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR under the Worker's Compensation Act, Disability benefits Act or other employee benefit act.

IN WITNESS WHEREOF, the parties hereto have duly affixed their hands and seals on the day and year first above written.

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_____
NAME OF PROPOSER

Prices must be submitted on this form table and submitted in a sealed envelope separate from the non-price (technical) proposal. Prices submitted on any other form will not be considered valid. Please return this form and the non-price proposal to:

Procurement Division
ATTN: Procurement Officer
Town Office Building
11 Lincoln Street
Plymouth, MA 02360

Technical proposals and bid proposals must be received by 11:00 a.m., Friday, July 24, 2015. Postmarks will not be considered. All non-price proposals will be publicly opened and recorded at the above address, date and time. All offers are subject to Specifications 21535. This contract may be extended for up to thirty (30) calendar days at the request of the Town of Plymouth.

In compliance with the above, the undersigned offers and agrees, if this offer is accepted within thirty (30) business days from date of receipt of offers specified above, to furnish all such services described in the Scope of Work and Specifications 21535 for the following prices and that said prices will be good for 3 years.

THE UNDERSIGNED BIDDER HEREBY CERTIFIES:

Bidder has carefully read and examined all the documents herein referred to and knows and understands the terms and provisions therein.

No person in the employ of the Town of Plymouth has any pecuniary interest in this proposal or in the contract for the work which is proposed.

THE UNDERSIGNED BIDDER HEREBY CERTIFIES UNDER THE PAINS AND PENALTIES OF PERJURY THE FOLLOWING:

This bid in all respects is bonafide, fair, and made without collusion or fraud with any The Contracting Party has complied with all laws of the other person. As used in this paragraph, the word PERSON shall mean any natural person, joint venture, partnership, corporation, or other business or legal entity.

The Contractor hereby certifies under the pains and penalties of perjury, in accordance with G.L. c.62C, s. 49A, that he/she has complied with all laws of the commonwealth relating to taxes, reporting of employees and contractors, and withholding and

remitting child support.

STRUCTURAL TESTS AND INPECTIONS SERVICES, PART A, AS SPECIFIED:

$_____

STRUCTURAL TESTS AND INPECTIONS SERVICES, PART B, AS SPECIFIED:

$_____

Please note any exceptions on separate contractor letterhead.

THE UNDERSIGNED ACKNOWLEDGES RECEIPT OF ADDENDA #_____*
*To be filled in by bidder if addenda are issued.

PROPOSER _____

_____

_____

COUNTY _____

PHONE _____

FAX _____

EMAIL _____

STATE OF INCORPORATION _____

TAX I.D. NUMBER _____

_____
AUTHORIZED SIGNATURE

_____
Printed Name and Title

_____
Date Offered

DELEGATION OF AUTHORITY

At a meeting of the Board of Directors of the _____ (Name of Corporation)

_____ duly called and held on _____ (Date)

at which a quorum was present, and acting throughout, the following vote

was duly adopted: VOTED: That _____ (Name of Individual)

the _____ (Title) of the Corporation, hereby is authorized

to affix the Corporate Seal, sign and deliver in the name and on behalf of the Corporation, bids, proposals, contracts, bills of sale, conditional sale agreements, chattel mortgages, leases, bonds, applications, affidavits, certificates, and any other similar documents required in connection with the sale of the Corporation's products to any purchaser, including assignments and satisfactions of any such documents.

Any and all applications, affidavits, statements, certificates, and similar documents required by law in connection with the licensing of the Corporation or its representatives for the sale, distribution, and servicing of its commercial products.

The authority is hereby delegated and shall be exercised by the aforesaid person in connection with the duties as

_____ (Title) of _____ (Name of Corporation)

and not otherwise.

ATTEST: _____ DATE: _____

NOTE: This form must be completed if the contractor is a corporation.

ATTACHMENT 1

TECHNICAL SPECIFICATIONS

Section 01 45 00
QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. General quality assurance and control of installation.

B. Site safety, worker safety and training.

C. Contractor's quality control (QC) program

D. Source quality control.

E. Field samples and mock-ups.

F. Manufacturer's field services and quality control.

G. Field quality control, Owner's right for confirmation.

1.2 RELATED REQUIREMENTS

A. Section 01 43 39 - MOCK-UPS.

B. Section 01 45 29 - TESTING LABORATORY SERVICES.

1.3 GENERAL QUALITY ASSURANCE AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including performance of each step in sequence. Notify Architect when manufacturers' instructions conflict with the provisions and requirements of the Contract Documents; obtain clarification before proceeding with the work affected by the conflict.

C. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate high standards or more precise workmanship.

D. Perform work by persons qualified to produce workmanship of specified quality.

E. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 SITE SAFETY, WORKER SAFETY AND TRAINING

A. General: The Contractor (and subcontractors and Filed subcontractors) shall, at all times, exercise reasonable precautions for the safety of all persons. All rules, regulations, and laws concerning safety that are in effect at the work site, and in particular, all applicable regulations of the Occupational Safety and Health Administration (OSHA) of the U.S. Government, in addition to specified requirements shall be complied with in all respects.

1. Contractor's responsibility for safety shall apply continuously twenty four (24) hours per Day during the term of this Contract and is not limited to normal working hours.

B. Contractor's safety program: Prior to commencement of the Work, the Contractor shall develop and implement a Safety and Health Plan to comply with the Occupational Safety and Health Administration (OSHA) standards for the Construction Industry and all other applicable Federal, State, local laws and regulations. Contractors Safety and Health Plan, and included health and safety procedures and policies, shall be submitted to the Architect and Owner's Representative within fifteen (15) Days after the date of Notice to Proceed and in no event later than commencement of the Work, whichever occurs first.

1. Perform pre planning to ensure access is provided to Fire Department for all areas of the work site throughout the duration of the Contract. The Contractor shall provide the Fire Department site access maps, updated regularly, to reflect changes in the layout of the work site and shall notify the Fire Department when each update is made
2. Post and maintain, at prominent locations throughout the Project site, emergency telephone numbers and shall insure that all personnel on site are continuously aware of this information.
3. Ensure safe access to the Work for the Owner, Architect, Architect's consultants, their designated representatives, and all others charged with inspection, testing and monitoring of the Work, and visitors to the site. The Contractor shall furnish site visitors with safety equipment, test equipment, safety apparel and instructions that are required to insure their safety on site, and In the performance of their duties related to the Work of this Contract

C. All employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration. The OSHA training and certification course shall occur at the time each employee begins work. Furnish documentation to Owner and Architect, for each employee documenting successful completion of the OHSA safety training and certification course. Submit with the first certified payroll report. Comply fully with all laws and regulations applicable to awards made subject to Massachusetts General Laws (MGL) Chapter 149, Section 44A.

1.5 CONTRACTOR'S QUALITY CONTROL PROGRAM

A. Procedures: Contractor and each subcontractor shall include all labor, materials, equipment, services and incidental items necessary to implement quality control procedures to the extent necessary to demonstrate and maintain compliance with the Contract Documents.

B. Quality Control Plan: Within 20 days after Notice to Proceed, the Contractor shall submit a Quality Control (QC) Plan to the Owner's Representative and Architect for approval. The plan shall address the following, as a minimum:

1. The Contractor's commitment to quality and implementing and managing the QC program.
2. Identification of the Contractor's onsite QC Manager, with name, qualifications, duties and responsibilities. The QC Manager shall have the authority to direct the removal and replacement of non-conforming work. The

QC Manager shall be present for all QC meetings, inspections and tests during the project.

3. Procedures for addressing and commenting QC with Contractor's staff, all subcontractors and suppliers, and Owner, Architect and Owner's representative.
4. Procedures for review of submittals and submittal status, and documentation of same.
5. Procedures for pre-installation meetings and documentation of same.
6. Procedures for inspections of deliveries and documentation of same.
7. Procedures for benchmark inspections, defined as initial installations, and documentation of same.
8. Procedures for mockup inspections and documentation of same.
9. Procedures for equipment in place, inspections and documentation of same.
10. Procedures for inspections prior to closures of concealment and documentation of same.
11. Procedures for start-up and commissioning and documentation of same.
12. Procedures for turnover and documentation of same.
13. Procedures for identifying, recording, tracking correcting and reporting items requiring rework, using a Rolling Completion list chronological item number, phase area, date listed, description, party responsible for correction, date notified, and date corrected.
14. Procedures for testing and documentation of same.
15. Procedures for corrective action on Architect's Field Reports and Testing Agency reports and documentation of same.

C. Procedures for reporting on all of the above on a monthly basis as a condition precedent to review of the Contractor's application for payment.

1.6 SOURCE QUALITY CONTROL

A. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Product Labeling: Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code(s).

1. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
   a. Model number.
   b. Serial number.
   c. Performance characteristics.

1.7 FIELD SAMPLES

A. Install field samples demonstrating quality level for the Work, at the site by individual specifications Sections for review and acceptance by Architect. Remove field samples prior to date of Final Inspection, or as directed.

1.8 MOCK-UPS

A. Comply with requirements of Section 01 43 39 - MOCK-UPS.

B. Where requested by Architect, or as specified in individual specification sections, assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes. Remove mock-up assemblies prior to date of Final Inspection, or as directed.

C. Mock-ups, when approved by the Architect, will be used as datum for comparison with the remainder of the Work for the purposes of acceptance or rejection.

D. Demolish and remove from site prior to requesting inspection for certification of Substantial Completion, all Mock-ups which are not permitted to remain as part of the finished work.

1.9 MANUFACTURER'S FIELD SERVICES AND REPORTS

A. When called for by individual Specification Sections, provide at no additional cost to the Owner, manufacturers' or product suppliers' qualified staff personnel, to observe site conditions, start-up of equipment, adjusting and balancing of equipment, conditions of surfaces and installation, quality of workmanship, and as specified under the various Sections.

1. Individuals shall report all observations, site decisions, and instructions given to applicators or installers. Immediately notify Architect of any circumstances which are supplemental, or contrary to, manufacturer's written instructions.

2. Submit full report within 30 calendar days from observed site conditions to Architect for review.

1.10 FIELD QUALITY CONTROL

A. The Owner reserves the right to take samples and perform, at random, tests of approved materials delivered to the job site to verify compliance of actual materials with specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section

Section 01 45 23
TESTING AND INSPECTING SERVICES

PART 1 – GENERAL

1.1 SUMMARY

A. The 8th Edition of the Massachusetts State Building Code, 780 CMR, under which this project is designed and will be built, requires the structural engineer of record (SER) to provide a program of structural tests and inspections for this project in accordance with 780 CMR 17.00.The SER is the structural engineer (an individual) who is in responsible charge of the preparation of the structural drawings and structural specifications for this project and whose Massachusetts professional engineering seal appears on said structural drawings.

B. The SER has prepared a document entitled *Program of Structural Tests and Inspections*, which has been or will be submitted to the building official who has jurisdiction over this project, with the application for a building permit.

C. The program of structural tests and inspections shall not relieve the Contractor or its subcontractors of their responsibilities and obligations for quality control of the Work, their other obligations for supervising the work, for any design work which is included in their scope of services, and for full compliance with the requirements of the Contract Documents. Furthermore, the detection of, or failure to detect, deficiencies or defects in the Work during the testing and inspection conducted pursuant to the program shall not relieve the Contractor or its subcontractors of their responsibility to correct all deficiencies or defects, whether detected or undetected, in all parts of the Work, and to otherwise comply with all requirements of the Contract Documents.

D. The program of structural tests and inspection does not apply to the Contractor's equipment, temporary structures used by the Contractor to construct the project, the Contractor's means, methods, and procedures, and job site safety.

1.2 CONTRACTOR'S RESPONSIBILITIES

A. Where the document *Program of Structural Tests and Inspections* indicates that a structural component or system is subject to structural tests and inspections by 780 CMR 17.00 and that the SER for the project has not been retained to design said component or system or to prepare a performance specification for said component or system, and the Architect has not otherwise provided for the structural design of said component or system, the Contractor shall retain, or require others under his aegis to retain, a professional engineer registered in Massachusetts to design said component or system and to provide the required program of structural tests and inspections for said component or system.

B. This engineer shall visit the site and provide an affidavit to the SER addressed to the Building Inspector verifying that construction has been completed in accordance with the submitted documents.

C. The Contractor shall provide free and safe access to the Work for the SER and all other individuals who are observing the Work or performing structural tests or inspections. The Contractor shall provide all ladders, scaffolding, staging, and up-to-date safety equipment, all in good and safe working order, and qualified personnel to handle and erect them, as may be required for safe access.

D. The Contractor shall give reasonable notice to the SER, or to those performing inspections and tests under the SER's direction, of when the various parts of the Work will be ready for inspection. The Contractor shall obtain instructions from the SER as to what is reasonable notice for the various aspects of the work, and who is to be notified.

E. The Owner reserves the right to back charge the Contractor for additional expense incurred by the Owner for the services of the SER or those under his direction when work is not reasonably ready for inspection in accordance with the notice provided by the Contractor.

PART 2 – NOT USED

PART 3 – NOT USED

End of Section

Section 01 45 29

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section consists of the following:

1. Quality assurance.
2. Laboratory responsibilities.
3. Laboratory reports.
4. Limits on testing laboratory authority.
5. Contractor responsibilities.
6. Contractor submittals.
7. Schedule of inspections and tests.
8. Concrete in situ relative humidity, calcium chloride and acidity/alkalinity testing.

1.2 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ANSI/ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the. Testing and/or Inspection of Soil and Rock
2. ANSI/ASTM E 329 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
3. ASTM F 1869 – Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
4. ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes
5. ASTM F 710 – Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.

1.3 QUALITY ASSURANCE

A. Comply with requirements of ANSI/ASTM D 3740 and ANSI/ASTM E 329.

B. Laboratory: Authorized to operate in state in which Project is located.

C. Laboratory staff: Maintain a full time specialist on staff to review services. Provide registered Engineer on staff for all review of services related to structural testing.

D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either the National Bureau of Standards (NBS) Standards or accepted values of natural physical constraints.

1.4 LABORATORY RESPONSIBILITIES

A. Cooperate with Architect and Contractor in performance of services; provide qualified personnel promptly on notice.
   1. Attend preconstruction conferences and progress meetings, as requested.

B. Acquaint Owner's Project Manager, Architect, and Contractor's superintendent with testing procedures and with all special conditions encountered at the site.

C. Perform specified Inspection, sampling, and testing of products and construction methods in accordance with specified standards as specified in individual technical specification sections:
   1. Comply with specified standards, ASTM, ANSI, and other recognized authorities.
   2. Conduct and interpret the tests and state in each report whether the test specimens comply with the requirements, and specifically state any deviations therefrom.
   3. Obtain Contractor's written acknowledgment of each inspection, sampling, and test made. Test samples of mixes submitted by Contractor.
   4. Ascertain compliance of materials and mixes with requirements of Contract Documents.

D. Promptly notify Architect and Contractor of irregularities, deficiencies, or non-conformance of Work or Products which are observed during performance of services.

E. Promptly submit written report of each test and inspection; one copy each to Architect, Owner's Project Manager, Contractor, and one copy to Project Record Documents File.

F. Perform additional inspections and tests required by Architect/Engineer.

1.5 LABORATORY REPORTS

A. After each test, promptly distribute directly from the testing laboratory, copies of laboratory report to:
   1. Owner's Project Manager.
   2. Architect's office.
   3. Consulting engineer's office.
   4. Contractor's office.
   5. Municipal Inspectional Services Department, if required.

B. Include in report the following information:
   1. Date issued,
   2. Project title and number,
   3. Testing laboratory name, address, and telephone number.
   4. Name and signature of laboratory inspector.
   5. Date and time of sampling,
   6. Record of temperature and weather conditions (as appropriate to test).
   7. Identification of product and Specifications Section,

8. Location of sample or test in the Project.
9. Type of inspection or test.
10. Results of tests and compliance with Contract Documents.
11. Interpretation of test results, when requested by Architect.
12. Observations regarding compliance with Contract Documents

1.6 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Laboratory may not approve or accept any portion of Work.

C. Laboratory may not assume any duties for Contractor.

D. Laboratory has no authority to stop the Work.

1.7 CONTRACTOR RESPONSIBILITIES

A. Coordinate and cooperate with laboratory personnel, provide access to Work.
   1. Monitor each inspection, sampling, and test.
   2. Provide Laboratory or Agency with written acknowledgment of each Inspection, sampling, and test.
   3. Within 24 hours notify Architect and Owner's Project Manager in writing of reasons for not acknowledging Laboratory results.

B. Secure and deliver to the Laboratory or designated location, adequate quantities of representational samples of materials proposed to be used and which require testing, along with proposed mix designs.

C. Furnish incidental labor and facilities:
   1. To provide access to Work to be tested.
   2. To obtain and handle samples at the Project site or at the source of the Product to be tested.
   3. To facilitate inspections and tests.
   4. For storage and curing of test samples.

D. Furnish verification of materials and equipment compliance with Contract Documents.

E. Notify Architect/Engineer and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.

F. Identify materials to be tested or inspected by Testing Laboratory or Agency.

G. After determination of need for testing or inspecting by Owner's Project Manager, notify Laboratory sufficiently in advance, minimum five days, of operations to allow for its assignment of personnel and scheduling of tests.
   1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractors negligence.

H. Make arrangements with laboratory and pay for additional samples and tests required for the following conditions:

1. Initial testing indicates Work does not comply with Contract Documents.
2. Contractor requested testing for additional testing and laboratory services beyond specified requirements.

1.8 CONDUCT OF INSPECTIONS AND TESTS

A. The General Contractor shall notify the Owner's Project Manager, Architect, and Testing Laboratory a minimum of 72 hours before the performance of work to permit the proper conduct of Owner-authorized inspections and tests.

B. Representatives of Testing Laboratory will inspect the manufacture, assembly, and placement of materials as required and as authorized by the Owner, and report their findings to the Architect, Owner's Project Manager, and Contractor.

C. Work shall be checked as it progresses, but failure to detect any defective work or materials shall in no way prevent later rejection when such defect is discovered nor shall it obligate the Owner to accept such work.

1.9 SCHEDULE OF TESTING AND LABORATORIES BY OWNER

A. General: Except as otherwise specified, Owner will appoint, employ, and pay services of independent firm(s) to perform inspection and testing and other services specified herein, in individual specification Sections, and as additionally required by the Architect.

B. General Construction Tests: Requirements for testing, observations, and inspections are described in individual specification sections; the schedule provided below is not intended to completely describe all of the inspection and testing Work required for this Contract, and is only furnished as a guide.

1. Section 03 30 00 - Cast-in-Place Concrete:
   a. Testing of cement mix and aggregates.
   b. Concrete test cylinders.
2. Section 04 20 00 - Unit Masonry:
   a. One day per week observation of masonry installation, grout, mortar and prism testing.
   b. Three cylinders tested for compressive strength at 10 days; ASTM C 91 tests.
3. Section 05 12 00 - Structural Steel Framing: Testing of welds of field and shop fabricated components. Testing of bolting.
   a. Bolt torque testing.
   b. Welding X-ray and ultrasonic tests as specified.
   c. Coating thickness of primer coats.
4. Section 05 21 00 - Steel Joist Framing.
5. Section 05 31 00 - Steel Decking: Periodic inspection of steel decking installation prior to concrete placement.
6. Section 07 84 00 - Fireproofing: Testing and certification of adhesion, density and thickness of installation.

7. Section 07 92 00 - Joint Sealants: Chemical analysis; adhesive strength; compatibility with adjacent materials; elasticity.
8. Section 08 43 13 - Aluminum-Framed Storefronts: In-place testing of specified limits of air infiltration and water resistance according to AAMA 502-08 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
9. Section 08 44 13 - Glazed Aluminum Curtain Wall: In-place testing of specified limits of air infiltration and water resistance according to AAMA 502-08 -Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
10. Section 08 51 13 - Aluminum Windows: In-place testing of specified limits of air infiltration and water resistance according to AAMA 502-08 -Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
11. Section 09 91 00 - Painting: Chemical analysis; coating thickness
12. Division 21 - Fire Suppression: Pressure and leakage testing.
13. Division 22 - Plumbing: Perform pressure, leakage and chlorination testing.
14. Division 23 - Heating, Ventilating and Air Conditioning: Performance testing. Balancing and leakage testing.
15. Section 32 13 13 – Site Concrete: Concrete test cylinders
16. Section 32 13 14 – Exposed Aggregate Concrete Paving: Concrete test cylinders
17. Division 31, 32, 33 - Earthwork, Exterior Improvements, Utilities sections: Continuous observations basis during the installation of the foundation, footings, structural slab, and during backfilling and grading of the site. Testing bearing surfaces prior to the installation of the backfill and foundations. Sampling and compaction testing of fill materials.
    a. Chemical testing of fill materials.
    b. Proctor tests for compaction.
18. Division 33 - Utilities: Perform pressure, leakage and chlorination Testing.
19. Wood: Moisture content; treatment retention; strength; dimension.
20. Paints and Finishes (shop finished products): Chemical analysis, coating thickness.

C. Concrete slabs and floors: Relative Humidity, Moisture Vapor Emission and acidity/alkalinity (pH)Testing:
    1. Owner will employ and pay for services of an independent testing laboratory to perform relative humidity, moisture vapor emission, and pH tests on concrete slabs as follows. The test shall be witnessed by the Contractor, flooring subcontractors and Owner's Project Manager.
        a. Relative Humidity, Moisture Vapor Emission and pH Testing on all concrete slabs over-which a finished floor is to be installed. This includes, but is not limited to:
            1) Resilient flooring, including (but not limited to) linoleum, rubber and vinyl flooring.
            2) Static dissipative flooring.
            3) Resinous flooring and seamless flooring of all types.
            4) Painted floors and concrete sealers.
            5) Carpet.

6) Wood flooring of all types.

b. Perform moisture and pH tests on all concrete floors over-which stone flooring is to be applied.

2. Requirements: As specified under Part 3 of this Section.

a. Submit 1 copy of test data to the installers of all flooring materials or coating materials scheduled to be installed.

b. Provide additional testing in the event test results indicate higher moisture content than recommended by the flooring material and coating material manufacturers for the installation of their products. Perform such additional testing, at no additional cost to the Owner, after procedures have been performed to reduce moisture content to ratings acceptable to the various flooring and coating manufacturers.

D. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

1. Testing agency will notify Architect, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.

3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

5. Testing agency will retest and re-inspect corrected work.

1.10 SCHEDULE OF TESTING AND LABORATORIES BY CONTRACTOR

A. General Contractor shall employ and pay for services of an approved independent testing laboratory to perform inspection and testing specified under this Article and as additionally in individual specification sections

1. Submit to Architect/Engineer a minimum of three independent testing laboratories for each type of testing specified by individual specification sections and those required by the referenced applicable codes, regulations and standards.

2. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

B. Earthwork: Lab tests to determine suitability of all fill materials shall be paid for by Contractor.

1. Owner reserves the right to retain and pay for his own testing for checking purposes

C. Concrete Paving and General Concrete Work: Concrete mix design testing shall be paid for by Contractor. Owner reserves the right to retain and pay for his own testing for checking purposes.

D. Moisture content testing of interior and exterior wood prior to application of field painted coatings.

E. Local Authority Inspections: The Contractor is also responsible for coordinating and cooperating with local requirements for inspections by local Authorities.

F. Massachusetts Energy Code Witness Testing: The Contractor shall engage the services of Massachusetts registered professional mechanical and electrical engineers who shall perform witness testing of all HVAC, lighting and power distribution systems in accordance with the requirements of the Massachusetts Energy Code. The registered professional engineer shall prepare a final performance acceptance report in accordance with the code requirements and in a form acceptable to the local code official. The actual testing shall be performed by the Contractor, his designated subcontractors or authorized manufacturers' representatives. All costs associated with the testing, witnessing of the testing and preparation of reports shall be part of the base contract bid.

1.11 SCHEDULE OF TESTING AND LABORATORIES BY FILED SUBCONTRACTORS

A. Respective Filed subcontractors shall employ and pay for services of an approved independent testing laboratory to perform inspection and testing specified under this Article and as additionally in individual specification sections

1. Submit to Architect a minimum of three independent testing laboratories for each type of testing specified by individual specification sections and those required by the referenced applicable codes, regulations and standards.
2. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents

B. Plumbing: At least the following tests shall be performed. Conform to requirements specified in individual Division 22 Specification Sections. The test shall be performed and paid for by the subcontractor and witnessed by the Contractor, Owner's Project Manager and authorities having jurisdiction:

1. Water supply piping hydrostatic pressure test.
2. Sanitary piping test before fixture installation: Cap pipes and fill to highest point in system.
3. Plumbing fixture operation.

C. Fire Protection System: At least the following tests shall be performed. Conform to requirements specified in individual Division 21 Specification Sections. The test shall be performed and paid for by the subcontractor and witnessed by the Contractor, Owner's Project Manager and authorities having jurisdiction:

1. Fire protection system flushed and pressure tested.

D. HVAC Testing: All HVAC work shall be tested by an independent testing and balancing agency, approved by Owner. Conform to requirements specified in individual Division 23 Specification Sections. The tests shall be performed and paid for by the subcontractor and witnessed by the Contractor, Owner's Project Manager and authorities having jurisdiction. Adjustments shall be made by the subcontractors directed by the Owner's Project Manager. At least the following tests shall be performed:

1. Piping hydrostatic tests.

2. Air and water balancing.
3. Thermostat control monitoring and testing.
4. Boiler efficiency testing.
5. Energy Management System operation.

E. Electrical Power System Testing: At least the following tests shall be performed. Conform to requirements specified in individual Division 26 Specification Sections. The tests shall be performed and paid for by the subcontractor and witnessed by the Contractor, Owner's Project Manager and authorities having jurisdiction:

1. Polarity tests.
2. Operation of all circuits.
3. Testing of emergency system.
4. Security systems.
5. Generation system.
6. Grounding systems.
7. Voice/Video/Data networking testing.

F. Electrical Lighting System Testing: Conform to requirements specified in individual Division 26 Specification Sections. At least the following tests shall be performed and paid for by the Filed-subcontractor:

1. Operation of every component of entire system.

G. Fire Alarm System Testing: At east the following tests will be performed. Conform to requirements specified in individual Division 26 Specification Sections. The test shall be performed and paid for by the subcontractor and witnessed by the Contractor, and Owner's Project Manager:

1. All smoke and heat detectors.
2. Proper operation as required by authorities having jurisdiction.

H. Where no testing requirements are described but the Owner's Project Manager or Architect decides that testing is required, testing will be performed under current pertinent standards for testing.

1.12 FOLLOW-UP AND CORRECTIVE ACTION

A. The Contractor and the Owner's Project Manager will note the test record on the Testing Log to acknowledge test procedures and results. If follow-up or corrective action is needed, the Contractor shall submit to the Owner's Project Manager two written copies of proposed follow-up or corrective plans and obtain the Owner's Project Manager's written approval before proceeding.

1. Cost of Testing: If tests indicate that materials or work do not comply with requirements, the Contractor shall pay for all retesting, and shall remove and replace non-complying work at no additional cost to the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONCRETE IN SITU RELATIVE HUMIDITY, CALCIUM CHLORIDE AND ACIDITY/ALKALINITY TESTING

A. Scope:

1. Provide in situ concrete relative humidity and surface pH testing to all concrete slabs specified to be covered with floor coverings or resinous coatings. Includes concrete placed as part of this Work which occurs below grade, above grade (suspended slabs), and slabs on grade.
    a. Building suspended slabs may be excluded from this requirement.

B. Scheduling:

1. Testing shall take place after allowing concrete to dry for a minimum of 90 days. Testing to be scheduled no less than one, nor more than three weeks prior to scheduled flooring installation.
    a. DO NOT conduct testing unless the slab environment is identical to that In which the finished flooring Is to be installed.
2. In the event new flooring is to be installed over existing resilient flooring, remove the portion of the existing flooring and adhesive directly under the area where testing will be conducted. Patch flooring to match existing construction after completion of testing.

C. Test result submittals:

1. Report all test results in chart form listing test dates, time, depth of test well, in situ temperature, relative humidity, moisture vapor and pH levels.
2. List test locations on chart and show same on marked up Floor Plan Drawings.
3. Submit results In duplicate. Deliver copies directly to Architect, Owner's Project Manager and General Contractor.

D. Testing equipment: shall be equal to the following

1. For relative humidity testing:
    a. Digital Meter and Calibrated Humidity and Temperature probe kit as manufactured by Vaisala Inc. (Boston Office) 10D Gill Street, Woburn, MA, 01801.
        1) Minimum 2 point probe calibration.
2. For calcium chloride testing:
    a. Anhydrous calcium chloride testing in accordance with Rubber Manufacturer's Association (RMA) Test requirements.
    b. Test kits: Vaprecision, inc. 2941 West MacArthur Boulevard, Suite 135. Santa Ana, CA 92704.
3. For pH testing:
    a. pH test paper by Micro Essential Laboratory, Inc., P.O. Box 100824 4224 Avenue "H", Brooklyn, NY 11210.
    b. Distilled or de ionized water.

E. Testing Procedures Quantification of Relative Humidity

1. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period. If meeting this criteria is not possible, then minimum conditions should be 75 degrees F (plus or minus 10 degrees F), and 50 percent (plus or minus 10 percent) relative humidity. When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be Included with the test report.
2. The number of In situ relative humidity test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 in the first 1,000 square feet and 1 per each additional 1,000 square feet.
3. Drill test holes utilizing a roto hammer drill. Hole diameter shall not exceed outside diameter of the insertabie test sleeve by more than 0.04 inch. Drilling operation must be dry. Determine the thickness of the concrete slab from Construction Documents. Depths of test holes shall be as follows:
   a. For elevated slabs (not poured in pans): Drill test holes to a depth equal to 20 percent of the concrete thickness.
   b. For slabs on grade and elevated slabs in pans: Drill test holes to a depth equal to 40 percent of the concrete thickness.
4. Vacuum all concrete dust from test hole.
5. Insert a hole liner, or sleeve, to the full depth of test hole, assuring that the liner is capped or plugged at the end protruding from the concrete surface.
6. Permit the test site to acclimate, or equilibrate, for 72 hours prior to taking relative humidity readings.
7. Remove the sleeve plug and place a probe into the sleeve assuring that it reaches the bottom of the test hole.
8. Allow the probe to sit In the test sleeve for 30 minutes before taking readings.
9. Read and record temperature and relative humidity at the test site.

F. Testing Procedures - Quantification of Concrete Moisture Vapor Emission through Calcium Chloride Testing.

1. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for 48 hours prior and during test period. If meeting this criteria is not possible, then minimum conditions should be 75 degrees F (plus or minus 10 degrees F) and 50 percent relative humidity (plus or minus 10 percent). When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.
2. The number of vapor emission test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to 3 In the first 1.000 square feet and I per each additional 1,000 square feet.
3. Tests sites are to be cleaned of all adhesive residue, curing compounds, paints, sealers, floor coverings, and similar materials. 24 hours prior to the placement of test kits.

4. Weigh test dish on site prior to start of test. Scale must report weight to 0.1 grams. Record weight and start time.
5. Expose Calcium Chloride and set dish on concrete surface.
6. Install test containment dome and allow test to proceed for 60 to 72 hours.
7. Retrieve test dish by carefully cutting through containment dome. Close and reseal test dish.
8. Weigh test dish on site recording weight and stop time.
9. Calculate and report results as pounds of emission per 1,000 square feet per 24 hours."

G. Testing Procedures Quantification of Acidity/Alkalinity (pH) Level

1. At or near the relative humidity test site and each vapor emission (calcium chloride) test site, perform pH test.
   a. At each testing site, lay down a loose 2 foot by 2 foot sheet of rubber flooring or non perforated polyethelene sheet backed by plywood. Leave in place for 48 hours.
   b. Remove rubber sheet/polyethelene and place several drops of distilled or de ionized water onto the concrete surface to form a puddle approximately 1 inches in diameter.
   c. Allow the water to set for approximately 60 seconds.
   d. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading
2. Record and report results.

H. Testing Procedures:

1. Initial testing: Provide 3 tests for the first 1,000 square feet.
2. Add one test for each additional 1,000 square feet.
3. Concrete surface area to be tested shall be completely clean. Remove all adhesives, residue, debris and sealing compounds. Remove all dust by vacuum or other methods. Do not use chemicals of any kind to clean concrete.
4. Perform moisture tests in strict accordance with the kit manufacturer's Instructions. Moisture tests shall remain undisturbed for 60 to 72 hours.
5. Immediately after moisture test has been removed from test area, conduct pH test in area previously covered by plastic dome of moisture test kit.
6. After completion of tests submit 2 copies of test data to the Architect. Submit a copy of the test data to all installers of flooring materials and resinous flooring materials scheduled to be installed.
7. Provide additional testing in the event test results indicate higher moisture content than recommended by the flooring material and coating material manufacturers for the installation of their products. Perform such additional testing, at no additional cost to the Owner, after procedures have been performed to reduce moisture content to ratings acceptable to the various flooring and coating manufacturers.

End of Section

ATTACHMENT 2

APPENDIX C – GEOTECHNICAL REPORT AND LOGS OF ADDITIONAL BORINGS

APPENDIX C

GEOTECHNICAL REPORT

AND

LOGS OF ADDITIONAL BORINGS

DO NOT REMOVE
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LGCI
Lahlaf Geotechnical Consulting, Inc.

September 8, 2014

Mr. L. Scott Dunlap, AIA
Ai3 Architects LLC
526 Boston Post Road
Wayland, MA 01778
phone: (508) 358-0790
fax: (508) 358-0791

Re: Geotechnical Report
Proposed Plymouth South High School
Plymouth, Massachusetts
LGCI Project No. 1408

Dear Mr. Dunlap:

Lahlaf Geotechnical Consulting, Inc. (LGCI) is pleased to submit our geotechnical report for the proposed Plymouth South High School in Plymouth, Massachusetts. We are submitting our geotechnical report electronically.

The soil samples from our explorations are currently stored at LGCI for further analysis, if requested. Unless notified otherwise, we will dispose of the soil samples after three months.

Thank you for choosing LGCI as your geotechnical engineer.

Very truly yours,

Lahlaf Geotechnical Consulting, Inc.

Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

cc. (via e-mail) Ms. Cari Orsi / Pare Corporation
Mr. James Jordan / Ai3 Architects LLC

LGCI
Lahlaf Geotechnical Consulting, Inc.

GEOTECHNICAL REPORT
PROPOSED PLYMOUTH SOUTH HIGH SCHOOL
PLYMOUTH, MASSACHUSETTS

LGCI Project No. 1408
September 8, 2014

Prepared for:

Ai3 ARCHITECTS LLC
526 Boston Post Road
Wayland, MA 01778
phone: (508) 358-0790
fax: (508) 358-0791

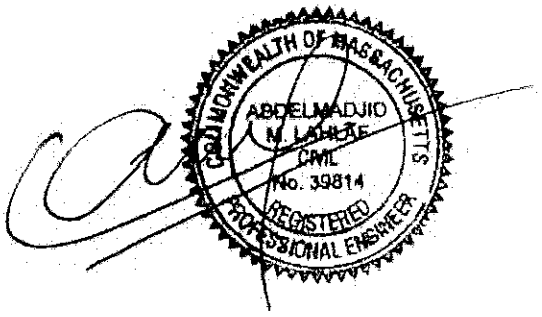
GEOTECHNICAL REPORT
PROPOSED PLYMOUTH SOUTH HIGH SCHOOL
PLYMOUTH, MASSACHUSETTS
LGCI Project No. 1408
September 8, 2014

Prepared for:

Ai3 ARCHITECTS LLC
526 Boston Post Road
Wayland, MA 01778
phone: (508) 358-0790
fax: (508) 358-0791

Prepared by:

LAHLAF GEOTECHNICAL CONSULTING, INC.
23 McGinness Way
Billerica, Massachusetts 01821
Phone: (978) 330-5912
Fax: (978) 330-5056



Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

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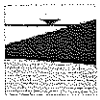


Geotechnical Engineering Report
Proposed Plymouth South High School
Plymouth, Massachusetts
LGCI Project No. 1408

1. PROJECT INFORMATION

1.1 Project Authorization

This report presents the results of subsurface explorations and a geotechnical evaluation performed by Lahlaf Geotechnical Consulting, Inc. (LGCI) for the proposed Plymouth South High School in Plymouth, Massachusetts.

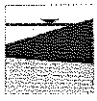
We performed our services in general accordance with our proposals No. 14019 and 14050 dated March 10 and July 21, 2014, respectively. Mr. Scott Dunlap of Ai3 Architect LLC (Ai3) authorized our services by signing our proposal on March 25, and July 29, 2014, respectively.

1.2 Purpose and Scope of Services

The purpose of this study was to obtain subsurface information at the site and to provide recommendations for foundation design and construction. LGCI performed the following services:

- Coordinated our field explorations with Pare Corporation, the project civil engineer, staked our exploration locations in the field, and contacted Dig Safe Systems Inc. (Dig Safe).
- Engaged an excavation subcontractor to excavate a total of twenty-four (24) test pits.
- Engaged a drilling subcontractor to drill a total of twenty-one (21) borings and to install one (1) groundwater observation well.
- Provided geotechnical field engineers at the site to coordinate and observe the borings and test pits, describe the soil samples, and prepare field logs.
- Submitted fourteen (14) soil samples for grain-size analysis.
- Prepared this geotechnical report containing the results of our subsurface explorations and our recommendations for foundation design and construction.

LGCI performed a preliminary study at the site and submitted a geotechnical report containing our preliminary foundation design and construction recommendations dated May 16, 2014. This current report contains a compilation of the results of all our explorations including those performed in the preliminary phase, and supersedes our previous report.



LGCI did not perform environmental services for this project. LGCI did not perform an assessment to evaluate the presence or absence of hazardous or toxic materials above or below the ground surface at or around the site. Any statement about the color, odor, or the presence of suspicious materials included in our boring and test pit logs or report were made by LGCI for information only and to support our geotechnical services. No environmental recommendations and/or opinions are included in this report.

Our scope did not include preparing specifications, attending meetings, performing contract document review, or providing construction services. LGCI would be pleased to perform these services, when needed, under a separate agreement. Recommendations for stormwater management, erosion control, pavement design, and detailed cost or quantity estimates are not included in our scope of work.

1.3 Site Description

Our understanding of the existing conditions is based on our field observations, our discussions with Pare Corporation, and on the following drawings:

- Drawings titled: "New Academic-Vocational High School for the Plymouth Carver Regional School Authority," (4 sheets) (Record Drawings) prepared by Day & Zimmermann of Boston, MA and dated April 1, 1985. These drawings were provided to us by the Town of Plymouth.

- Plan titled "Plymouth South HS Survey, 490 Long Pond Road, Plymouth, MA," (Survey Plan) prepared by CHA of Norwell, MA and dated January 29, 2014.

- Plan titled "Overall Site Plan," (Site Plan) prepared by Ai3 Architects / Pare Corporation and dated July 2014.

Plymouth South High School is located at 490 Long Pond Road in Plymouth, Massachusetts as shown in Figure 1. We understand that the existing school was constructed in the mid-1980s and was opened in 1988.

The site is occupied by the existing high school, parking lots, and a track and field on the southern side; and by athletic fields on the northern side. The site is bordered by Long Pond Road on the southern side, by a driveway leading to the middle school on the western side, by the middle school on the northern side, and by wooded land and Route 3 on the eastern side.

The athletic fields, where the proposed school building will be located, have a diamond shape with two baseball fields on the eastern and western corners, and two softball fields on the northern and southern corners. Soccer and football practice fields are located in the center of the athletic fields. Based on the Survey Plan, the ground surface in the athletic fields ranges between El. 211 feet near the western corner and El. 217 feet on the northeastern side. A small hill is located just east

of the athletic fields and has a local high elevation at about El. 233 feet. On the western side, the ground surface drops beyond the athletic fields over steep slopes to about El. 185 feet.

The site topography suggests that the grades were cut on the eastern side and fill was placed on the western side to create the existing athletic fields. Based on topographical information from the Record Drawings, the original grades within the existing athletic fields ranged between about El. 230 feet on the eastern side and about El. 190 near the western corner of the field; thus, indicating that cuts of up to 13 feet on the eastern side and fill up 19 feet near the western side of the athletic fields were performed during construction of the existing school and athletic fields.

1.4 Project Description

Our understanding of the proposed construction is based on our discussions with Pare Corporation, information provided to us by Ai3 during a conference call on April 16, 2014, and on the Site Plan listed in Section 1.3.

We understand that the proposed high school will be constructed in the existing athletic fields north of the existing school. The existing school will be demolished after the proposed construction is completed to allow for the construction of new athletic fields.

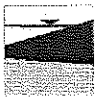
We understand that the proposed school will be three stories high and will have a footprint of about 160,000 square feet. The proposed school building will have a long irregular shape extending from the dirt path leading to the athletic fields on the eastern side to near the baseball field on the western side of the athletic fields. Based on information provided to us by Ai3, the proposed school building will not have a basement.

The proposed construction will also include paved parking lots on the northern and southern sides of the proposed school building, a driveway that loops around the proposed building, an addition to the waste water treatment facility, a half-time building near the northwestern corner of the track, and infiltration basins. We understand that the locations of the infiltration basins have not been selected as shown in Figure 2.

We understand that at the time of this report, the grading design was not completed. Pare Corporation indicated to us that the proposed school building will have a finished floor elevation (FFE) at about El. 214 feet. No information was available at the time of this report about the finished floor elevations at the half-time building and the waste water treatment facility addition.

1.5 Elevation Datum

We understand that the elevations shown in the Survey Plan prepared by CHA, and which we included in our boring and test pit logs, are referenced to the National Vertical Datum of 1988 (NAVD 1988). The Record Drawings referenced in Section 1.3 do not include a reference to an elevation datum.



2. SITE AND SUBSURFACE CONDITIONS

2.1 Surficial Geology

LGCI reviewed the following map:

> "Surficial geologic map of the Norton-Manomet-Westport-Sconticut Neck 23-quadrangle area in southeast Massachusetts," by Stone, B.D., Stone, J.R., DiGiacomo-Cohen, M.L., and Kincare, K.A, U.S. Geological Survey, 2011, Open-File Report 2006–1260–F.

Based on the map, the natural surficial materials at the site consist of glacial stratified deposits of sand, sand and gravel, and gravel.

The surficial geologic map is shown in Figure 3.

2.2 Subsurface Explorations

2.2.1 General

LGCI marked our test pit and boring locations in the field in the presence of representatives of Pare Corporation, Ted Gentry Associates, Inc., the Owner Project Manager, and school personnel.

LGCI provided a field engineer at the site full-time to observe the borings and the test pits, collect soil samples, and prepare field logs.

2.2.2 Test Pits

LGCI engaged J. C. Engineering, Inc. of East Wareham, Massachusetts to excavate twenty-four (24) test pits using a KUBOTA KX080 rubber-track mounted excavator. Test pits TP-1 to TP-12 were excavated on April 3 and 4, 2014 as part of our preliminary study. Test pits TP-101 to TP-112 were excavated on August 11 and 12, 2014 as part of the current study.

The test pits were advanced to depths ranging between 10 and 13.5 feet beneath the existing ground surface. The test pits were backfilled with the excavated materials. The backfill in the bottom of the test pit was placed and tamped with the excavator bucket up to a depth of 6 feet. The top 6 feet were backfilled in 12- to 18-inch lifts and were compacted with a plate compactor. Appendix A contains LGCI's test pit logs, Table 1 contains the test pit summary, and Figures 4A and 4B show the test pit locations.

We understand that the ground surface at the test pit locations was restored with loam and seed by school personnel after our field explorations.

2.2.3 Soil Borings

A total of twenty-one (21) soil borings were advanced at the site.

LGCI engaged Northern Drill Service of Northborough, Massachusetts to advance five (5) soil borings (B-1 to B-5) in the existing athletic fields between April 5 and 7, 2014 using a rubber-track mounted drill rig as part of the preliminary study. LGCI also engaged New Hampshire Boring, Inc. of Brockton, Massachusetts to advance sixteen (16) borings (B-101 to B-114, B-116 and B-117) as part of the current study. Boring B-115 was not advanced because of proximity to the existing building and the presence of utilities in the general area of the boring.

The borings were advanced using 2-¼-inch or 3-¼-inch hollow stem augers (HSAs). Borings B-3 and B-102 were started with HSAs and were completed using 4-inch cased wash-boring techniques.

The borings extended to depths ranging between 11 and 66 feet beneath the ground surface. The drillers performed Standard Penetration Tests (SPT) and obtained split spoon samples with an automatic hammer semi-continuously or at five-foot intervals as noted in the boring logs in general accordance with ASTM D-1586. Unless notified otherwise, we will dispose of the soil samples after three months.

Upon completion, the boreholes were backfilled with the soil cuttings. The drillers installed one groundwater observation well at boring B-2-OW.

Appendix B contains LGCI's boring logs and the groundwater observation well installation report, Table 2 shows the boring summary and Figures 4A and 4B show the boring locations.

The ground surface elevations shown in the test pit and boring logs were interpolated from the Survey Plan or from the Site Plan listed in Section 1.3 and are approximate.

2.3 Subsurface Conditions

The subsurface description in this report is based on a limited number of borings and test pits and is intended to highlight the major soil strata encountered during our borings and test pits. The subsurface conditions are known only at the actual boring and test pit locations. Variations may occur and should be expected between boring and test pit locations. The boring and test pit logs represent conditions that we observed at the time of our explorations and were edited, as appropriate, based on the results of the laboratory test data and inspection of the soil samples in the laboratory. The strata boundaries shown in our boring and test pit logs are based on our interpretations and the actual transition may be gradual. Graphic soil symbols are for illustration only.

The soil strata encountered in our borings and test pits were as follows, starting from the ground surface.

Topsoil/Subsoil – A layer of organic soil (topsoil/subsoil) was encountered at the ground surface in all explorations except in borings B-111 and B-114. The thickness of this layer ranged between 0.3 feet and 1.5 feet, but was mostly more than 1 foot.

Fill – Fill was encountered in all borings and in all test pits except in TP-10 to TP-12, excavated on the northeastern side of the existing athletic fields. The fill extended to depths ranging between about 0.9 and 15 feet beneath the ground surface. The thickness of the fill increased in a westerly direction, consistent with the topographic information from the Record Drawings.

The fill generally consisted of a heterogeneous mixture of poorly graded sand and silty sand with up to 30 percent fines. The fill encountered in the explorations on the western side generally contained more fines than the fill encountered on the eastern side of the athletic fields.

In test pits TP-4, TP-5, TP-7, TP-105 to TP-109, TP-111 and TP-112 excavated on the southeastern side of the athletic fields or on the southern side of site, and in in borings B-4, B-5, B-108 to B-111, B-113, and B-114 drilled on the eastern side of the fields on the southern side of the site, the fill was generally clean, i.e., did not contain organics. In test pits TP-1 to TP-3, TP-6, TP-8, TP-9, TP-101 to TP-104, and in TP-110, and in borings B-101 to B-106, the fill in the top 1.6 to 8 feet was also generally clean. The remainder of the fill in these test pits, and the entire fill layer in borings B-1 to B-3, B-107, B-112, B-116, and B-117 contained traces of organics, buried topsoil, roots, and tree stumps up to 2 feet long and between 6 and 12 in inches in diameter. A few sublayers in the fill contained between 5 percent and 10 percent cobbles as indicated in the test pit logs. At test pit TP-2, nested boulders were observed in the fill.

In general, the fill encountered in the explorations within the western half of the proposed school building and the fill encountered in the borings advanced within the proposed waste water treatment facility addition contained organics.

The standard penetration test (SPT) N-values in the fill ranged between 5 and 31 blows per foot (bpf) with most values lower than 26 bpf, indicating mostly loose to medium dense fill.

Based on the established woods around the athletic fields, i.e., within the footprint of the proposed school building, this area was likely cleared of trees when the existing athletic fields were constructed. Although LGCI did not observe evidence of a stump dump during our borings and test pits, it is not atypical for tree stumps and root balls to be dumped and buried in non-structural areas, and such dumps could exist at locations not explored by LGCI or between explorations.

Natural Sand – A layer of mostly poorly graded sand with up to 5 percent fines and up 20 percent fine gravel was encountered beneath the fill. This layer extended to the exploration termination depths, except in test pits TP-1 and TP-8 which were terminated in the fill. The SPT N-values in this layer ranged between 8 and more than 100 bpf, with most values between 10 and 49 bpf, indicating medium dense to dense sand.

2.4 Groundwater

Groundwater was observed during drilling in borings B-1, B-2, B-101 to B-105, and B-112 and during the excavation of test pits TP-1 to TP-3, TP-6, TP-8, TP-9, and TP-101 to TP-103 at depths ranging between 2 and 10 feet beneath the ground surface. These depths correspond to elevations ranging between El. 203.5 feet and El. 213.5 feet. In boring B-102, the groundwater level was encountered at 32 feet beneath the ground surface during drilling.

The soil samples in borings B-1 and B-2-OW at depths greater than 12 feet were moist and unsaturated, suggesting that the groundwater observed in the borings and test pits listed in the previous paragraph at shallower depths is perched groundwater. We believe that the water that infiltrates at the surface is trapped above the silty, slow-draining fill causing a perched condition, as evidenced by the unsaturated soil samples below a depth of 12 feet in boring B-1 and B-2-OW.

One groundwater observation well was installed in boring B-2-OW. The well was screened between depths of 7 and 17 feet beneath the ground surface. The groundwater observation well installation report is included at the end of Appendix B. The groundwater levels measured in B-2-OW after installation on April 7, and again on April 22, 2014, were 8.3 feet and 3 feet beneath the ground surface, corresponding to El. 205.7 feet and El. 211 feet, respectively. The groundwater level was 2.8 feet beneath the ground surface in B-2-OW on August 13 and 14, 2014, corresponding to El. 211.2 feet.

Based on the borings, the groundwater table in the natural sand layer is deeper than 42 feet.

The reported levels may not represent the actual groundwater conditions, as additional time may be required for the groundwater levels to stabilize. The groundwater levels presented in this report only represent the conditions encountered at the time and locations of our explorations. Seasonal fluctuation should be anticipated.

2.5 Laboratory Test Data

LGCI submitted fourteen (14) soil samples obtained from the borings and test pits for grain-size analysis. The laboratory data sheets are included in Appendix C and the results are summarized below.

Boring/ Test Pit No.	Sample Depth (ft)	Soil Layer	Percent Gravel	Percent Sand	Percent Fines
B-2	2 – 4 (Bot. 8")	Fill	7.1	63.3	29.6
B-3	6 – 8	Natural Sand	13.8	84.6	1.6
B-103	2 – 4	Fill	5.7	87.3	7
B-111	2 – 4	Natural Sand	0.6	97.3	2.1
B-114	0.5 – 2.5	Natural Sand	-.6	96.5	2.9
B-116	5 – 7	Fill	5.8	70.6	23.6
TP-3	2 – 4	Fill	18.7	70.1	11.2
TP-5	2 – 4	Fill	17.3	80.2	2.5
TP-7	2 – 4	Fill	5	93.5	1.5
TP-12	3 – 8	Natural Sand	11.3	83.4	5.3
TP-101	4 – 5	Fill	12.1	85.6	2.3
TP-107	4 - 5	Natural Sand	11.8	87.8	0.4
TP-109	4 – 5	Natural Sand	3	96.3	0.7
TP-112	4 – 5	Natural Sand	7.7	91.1	1.2

3. EVALUATION AND RECOMMENDATIONS

3.1 Foundation Recommendations

3.1.1 General

Based on the results of the borings and test pits, the subsurface conditions at the site are suitable to support shallow foundations after the subgrade is prepared in accordance with the recommendations in this report.

The topsoil/subsoil should be removed from the entire construction area, including the proposed buildings and paved areas. The existing fill is also not suitable to support shallow foundations and should be entirely removed from under the proposed footings to the natural sand layer.

Where the fill contains organics, roots, and other deleterious matter such as encountered in the borings and test pits on the western side of the athletic fields, i.e., on the western side of the proposed school building, and in the area of the proposed waste water treatment facility, the fill is not suitable to support the proposed slab. On the eastern side of the proposed school building, where the existing fill did not generally contain organics, it can support the proposed slab after it is improved as described below.

In consideration of the above, we recommend entirely removing the existing fill from within the western portion of the proposed school building and from under the proposed waste water treatment facility addition and restoring the grades with Structural Fill. Alternatively, the existing fill should be improved using rammed aggregate piers (RAPs). On the eastern side of the proposed school building, the existing fill should be removed from under the proposed footings, but it can stay in place under the proposed slab after it is improved as described in Sections 3.2 and 4.1 of this report.

The proposed half-time building may be supported on shallow footings bearing in the natural sand.

The proposed paved areas can be constructed on the exiting fill after the topsoil/subsoil layer is removed and the top of the existing fill is improved as described in Section 4.1.

Our recommendations for the "remove and replace" improvement option and for RAPs are presented in Sections 3.1.2 and 3.1.3, respectively. Our recommendations for the design of footings and slab-on-grade are presented in Sections 3.1.4 and 3.2, respectively.

3.1.2 Remove and Replace Improvement Option

On the western side of the proposed school building and within the proposed waste water treatment facility, where the existing fill contained organics, buried topsoil, roots, and tree stumps, the existing fill should be entirely removed to the top of the natural sand and replaced with Structural Fill meeting the gradation and compaction requirements presented in Section 4.3.1. Based on the borings, the removal is anticipated to extend to depths of up to 15 feet. On the eastern side of the proposed school building, the existing fill should be removed only from under the proposed footings.

The existing fill removal should extend laterally beyond the zone of influence of footings as described in Section 4.1

To further delineate the limits of the fill that contains organics and that should be entirely removed from under the proposed school building and under the proposed waste water treatment facility, the site contractor should excavate test pits during the earthwork operations.

3.1.3 Rammed Aggregate Piers (RAPs) Improvement Option

We understand that the "remove and replace option" is being considered.

As an alternative to the "remove and replace" option, The RAP option should also be considered. The ground on the western side of the proposed school building footprint and under the proposed waste water treatment facility addition could be improved using RAPs to allow for using shallow foundations and a slab-on-grade. A few tree stumps were observed in test pits TP-1 and TP-2. Based on the number and size of the tree stumps we observed and based on our discussion with a local RAP installer, we believe that these stumps will not obstruct the installation of RAPs.

The selection of RAPs versus the "remove and replace" option should be based on a cost-benefit analysis that takes into account the cost of RAPs, the extent of removal, and whether and how much of the existing fill can be reused onsite.

RAPs are typically installed by augering 24- to 30-inch diameter holes and backfilling the holes by placing and ramming crushed stone or well graded sand with gravel. The backfill material is generally rammed/compacted in one-foot lifts, with a patented high frequency percussion hammer, to provide a firm subgrade and to compact the surrounding soil. In addition to providing a rigid column of granular material, RAPs improve the existing soil as a result of the lateral compaction that occurs during ramming of the crushed stone or well graded sand and gravel in the RAP.

Where it is not desired to generate spoils during the improvement process, vertical displacement RAPs could be used. These are installed by driving a mandrel and hammer to the design depth, feeding the backfill material through the hollow mandrel, and compacting the backfill in one-foot lifts using the hammer; thus, generating no spoils. Vertical displacement RAPs are installed with diameters ranging between 12 and 16 inches, and could be installed to depths of up to 35 feet.

In a previous communication, the project civil engineer expressed a concern about the RAP option related to the long term settlement of the foundations and floor slab as a result of the decay of the organics and tree stumps in the deeper fill. Based on our experience and on our discussion with a local contractor representative specialized in the design of RAPs, we believe that the decay of the occasional stump would not negatively impact the proposed footings or slab. We believe that local settlement that may occur as a result of such decay would be bridged by the granular fill present above the deeper fill containing organics. To reduce the potential for bulging of the RAPs in the deeper fill containing organics, the RAPs should be grouted. This requirement may be waived based on the results of a modulus test performed in an area where the deeper fill contains organics.

The final design of RAPs should be performed by a professional engineer registered in the Commonwealth of Massachusetts and engaged by the contractor. A RAP load/modulus test would be required before the start of the production RAPs. The contractor should submit details about the RAP improvement program, including number, layout, size, and depth of the RAPs, and anticipated settlement of footings bearing on RAP improved ground at least two weeks before the start of the improvements. LGCI should be engaged to review the RAP submittal.

3.1.4 Footing Design

- The topsoil/subsoil layer and the existing fill are not suitable to support the proposed footings and should be entirely removed under footings.

- We recommend supporting the proposed buildings on spread and continuous footings bearing in the natural sand layer, on Structural Fill placed directly over the natural sand, or on RAP improved existing fill.

- For footing design, we recommend using a net allowable bearing pressure of 4,000 pounds per square foot (psf).

- The subgrade of footings should be prepared in accordance with the recommendations in Section 4.1

- All foundations should be designed in accordance with *The Commonwealth of Massachusetts State Building Code 780 CMR, Eighth Edition* (MSBC 8th Edition).

- Exterior footings and footings in unheated areas should be placed at a minimum depth of 4 feet below the final exterior grade to provide adequate frost cover protection. Interior footings in heated areas may be designed and constructed at a minimum depth of 2 feet below finished floor grades.

- We recommend that wall footings have a minimum width of 2 feet, and that column footings have a minimum width of 3 feet. For foundations with a least lateral dimension smaller than 3 feet, the allowable bearing pressure should be reduced to 1/3 of the recommended allowable bearing pressure times the least dimension in feet.

- Wall footings should be designed and constructed with continuous, longitudinal steel reinforcement for greater bending strength to span across small areas of loose or soft soils that may go undetected during construction.

- A representative of LGCI should observe the subgrade of footings to verify that the subgrade has been prepared in accordance with our recommendations.

3.1.5 Settlement

We estimate for foundations constructed in accordance with the recommendations contained in this report, that the total post-construction settlement will be less than about 1 inch and that the differential settlement will be 3/4 inch or less over a distance of 25 feet. Total and differential settlements of these magnitudes are usually considered tolerable for the anticipated construction. However, the tolerance of the proposed structure to the predicted total and differential settlements should be assessed by the structural engineer.

3.2 Concrete Slab Considerations

- The proposed floor slabs can be constructed as slabs-on-grade after the subgrade is prepared in accordance with recommendations in this Section and in Section 4.1.

- The existing fill should be entirely removed and replaced under the proposed slab on the western side of the proposed school building and under the proposed waste water treatment facility addition. The fill should be improved on the eastern side of the proposed school building and under the proposed half-time building. The existing fill should be improved in accordance with the recommendations in Section 4.1.

- We recommend supporting the proposed slab on a minimum of 12 inches of Structural Fill placed directly over the natural sand or on improved existing fill.

- The subgrade of the proposed slabs should be prepared in accordance with the recommendations in Section 4.1.

- A vapor retarder membrane with a minimum thickness of 15 mils could be used beneath the slabs. The need for such a membrane should be evaluated by the architect. The membrane should be protected from puncture during placement of the steel mesh and construction of the slabs.

- For the design of the floor slabs bearing on the materials described above, we recommend using a modulus of subgrade reaction, k_{s1}, of 100 tons per cubic foot (tcf) (116 pci). Please note that the values of k_{s1} are for a 1 x 1 square foot area. These values should be adjusted for larger areas using the following expression:

$$Modulus\ of\ Subgrade\ \mathrm{Re}action(k_s) = k_{s1} * \left(\frac{B+1}{2B}\right)^2$$

where:

k_s = Coefficient of vertical subgrade reaction for loaded area,
k_{s1} = Coefficient of vertical subgrade reaction for 1 x 1 square foot area, and
B = Width of area loaded, in feet.

Please note that cracking of slabs-on-grade can occur as a result of heaving or compression of the underlying soil, but also as a result of concrete curing stresses. To reduce the potential for cracking, the precautions listed below should be closely followed for construction of all slabs-on-grade:

- Construction joints should be provided between the floor slab and the walls and columns in accordance with the American Concrete Institute (ACI) requirements, or other applicable code.

- Backfill in interior and exterior utility trenches should be properly compacted as recommended in Section 3.7.

- In order for the movement of exterior slabs not to be transmitted to the building foundation or superstructure, exterior slabs such as approach slabs and sidewalks, should be isolated from the building superstructure.

3.3 Under-slab Drains

Based on the groundwater levels observed in our explorations and the location of the proposed buildings as conceived at the time of this report, an under-slab drainage system is not required

under the eastern side of the proposed school building, under the proposed half-time building, or under the proposed waste water treatment facility addition.

On the western side of the proposed school building, perched groundwater was observed in our explorations possibly caused by the presence of an impervious silty layer at the bottom of the existing fill. We understand that the design of the proposed school is proceeding with the "remove and replace" option. For this option, we anticipate that the Structural Fill placed to replace the unsuitable existing fill will be free draining; thus, causing the perched condition to cease to exist. Therefore, an under-slab drainage system is not required for the "remove and replace option." If the ground is improved with RAPs, the perched groundwater condition will continue to exist and an under-slab drainage system may be required. LGCI should be notified if such a change occurs so that we may amend our recommendation.

3.4 Seismic Design Criteria

In accordance with Section 1613 of MSBC 8th Edition, the seismic criteria for the site are as follows:

- Site Class: D
- Spectral Response Acceleration at short period (S_s): 0.24g
- Spectral Response Acceleration at 1 sec. (S_1): 0.060g
- Site Coefficient F_a (Table 9.4.1.2.4a): 1.6
- Site Coefficient F_v (Table 9.4.1.2.4b): 2.4
- Adjusted spectral response S_{ms}: 0.384g
- Adjusted spectral responses S_{m1}: 0.144g

Based on the existing deep groundwater table in the natural sand and the SPT N-values, and in accordance with Section 1806.4 of MSBC 8th Edition, the natural sand layer at the site is not susceptible to liquefaction during a seismic event.

3.5 Lateral Pressures for Wall Design and Perimeter Drains

3.5.1 Lateral Earth Pressures

We recommend using the following values for the design of retaining walls:

Coefficient of Active Earth Pressure, K_A:	0.31
Coefficient of At-Rest Earth Pressure, K_o:	0.5
Coefficient of Passive Earth Pressure, K_p:	3.3
Total Unit Weight, γ:	125 pounds per cubic foot

Note: The values in the table are based on a friction angle for the backfill of 32 degrees and neglecting friction between the backfill and the wall. The design active and passive coefficients are

based on horizontal surfaces (non-sloping backfill) on both the active and passive sides, and a vertical wall face.

- Site retaining walls should be designed using the active earth pressure coefficient shown above. Perimeter walls of below-ground spaces, if any, should be designed using the at-rest earth pressures.

- Passive earth pressures should only be used at the toe of the wall where special measures or provisions are taken to prevent disturbance or future removal of the soil on the passive side of the wall, or in areas where the wall design includes a key.

- Where a permanent vertical uniform load will be applied on the active side immediately adjacent to the wall, a horizontal surcharge load equal to half of the uniform vertical load should be applied over the height of the wall. At a minimum, a temporary construction surcharge of 100 psf should be applied uniformly over the height of the wall.

- We recommend using an ultimate friction factor of 0.50 between the natural sand and the bottom of the retaining wall. Retaining walls should be designed for minimum factors of safety of 1.5 for sliding and 2.0 for overturning.

3.5.2 Seismic Pressure

- In accordance with the *Massachusetts State Building Code, 8th Edition, Section 1610*, a lateral earthquake force equal to $0.100*(S_s)*(F_a)*\gamma*H^2$ should be included in the design of the wall (for horizontal backfill), where S_s is the maximum considered earthquake spectral response acceleration (defined in Section 3.4), F_a is the site coefficient (defined in Section 3.4), γ is the total unit weight of the soil backfill, and H is the height of the wall.

  The earthquake force should be distributed as an inverted triangle over the height of the wall. In accordance with MSBC 8th Edition, Section 1610.2, a load factor of 1.43 shall be applied to the earthquake force for wall strength design.

- Temporary surcharges should not be included when designing for earthquake loads. Surcharge loads applied for extended periods of time shall be included in the total static lateral soil pressure and their earthquake lateral force shall be computed and added to the force determined above.

3.5.3 Perimeter Drains

If the proposed school building includes an elevator, the elevator pit may require perimeter drains or should be designed as a waterproof box.

3.6 Parking Lots, Driveways, and Sidewalks

3.6.1 General

The subsurface conditions encountered at the site are generally suitable to support the proposed driveways and parking lots after preparation of the subgrade as described in Section 4.1.

- We recommend removing the surficial topsoil/subsoil within the footprint of the proposed paved areas.

- In existing fill areas, the ground should be improved by excavating at least one foot of the existing fill beneath the bottom of the proposed subbase and compacting the exposed subgrade as described in Section 4.1.

3.6.2 Sidewalks

- Sidewalks should be placed on a minimum of 12 inches of Structural Fill with less than 5 percent fines.

- To reduce the potential for heave caused by surface water penetrating under the sidewalk, the sidewalk concrete sections should be sealed with a waterproof compound. The sidewalks should be sloped away from the building or other vertical surfaces to promote flow of water. To the extent possible, roof leaders should not discharge onto sidewalk surfaces.

3.6.3 Typical Pavement Sections

A typical, minimum, standard-duty pavement section that could be used for parking areas is as follows:

1.5"	Asphalt "Top Course"
2.0"	Asphalt "Base Course"
8"	Processed Gravel for Sub-Base (MassDOT M1.03.1)

A typical, minimum, heavy-duty pavement section that could be used for areas of heavy truck traffic is as follows:

2.0"	Asphalt "Top Course"
2.5"	Asphalt "Base Course"
12"	Processed Gravel for Sub-Base (MassDOT M1.03.1)

The pavement sections shown above represent minimum thicknesses representative of typical local construction practices for similar use. Periodic maintenance should be anticipated.

Pavement material types and construction procedures should conform to specifications of the "Standard Specifications for Highways and Bridges," prepared by the Commonwealth of Massachusetts Department of Public Works and dated 1988 (with 2012 Supplemental Specifications).

Areas to receive relatively highly concentrated, sustained loads such as dumpsters, loading areas, and storage bins are typically installed over a rigid pavement section to distribute concentrated loads and reduce the possibility of high stress concentrations on the subgrade. Typical rigid pavement sections consist of 6 inches of concrete placed over a minimum of 12 inches of subbase material.

3.7 Underground Utilities

Existing fill containing organics encountered in utility trenches should be removed and replaced. Where the trenches terminate in the existing fill free of organics, the bottom of the trench should be improved as described in Section 4.1. To reduce the potential for the deep excavations associated with the removal of the unsuitable existing fill, we recommend installing and tying the utilities to the proposed school building on the eastern side of the site.

Utilities should be placed on suitable bedding material in accordance with the manufacturer's recommendations. "Cushion" material should be placed, by hand, above the utility pipe in maximum 6-inch lifts. The lift should be compacted by hand to avoid damage to the utility. Where the bedding/cushion material consists of crushed stone, it should be wrapped in a geotextile fabric.

Compaction of fill in utility trenches should be in accordance with our recommendations in Section 4.3. To reduce the potential for damage to utilities, placement and compaction of fill immediately above the utilities should be performed in accordance with the manufacturer's recommendations.

3.8 Sedimentation Basins

To help assess the drainage capacity of the soils within the possible locations of the proposed infiltration basins, we performed grain-size analyses on the materials excavated from depths of about 4 to 5 feet beneath the ground surface. The test results are summarized in Section 2.5.

LGCI used the Hazen Formula[1], an empirical relationship correlating the coefficient of permeability to the grain-size data.

The Hazen Formula correlates the coefficient of permeability to the diameter at 10 percent passing by weight also called effective size diameter, D_{10}, as follows:

$$K = C\,(D_{10})^2$$

Where C is a constant with an average value of 1, D_{10} is in mm (between 0.1 and 3 mm), and K is in cm/sec.

The results of the four (4) grain-size analyses from test pits TP-101, TP-107, TP-109, and TP-112 indicated D_{10} values of between about 0.25 and 0.32 mm, indicating a coefficient of permeability value between about 0.06 and 0.10 cm/sec. Soils with similar coefficient of permeability values are considered having good drainage.

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[1] Robert D. Holtz, and William D. Kovacs (1981), *An Introduction to Geotechnical Engineering*, Prentice Hall International, Inc., p.211.

4. CONSTRUCTION CONSIDERATIONS

4.1 Subgrade Preparation

- The topsoil/subsoil layer should be entirely removed from within the proposed building footprints and paved areas.

- For the "remove and replace" option, the existing fill should be entirely removed from within the western portion of the proposed school building and under the proposed waste water treatment facility addition. After the existing fill is removed, the exposed subgrade in the natural sand should be compacted using at last four (4) passes of a vibratory roller compactor imparting a dynamic effort of at least 40 kips.

- The existing fill should also be removed from under the proposed footings on the eastern side of the proposed school building and under the footings of the proposed half-time building.

- The existing fill removal should extend laterally beyond the limit of the proposed buildings a minimum distance equal to the distance between the bottom of the proposed footings and the natural sand or 5 feet, whichever is greater.

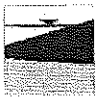
- The base of the footing excavations in the natural sand should be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade, before placing the backfill or concrete.

- In areas with no existing fill, subgrades of slabs and paved areas in the natural sand should be compacted with a heavy vibratory roller compactor imparting a dynamic effort of at least 40 kips.

- To improve the fill under the proposed slab-on-grade on the eastern side of the proposed school building, under the proposed half-time building, and in paved areas, we recommend removing the top one foot of the existing fill and compacting the exposed subgrade with at least six (6) passes of a heavy vibratory roller compactor imparting a dynamic effort of at least 40 kips. Where soft zones are revealed by the compaction effort and where organic soil is exposed, the soft materials or organic soil should be removed and replaced with Structural Fill under buildings and with Ordinary Fill in paved areas. After the exposed subgrade is compacted, the removed existing fill that is free of organics can be placed back in 9-inch loose lifts up to the bottom of the proposed slab subbase or pavement subbase layer.

- At a minimum, 12 inches of Structural Fill should be placed under the proposed slab.

- Utility trenches in the existing fill free of organics, should be extended one foot deeper than the proposed trench bottom. The exposed subgrade should be compacted using at least 4



passes of a vibratory plate compactor imparting a minimum dynamic effort of 10 kips. After the exposed subgrade is compacted, the removed fill should be placed and compacted in six-inch lefts.

- Due to the high susceptibility of the natural sand for disturbance under foot and vehicular traffic, we recommend placing a minimum of 6 inches of Structural Fill under footings to provide a firm working surface during placement of formwork and rebar. If RAPs are used, we recommend placing at least 12 inches of Structural Fill between the bottom of the footings and the RAPs.

- Boulders at the bottom of excavations for footings and slabs should be removed, and the resulting excavation should be backfilled with compacted Structural Fill.

- Fill placed within the footprint of the proposed buildings should meet the gradation and compaction requirements of Structural Fill shown in Section 4.3.1.

- Fill placed under the subbase of paved areas, should meet the gradation and compaction requirements of Ordinary Fill shown in Section 4.3.2.

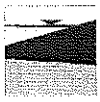
- Fill placed in the top 12 inches beneath sidewalks should consist of Structural Fill with less than 5 percent fines.

- When crushed stone is required in the drawings or it is used for the convenience of the contractor, it should be wrapped in a geotextile for separation.

- An LGCI geotechnical representative should observe the exposed subgrades prior to fill and concrete placement to verify that the exposed bearing materials are suitable for the design soil bearing pressure. If soft or loose pockets are encountered in the footing excavations, the soft or loose materials should be removed, and the bottom of the footing should be placed at a lower elevation on firm soil, or the resulting excavation should be backfilled with Structural Fill, or crushed stone wrapped in a filter fabric.

4.2 Subgrade Protection

The on-site sand may be frost susceptible. If construction takes place during freezing weather, special measures should be taken to prevent the subgrade from freezing. Such measures should include the use of heat blankets, or excavating the final six inches of soil just before pouring concrete. Footings should be backfilled as soon as possible after footing construction. Soil used as backfill should be free of frozen material, as should the ground on which it is placed. Filling operations should be halted in freezing weather.



Materials with high fine contents are typically difficult to handle when wet as they are sensitive to moisture content variations. Subgrade support capacities may deteriorate when such soils become wet and/or disturbed. The contractor should keep exposed subgrades properly drained and free of ponded water. Subgrades should be protected from machine and foot traffic to reduce disturbance.

4.3 Fill Materials

Structural Fill and Ordinary Fill should consist of inert, hard, durable sand and gravel, free from organic matter, clay, surface coatings and deleterious materials, and should conform to the gradation requirements shown below.

4.3.1 Structural Fill

The Structural Fill should have a plasticity index of less than 6, and should meet the gradation requirements shown below. Structural Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of optimum moisture content.

Sieve Size	Percent Passing by Weight
3 inches	100
1 ½ inch	80 - 100
½ inch	50 – 100
No. 4	30 – 85
No. 20	15 – 60
No. 60	5 – 35
No. 200*	0 – 10

* 0 – 5 Under sidewalks

4.3.2 Ordinary Fill

Ordinary Fill should have a plasticity index of less than 6, and should meet the gradation requirements shown below. Ordinary Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of optimum moisture content.

Sieve Size	Percent Passing by Weight
6 inches	100
1 inch	50 - 100
No. 4	20 – 100
No. 20	10 - 70

No. 60	5 – 45
No. 200	0 – 20

4.4 Reuse of Onsite Materials

Based on the grain-size analyses, the natural sand and the existing fill free of organics can be used as Structural Fill or Ordinary Fill.

Poorly graded soils generally require wetting during placement and compaction. The contractor should make available a watering truck to keep surfaces moist during earthwork operations.

During earthwork operations, the contractor should avoid mixing the reusable soils with fine-grained and/or organic soils. The soils to be reused should be excavated and stockpiled separately.

All materials to be used as fill should first be tested for compliance with the applicable gradation specifications.

4.5 Groundwater Control Procedures

Based on the groundwater levels encountered in our explorations, we do not anticipate that groundwater control procedures will be needed during building footing and utility excavations. We expect that filtered sump pumps installed in pits located at least three feet below the bottom of the excavation may be sufficient to handle the perched groundwater or surface runoff that may enter the excavation.

The contractor should be permitted to employ whatever commonly accepted means and practices as necessary to maintain the groundwater level below the bottom of the excavation, and to maintain a dry excavation during wet weather. Groundwater levels should be maintained at a minimum of 1-foot below the bottom of excavations during construction. Placement of reinforcing steel or concrete in standing water should not be permitted.

4.6 Temporary Excavations

All excavations to receive human traffic, including utility trenches, basement or footing excavations, or others (i.e. underground storage tanks, etc.), should be constructed in accordance with the OSHA guidelines.

The site soils should generally be considered Type "C" and should have a maximum allowable slope of 1.5 Horizontal to 1 Vertical (1.5H:1V) for excavations less than 20 feet deep. Deeper excavations, if needed, should have shoring designed by a professional engineer.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of the excavation sides and bottom.

5. RECOMMENDATIONS FOR FUTURE WORK

We recommend engaging LGCI to perform the following services:

- Review the geotechnical aspects of the contract drawings and provide comments in a letter.
- Review the geotechnical aspects of contractor submittals.
- Provide a field representative during construction to observe the subgrades for footings, floor slabs, ground improvements, if applicable, and paved areas, and to submit daily field reports documenting our observations and field recommendations.

6. REPORT LIMITATIONS

Our analysis and recommendations are based on project information provided to us at the time of this report. If changes to the type, size, and location of the proposed structures or to the site grading are made, the recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions and recommendations modified in writing by LGCI. LGCI cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to determine whether any changes in the project affect the validity of our recommendations and whether our recommendations have been properly implemented in the design.

It is not part of our scope to perform a more detailed site history; therefore, we have not explored for or researched the locations of buried utilities or other structures in the area of the proposed construction. Our scope did not include environmental services or services related to moisture, mold, or other biological contaminates in or around the site.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. We cannot accept responsibility for designs based on recommendations in this report unless we are engaged to 1) make site visits during construction to check that the subsurface conditions exposed during construction are in general conformance with our design assumptions and 2) ascertain that, in general, the work is being performed in compliance with the contract documents.

Our report has been prepared in accordance with generally accepted engineering practices and in accordance with the terms and conditions set forth in our agreement. No other warranty, expressed or implied, is made. This report has been prepared for the exclusive use of Ai3 Architects LLC for the specific application to the proposed Plymouth South High School in Plymouth, Massachusetts as conceived at this time.

7. REFERENCES

The Commonwealth of Massachusetts (2010), "The Massachusetts State Building Code, 780 CMR, Eighth Edition."

The Department of Labor, Occupational Safety and Health Administration (1989), "Occupational Safety and Health Standards - Excavations; Final Rule," 20 CFR Part 1926, Subpart P.

USGS Plymouth, MA topographic map from www.digital-topo-maps.com

Table 1 - Summary of Test Pits
Proposed Plymouth South School
Plymouth, Massachusetts
LGCI Project No. 1408

Test Pit No.	Ground Surface Elevation (ft.)*	Groundwater** Depth / El. (ft.)	Bottom of Topsoil Depth / El. (ft.)	Bottom of Fill *** Depth / El. (ft.)	Bottom of Test Pit Depth / El. (ft.)
TP-1	211.5	6 / **205.5**	1.5 / **210**	13.5 / **198**	13.5 / **198**
TP-2	214.5	4 / **210.5**	0.9 / **213.6**	9.5 / **205**	12 / **202.5**
TP-3	215.5	3 / **212.5**	1 / **214.5**	7.5 / **208**	11 / **204.5**
TP-4	214.5	- / -	1.1 / **213.4**	4 / **210.5**	11 / **203.5**
TP-5	213.5	- / -	0.7 / **212.8**	4 / **209.5**	10.5 / **203**
TP-6	214	2.5 / **211.5**	0.9 / **213.1**	6.5 / **207.5**	12 / **202**
TP-7	215	- / -	1 / **214**	6.5 / **208.5**	11 / **204**
TP-8	215	6 / **209**	0.8 / **214.2**	12 / **203**	12 / **203**
TP-9	216	2.5 / **213.5**	0.8 / **215.2**	8 / **208**	12 / **204**
TP-10	216.5	- / -	1.1 / **215.4**	- / -	10 / **206.5**
TP-11	214.5	- / -	0.9 / **213.6**	- / -	11 / **203.5**
TP-12	233	- / -	1.3 / **231.7**	- / -	11 / **222**
TP-101	212.5	8 / **204.5**	1 / **211.5**	10.5 / **202**	11.5 / **201**
TP-102	213	6 / **207**	1 / **212**	10 / **203**	10.5 / **202.5**
TP-103	213.5	3.5 / **210**	0.8 / **212.7**	5.5 / **208**	11 / **202.5**
TP-104	213.5	NA / -	0.8 / **212.7**	3.4 / **210.1**	10.5 / **203**
TP-105	204.5	NA / -	0.5 / **204**	2 / **202.5**	11 / **193.5**
TP-106	209.5	NA / -	0.3 / **209.2**	3.5 / **206**	10 / **199.5**
TP-107	209.5	NA / -	0.7 / **208.8**	3 / **206.5**	10 / **199.5**
TP-108	210.5	NA / **0**	1.3 / **209.2**	1.8 / **208.7**	11 / **199.5**
TP-109	209.5	NA / -	1 / **208.5**	4 / **205.5**	10 / **199.5**
TP-110	206.5	NA / -	0.7 / **205.8**	10 / **196.5**	11 / **195.5**
TP-111	210	NA / -	0.6 / **209.4**	5 / **205**	10.5 / **199.5**
TP-112	214	NA / -	0.9 / **213.1**	2 / **212**	10 / **204**

* Ground surface elevations for TP-1 to TP-12 interpolated from Survey Plan prepared by CHA and dated 01/29/14.

* Ground surface elevations for TP-101 to TP-111 were interpolated from Plan titled: "Overall Site Plan," prepared by Ai3 Architect / Pare Corporation and dated July 2014.

* The elevations are approximate.

* Ground surface elevation are referenced with respect to NAVD 88.

** Groundwater in the test pits may be due perched groundwater condition.

*** TP-1 and TP-8 terminated in the fill.

Table 2 - Summary of Borings
Proposed Plymouth South High School
Plymouth, Massachusetts
LGCI Project No. 1408

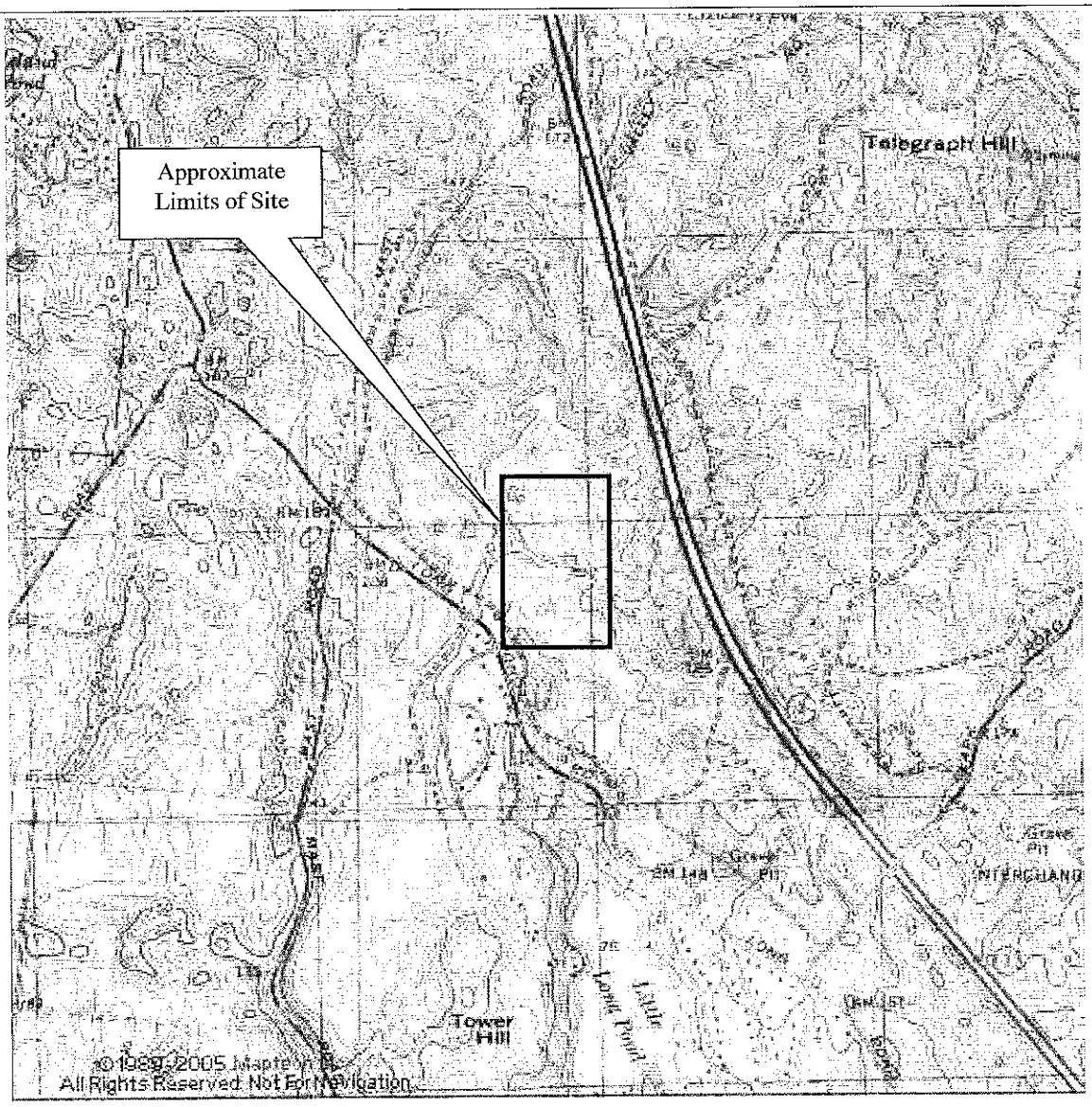
Boring No.	Ground Surface Elevation (ft.)*	Groundwater Depth / El. (ft.)*	Bottom of Topsoil Depth / El. (ft.)*	Bottom of Fill Depth / El. (ft.)	Bottom of Boring Depth / El. (ft.)*
B-1	213.5	10 / **203.5**	1.2 / **212.3**	15 / **198.5**	42 / **171.5**
B-2	214	2 / **212**	1 / **213**	12 / **202**	42 / **172**
B-3	216	- / -	1.2 / **214.8**	4 / **212**	66 / **150**
B-4	213	- / -	0.6 / **212.4**	5 / **208**	42 / **171**
B-5	214	- / -	1 / **213**	7 / **207**	42 / **172**
B-101	213	4.8 / **208.2**	0.7 / **212.3**	10.9 / **202.1**	17 / **196**
B-102	214	32 / 182	0.9 / **213.1**	7 / **207**	36 / **178**
B-103	214.5	4 / 210.5	0.9 / **213.6**	10.4 / **204.1**	35 / **179.5**
B-104	215.5	3 / 212.5	1 / **214.5**	7 / **208.5**	21 / **194.5**
B-105	215	5 / **210**	0.7 / **214.3**	8.5 / **206.5**	21 / **194**
B-106	216	NA / -	1 / **215**	5.4 / **210.6**	17 / **199**
B-107	215.5	NA / -	0.8 / **214.7**	5.8 / **209.7**	17 / **198.5**
B-108	214.5	NA / -	0.6 / **213.9**	5.1 / **209.4**	17 / **197.5**
B-109	213.5	NA / -	0.5 / **213**	2.2 / **211.3**	17 / **196.5**
B-110	214.5	NA / -	1 / **213.5**	6 / **208.5**	17 / **197.5**
B-111	210	NA / -	NA / -	1 / **209**	17 / **193**
B-112	216	5 / 211	1.2 / **214.8**	13.3 / **202.7**	17 / **199**
B-113	217	NA / -	0.3 / **216.7**	4 / **213**	11 / **206**
B-114	211	NA / -	NA / -	0.9 / **210.1**	22 / **189**
B-115	NOT PERFORMED	/	/	/	/
B-116	214	NA / -	1 / **213**	11 / **203**	17 / **197**
B-117	214	NA / -	1.1 / **212.9**	7.8 / **206.2**	22 / **192**

* Ground surface elevations for B-1 to B-5 were interpolated from Survey Plan prepared by CHA and dated 01/29/14.

* Ground surface elevations for B-101 to B-117 were interpolated from Plan titled: "Overall Site Plan," prepared by Ai3 Architect / Pare Corporation and dated July 2014.

* The elevations are approximate.

* Ground surface elevation are referenced with respect to NAVD 88.

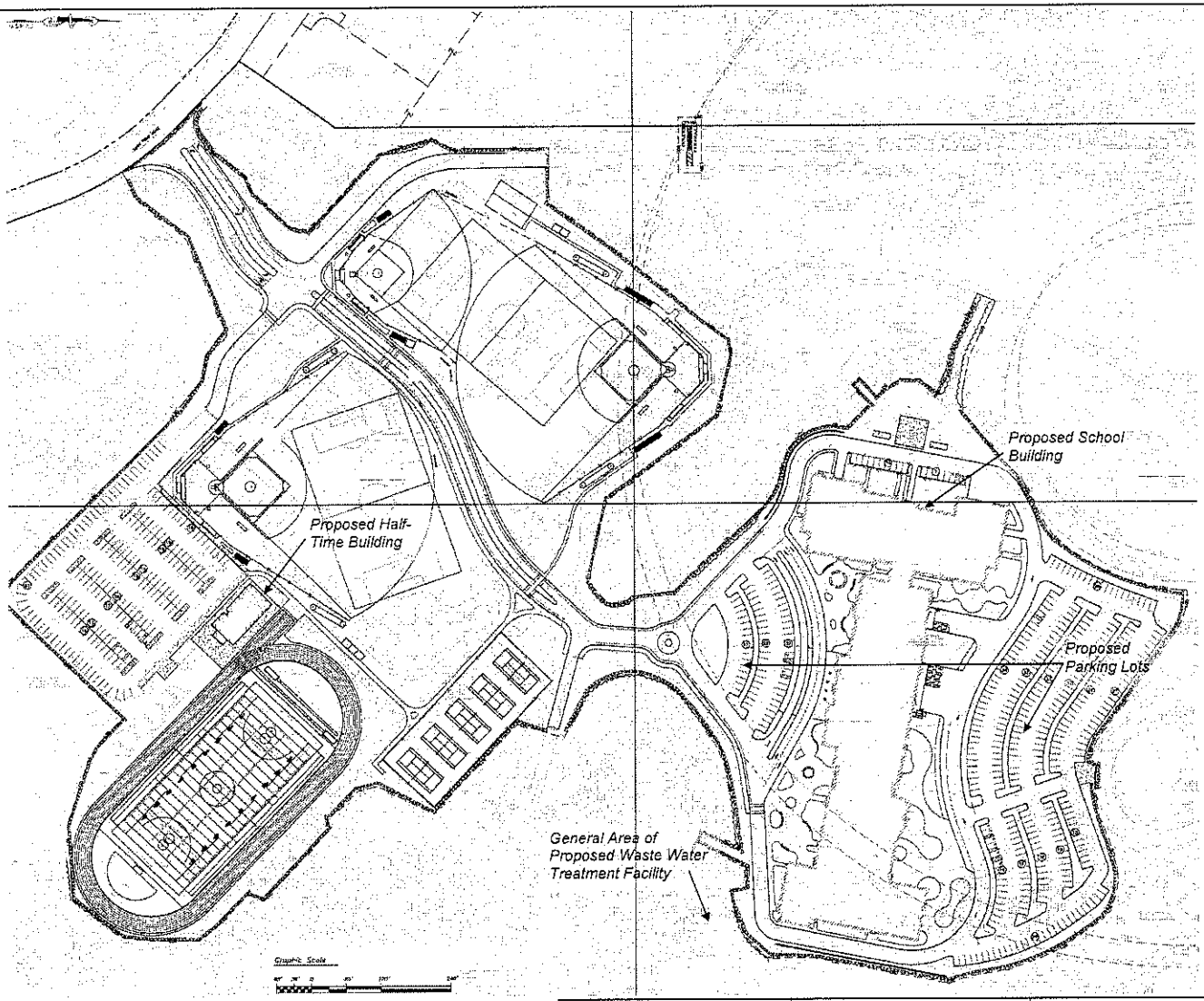


N

Approximate Scale: 1:25000
Contour intervals: 10 feet

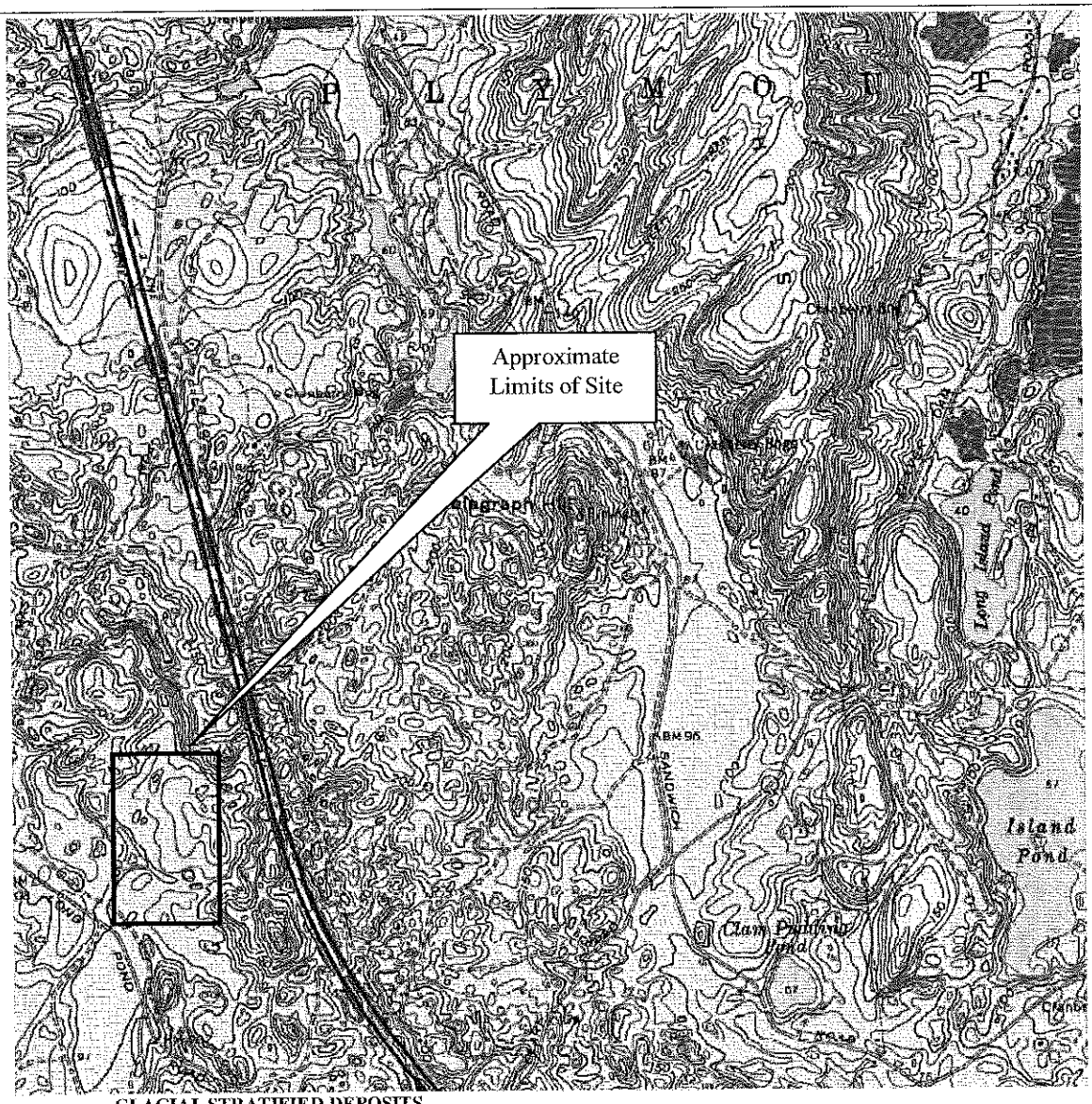
Note: Figure based on USGS topographic map of Plymouth, MA – from http://mapserver.mytopo.com

Client:	Project:	**Figure 1 – Site Location Map**	
Ai3 Architects LLC	Proposed Plymouth South High School		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Plymouth, MA	LGCI Project No.: 1408	Date: Sept. 2014



Note – Figure based plan titled "Overall Site Plan," prepared by Pare Corporation and dated July 2014.

Client:	Project:	**Figure 2 – Proposed Construction Layout**	
Al3 Architects LLC	Proposed Plymouth South High School		
LGCI Labitat Geotechnical Consulting, Inc.	Project Location: Plymouth, MA	LGCI Project No.: 1408	Date: Sept. 2014



GLACIAL STRATIFIED DEPOSITS

Coarse deposits include gravel deposits composed of at least 50 percent gravel-size clasts; cobbles and boulders predominate; minor amounts of sand occur within gravel beds, and sand comprises few separate layers. Gravel layers generally are poorly sorted, and bedding commonly is distorted and faulted due to postdepositional collapse related to melting of ice. Sand and gravel deposits occur as mixtures of gravel and sand within individual layers and as layers of sand alternating with layers of gravel. Sand and gravel layers generally range from 25 to 50 percent gravel particles and from 50 to 75 percent sand particles. Layers are well to poorly sorted; bedding may be distorted and faulted due to postdepositional collapse. Sand deposits are composed mainly of very coarse to fine sand, commonly in well-sorted layers. Coarser layers may contain up to 25 percent gravel particles, generally granules and pebbles; finer layers may contain some very fine sand, silt, and clay

Note: Figure based on "Surficial geologic map of the Norton-Manomet-Westport-Sconticut Neck 23-quadrangle area in southeast Massachusetts," prepared by Stone, B.D., Stone, J.R., DiGiacomo-Cohen, M.L., and Kincare, K.A., for U.S. Geological Survey, 2011, Open-File Report 2006–1260–F.

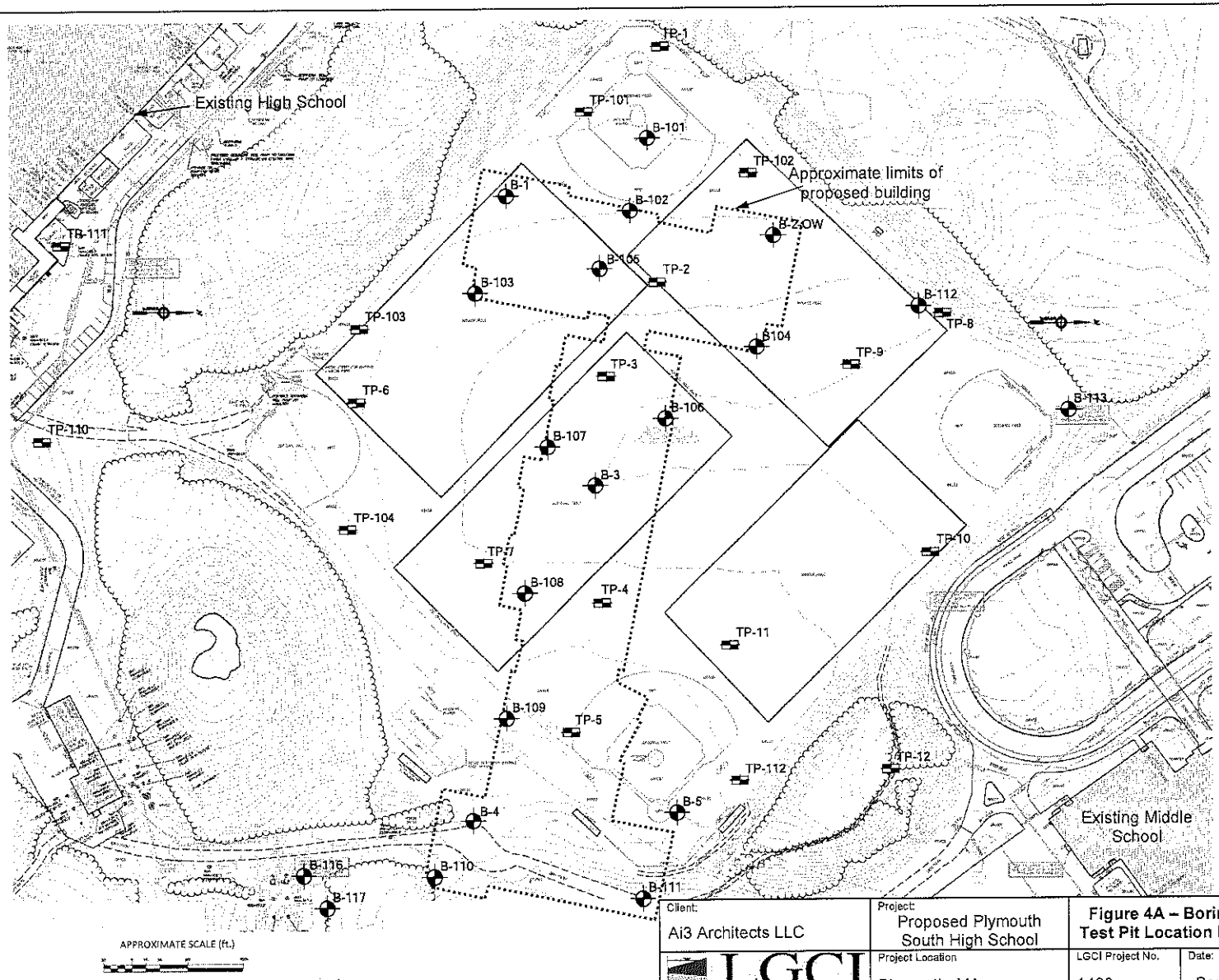
Client:	Project:	**Figure 3 – Surficial Geologic Map**	
Ai3 Architects LCC	Proposed Plymouth South High School		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Plymouth, MA	LGCI Project No.: 1408	Date: Sept. 2014

Note – Figure based on a survey plan provided to us by Pare Corporation (Pare) on April 22, 2014 and on a Plan titled "Overall Site Plan," prepared by Pare and dated July 2014.

Legend

Approximate location of boring. Borings B-1 to B-5 advanced by Northern Drill Service of Northborough, MA between April 5 and 7, 2014. Borings B-101 to B-117 advanced by New Hampshire Boring of Brockton, MA between August 13 and 18, 2014. All borings were observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).
OW denotes that a groundwater observation well was installed in the borehole.

Approximate location of test pit excavated by J. C. Engineering, Inc. of East Wareham, MA. TP-1 to TP-12 excavated on April 3 and 4, 2014. TP-101 to TP-112 excavated on August 11 and 12, 2014. All test pits were



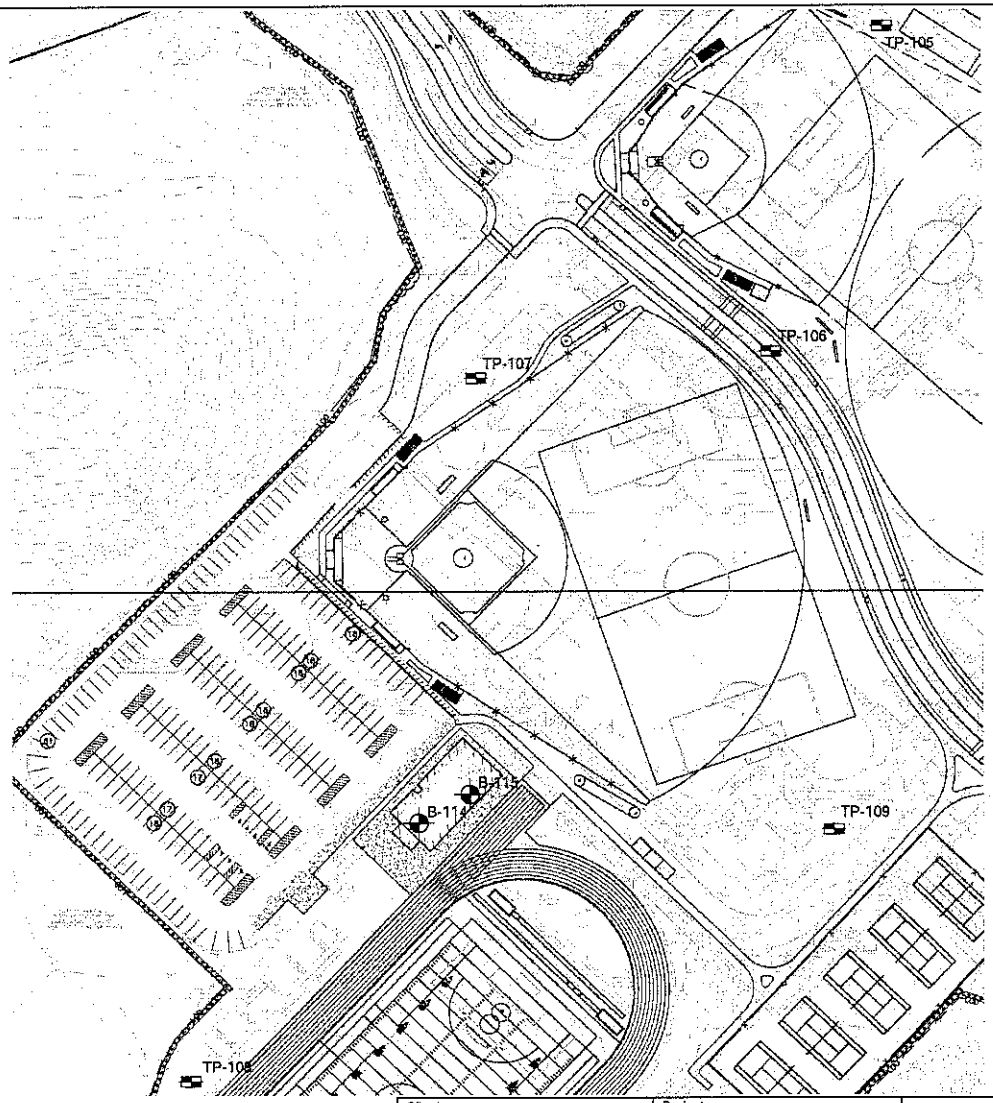
Client: Ai3 Architects LLC	Project: Proposed Plymouth South High School	**Figure 4A – Boring and Test Pit Location Plan 1/2**	
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Plymouth, MA	LGCI Project No.: 1408	Date: Sept. 2014

Note – Figure based plan titled "Overall Site Plan," prepared by Pare Corporation and dated July 2014.

Legend

⊕ Approximate location of boring advanced by New Hampshire Boring of Brockton, MA between August 13 and 18, 2014 and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI). Boring B-115 was not advanced due to proximity to utilities.

▬ Approximate location of test pit excavated by J. C. Engineering, Inc. of East Wareham, MA on August 11 and 12, 2014 and observed by LGCI.



APPROXIMATE SCALE (ft.)

60' 30' 0 60' 120' 240'

Client:	Project:	Figure 4B – Boring and Test Pit Location Plan 2/2	
Ai3 Architects LLC	Proposed Plymouth South High School		
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Plymouth, MA	LGCI Project No.: 1408	Date: Sept. 2014

Appendix A Test Pit Logs

LGCI
Lahlaf Geotechnical Consulting, Inc.

TP-1 **Page 1 of 1**

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/04/14
Excavation Foreman : Tim Lydon		Date Completed:	04/04/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Western corner of existing Athletic fields
Ground Surface El:	Est. 211.5 ft (see remark 1)	Total Depth:	13.5 feet
Groundwater Depth:	Seeped at 6 ft (perched groundwater)	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	4.5' x 10'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil / Subsoil	7": Topsoil 7" - 19": Silty SAND (SM), fine to medium, 10-15% fines, ~5% cobbles, traces of organics, thin (~4") layer of mostly organics near the bottom, brown, moist (subsoil)
	E - M	Fill	19" - 3.3': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, brown-tan, moist (fill)
	E - M		
	E - M		3.3' - 4' : thin (~8") layer of buried topsoil
5 ft	E - M		4' - 7.7': Poorly Graded SAND with Silt (SP-SM), mostly fine, ~10% fines, occasional thin (~2") layers of organics, tan-brown, moist to wet (fill)
	E - M		
	E - M		
	E - M		
	M		7.7' - 12': Silty SAND (SM), fine to medium, ~20% fines, 5-10% cobbles, traces of organics, 10-15% roots, one tree stump up to 2 feet long and about 12 inches in diameter at 11 feet, dark gray, moist (fill)
10 ft	M		
	M		
	M		12' - 13.5': Silty SAND (SM), fine to medium, ~20% fines, traces of organics, 5-10% roots, dark gray, moist (fill)
	M		
	M		
	M		Bottom of test pit at 13.5 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/04/14
Excavation Foreman : Tim Lydon		Date Completed:	04/04/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Western side of proposed building
Ground Surface El:	Est. 214.5 ft (see remark 1)	Total Depth:	12 feet
Groundwater Depth:	Seeped at 4 ft (perched groundwater)	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 11' x 15' (see remark 2)

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil & Subsoil	6": Topsoil 6" - 11": Silty SAND (SM), fine to medium, 10-15% fines, traces of roots, brown, moist (subsoil)
	E - M	Fill	11" - 5.5': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, ~5% gravel, ~5% cobbles, brown with occasional thin (~2") dark brown seams, moist to wet (fill)
	E - M		
	E - M		
5 ft	M		
	D		5.5' to 9.5': Cluster of four boulders up to 4.5 ft mixed in with Silty SAND (SM), fine to medium, ~15% fines, traces of organics, ~10% roots, two tree stumps up to 2 feet long and about 6 inches in diameter, dark gray, moist (fill)
	D		
	D		
	D		
	D	~9.5'	
10 ft	M	Sand	9.5' - 12': Poorly Graded SAND (SP), fine to medium, 5-10% fines, 5-10% gravel, light tan, moist
	M		
			Bottom of test pit at 12 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Unstable sides in the top 6 feet. The test pit opened up to 11 feet wide after excavating the boulders.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/04/14
Excavation Foreman : Tim Lydon		Date Completed:	04/04/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Western side of proposed building
Ground Surface El:	Est. 215.5 ft (see remark 1)	Total Depth:	11 feet
Groundwater Depth:	Seeped at 3 ft (perched groundwater)	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' x 11'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil/ subsoil	6": Topsoil 6" - 12": Silty SAND (SM), fine to medium, ~15% fines, traces of roots, brown, moist (subsoil)
	E - M	Fill	12" - 4': Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 10-15% fines, 15-20% gravel, brown with occasional thin (~2") bright brown seams, moist to wet (fill)
	E - M		
	E - M		
5 ft	M		4' to 7.5': Silty SAND (SM), mostly fine, 20-25% fines, traces of organics, traces of roots, ~5% cobbles, dark gray, moist (fill)
	M		
	M		
	M	7.5'	
	M	Sand	7.5' - 11': Poorly Graded SAND (SP), fine to medium, ~5% fines, ~5% gravel, light tan, moist
	M		
10 ft	M		
	M		Bottom of test pit at 11 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Unstable sides in the top 4 feet due to seeping perched groundwater.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/03/14
Excavation Foreman : Tim Lydon		Date Completed:	04/03/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Near center of proposed building
Ground Surface El:	Est. 214.5 ft (see remark 1)	Total Depth:	11 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 6 ' x 9' (see remark 2)

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil / Subsoil	5": Topsoil 5" - 13": Silty SAND (SM), fine to medium, 10-15% fines, brown, moist (subsoil)
	E - M	Fill	13" - 4': Poorly Graded SAND (SP), mostly medium, ~5% fines, tan-brown with occasional thin (~2") dark brown seams, moist (fill)
	E - M		
	E - M		
5 ft	E - M	Sand	4' to 7': Poorly Graded SAND (SP), fine to medium, 5-10% fines, 5-10% fine gravel, tan, moist
	E - M		
	E - M		
	M		7' - 11': Poorly Graded SAND (SP), mostly medium to coarse, 5-10% fines, 5-10% gravel, a few cobbles near the bottom, light tan, moist
	M		
10 ft	M		
	M		
			Bottom of test pit at 11 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Unstable sides in the top 7 feet. The excavation opened up to about 6 feet wide.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/03/14
Excavation Foreman : Tim Lydon		Date Completed:	04/03/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Eastern side of proposed building
Ground Surface El:	Est. 213.5 ft (see remark 1)	Total Depth:	10.5 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 5' x 9' (see remark 2)

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil	6": Topsoil 6" - 8": Silty SAND (SM), fine to medium, ~10-15% fines, brown, moist (subsoil)
	E - M	Fill	8" - 4': Well Graded SAND with Gravel (SW), mostly medium, 15-20% fine gravel, tan-brown with occasional thin (~2") dark brown seams, moist (fill)
	E - M		
	E - M		
5 ft	E - M	Sand	4' to 8': Poorly Graded SAND (SP), mostly medium, ~5% fines, 5-10% fine gravel, dark tan, moist
	E - M		
	E - M		
	E - M		
	E - M		8' - 10.5': Poorly Graded SAND (SP), mostly medium to coarse, ~5% fines, 5-10% gravel, light tan, moist
10 ft	E - M		
	E - M		Bottom of test pit at 10.5 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Unstable sides in the top 5 feet. The excavation opened up to about 5 feet wide.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/03/14
Excavation Foreman : Tim Lydon		Date Completed:	04/03/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Southern side of existing athletic fields
Ground Surface El:	Est. 214 ft (see remark 1)	Total Depth:	12 feet
Groundwater Depth:	Seeped at 2.5 ft (perched groundwater)	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' x 10'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil & subsoil	7": Topsoil 7" -11": Silty SAND (SM), fine to medium, ~10-15% fines, brown, moist (subsoil)
	E - M	Fill	11" - 2.5': Poorly Graded SAND (SP), fine to medium, ~10% fines, bright brown with occasional thin (~1") reddish brown seams, moist to wet (fill)
	E - M		
	M		2.5' to 6.5': Silty SAND (SM), mostly fine, 25-30% fines, 5-10% cobbles, traces of organics, ~10% roots, dark gray, moist (fill)
5 ft	M		
	M		
	M	6.5'	
	M		6.5' - 12': Poorly Graded SAND (SP), mostly medium, 5-10% fines, 5-10% gravel, tan, moist
	M		
	M	Sand	
10 ft	M		
	M		
	M		
			Bottom of test pit at 12 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/03/14
Excavation Foreman : Tim Lydon		Date Completed:	04/03/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Near southern side of prop. building
Ground Surface El:	Est. 215 ft (see remark 1)	Total Depth:	11 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 6' x 9' (see remark 2)

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil/ Subsoil	6": Topsoil 6" -12": Silty SAND (SM), fine to medium, ~10-15% fines, traces of organics, brown, moist (subsoil)
	E - M	Fill	12" - 4': Poorly Graded SAND (SP), fine to medium, ~ 5% fine gravel. brown-tan, moist (fill)
	E - M		
	E - M		4' - 4.3': thin (~4") layer of mostly gravel, traces of cobbles (fill)
5 ft	E - M		4.3' to 6': Poorly Graded SAND (SP), mostly medium to coarse, ~5% fines, 5-10% gravel, tan, moist (fill)
	E - M		
	E - M	6.5'	6' - 6.5': thin (~6") layer of mostly gravel, <5% cobbles (fill)
	E - M		6.5' - 12': Poorly Graded SAND (SP), fine to medium, ~5% fines, ~5% gravel, <5% cobbles, tan, moist
	E - M	Sand	
	E - M		
10 ft	E - M		
	E - M		
			Bottom of test pit at 11 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Unstable sides in the top 6 feet. The excavation opened up to about 6 feet wide.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/03/14
Excavation Foreman : Tim Lydon		Date Completed:	04/03/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Northern corner of existing athletic fields
Ground Surface El:	Est. 215 ft (see remark 1)	Total Depth:	12 feet
Groundwater Depth:	Seeped at 6 ft (perched groundwater)	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' x 11'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil	6": Topsoil 6" - 10": Silty SAND (SM), fine to medium, 10-15% fines, brown, moist (subsoil)
	E - M	Fill	10" - 2.5': Silty SAND with Gravel (SM), fine to medium, 10-15% fines, 15-20% gravel, brown, moist (fill)
	E - M		2.5' - 6.5': Poorly Graded SAND (SP), mostly medium, 5-10% fines, bright brown, moist (fill)
	E - M		
5 ft	E - M		
	E - M		
	E - M		
	M		6.5' - 9': Silty SAND (SM) fine to medium, ~20% fines, ~10% gravel, ~5% cobbles, traces of organics, 5-10% roots, gray, moist (fill)
	M		
10 ft	M		9' - 12': Silty SAND (SM), mostly fine, ~20% fines, traces of organics, ~25% roots, dark gray, most (fill)
	M		
	M		
			Bottom of test pit at 12 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Unstable sides in the top 6 feet due to seeping of perched groundwater.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor:	JC Engineering, Inc.	Date Started:	04/03/14
Excavation Foreman :	Tim Lydon	Date Completed:	04/03/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Northern side of existing athletic fields
Ground Surface El:	Est. 216 ft (see remark 1)	Total Depth:	12 feet
Groundwater Depth:	Seeped at 2.5 ft (perched groundwater)	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' x 10'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil	6": Topsoil 6" - 10": Silty SAND (SM), mostly fine, 10-15% fines, brown, moist (subsoil)
	E - M	Fill	10" - 4': Poorly Graded SAND (SP), fine to medium, ~10% fines, brown, moist to wet (fill)
	E - M		
	E - M		
5 ft	M		4' - 8': Silty SAND (SM), fine to medium, ~25% fines, ~5% cobbles, traces of organics, ~10% roots, dark gray, moist (fill)
	M		
	M		
	M		
	M	Sand	8' - 12': Poorly Graded SAND (SP), mostly medium to coarse, ~5% fines, 5-10% gravel, tan, moist
10 ft	M		
	M		
	M		
			Bottom of test pit at 12 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Unstable sides in the top 4 feet due to seeping of perched groundwater.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/04/14
Excavation Foreman : Tim Lydon		Date Completed:	04/04/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Northern side of existing athletic fields
Ground Surface El:	Est. 216.5 ft (see remark 1)	Total Depth:	10 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 8 ' x 10' (see remark 2)

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil / Subsoil	6": Topsoil 6" - 13": Silty SAND (SM), fine, traces of gravel, ~15% fines, traces of roots, brown, moist (subsoil)
	E - M	Sand	13" - 10': Poorly Graded SAND (SP), mostly medium, 5-10% coarse, occasional thin (~3") layers of coarse, ~5% fines, 5-10% gravel, <5% cobbles, light tan, moist
	E - M		
	E - M		
5 ft	M		
	M		
	M		
	M		
	M		
10 ft	M		
			Bottom of test pit at 10 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Excavation opened wider to 8 feet and continued to collapse when attempted to excavate deeper than 10 feet.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/04/14
Excavation Foreman : Tim Lydon		Date Completed:	04/04/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Northern side of existing athletic fields
Ground Surface El:	Est. 214.5 ft (see remark 1)	Total Depth:	11 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 5 ' x 10'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil / subsoil	5": Topsoil 5" - 11": Silty SAND (SM), fine, traces of fine gravel, 10-15% fines, traces of roots, brown, moist (subsoil)
	E - M		11" - 6': Poorly Graded SAND (SP), fine to medium, <5% fines, 5-10% gravel, light tan, moist
	E - M		
	E - M		
5 ft	E - M		
	E - M		
	E - M	Sand	6' - 11': Poorly Graded SAND (SP), medium to coarse, <5% fines, ~10% gravel, <5% cobbles, light tan, moist
	E - M		
	E - M		
10 ft	E - M		
	E - M		
			Bottom of test pit at 11 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	04/03/14
Excavation Foreman : Tim Lydon		Date Completed:	04/03/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Hill near NE side of exist. athletic fields
Ground Surface El:	Est. 233 ft (see remark 1)	Total Depth:	11 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 6 ' x 10'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil / Subsoil	8": Topsoil 8" - 16": Silty SAND (SM), fine, 10-15% fines, traces of roots, bright brown, moist (subsoil)
	E - M		16" - 3': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, traces of roots, bright brown, moist
	E - M		
	E - M		3' - 6': Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, 10-15% fine gravel, bright brown, moist
5 ft	E - M		
	E - M		
	E - M	Sand	
	E - M		6' - 11': Poorly Graded SAND (SP), medium to coarse, ~5% fines, ~10% gravel, light tan, moist
	E - M		
	E - M		
10 ft	E - M		
	E - M		
			Bottom of test pit at 11 feet. Backfilled with excavated material compacting in lifts.
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/12/14
Excavation Foreman : Rob Bishop		Date Completed:	08/12/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed parking - NW side
Ground Surface El:	Est. 212.5 ft (see remark 1)	Total Depth:	11.5 feet (see remark 2)
Groundwater Depth:	Seeped at 8 ft	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 6' x 9'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil / Subsoil	8": Topsoil 8" - 1': Silty SAND (SM), fine to medium, ~15% fines, ~5% organics, brown, moist (subsoil)
	E - M	Fill	1' - 9': Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, 10 - 15% coarse gravel and cobbles up to 8 inches, brown-tan, moist (fill)
	M		
	M		
5 ft	M		
	M		
	M		
	M		
	M		
	M		
10 ft	M		9' - 10.5': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, 5-10% organics, 5-10% small to medium size roots, one ~6" dia stump ~2 feet long, exposed another ~6" dia stump on the side of test pit, bright brown-gray, wet (fill)
	M	~10.5'	
	M	Sand	10.5' - 11.5': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, bright brown-tan, wet
	M		
			Bottom of test pit at 11.5 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

2 - Excavated sides in the fill were stable. When excavated below 10 feet test pit sides did not stay open below 10.5 feet.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/12/14
Excavation Foreman : Rob Bishop		Date Completed:	08/12/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed parking - NW side
Ground Surface El:	Est. 213 ft (see remark 1)	Total Depth:	10.5 feet (see remark 2)
Groundwater Depth:	Standing water at 6 ft	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 7' x 9'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil / Subsoil	8": Topsoil 8" - 1': Silty SAND (SM), fine to medium, 15-20% fines, ~5% fine gravel, <5% organics, brown, moist (subsoil)
	E - M	Fill	1' - 3.5': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, 5-10% fine gravel, <5% cobbles up to 6 inches, tan-brown, moist (fill)
	M		
	M		3.5' - 4': Poorly Graded SAND (SP), fine to medium, ~5% fines, dark gray, moist (fill)
5 ft	M		4' - 6': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, thin (~2") layer of organics, one tree log ~8" dia and ~2 feet long, exposed another tree log ~10" dia, 5-10% medium size roots, bright brown to brown, moist to wet at 6 feet
	M		
	M		6' - 10': Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, ~10% organics, ~20% small to medium size roots, dark gray, wet (fill)
	M		
	M		
10 ft	M	~10'	
	M	Sand	10' - 10.5': Poorly Graded SAND (SP), fine to medium, ~5% fines, tan-brown, wet
			Bottom of test pit at 10.5 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

2- Unstable sides below 4 feet. Test pit could not be excavated deeper below 10.5 feet due to unstable sides.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/12/14
Excavation Foreman : Rob Bishop		Date Completed:	08/12/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed parking - southern side
Ground Surface El:	Est. 213.5 ft (see remark 1)	Total Depth:	11 feet
Groundwater Depth:	Seeped between 3.5 ft & 4.5 ft (see remark 2)	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' x 8'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil 0.8'	6": Topsoil 6" - 0.8': Silty SAND (SM), fine to medium, ~15% fines, ~5% fine gravel, <5% organics, brown, moist (subsoil)
	E - M	Fill	0.8' - 3.5': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, <5% fine gravel, tan-brown, moist (fill)
	M		
	M		▼
	M	5.5'	3.5' - 4.5': Silty SAND (SM), fine, 15-20% fines, 5-10% organics, 5-10% small to medium size roots, dark gray, wet (fill)
5 ft	M		4.5' - 7': Silty SAND (SM), mostly fine, 10-15% fines, <5% fine gravel, bright brown, moist
	M		
	M	Sand	
	M		7' - 11': Poorly Graded SAND (SP), fine to medium, ~5% fines, tan, moist
	M		
10 ft	M		
	M		
			Bottom of test pit at 11 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

2 - No standing water observed at the bottom of test pit.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/12/14
Excavation Foreman : Rob Bishop		Date Completed:	08/12/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed parking - southern side
Ground Surface El:	Est. 213.5 ft (see remark 1)	Total Depth:	10.5 feet (see remark 2)
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3' to 5' x 9'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil / Subsoil	9": Topsoil 9" - 0.8': Silty SAND (SM), fine to medium, ~15% fines, brown, moist (subsoil)
	E - M	Fill	0.8' - 2.6': Silty SAND (SM), fine to medium, ~15% fines, 5-10% fine gravel, brown, moist (fill)
	E - M	~3.4'	2.6' - 3': thin (~5") layer of buried topsoil, ~5% medium to large size roots 3' - 3.4': Silty SAND (SM), fine to medium, ~15% fines, <5% organics, bright brown, moist (buried subsoil)
	M		3.4' - 4': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, 5-10% fine gravel, bright brown, moist
5 ft	M		4' - 10.5': Poorly Graded SAND (SP), fine to medium, ~5% coarse sand, ~5% fines, <5% fine gravel, <5% cobbles up to 12 inches, tan, moist
	M		
	M	Sand	
	M		
	M		
	M		
10 ft	M		
	M		Bottom of test pit at 10.5 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

2 - Unstable sides below 5 feet and opened wider to 5 feet below 5 feet.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/11/14
Excavation Foreman : Rob Bishop		Date Completed:	08/11/14
LGCI Engineer:	Alan Smith	Location:	Proposed access road
Ground Surface El:	Est. 204.5 ft (see remark 1)	Total Depth:	11 feet (see remark 2)
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	5' x 8'

Depth Scale	Exc. Effort	Strata	Soil Description
		Topsoil ~0.5'	6": Topsoil
	E	Fill ~2'	0.5' - 2': Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, ~5% fine gravel, brown, moist (fill)
	E - M		
	M	Sand	2' - 11': Poorly Graded SAND (SP), mostly fine to medium, thin (~2") layer of coarse sand at 4 feet, ~5% fines, ~5% fine gravel, tan, moist
	M		
5 ft	M		
	M		
	M		
	M		
	M		
10 ft	M		
	M		
			Bottom of test pit at 11 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

2 - Test pit damaged electric line which was later fixed by the school personnel.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/11/14
Excavation Foreman : Rob Bishop		Date Completed:	08/11/14
LGCI Engineer:	Alan Smith	Location:	Proposed access road
Ground Surface El:	Est. 209.5 ft (see remark 1)	Total Depth:	10 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	5' x 9'

Depth Scale	Exc. Effort	Strata	Soil Description
		Topsoil	4": Topsoil
	E	Fill	0.3' - 3.5': Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, ~5% fine gravel, brown, moist (fill)
	E - M		
	M		
	M	~3.5'	
	M		3.5' - 6': Poorly Graded SAND with Silt (SP-SM), mostly fine, ~5% medium, 5-10% fines, ~5% fine gravel, bright brown, moist
5 ft	M		
	M		
	M	Sand	6' - 8': Poorly Graded SAND (SP), mostly fine, ~5% medium, ~5% fines, brown, moist
	M		
	M		8' - 10': Poorly Graded SAND (SP), mostly fine to medium, ~5% coarse, <5% fines, tan, moist
10 ft	M		
			Bottom of test pit at 11 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/11/14
Excavation Foreman : Rob Bishop		Date Completed:	08/11/14
LGCI Engineer:	Alan Smith	Location:	Proposed access road
Ground Surface El:	Est. 209.5 ft (see remark 1)	Total Depth:	10 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	4.5' x 7'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil ~0.7'	8": Topsoil
	E - M	Fill ~3'	0.7' - 3': Poorly Graded SAND with Silt (SP-SM), mostly fine, ~5% medium, 5-10% fines, brown-gray, moist (fill)
	M		
	M	Sand	3' - 10': Poorly Graded SAND (SP), mostly fine to medium, ~5% coarse, <5% fines, 10-15% fine gravel, tan, moist
5 ft	M		
	M		
	M		
	M		
	M		
10 ft	M		
			Bottom of test pit at 10 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/12/14
Excavation Foreman : Rob Bishop		Date Completed:	08/12/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	SE side of existing football field
Ground Surface El:	Est. 210.5 ft (see remark 1)	Total Depth:	11 feet (see remark 2)
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	5' to 7' x 10'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil / Subsoil	8": Topsoil 8" - 1.3': Silty SAND (SM), fine to medium, ~20% fines, <5% organics, bright brown, moist (subsoil)
	E - M	Fill	1.3' - 1.8': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, ~10% fine gravel, brown, moist (fill)
	E - M		1.8' - 2.7': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, brown-tan, moist
	E - M		2.7' - 11': Poorly Graded SAND (SP), fine to medium, ~5% fines, <5% fine gravel, tan, moist
5 ft	E - M		
	E - M	Sand	
	M		
	M		
	M		
10 ft	M		
	M		
			Bottom of test pit at 11 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

2 - Unstable sides below 3 feet and opened wider to 7 feet below 3 feet.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/11/14
Excavation Foreman : Rob Bishop		Date Completed:	08/11/14
LGCI Engineer:	Alan Smith	Location:	Proposed access road
Ground Surface El:	Est. 209.5 ft (see remark 1)	Total Depth:	10 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	5' x 7'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil	12": Topsoil
	E - M	Fill	0.7' - 3': Poorly Graded SAND with Silt (SP-SM), mostly fine, ~5% medium, 5-10% fines, brown-gray, moist (fill)
	M		
	M	~4'	
5 ft	M		4' - 10': Poorly Graded SAND (SP), mostly fine to medium, <5% fines, <5 fine gravel, tan with thin (~2") layers of bright brown in the top 2 feet, moist
	M		
	M	Sand	
	M		
	M		
10 ft	M		
			Bottom of test pit at 10 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/11/14
Excavation Foreman : Rob Bishop		Date Completed:	08/11/14
LGCI Engineer:	Alan Smith	Location:	Proposed access road
Ground Surface El:	Est. 206.5 ft (see remark 1)	Total Depth:	11 feet
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	5' x 7'

Depth Scale	Exc. Effort	Strata	Soil Description
		Topsoil	8": Topsoil
	E		
	E - M	Fill	0.7' - 8': Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, 5-10% fine gravel, brown, moist (fill)
	M		
	M		
	M		Thin (~1") black layer of possible wood ash at 4 feet
5 ft	M		
	M		
	M		
	M		
	M		
	M	~10'	8' - 10': Silty SAND (SM), mostly fine to medium, 15-20% fines, gray, moist
10 ft	M	Sand	10' - 11': Poorly Graded SAND (SP), mostly fine to medium, <5% fines, tan, moist
			Bottom of test pit at 11 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/12/14
Excavation Foreman : Rob Bishop		Date Completed:	08/12/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed access road
Ground Surface El:	Est. 210 ft (see remark 1)	Total Depth:	10.5 feet (see remark 2)
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	4.5' x 9'

Depth Scale	Exc. Effort	Strata	Soil Description
		Topsoil	7": Topsoil
	E		
	E - M		0.6' - 5': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, 5-10% fine to coarse gravel, brown, moist (fill)
	E - M	Fill	
	M		
5 ft	M	~5'	
	M	Sand	5' - 10.5': Poorly Graded SAND (SP), fine to medium, ~5% fines, tan with occasional thin (~1") layers of bright brown, moist
	M		
	M		7' - 10.5': Poorly Graded SAND (SP), mostly medium, ~5% coarse, ~5% fines, <5% fine gravel, tan, moist
	M		
10 ft	M		
	M		Bottom of test pit at 10.5 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

2 - Encountered an existing sewer line at about 5 feet which was later fixed by the school. Moved about 6 ft away and excavated to 10.5 feet.

LGCI
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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Excavation Subcontractor: JC Engineering, Inc.		Date Started:	08/12/14
Excavation Foreman : Rob Bishop		Date Completed:	08/12/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed parking - NE side
Ground Surface El:	Est. 214 ft (see remark 1)	Total Depth:	10 feet (see remark 2)
Groundwater Depth:	Not encountered	Excavator Type:	KUBOTA KX080-3
		Test Pit Dimensions:	3.5' to 7' x 9'

Depth Scale	Exc. Effort	Strata	Soil Description
	E	Topsoil ~8"	8": Topsoil 8" - 0.9': Silty SAND (SM), fine to medium, ~20% fines, <5% organics, bright brown, moist (subsoil)
	E - M	Fill ~2'	0.9' - 2': Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, 5-10% fine gravel, ~5% cobbles up to 6 inches, brown, moist (fill)
	E - M	Sand	2' - 3': Poorly Graded SAND (SP), fine to medium, ~5% fines, thin (~2") layer of fine to coarse gravel, dark tan, moist
	E - M		3' - 8': Poorly Graded SAND (SP), fine to medium, <5% fines, 5-10% mostly coarse gravel, tan, moist
5 ft	E - M		
	E - M		
	E - M		
	E - M		
	E - M		8' - 10': Poorly Graded SAND (SP), fine to medium, ~5% fines, ~5% cobbles up to 6 inches, tan, very moist
10 ft	E - M		
			Bottom of test pit at 10 feet. Backfilled with excavated material. Compacted in lifts in the top 6 feet with plate compactor
15 ft			

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

2 - Unstable sides below 1.5 feet and opened wider to 7 feet below 1.5 feet.

Appendix B Boring Logs and Groundwater Observation Well Installation Report

LGCI
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BORING LOG

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Sevice, Inc.	Date Started:	4/5/2014
Drilling Foreman:	Chris De Villers	Date Completed:	4/5/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Western side of proposed building
Ground Surface El:	213.5 feet (see remark 1)	Total Depth:	42 feet
Groundwater Depth:	Perched water at 10 ft (wet sample S3)	Drill Rig Type:	Mobile B-48 ATV
		Drilling Method:	3-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
									2	Topsoil/ Subsoil	~7" Topsoil 7" - 18": Silty SAND (SM), fine to medium, ~15% fines, traces of organics, brown, moist (subsoil)
	2 - 4	S1	11	8	8	9	24	2		Fill	S1 - Silty SAND (SM), mostly fine, ~5% fine gravel, gravel piece at the tip of the spoon, ~15% fines, traces of organics, brown, moist (fill) 2' - 5' auger cuttings: Silty SAND (SM), fine to medium, 10-15% fines, ~5% fine to coarse gravel, brown, moist (fill)
5ft											
	5 - 7	S2	3	6	7	10	24	13			S2 - Poorly Graded SAND (SP), fine to medium, ~5% fines, <5% fine gravel, brown-tan, moist (fill)
10ft											
	10 - 12	S3	9	15	10	8	24	16			S3 - Top 7": Silty SAND (SM), fine to medium, 10-15% fines, brown, wet (fill) Mid 4": Silty SAND (SM), fine to medium, ~15% fines, traces of organics, traces of roots, dark gray, wet (fill)
	12 - 14	S4	11	13	11	11	24	18	3		Bot. 5": Silty SAND (SM), fine to medium with occasional thin (~1/4") seams of medium sand, 10-15% fines, brown with thin seams of reddish brown, wet (fill) S4 - Top 4": Similar to bot. 5" of S3 (fill)
15ft										15'	
	15 - 17	S5	4	7	10	12	24	12		Sand	Bot. 14": Silty SAND (SM), fine, ~15% fines, thin (~1/8") seams of organics, gray with seams of reddish brown in bottom 3 inches, moist (fill) S5 - Poorly Graded SAND (SP), fine to medium, ~5% fines, tan, moist
	17 - 19	S6	9	9	14	16	24	14			S6 - Similar to S5, thin (~1") layer of fine to coarse angular gravel in the middle of the sample, tan, moist
20ft											
	20 - 22	S7	7	8	9	10	24	15			S7 - Poorly Graded SAND (SP), fine to medium, ~5% coarse, ~5% fines, tan, moist

Remarks:

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Boring was advanced with a posthole digger to 18 inches to clear irrigation pipes.
3 - Based on drilling action, possible cobble at 14 feet.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Project:	**Proposed Plymouth South High School, Plymouth, MA**
Client:	**Ai3 Architects LLC**

LGCI Project No.: 1408

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	25 - 27	S8	9	11	11	13	24	16			S8 - Poorly Graded SAND (SP), mostly medium, 5-10% coarse, <5% fines, tan, moist
30 ft	30 - 32	S9	8	12	13	16	24	17		Sand	S9 - Similar to S8, fine to medium sand at the tip of the spoon, <5% fines, tan, moist
35 ft	35 - 37	S10	9	14	18	20	24	18			S10 - Poorly Graded SAND (SP), fine to medium, <5% fines, <5% fine gravel, tan with occasional thin (~1/16") dark seams, moist
40 ft	40 - 42	S11	7	13	16	16	24	14			S11 - Similar to S10
45 ft											End of boring at 42 feet. Backfilled with drill cuttings.
50 ft											

Remarks:

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-2-OW

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Sevice, Inc.	Date Started:	4/5/2014
Drilling Foreman:	Chris De Villers	Date Completed:	4/5/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Western side of proposed building
Ground Surface El:	214 feet (see remark 1)	Total Depth:	42 feet
Groundwater Depth:	Perched water between 2 ft and 9 ft (wet samples)	Drill Rig Type:	Mobile B-48 ATV
		Drilling Method:	3-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
									2	Topsoil/ Subsoil	~6" Topsoil 6" - 14": Silty SAND (SM), fine to medium, ~15% fines, traces of organics, brown, moist (subsoil)
	2 - 4	S1	9	9	7	11	24	20		Fill	S1 - Top 12": Poorly Graded SAND (SP), mostly medium, ~5% fines, brown, wet (fill) Bot. 8": Silty SAND (SM), mostly fine, 25-30% fines, 5 - 10% fine gravel, thin (~1/16") seams of organics, traces of roots, brown, moist (fill)
5ft	5 - 7	S2	3	6	6	9	24	17			S2 - Top 5": Silty SAND (SM), fine to medium, 25-30% fines, 5-10% fine gravel, gray-brown, wet (fill) Bot. 12": Poorly Graded SAND with Silt (SP-SM), mostly medium, 5-10% fines, <5% fine gravel, brown, wet (fill)
	7 - 9	S3	12	14	12	27	24	16			S3 - Silty SAND (SM), mostly fine, mostly brown medium sand in the middle, 5", 15-20% fines, traces of organics in the top 5 inches, brown-gray, wet (fill)
10ft	10 - 12	S4	2	9	6	6	24	14			S4 - Top 9": Silty SAND (SM), fine to medium, ~15% fines, 10-15% fine gravel, traces of roots, gray, moist (fill)
									3	~12'	Bot. 5": Silty SAND (SM), fine, ~15% fines, traces of roots, ~ 1" of organic soil, brown, moist (buried subsoil)
	12 - 14	S5	3	3	5	7	24	14			S5 - Silty SAND (SM), mostly fine at the top 9 inches to fine to medium below, ~15% fines, 10-15% fine gravel, bright brown in the top 9 inches to tan below, moist
15ft	15 - 17	S6	4	6	7	8	24	11			S6 - Poorly Graded SAND (SP), mostly fine, ~5% fines, <5% fine gravel, tan, moist
	17 - 19	S7	7	6	5	7	24	15		Sand	S7 - Poorly Graded SAND (SP), mostly medium, 5-10% coarse, <5% fines, light tan, moist
20ft	20 - 22	S7	3	5	5	6	24	15			S8 - Similar to S7

Remarks:

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Boring was advanced with a posthole digger to 18 inches to clear irrigation pipes.
3 - Estimated strata change based on observed drilling condition.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-2-OW

Project:	**Proposed Plymouth South High School, Plymouth, MA**
Client:	**Ai3 Architects LLC**

LGCI Project No.: 1408

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	25 - 27	S9	5	7	8	9	24	15			S9 - Poorly Graded SAND (SP), fine to medium, <5% fines, <5% fine gravel, light tan, moist
30 ft	30 - 32	S10	3	8	9	8	24	14			S10 - Poorly Graded SAND (SP), mostly medium, <5% fines, <5% fine gravel, light tan, moist
35 ft	35 - 37	S11	7	9	12	14	24	14		Sand	S11 - Poorly Graded SAND (SP), mostly fine, <5% fines, light tan, moist
40 ft	40 - 42	S12	6	10	11	12	24	13			S12 - Poorly Graded SAND (SP), fine to medium with occasional thin (~1/2") layers of medium, ~5% fines, light tan, moist
45 ft											End of boring at 42 feet. Backfilled with drill cuttings. Moved 3 ft to the west and installed an observation well to 17 ft.
50 ft											

Remarks:

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Sevice, Inc.	Date Started:	4/6/2014
Drilling Foreman:	Tim Tucker	Date Completed:	4/7/2014
LGCI Engineer:	A. Smith / G. Mathiyalakan	Location:	Near center of proposed building
Ground Surface El:	216 feet (see remark 1)	Total Depth:	66 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 ATV
		Drilling Method:	3-1/4" HSA to 40 ft / 4-in casing to 64 ft
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
									2	Topsoil/ Subsoil ~12"	~7" Topsoil 7" - 14": Silty SAND (SM), fine to medium, 10-15% fines, traces of roots, brown, moist (subsoil)
	2 - 4	S1	13	10	9	8	24	21		Fill ~4'	S1 - Top 12": Silty SAND (SM), mostly fine, 15-20% fines, ~5% gravel, traces of roots, dark brown, moist (fill) Bot. 9": Poorly Graded SAND with Silt (SP -SM), fine to medium, 5-10% fines, 5-10% fine gravel, orange-brown, moist (buried subsoil)
5ft	4 - 6	S2	4	4	6	7	24	18	3		S2 - Poorly Graded SAND (SP), fine to medium, ~5% coarse, 10-15% fine gravel, tan, moist
	6 - 8	S3	7	7	9	9	24	18			S3 - Similar to S2, 10-15% fine gravel
	8 - 10	S4	4	6	8	10	24	6			S4 - Poorly Graded SAND (SP), fine to medium, ~5% fines, ~1" subangular gravel piece at the tip of the spoon, tan, moist
10ft	10 - 12	S5	7	5	6	8	24	15			S5 - Poorly Graded SAND (SP), mostly medium, ~5% coarse, <5% fines, tan, moist
	12 - 14	S6	6	6	9	8	24	16		Sand	S6 - Poorly Graded SAND (SP), fine to medium, ~5% fines, ~5% fine gravel, tan with occasional thin (~1/8") dark seams, moist
15ft	14 - 16	S7	7	8	10	12	24	12			S7 - Poorly Graded SAND (SP), mostly medium, ~5% coarse, ~5% fines, tan, moist
20ft	20 - 22	S8	6	10	11	13	24	17			S8 - Poorly Graded SAND (SP), fine to medium with occasional thin (~1/4") layers of medium, ~5% fines, tan, moist

Remarks:

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Boring was advanced with a posthole digger to 18 inches to clear irrigation pipes.
3 - Estimated strata change based on observed drilling condition.

Project: **Proposed Plymouth South High School, Plymouth, MA**
Client: **Ai3 Architects LLC** LGCI Project No.: 1408

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	25 - 27	S9	6	13	14	14	24	16			S9 - Poorly Graded SAND (SP), mostly medium, <5% fines, <5% fine gravel, tan, moist
30 ft	30 - 32	S10	9	12	13	17	24	17			S10 - Poorly Graded SAND (SP), fine to medium, ~5% fines, ~5% fine gravel, tan, moist
35 ft	35 - 37	S11	7	11	14	15	24	17			S11 - Poorly Graded SAND (SP), fine to medium, <5% coarse, <5% fines, tan, moist
40 ft	40 - 42	S12	10	21	18	20	24	16	4	Sand	S12 - Poorly Graded SAND (SP), fine to medium, ~5% fines, tan, moist
45 ft	44 - 46	S13	12	19	24	25	24	2	5		S13 - Similar to S12, traces of fine gravel piece sat the tip of the spoon, tan, wet
50 ft	49 - 51	S14	12	17	21	21	24	9			S14 - Poorly Graded SAND (SP), mostly fine to medium, <5% coarse, ~5% fines, tan, wet
	54 - 56	S15	5	9	15	21	24	3			S15 - Poorly Graded SAND (SP), fine to medium, ~5% fines, <5% fine gravel, tan, wet

Remarks:
4 - Advanced with 3-1/4" HSA to 40 ft and switched to 4-in casing after split spoon sample S12.
5 After S13, attempted to advance the bore hole with drill mud and roller bit, but lost drill water then switched to drive and wash.

LGCI
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BORING LOG

Boring B-3

Project:	**Proposed Plymouth South High School, Plymouth, MA**
Client:	**Ai3 Architects LLC**

LGCI Project No.: 1408

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
60 ft	59 - 61	S16	34	100	50/2"		14	6		Sand	S16 - Well Graded SAND (SW), mostly fine to medium, 10-15% coarse, ~5% fines, tan, wet
65 ft	64 - 66	S17	15	33	40	31	24	10	6		S17 - Poorly Graded SAND (SP), mostly fine to medium, occasional thin (~1/8") layers of coarse sand, 5-10% gravel, 5% fines, tan, wet
70 ft											End of boring at 66 feet. Backfilled with drill cuttings.
75 ft											
80 ft											

Remarks:
6 - Attempted to take a split spoon sample after S17 with 4-in casing at 64 ft but borehole collapsed to 64 ft.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Sevice, Inc.	Date Started:	4/6/2014
Drilling Foreman:	Chris De Villers	Date Completed:	4/6/2014
LGCI Engineer:	Alan Smith	Location:	Eastern side of proposed building
Ground Surface El:	213 feet (see remark 1)	Total Depth:	42 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 ATV
		Drilling Method:	3-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
									2	Topsoil/ Subsoil	~7" Topsoil, traces of gravel, ~2" Subsoil
										Fill	9" - 18": Silty SAND (SM), fine to medium, ~5% coarse, ~15% fines, 5-10% fine gravel, brown, moist (fill)
	2 - 4	S1	20	14	9	11	24	22			S1 - Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, 10-15% gravel, brown, moist (fill)
5ft									3	~5'	
	5 - 7	S2	3	3	5	6	24	19			S2 - Poorly Graded SAND (SP), fine to medium, occasional thin (~1") layers of fine to coarse sand, ~5% fines, ~5% fine gravel, tan, moist
	7 - 9	S3	6	5	6	7	24	19			S3 - Similar to S2
10ft											
	10 - 12	S4	3	6	7	8	24	18			S4 - Similar to S2, occasional thin (~1/2") layers of silty fine sand, tan, moist
										Sand	
									4		
15ft											
	15 - 17	S5	5	12	13	12	24	15			S5 - Poorly Graded SAND with Gravel (SP), mostly medium, 5-10% coarse, <5% fines, 15-20% gravel, tan, moist
20ft											
	20 - 22	S6	6	8	10	11	24	19			S6 - Poorly Graded SAND (SP), fine to medium, <5% fines, dark tan to tan, moist

Remarks:

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Boring was advanced with a posthole digger to 18 inches to clear irrigation pipes.
3 - Estimated strata change based on observed drilling condition.
4 - Based on drilling action possible cobble at 14 feet.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-4
Page 2 of 2

Project:	**Proposed Plymouth South High School, Plymouth, MA**
Client:	**Ai3 Architects LLC**

LGCI Project No.: 1408

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	25 - 27	S7	7	18	16	14	24	15			S7 - Poorly Graded SAND (SP), fine to medium, <5% fines, 10-15% gravel in the top 7 inches, dark tan to tan, moist
30 ft	30 - 32	S8	8	12	15	16	24	18		Sand	S8 - Poorly Graded SAND (SP), fine to medium, <5% fines, thin (~2") layer of gravel, dark tan to tan, moist
35 ft	35 - 37	S9	7	10	15	17	24	20			S9 - Poorly Graded SAND (SP), fine to medium, <5% fines, dark tan to tan, moist
40 ft	40 - 42	S10	7	11	12	13	24	20			S10 - Similar to S9
45 ft											End of boring at 42 feet. Backfilled with drill cuttings. Moved 3.5 ft and drilled to 16 ft and took continuous samples.
50 ft											

Remarks:

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Sevice, Inc.	Date Started:	4/5/2014
Drilling Foreman:	Chris De Villers	Date Completed:	4/6/2014
LGCI Engineer:	G. Mathiyalakan / A. Smith	Location:	Eastern side of proposed building
Ground Surface El:	214 feet (see remark 1)	Total Depth:	42 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 ATV
		Drilling Method:	3-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
									2	Topsoil/ Subsoil	~6" Topsoil 6" - 12": Silty SAND (SM), mostly fine, 20-25% fines, traces of organics, brown, moist (subsoil)
	2 - 4	S1	10	12	9	7	24	18		Fill	12" - 18": Silty SAND with Gravel (SM), mostly fine, ~20% fines, 10-15% gravel, brown, moist (fill) S1 - Top 3": Silty SAND (SM), mostly fine, ~15% fines, brown, moist (fill) Bot. 15": Poorly Graded SAND with Gravel (SP), fine to medium, ~5% fines, ~30% mostly coarse angular gravel, tan, moist (fill)
5ft	5 - 7	S2	2	2	3	4	24	13	3	7'	S2 - Poorly Graded SAND (SP), mostly medium, ~5% fines, ~5% fine gravel, tan, moist (fill)
	7 - 9	S3	3	4	5	4	24	16			S3 - Poorly Graded SAND (SP), fine to medium, ~5% fines, ~5% fine gravel, tan with occasional thin (~1/16") dark and reddish brown seams, moist
10ft	10 - 12	S4	2	4	5	4	24	17		Sand	S4 - Poorly Graded SAND (SP), mostly fine, ~5% medium, <5% fines, <5% fine gravel, tan with occasional thin gray lenses, moist
15ft	15 - 17	S5	4	5	6	8	24	20			S5 - Poorly Graded SAND (SP), fine to medium, occasional thin (~1") layer of medium sand, <5% fines, tan, moist
20ft	20 - 22	S6	5	9	11	15	24	20			S6 - Similar to S5

Remarks:

1. The elevation was interpolated from plan titled " Plymouth South HS Survey," by CHA Consulting, Inc., dated 1/29/14, and is approximate.
2 - Boring was advanced with a posthole digger to 18 inches to clear for irrigation utilities.
3 - Estimated strata change based on observed drilling condition.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Project:	**Proposed Plymouth South High School, Plymouth, MA**
Client:	**Ai3 Architects LLC**

LGCI Project No.: 1408

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	25 - 27	S7	9	12	13	13	24	20			S7 - Poorly Graded SAND (SP), fine to medium, occasional thin (~1") layer of medium sand, <5% fines, tan, moist
30 ft	30 - 32	S8	7	9	13	16	24	20			S8 - Similar to S7
35 ft	35 - 37	S9	9	12	13	14	24	19		Sand	S9 - Similar to S7
40 ft	40 - 42	S10	7	12	16	21	24	19			S10 - Similar to S7
45 ft											End of boring at 42 feet. Backfilled with drill cuttings.
50 ft											

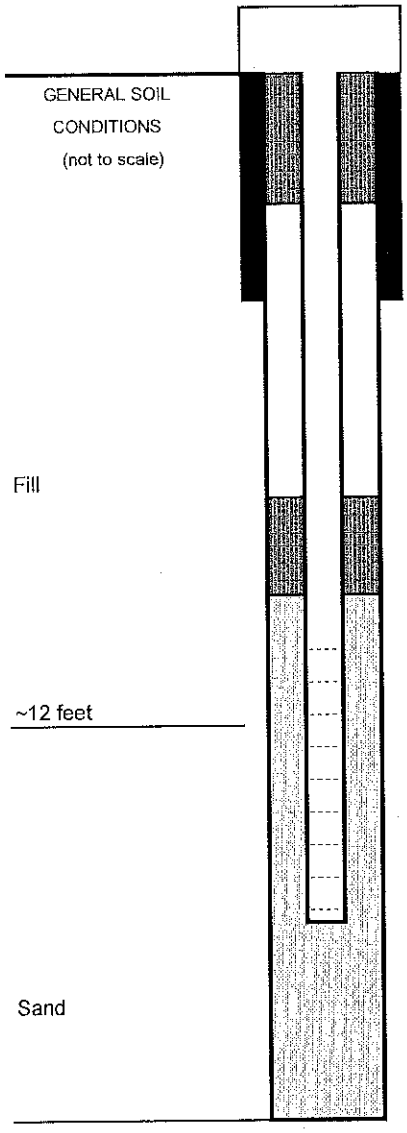
Remarks:

LGCI
Lahlaf Geotechnical Consulting, Inc.

GROUNDWATER OBSERVATION WELL INSTALLATION REPORT

Boring No. : **B-2-OW**

Project Name:	**Proposed Plymouth South High School, Plymouth, Massachusetts**		
LGCI Project Number:	**1408**		
Client:	**Ai3 Architects LLC**		
Drilling Subcontractor:	Northern Drill Service, Inc.	Date Started:	4/7/14
Drilling Foreman:	Tim Tucker	Date Completed:	4/7/14
LGCI Engineer:	Geetha Mathiyalakan	Location:	Western side of proposed building
Ground Surface Elevation:	214.0 ft (see remark 1)	Total Depth of Boring:	17 feet
Ground Water Depth:	8.3 ft at the end of installation	Drill Rig Type:	Mobil B-48 ATV
		Drilling Method:	3 1/4" HSA



Riser Stickup ~ 5 inches below ground surface

THICKNESS OF SURFACE SEAL	~ 6 inches
TYPE OF SURFACE SEAL	Concrete
TYPE OF SURFACE CASING	Roadbox
ID OF SURFACE CASING	4 inches
DEPTH TO BOTTOM OF CASING	10 inches
ID OF RISER PIPE	2 inches
TYPE OF RISER PIPE	Schedule 40 PVC
TYPE OF BACKFILL AROUND RISER PIPE	Sand
DEPTH TO TOP OF SEAL	3 feet
TYPE OF SEAL	Bentonite chips
DEPTH TO BOTTOM OF SEAL	5 feet
DEPTH TO TOP OF PERVIOUS SECTION	7 feet
TYPE OF PERVIOUS SECTION	Schedule 40 PVC
DESCRIBE OPENINGS	0.01-inch slots
ID OF PERVIOUS SECTION	2 inches
TYPE OF BACKFILL AROUND PERVIOUS SECTION	Filter Sand
DEPTH TO BOTTOM OF PERVIOUS SECTION	17 feet
DEPTH TO BOTTOM OF SAND COLUMN	17 feet
TYPE OF BACKFILL BELOW PERVIOUS SECTION	Filter Sand
DIAMETER OF BOREHOLE	6 inches
DEPTH TO BOTTOM OF BOREHOLE	17 feet

NOTES:

1 - Ground surface elevation estimated from plan titled " Plymouth South HS Survey," dated January 29, 2014, by CHA Consulting, Inc.

LGCI
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BORING LOG

Boring B-101
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/15/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/15/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed parking - NW side
Ground Surface El:	213 feet (see remark 1)	Total Depth:	17 feet
Groundwater Depth:	4.8 ft at the end of drilling	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
	Wet samples below 5 feet	Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	4	5	8	13	24	17		Topsoil	S1 - Top 5": Topsoil Mid 2": Silty SAND (SM), fine to medium, ~15% fines, ~5% organics, brown, moist (subsoil) Bot. 7": Poorly Graded SAND with Silt (SP-SM), mostly fine to medium, 5-10% fines, tan-brown, moist (fill)
5ft	5 - 7	S2	8	13	12	13	24	9		Fill	S2 - Poorly Graded SAND (SP), mostly medium, <5% fines, <5% fine gravel, tan, wet (fill) S3 - Top 6": Similar to S2 Bot. 12": Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, thin (~3") layer of organics and ~5% roots in the middle of the sample, black-tan, wet (fill)
	7 - 9	S3	6	8	16	34	24	18			S4 - Top 9": Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, thin (~2") layer of organics in the middle of the sample, brown-gray, wet Bot. 2": Silty SAND (SM), fine to medium, ~15% fines, bright brown, moist (buried subsoil)
10ft	10 - 12	S4	7	12	10	11	24	11		~10.9'	
	12 - 14	S5	6	7	10	10	24	11		Sand	S5 - Poorly Graded SAND with Silt (SP-SM), mostly fine, 5-10% fines, brown-tan, wet
15ft	15 - 17	S6	8	12	14	14	24	10			S6 - Poorly Graded SAND (SP), fine to medium, ~5% fines, <5% coarse gravel, brown-tan, wet
20ft											End of boring at 17 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-102

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/13/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/13/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed building - western side
Ground Surface El:	214 feet (see remark 1)	Total Depth:	36 feet
Groundwater Depth:	32 feet at the end of drilling	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	4 in casing to 29 ft / Tri-cone roller bit
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	3	10	26	31	24	15		Topsoil/ Subsoil	S1 - Top 6": Topsoil Mid. 5": Silty SAND (SM), fine to medium, 20-25% fines, traces of roots, brown, moist (subsoil)
	2 - 4	S2	16	21	31	22	24	15		Fill	Bot. 4": Silty SAND (SM), fine to medium, 15-20% fines, brown, moist (fill) S2 - Poorly Graded SAND (SP), fine to medium, ~5% coarse, ~5% fines, <5% fine gravel, tan-brown, moist (fill)
5ft	4 - 6	S3	10	11	16	22	24	11			S3 - Similar to S2, ~5% fine gravel, tan-brown, wet (fill)
	6 - 8	S4	11	17	23	20	24	12			S4 - Top 3": Similar to S2, ~10% coarse, ~5% fines, ~5% fine gravel, tan-brown, wet (fill) Bot. 9": Silty SAND (SM), mostly fine to medium, ~20% fines, 5-10% organics, thin (~2") layer of small to medium size roots at the bottom of the sample, brown to dark gray, wet (trace of natural bright brown silty sand at the tip of the spoon)
	8 - 10	S5	9	9	10	11	24	9			S5 - Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, brown-tan, wet
10ft	10 - 12	S6	14	14	15	16	24	9		Sand	S6 - Poorly Graded SAND with Silt (SP-SM), mostly fine to medium, 5-10% fines, <5% organics, tan, wet
15ft	14 - 16	S7	5	6	7	9	24	11			S7 - Poorly Graded SAND (SP), fine to medium, ~5% fines, tan, wet
	16 - 18	S8	16	15	16	12	24	8			S8 - Similar to S7, ~5% fine gravel at the top of the sample, tan, wet
20ft	19 - 21	S9	9	12	16	23	24	12			S9 - Similar to S7, 5-10% coarse, ~5% fines, tan, wet
	24 - 26	S10	12	14	18	15	24	14			S10 - Poorly Graded SAND (SP), mostly medium, <5% fines, ~5% fine gravel, tan, wet

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-102
Page 2 of 2

Project:	**Proposed Plymouth South High School, Plymouth, MA**
Client:	**Ai3 Architects LLC**

LGCI Project No.: 1408

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
30 ft	29 - 31	S11	12	19	20	21	24	11		Sand	S11 - Poorly Graded SAND (SP), fine to medium, <5% fines, ~5% fine gravel, tan, wet
35 ft	34 - 36	S12	10	18	20	21	24	0			S12 - No Recovery
											End of boring at 36 feet. Backfilled with drill cuttings.
40 ft											
45 ft											
50 ft											

Remarks:

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-103
Page 1 of 2

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/14/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/14/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed Building - west side
Ground Surface El:	214.5 feet (see remark 1)	Total Depth:	35 feet
Groundwater Depth:	4 feet at the end of drilling	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
	Wet samples below 7 feet	Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	8	8	14	10	24	15		Topsoil/ Subsoil	S1 - Top 6": Topsoil Mid. 5": Silty SAND (SM), mostly fine, ~10% medium, ~20% fines, <5% organics, brown, moist (subsoil)
	2 - 4	S2	14	16	17	21	24	13			Bot. 4": Poorly Graded SAND (SP), fine to medium, ~5% fines, tan, moist (fill) S2 - Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, ~5% fine gravel, tan, moist (fill)
5ft										Fill	
	5 - 7	S3	5	13	15	14	24	14			S3 - Poorly Graded SAND (SP), fine to medium, ~5% coarse, ~5% fines, <5% fine gravel, tan, moist (fill) S4 - Top 13": Similar to S3, ~1" coarse gravel, tan, wet (fill) Bot. 1": Silty SAND (SM), mostly fine to medium, 10-15% fines, bright brown-gray, wet (buried subsoil)
	7 - 9	S4	25	16	19	20	24	14			S5 - Top 5": Silty SAND (SM), mostly fine to medium, 10-15% fines, <5% small roots, dark brown, wet (buried subsoil)
10ft										~10.4'	
	10 - 12	S5	4	6	5	7	24	17			Bot. 12": Poorly Graded SAND (SP), fine to medium, <5% fines, tan, wet
	12 - 14	S6	10	12	17	20	24	9		Sand	S6 - Similar to bot. 12" of S5
15ft											
	15 - 17	S7	14	15	21	22	24	12			S7 - Poorly Graded SAND (SP), mostly fine, ~5% fines, tan, wet
											S8 - Poorly Graded SAND (SP), fine to medium, ~5% fines, tan, wet
20ft	19 - 21	S8	7	12	15	14	24	16			
	24 - 26	S9	78	26	29	38	24	12			S9 - Poorly Graded SAND (SP), fine to medium at the top of the sample to medium below, <5% fines, tan, wet

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
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BORING LOG

Boring B-103
Page 2 of 2

Project:	**Proposed Plymouth South High School, Plymouth, MA**
Client:	**Ai3 Architects LLC**

LGCI Project No.: 1408

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
30 ft	29 - 31	S10	16	26	27	30	24	11		Sand	S10 - Poorly Graded SAND (SP), mostly medium, ~5% coarse, <5% fines, tan, wet
	33 - 35	S11	19	30	35	44	24	10			S11 - Poorly Graded SAND (SP), mostly medium, 5-10% coarse, <5% fines, tan, wet
35 ft											End of boring at 35 feet. Backfilled with drill cuttings.
40 ft											
45 ft											
50 ft											

Remarks:

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-104

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/14/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/14/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed building - western side
Ground Surface El:	215.5 feet (see remark 1)	Total Depth:	21 feet
Groundwater Depth:	3 ft at the end of drilling	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
	Wet samples below 5 feet	Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	4	10	13	14	24	13		Topsoil/ Subsoil	S1 - Top 6": Topsoil Mid 6": Silty SAND (SM), fine to medium, ~15% fines, <5% organics, <5% fine gravel, brown, moist (subsoil)
5ft	5 - 7	S2	8	9	9	5	24	17		Fill	Bot. 1": Poorly Graded SAND with Silt (SP-SM), mostly fine to medium, ~10% fines, bright brown, moist (fill) S2 - Top 6": Poorly Graded SAND (SP), fine to medium, ~5% fines, ~5% fine gravel, brown, wet (fill) Bot. 11": Silty SAND (SM), fine to medium, 10-15% fines, ~5% organics, 5-10% roots, thin (~2") layer of roots near the tip of the spoon, brown to gray near the tip of the spoon, wet (fill)
	7 - 9	S3					24	13	2	Sand	S3 - Poorly Graded SAND (SP), mostly medium, ~5% fines, brown-tan, wet
10ft	10 - 12	S4	6	13	18	19	24	11			S4 - Poorly Graded SAND (SP), mostly medium, ~10% coarse, <5% fines, tan, wet
15ft	14 - 16	S5	6	7	9	21	24	13			S5 - Poorly Graded SAND (SP), mostly medium, 10-15% coarse, <5% fines, ~5% fine gravel, tan, wet
20ft	19 - 21	S6	12	18	21	23	24	12			S6 - Poorly Graded SAND (SP), fine to medium, ~5% coarse, <5% fines, tan, wet
											End of boring at 21 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.
2 - Blow counts were missed for the split spoon sample S3.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-105
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/14/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/14/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed building - western side
Ground Surface El:	215 feet (see remark 1)	Total Depth:	21 feet
Groundwater Depth:	12 ft at the end of drilling	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
	Wet samples below 5 feet	Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	3	6	16	15	24	17		Topsoil	S1 - Top 5": Topsoil Mid 3": Silty SAND (SM), fine to medium, ~15% fines, <5% roots, brown, moist (subsoil)
5ft	5 - 7	S2	8	15	22	23	24	11		Fill ~8.5	Bot. 9": Silty SAND (SM), mostly fine to medium, 10-15% fines, <5% coarse gravel, brown to tan near the tip of the spoon, moist (fill) S2 - Top 6": Poorly Graded SAND (SP), fine to medium, ~5% fines, reddish brown, wet (fill) Bot. 5": Silty SAND (SM), fine to medium, ~15% fines, ~5% gravel, 5-10% organics with occasional thin (~1/8") layers, gray, wet (fill)
	7 - 9	S3	6	21	33	32	24	15			S3 - Top 7": Poorly Graded SAND (SP), fine to medium, ~5% fines, brown, wet Bot. 8": Silty SAND (SM), mostly fine, ~15% fines, 5-10% organics with occasional thin (~1/16") layers, gray, wet (trace of bright brown natural silty sand at the tip of the spoon)
10ft	9 - 11	S4	8	9	10	10	24	9		Sand	S4 - Top 6": Silty SAND (SM), fine to medium, ~15% fines, <5% small roots, brown with thin (~1/16") layers of gray, wet Bot. 3": Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, tan, wet
15ft	14 - 16	S5	5	10	10	9	24	7			S5 - Poorly Graded SAND (SP), fine to medium, <5% fines, ~5% fine gravel, tan, wet to moist near the tip of the spoon
20ft	19 - 21	S6	17	10	12	13	24	7			S6 - Poorly Graded SAND (SP), mostly medium, <5% fines, tan, wet to moist near the tip of the spoon
											End of boring at 21 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-106
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/15/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/15/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed building - NW side
Ground Surface El:	216 feet (see remark 1)	Total Depth:	17 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	2	11	8	12	24	17		Topsoil/ Subsoil	S1 - Top 5": Topsoil Mid 7": Silty SAND (SM), fine to medium, ~15% fines, ~5% coarse gravel, <5% organics, brown, moist (subsoil)
	2 - 4	S2	15	20	26	33	24	15		Fill	Bot. 5": Poorly Graded SAND (SP), mostly medium, <5% fines, tan-brown, moist (fill) S2 - Top 10": Similar to bot. 5" of S1, ~5% fine to coarse gravel, tan-brown, moist (fill)
5ft											
	5 - 7	S3	2	6	12	19	24	17		~5.4'	Bot. 5": Silty SAND (SM), fine to medium, 10-15% fines, <5% gravel, 5-10% organics with occasional thin (~1/16") layers, <5% small roots, gray, moist (fill) S3 - Top 5": Similar to bot. 5" of S2, ~10% organics, brown-black, moist (buried topsoil/subsoil)
10ft											Bot. 12": Poorly Graded SAND (SP), fine to medium, <5% fines, <5% coarse gravel, tan-brown, moist
	10 - 12	S4	5	12	19	20	24	7		Sand	S4 - Poorly Graded SAND (SP), mostly medium, ~10% coarse, <5% fines, ~5% coarse gravel, tan, moist
15ft											
	15 - 17	S5	6	10	14	12	24	13			S5 - Similar to S4, 5-10% coarse gravel, ~1" coarse gravel near the tip of the spoon, tan, moist
20ft											End of boring at 17 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-107
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/15/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/15/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed building - near center
Ground Surface El:	215.5 feet (see remark 1)	Total Depth:	17 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	3	7	17	10	24	9		Topsoil	S1 - Top 5": Topsoil
											Bot. 4": Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, ~5% coarse gravel, brown, moist (fill)
	2 - 4	S2	11	15	22	14	24	18		Fill	S2 - Top 8": Poorly Graded SAND (SP), fine to medium, <5% fines, tan-brown, moist (fill)
											Bot. 10": Silty SAND (SM), fine to medium, ~15% fines, 5-10% organics, thin (~1") layer of wood pieces at the tip of the spoon, brown-gray, moist (fill)
5ft										~5.8	
	5 - 7	S3	2	7	7	6	24	14			S3 - Top 4": Buried Topsoil
											Mid 5": Silty SAND (SM), fine, ~20% fines, ,5% organics, gray-brown, moist (buried subsoil)
											Bot. 5": Poorly Graded SAND with Silt (SP-SM), mostly fine, 5-10% fines, brown-tan, moist
10ft											
	10 - 12	S4	10	9	10	14	24	12		Sand	S4 - Poorly Graded SAND (SP), mostly medium, ~10% coarse, <5% fines, <5% fine gravel, tan, moist
15ft											
	15 - 17	S5	7	7	11	11	24	11			S5 - Similar to S4, <5% coarse, <5% fines, tan, moist
20ft											End of boring at 17 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-108
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Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/15/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/15/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed building - eastern side
Ground Surface El:	214.5 feet (see remark 1)	Total Depth:	17 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	3	4	6	9	24	16		Topsoil	S1 - Top 5": Topsoil Mid. 2": Poorly Graded SAND with Silt (SP-SM), mostly fine, ~10% fines, <5% roots, brown, moist (subsoil)
	2 - 4	S2	10	11	13	14	24	7		Fill	Bot. 9": Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, <5% coarse gravel, brown-tan, moist (fill) S2 - Poorly Graded SAND (SP), mostly medium, 5% coarse, <5% fines, brown-tan, moist (fill)
5ft										5'	
	5 - 7	S3	3	6	29	11	24	13			S3 - Top 2": Similar to S2, bright brown, moist (fill) Bot. 11": Poorly Graded SAND (SP), mostly medium, ~10% coarse, <5% fines, ~5% fine gravel, tan, moist
10ft										Sand	
	10 - 12	S4	8	11	14	13	24	8			S4 - Poorly Graded SAND (SP), mostly medium, ~10% coarse, <5% fines, <5% fine gravel, tan, moist
15ft											
	15 - 17	S5	8	14	16	15	24	17			S5 - Poorly Graded SAND (SP), mostly medium, <5% fines, ~5% coarse gravel, tan, moist
20ft											End of boring at 17 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Land Geotechnical Consulting, Inc.

BORING LOG

Boring B-109
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/15/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/15/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed building - eastern side
Ground Surface El:	213.5 feet (see remark 1)	Total Depth:	17 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	4	5	5	8	24	15		Topsoil / Fill	S1 - Top 4": Topsoil Mid. 2": Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, bright brown, moist (subsoil)
	2 - 4	S2	9	12	15	16	24	6		~2.2'	Bot. 9": Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, tan-brown, moist (fill) S2 - Top 3": Poorly Graded SAND (SP), fine to medium, ~5% fines, brown-tan, moist (fill)
5ft	5 - 7	S3	5	8	11	12	24	13			Bot. 3": Poorly Graded SAND (SP), mostly medium, 5-10% coarse, <5% fines, tan, moist S3 - Poorly Graded SAND (SP), mostly medium, 5-10% coarse, <5% fines, ~1.5" coarse, subangular gravel piece near the bottom of the sample, tan, moist
10ft	10 - 12	S4	7	9	8	10	24	0		Sand	S4 - No Recovery (auger cuttings similar to S3)
15ft	15 - 17	S5	5	6	7	9	24	14			S5 - Poorly Graded SAND (SP), mostly medium, ~10% coarse, <5% fines, <5% coarse gravel, tan, moist
20ft											End of boring at 17 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-110
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/18/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/18/2014
LGCI Engineer:	Zach Morris	Location:	Proposed building - SE corner
Ground Surface El:	214.5 feet (see remark 1)	Total Depth:	17 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	3	19	26	33	24	12		Topsoil/ Subsoil	S1 - Top 2": Topsoil Bot. 10": Silty SAND (SM), fine to medium, 15-20% fines, ~5% fine gravel, ~5% roots, brown, moist (subsoil)
	2 - 4	S2	23	16	17	20	24	16		Fill	S2 - Silty SAND (SM), fine to medium, ~20% fines, 5-10% organics, dark brown, moist (fill) S3 - Silty SAND with Gravel (SM), fine to medium, ~20% fines, ~15% mostly fine gravel, dark brown, moist (fill)
5ft											
	5 - 6.3	S3	8	33	60/4"		16	11		~6'	
											(trace of natural bright brown silty sand at the tip of the spoon)
10ft											
	10 - 12	S4	11	17	14	11	24	13		Sand	S4 - Poorly Graded SAND (SP), fine to medium, 5% fines, ~5% fine gravel, tan, moist
15ft											
	15 - 17	S5	10	15	18	43	24	11			S5 - Similar to S4, 5-10% fine gravel, tan, moist
											End of boring at 17 feet. Backfilled with drill cuttings.
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-111

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/18/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/18/2014
LGCI Engineer:	Zach Morris	Location:	Proposed building - NE corner
Ground Surface El:	210 feet (see remark 1)	Total Depth:	17 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	6	7	10	15	24	16		Fill	S1 - Top 12": Poorly Graded SAND (SP), fine to medium, 5% fines, ~5% fine gravel, brown-tan, moist (fill)
											Bot. 4": Similar to top 12", tan, moist
	2 - 4	S2	25	35	21	18	24	9			S2 - Poorly Graded SAND (SP), fine to medium, <5% fines, tan, moist
5ft											
	5 - 7	S3	7	10	8	10	24	13			S3 - Similar to S2
10ft											
	10 - 12	S4	7	13	13	15	24	11		Sand	S4 - Similar to S2
15ft											
	15 - 17	S5	8	17	19	12	24	11			S5 - Poorly Graded SAND (SP), fine to medium, <5% fines, 5-10% fine gravel, tan, moist
20ft											End of boring at 17 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-112

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/15/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/15/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed parking - NW side
Ground Surface El:	216 feet (see remark 1)	Total Depth:	17 feet
Groundwater Depth:	Wet samples below 5 feet	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	6	17	23	21	24	19		Topsoil/ Subsoil ~1.2'	S1 - Top 4": Topsoil Mid 10": Silty SAND (SM), fine to medium, 10-15% fines, ~5% fine gravel, ~5% organics, dark brown, moist (subsoil)
5ft	5 - 7	S2	13	22	21	29	24	9		Fill	Bot. 5": Poorly Graded SAND (SP), mostly fine to medium, ~5% fines, tan-brown, moist (fill) S2 - Top 1": Silty SAND (SM), fine to medium, ~15% fines, 5-10% organics, ~5% roots, brown, wet (fill) Bot. 8": Poorly Graded SAND (SP), mostly medium, ~10% coarse, <5% fines, tan, wet (fill)
10ft	12 - 14	S3	6	12	14	19	24	16		~13.3'	S3 - Top 4": Poorly Graded SAND (SP), fine to medium, ~5% fines, tan, wet (fill) Mid. 11": Silty SAND (SM), mostly fine, 20-25% fines, ~10% organics with thin (~2") layer of wood chips, ~5% small roots, brown-gray, wet (fill)
15ft	15 - 17	S4	11	19	19	34	24	5		Sand	Bot. 1": Silty SAND (SM), fine to coarse, 15-20% fines, gray-reddish brown, wet S5 - Poorly Graded SAND with Silt (SP-SM), mostly fine to medium, ~10% fines, gray-brown, wet
20ft											End of boring at 17 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-113
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/15/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/15/2014
LGCI Engineer:	Geetha Mathiyalakan	Location:	Proposed parking - northern side
Ground Surface El:	217 feet (see remark 1)	Total Depth:	11 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	8	10	18	17	24	8		Topsoil / Fill	S1 - Top 4": Topsoil Bot. 4": Poorly Graded SAND with Silt and Gravel (SP-SM), fine to medium, 5-10% fines, 10-15% mostly coarse, sub-angular gravel, brown-tan, moist (fill)
									2	~4'	
5ft	4 - 6	S2	14	18	19	16	24	2		Sand	S2 - ~1" - 1.5" coarse, angular gravel pieces (observed fine to medium sand, <5% fines, tan, moist auger cuttings below 4 feet)
10ft	9 - 11	S3	6	9	9	8	24	9			S3 - Poorly Graded SAND (SP), fine to medium, ~5% fines, <5% fine gravel, tan, moist
15ft											End of boring at 11 feet. Backfilled with drill cuttings.
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.
2 - Estimated strata change based on the drilling condition.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-114

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/18/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/18/2014
LGCI Engineer:	Zach Morris	Location:	Proposed half-time building
Ground Surface El:	211 feet (see remark 1)	Total Depth:	22 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	5	25	26	26	24	11		Asphalt / Fill	~4.5" asphalt S1 - Poorly Graded SAND (SP), fine to medium, ~5% fines, ~5% fine gravel, bright brown to tan, moist (appears natural near the bottom half)
	2.5-4.5	S2	19	22	23	21	24	13			S2 - Poorly Graded SAND (SP), fine to medium, <5% fines, tan, moist
5ft											
	5 - 7	S3	11	12	15	13	24	12			S3 - Similar to S2
10ft											
	10 - 12	S4	6	10	13	17	24	14			S4 - Similar to S2
15ft											
	15 - 17	S5	11	20	24	31	24	12		Sand	S5 - Poorly Graded SAND (SP), fine to medium, <5% fines, 5-10% fine gravel, tan, moist
20ft											
	20 - 22	S6	50	25	25	44	24	16			S6 - Poorly Graded SAND (SP), mostly medium, <5% fines, tan, moist
											End of boring at 22 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-115
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/18/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/18/2014
LGCI Engineer:	Zach Morris	Location:	Proposed Half-Time building
Ground Surface El:		Total Depth:	
Groundwater Depth:		Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
											B-115 was close to existing portion of half-time building, and was not drilled.
5ft											
10ft											
15ft											
20ft											

Remarks:

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-116
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/18/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/18/2014
LGCI Engineer:	Zach Morris	Location:	Proposed WWTP - SW corner
Ground Surface El:	214 feet (see remark 1)	Total Depth:	17 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	7	26	39	36	24	17		Topsoil 1'	S1 - Top 12": Topsoil Bot. 5": Poorly Graded SAND with Silt (SP-SM), fine to medium, 5-10% fines, brown, moist (fill)
	2 - 4	S2	22	21	17	20	24	11			S2 - Silty SAND (SM), fine to medium, ~20% fines, 5-10% organics, ~5% small roots, black-brown, moist (fill)
5ft	5 - 7	S3	12	28	24	19	24	12		Fill	S3 - Silty SAND (SM), fine to medium, ~25% fines, ~5% fine gravel, <5% organics, <5% roots, brown, moist (fill)
10ft	10 - 12	S4	8	15	17	20	24	22		~11'	S4 - Top 12": Buried Topsoil Bot. 10": Poorly Graded SAND (SP), fine to medium, <5% fines, <5% fine gravel, tan, moist
15ft	15 - 17	S5	6	6	6	6	24	14		Sand	S5 - Poorly Graded SAND (SP), mostly medium, <5% fines, tan, moist
20ft											End of boring at 17 feet. Backfilled with drill cuttings.

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-117

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	New Hampshire Boring	Date Started:	8/18/2014
Drilling Foreman:	Ernie Nadeau	Date Completed:	8/18/2014
LGCI Engineer:	Zach Morris	Location:	Proposed WWTP - NE corner
Ground Surface El:	214 feet (see remark 1)	Total Depth:	22 feet
Groundwater Depth:	Not encountered	Drill Rig Type:	Morooka D-50 Rubber Tire ATV
		Drilling Method:	2-1/4" HSA
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Safety	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	5	22	24	21	24	13		Topsoil/ Subsoil	S1 - Top 4": Topsoil Bot. 9": Silty SAND (SM), fine to medium, ~25% fines, 5-10% fine gravel, 10-15% organics, ~5% roots, brown, moist (subsoil)
	2 - 4	S2	14	25	21	29	24	16			S2 - Silty SAND (SM), fine to medium, ~25% fines, 5-10% fine gravel, 10-15% organics, ~5% small roots, black-brown, moist (fill)
5ft										Fill	
	5 - 7	S3	15	23	29	16	24	12			S3 - Silty SAND (SM), fine to medium, ~20% fines, ~10% organics, <5% roots, black-brown, moist (fill)
	7 - 8.8	S4	19	50	54	60/5"	23	15		~7.8	S4 - Top 9": Similar to S3 Bot. 6": Poorly Graded SAND (SP), fine to medium, ~5% fines, 5-10% fine gravel, tan, moist
10ft											
	10 - 12	S5	8	18	15	17	24	10			S5 - Poorly Graded SAND with Silt (SP-SM), mostly fine, 5-10% fines, ~5% fine gravel, tan, moist
15ft											
	15 - 17	S6	5	8	11	9	24	8			S6 - Poorly Graded SAND (SP), fine to medium, <5% fines, ~5% fine gravel, tan, moist
										Sand	
20ft											
	20 - 22	S7	7	14	13	17	24	10			S7 - Similar to S6
											End of boring at 22 feet. Backfilled with drill cuttings.

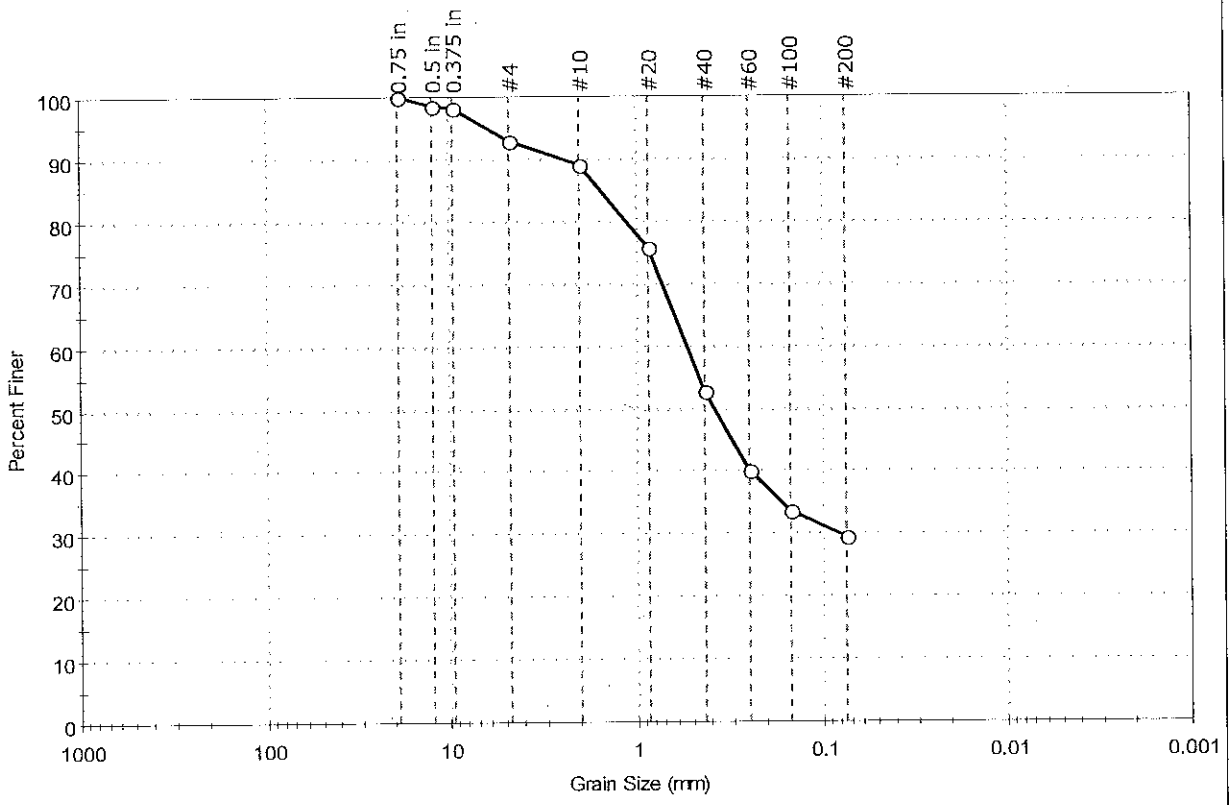
Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

Appendix C Laboratory Test Results

GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	B-2	Sample Type:	jar	Tested By:	jbr
Sample ID:	B-2-S1-2'-4'-Bot 8"	Test Date:	04/14/14	Checked By:	jdt
Depth :	2-4 ft	Test Id:	292743		
Test Comment:	---				
Sample Description:	Moist, dark brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	7.1	63.3	29.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	99		
0.375 in	9.50	98		
#4	4.75	93		
#10	2.00	89		
#20	0.85	76		
#40	0.42	53		
#60	0.25	40		
#100	0.15	34		
#200	0.075	30		

Coefficients

D_{85} = 1.5496 mm D_{30} = 0.0800 mm
D_{60} = 0.5296 mm D_{15} = N/A
D_{50} = 0.3789 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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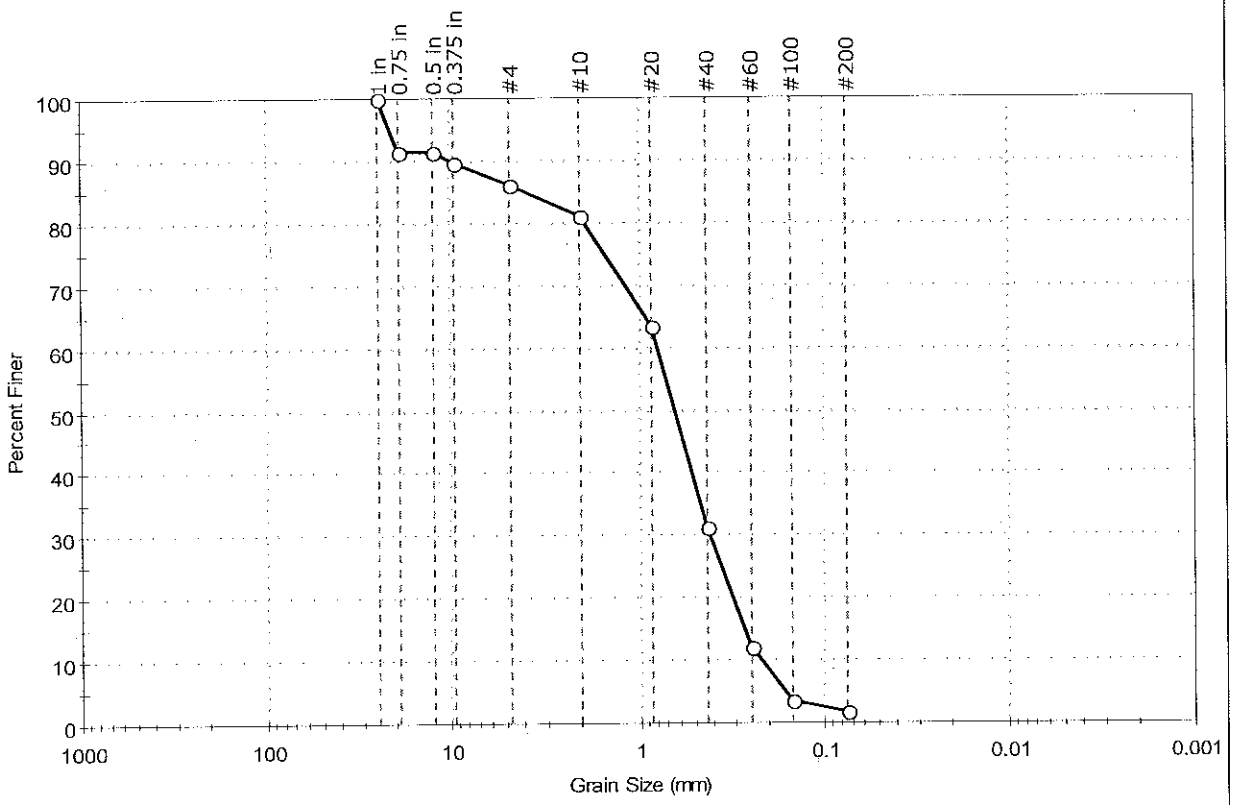
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	B-3	Sample Type:	jar	Tested By:	jbr
Sample ID:	B-3-6'-8'	Test Date:	04/14/14	Checked By:	jdt
Depth :	6-8 ft	Test Id:	292744		
Test Comment:	---				
Sample Description:	Moist, brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	13.8	84.6	1.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	91		
0.5 in	12.50	91		
0.375 in	9.50	90		
#4	4.75	86		
#10	2.00	81		
#20	0.85	64		
#40	0.42	31		
#60	0.25	12		
#100	0.15	4		
#200	0.075	1.6		

Coefficients

D_{85} =3.8777 mm	D_{30} =0.4092 mm
D_{60} =0.7877 mm	D_{15} =0.2713 mm
D_{50} =0.6349 mm	D_{10} =0.2211 mm
C_u =3.563	C_c =0.961

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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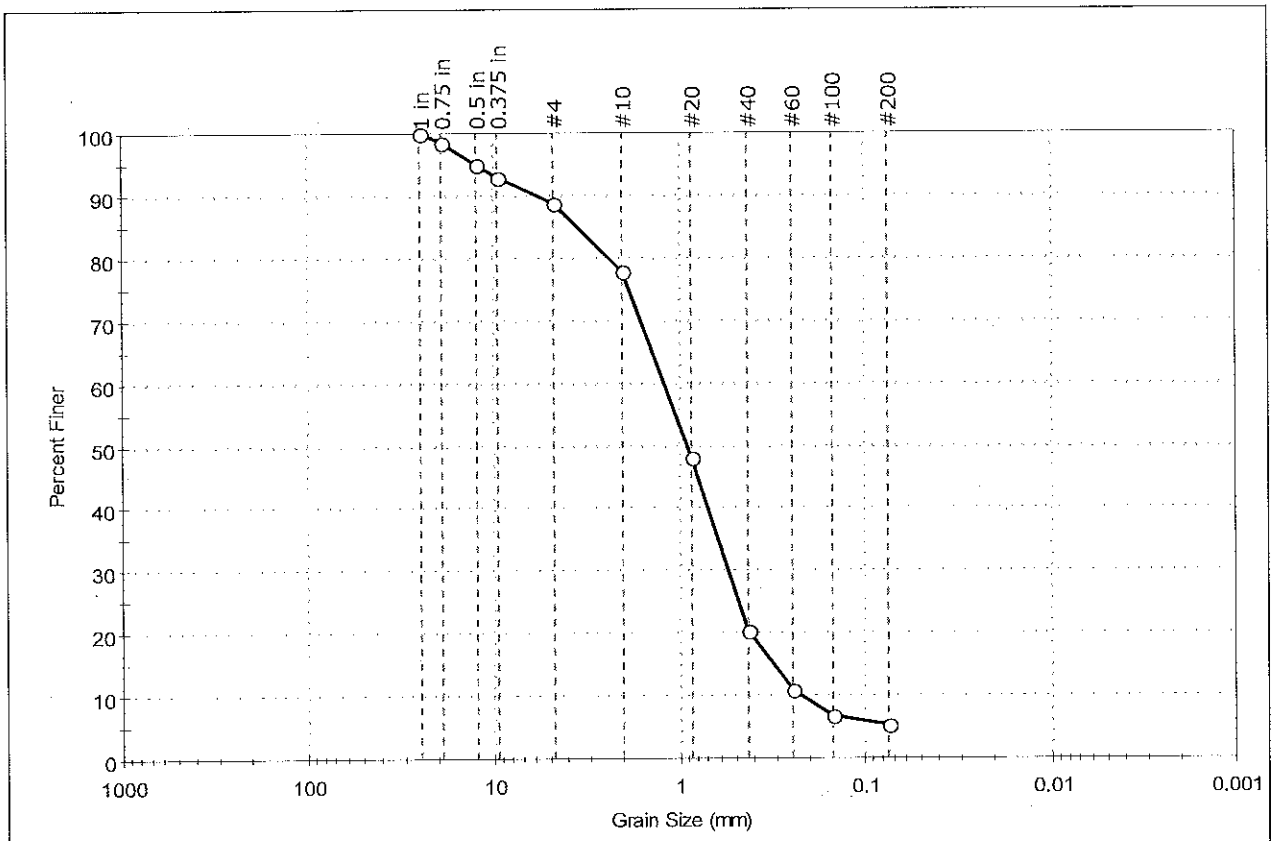
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	TP-12	Sample Type:	jar	Tested By:	jbr
Sample ID:	TP-12-3'-8'	Test Date:	04/15/14	Checked By:	jdt
Depth :	3-8 ft	Test Id:	292745		
Test Comment:	---				
Sample Description:	Moist, brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	11.3	83.4	5.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	99		
0.5 in	12.50	95		
0.375 in	9.50	93		
#4	4.75	89		
#10	2.00	78		
#20	0.85	48		
#40	0.42	20		
#60	0.25	11		
#100	0.15	7		
#200	0.075	5.3		

Coefficients

D_{85} =3.5497 mm	D_{30} =0.5417 mm
D_{60} =1.1992 mm	D_{15} =0.3149 mm
D_{50} =0.8991 mm	D_{10} =0.2220 mm
C_u =5.402	C_c =1.102

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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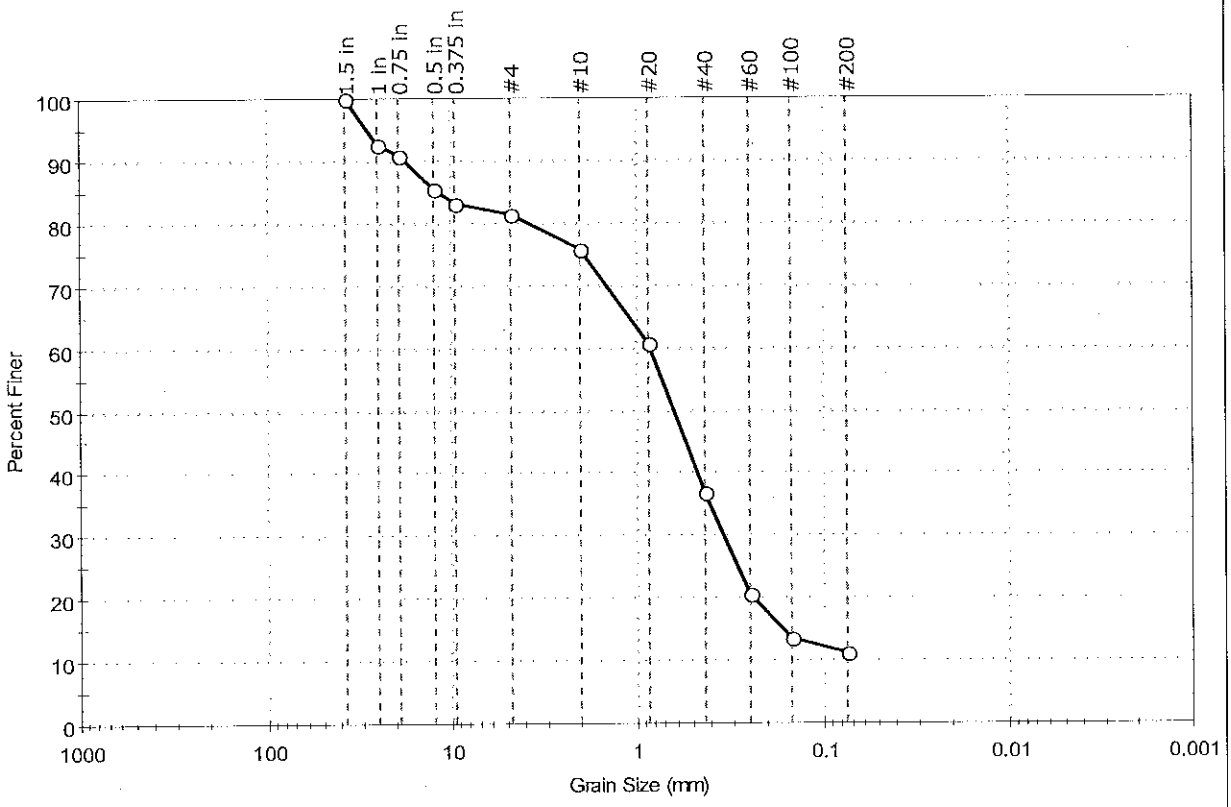
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	TP-3	Sample Type:	jar	Tested By:	jbr
Sample ID:	TP-3-2'-4'	Test Date:	04/14/14	Checked By:	jdt
Depth :	2-4 ft	Test Id:	292740		
Test Comment:	---				
Sample Description:	Moist, brown sand with silt and gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	18.7	70.1	11.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	92		
0.75 in	19.00	91		
0.5 in	12.50	86		
0.375 in	9.50	83		
#4	4.75	81		
#10	2.00	76		
#20	0.85	61		
#40	0.42	37		
#60	0.25	21		
#100	0.15	14		
#200	0.075	11		

Coefficients

D_{85} =11.6694 mm	D_{30} =0.3397 mm
D_{60} =0.8302 mm	D_{15} =0.1664 mm
D_{50} =0.6219 mm	D_{10} =0.0536 mm
C_u =15.489	C_c =2.593

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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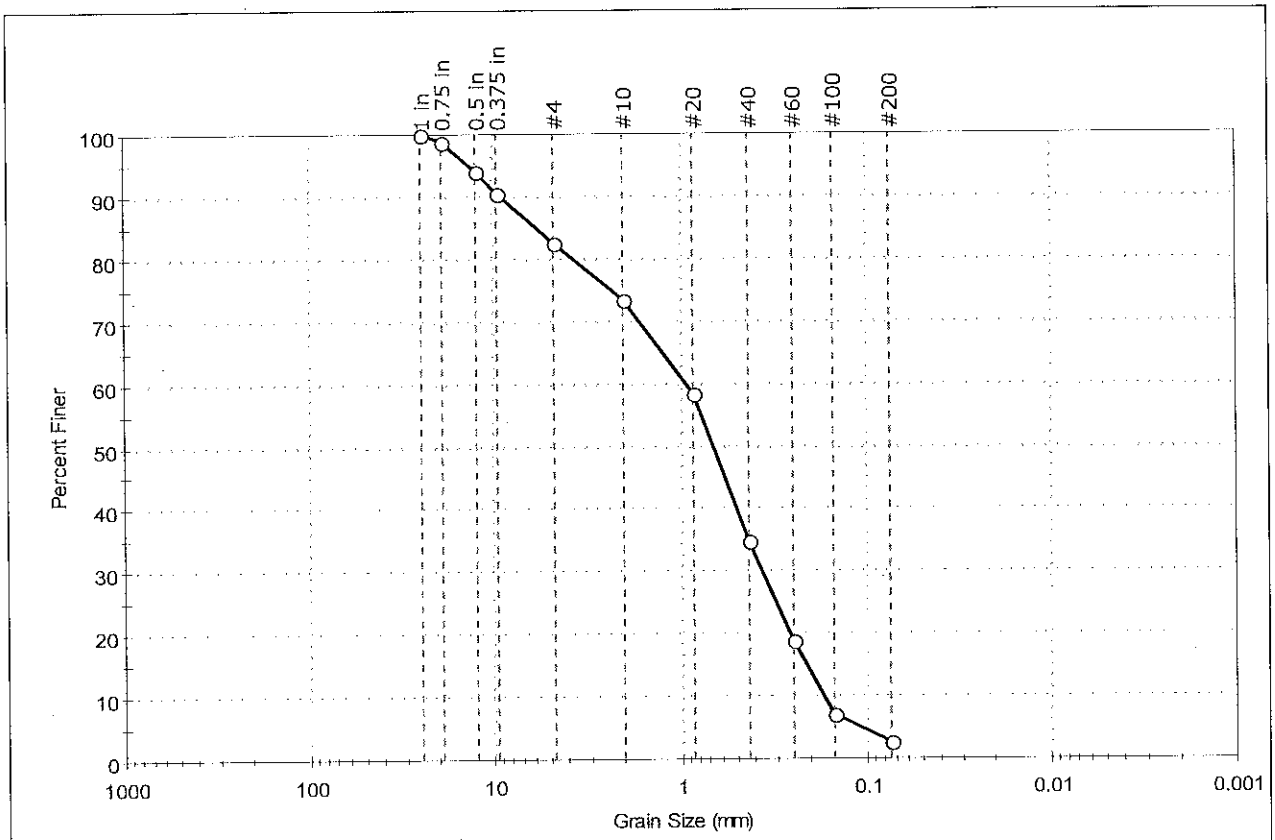
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	TP-5	Sample Type:	jar	Tested By:	jbr
Sample ID:	TP-5-2'-4'	Test Date:	04/14/14	Checked By:	jdt
Depth :	2-4 ft	Test Id:	292741		
Test Comment:	---				
Sample Description:	Moist, brown sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	17.3	80.2	2.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	99		
0.5 in	12.50	94		
0.375 in	9.50	91		
#4	4.75	83		
#10	2.00	73		
#20	0.85	58		
#40	0.42	35		
#60	0.25	19		
#100	0.15	7		
#200	0.075	2.5		

Coefficients

D_{85} = 5.8185 mm	D_{30} = 0.3624 mm
D_{60} = 0.9331 mm	D_{15} = 0.2113 mm
D_{50} = 0.6646 mm	D_{10} = 0.1698 mm
C_u = 5.495	C_c = 0.829

Classification

ASTM: Poorly graded sand with gravel (SP)

AASHTO: Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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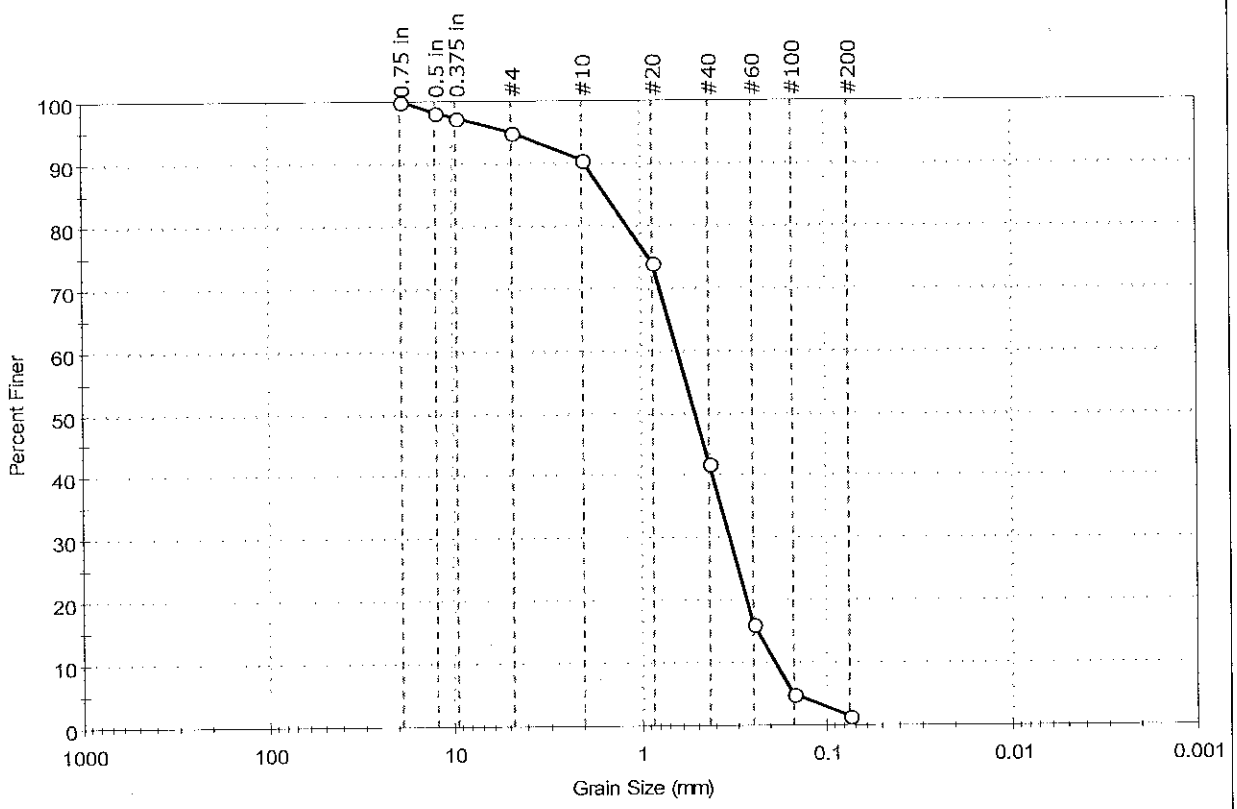
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	TP-7	Sample Type:	jar	Tested By:	jbr
Sample ID:	TP-7-2'-4'	Test Date:	04/14/14	Checked By:	jdt
Depth :	2-4 ft	Test Id:	292742		
Test Comment:	---				
Sample Description:	Moist, brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	5.0	93.5	1.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	98		
0.375 in	9.50	97		
#4	4.75	95		
#10	2.00	91		
#20	0.85	74		
#40	0.42	42		
#60	0.25	16		
#100	0.15	5		
#200	0.075	1.5		

Coefficients

D_{85} = 1.4901 mm	D_{30} = 0.3327 mm
D_{60} = 0.6278 mm	D_{15} = 0.2363 mm
D_{50} = 0.5067 mm	D_{10} = 0.1884 mm
C_u = 3.332	C_c = 0.936

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

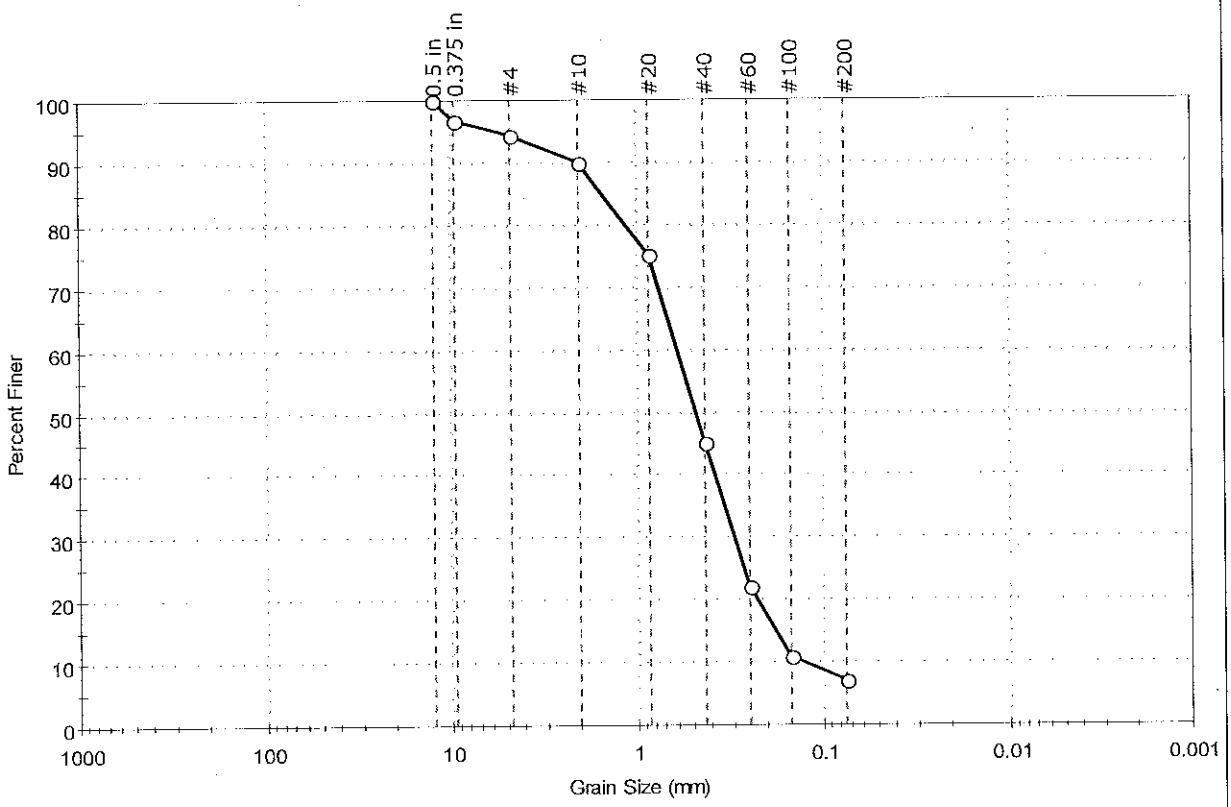
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	B-103	Sample Type:	jar	Tested By:	jbr
Sample ID:	B-103-S2-2'-4'	Test Date:	09/02/14	Checked By:	jdt
Depth :	2-4 ft	Test Id:	306857		
Test Comment:	---				
Sample Description:	Moist, olive sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	5.7	87.3	7.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	97		
#4	4.75	94		
#10	2.00	90		
#20	0.85	75		
#40	0.42	45		
#60	0.25	22		
#100	0.15	11		
#200	0.075	7.0		

Coefficients

D_{85} =1.4889 mm	D_{30} =0.2991 mm
D_{60} =0.5974 mm	D_{15} =0.1808 mm
D_{50} =0.4749 mm	D_{10} =0.1297 mm
C_u =4.606	C_c =1.155

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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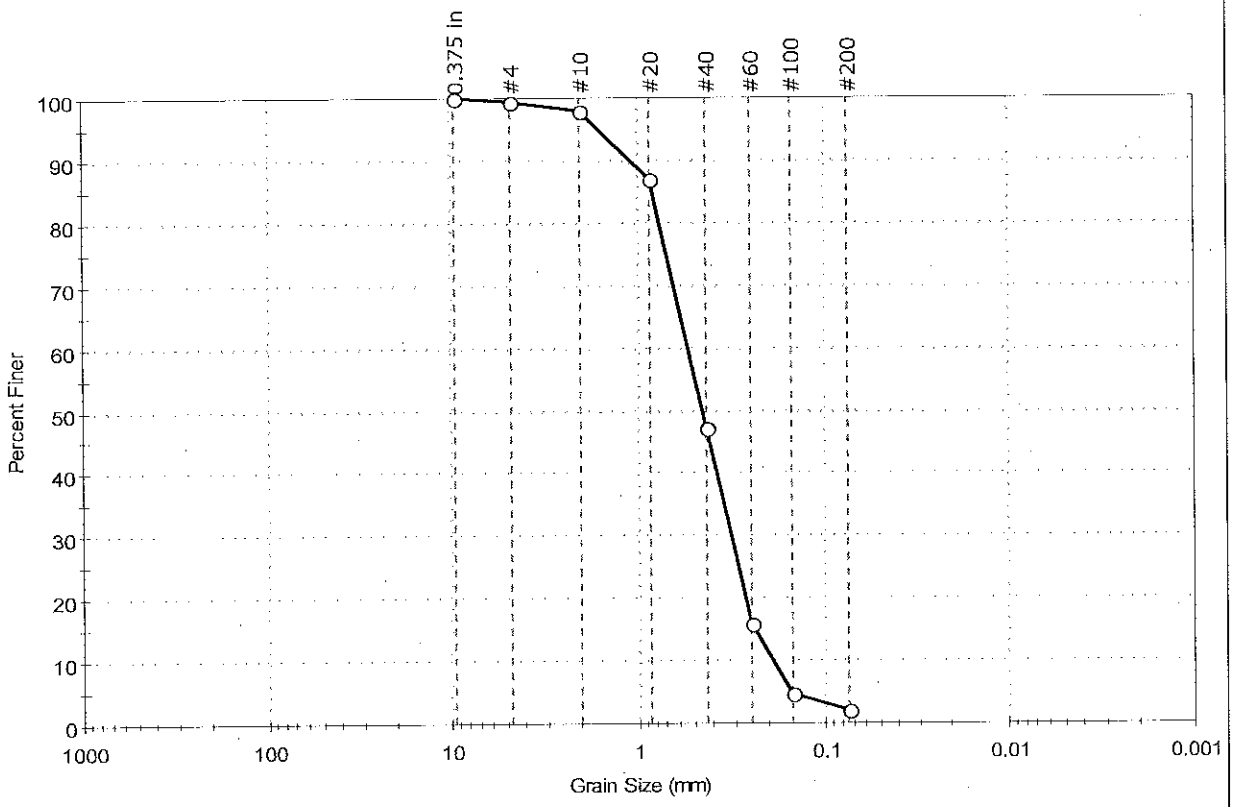
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	B-111	Sample Type:	jar	Tested By:	jbr
Sample ID:	B-111-S2-2'-4'	Test Date:	09/02/14	Checked By:	jdt
Depth :	2-4 ft	Test Id:	306858		
Test Comment:	---				
Sample Description:	Moist, light brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.6	97.3	2.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	98		
#20	0.85	87		
#40	0.42	47		
#60	0.25	16		
#100	0.15	5		
#200	0.075	2.1		

Coefficients

D_{85} =0.8193 mm	D_{30} =0.3170 mm
D_{60} =0.5306 mm	D_{15} =0.2387 mm
D_{50} =0.4460 mm	D_{10} =0.1909 mm
C_u =2.779	C_c =0.992

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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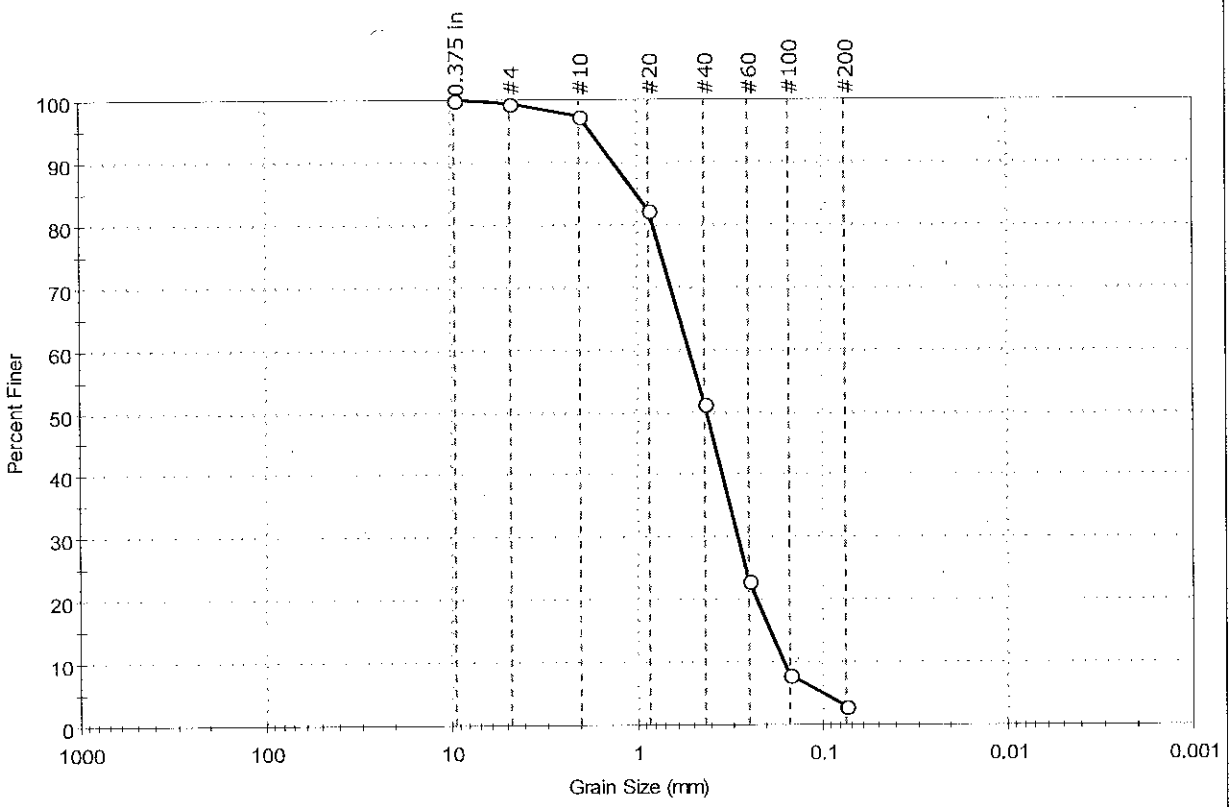
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	B-114	Sample Type:	jar	Tested By:	jbr
Sample ID:	B-114-S1-0.5'-2.5'	Test Date:	09/02/14	Checked By:	jdt
Depth :	0.5-2.5 ft	Test Id:	306859		
Test Comment:	---				
Sample Description:	Moist, light yellow sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.6	96.5	2.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	97		
#20	0.85	82		
#40	0.42	51		
#60	0.25	23		
#100	0.15	8		
#200	0.075	2.9		

Coefficients

D_{85} =0.9930 mm	D_{30} =0.2856 mm
D_{60} =0.5170 mm	D_{15} =0.1911 mm
D_{50} =0.4154 mm	D_{10} =0.1612 mm
C_u =3.207	C_c =0.979

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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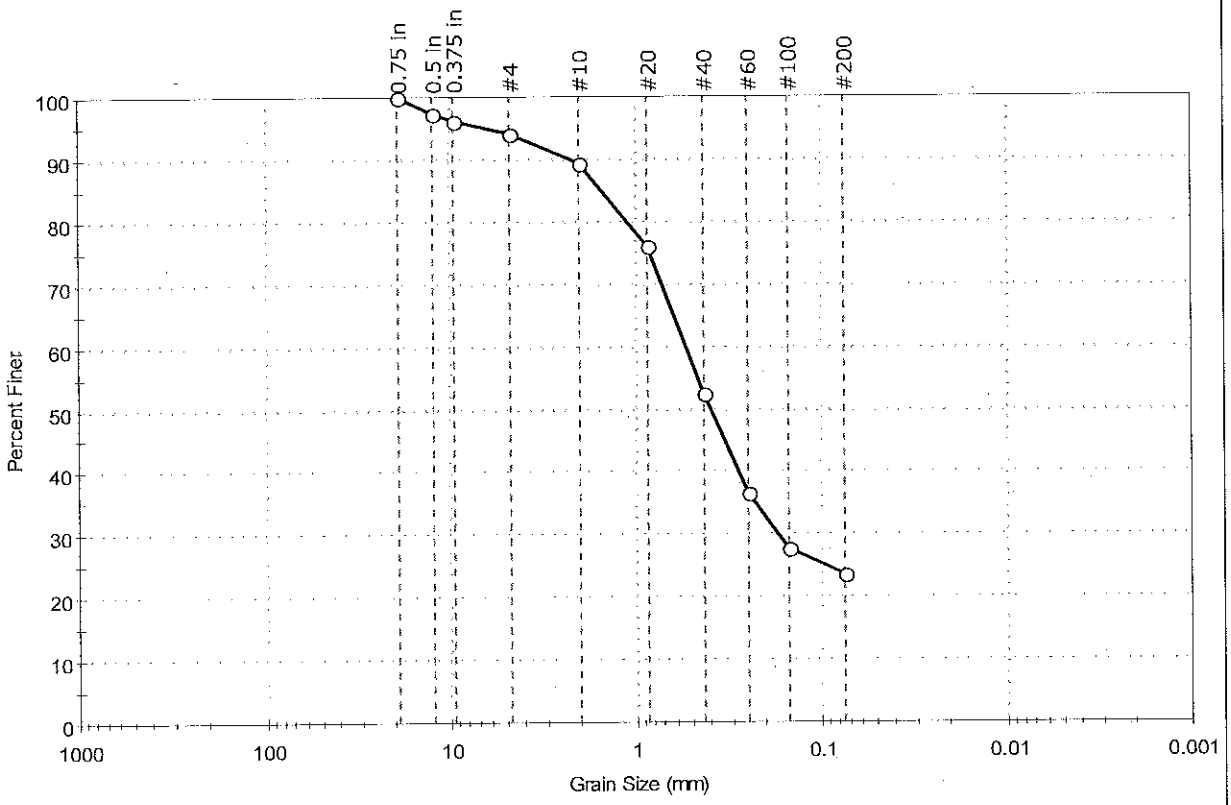
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	B-116	Sample Type:	jar	Tested By:	jbr
Sample ID:	B-116-S3-5'-7'	Test Date:	09/02/14	Checked By:	jdt
Depth :	5-7 ft	Test Id:	306860		
Test Comment:	---				
Sample Description:	Moist, grayish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



%Cobble	%Gravel	%Sand	%Silt & Clay Size
—	5.8	70.6	23.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	97		
0.375 in	9.50	96		
#4	4.75	94		
#10	2.00	89		
#20	0.85	76		
#40	0.42	52		
#60	0.25	37		
#100	0.15	28		
#200	0.075	24		

Coefficients

D_{85} =1.5111 mm	D_{30} =0.1701 mm
D_{60} =0.5311 mm	D_{15} =N/A
D_{50} =0.3917 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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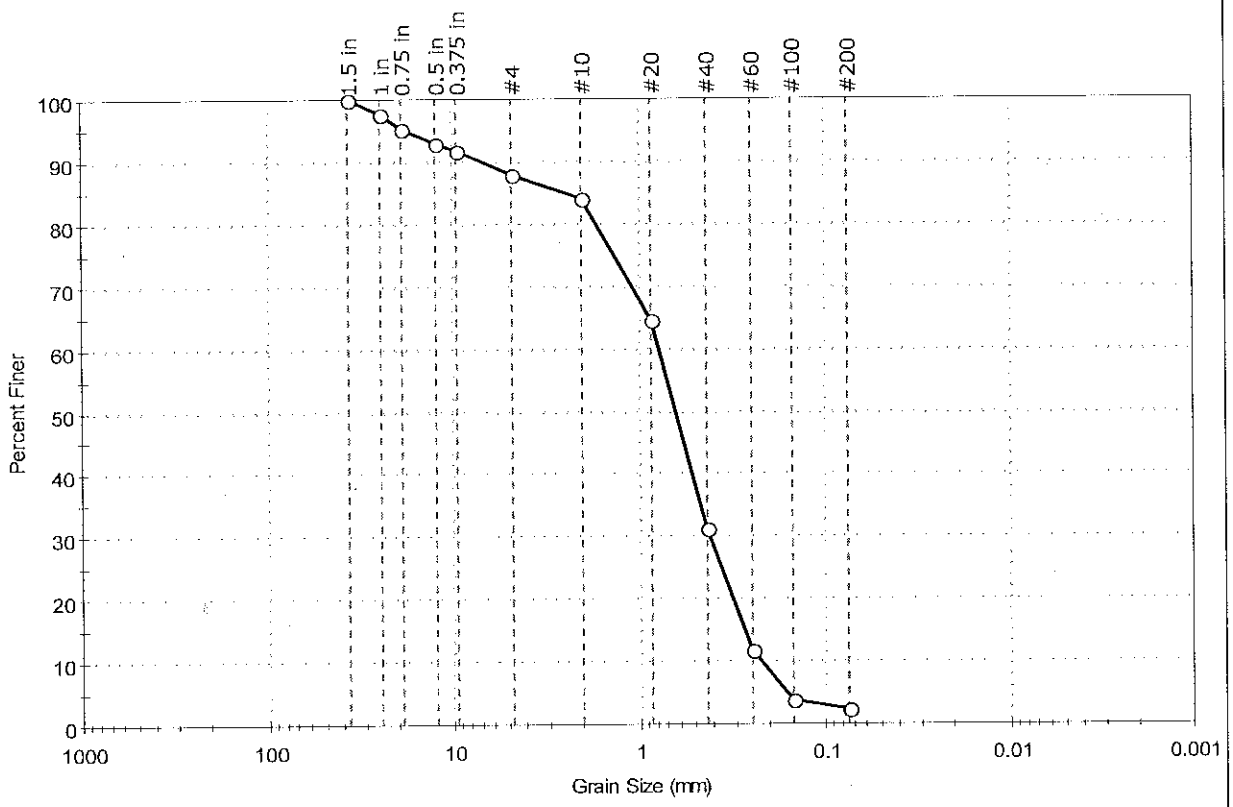
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	TP-101	Sample Type:	bag	Tested By:	jbr
Sample ID:	TP-101-4'-5'	Test Date:	09/02/14	Checked By:	jdt
Depth :	4-5 ft	Test Id:	306853		
Test Comment:	---				
Sample Description:	Moist, light yellow sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	12.1	85.6	2.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	98		
0.75 in	19.00	95		
0.5 in	12.50	93		
0.375 in	9.50	92		
#4	4.75	88		
#10	2.00	84		
#20	0.85	65		
#40	0.42	31		
#60	0.25	12		
#100	0.15	4		
#200	0.075	2.3		

Coefficients

D_{85} =2.4822 mm	D_{30} =0.4110 mm
D_{60} =0.7714 mm	D_{15} =0.2726 mm
D_{50} =0.6271 mm	D_{10} =0.2220 mm
C_u =3.475	C_c =0.986

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

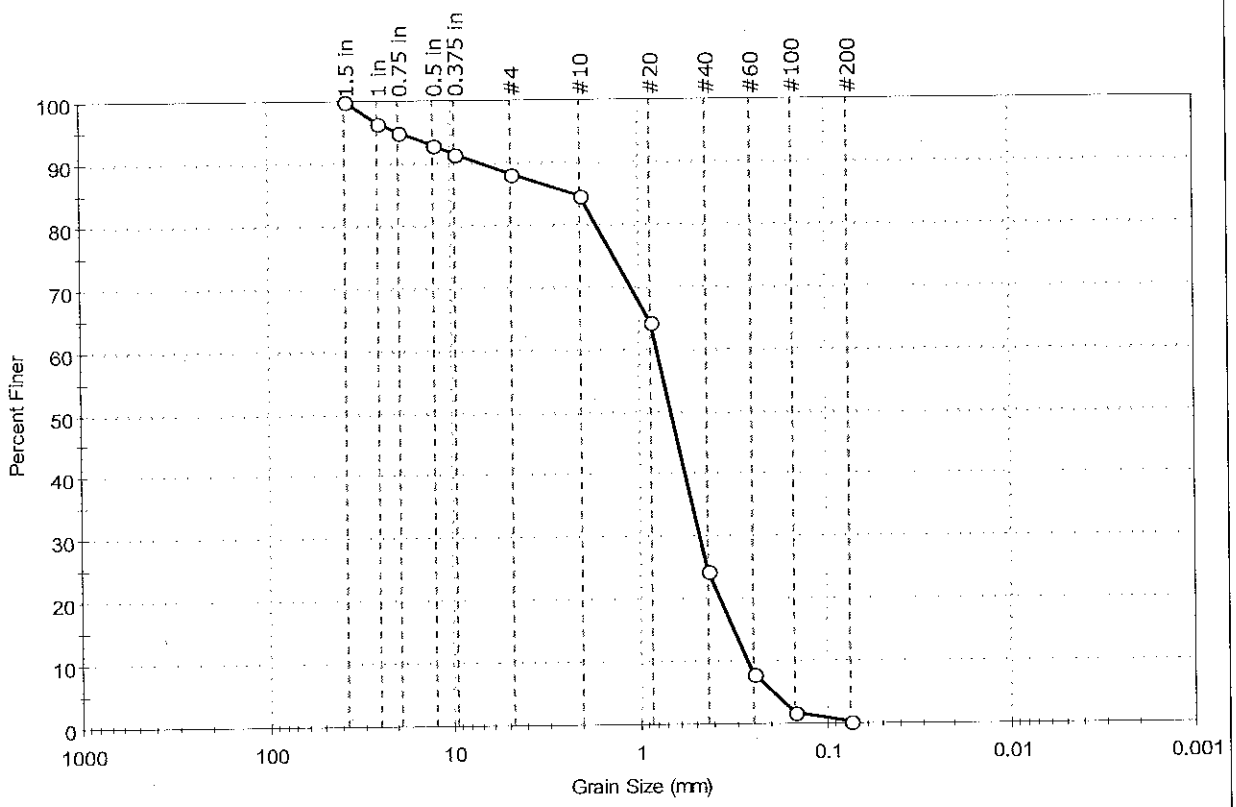
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	TP-107	Sample Type:	bag	Tested By:	jbr
Sample ID:	TP-107-4'-5'	Test Date:	09/02/14	Checked By:	jdt
Depth :	4-5 ft	Test Id:	306855		
Test Comment:	---				
Sample Description:	Moist, light yellow sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	11.8	87.8	0.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	97		
0.75 in	19.00	95		
0.5 in	12.50	93		
0.375 in	9.50	92		
#4	4.75	88		
#10	2.00	85		
#20	0.85	64		
#40	0.42	24		
#60	0.25	8		
#100	0.15	2		
#200	0.075	0.4		

Coefficients

D_{85} =2.2358 mm	D_{30} =0.4679 mm
D_{60} =0.7902 mm	D_{15} =0.3135 mm
D_{50} =0.6636 mm	D_{10} =0.2671 mm
C_u =2.958	C_c =1.037

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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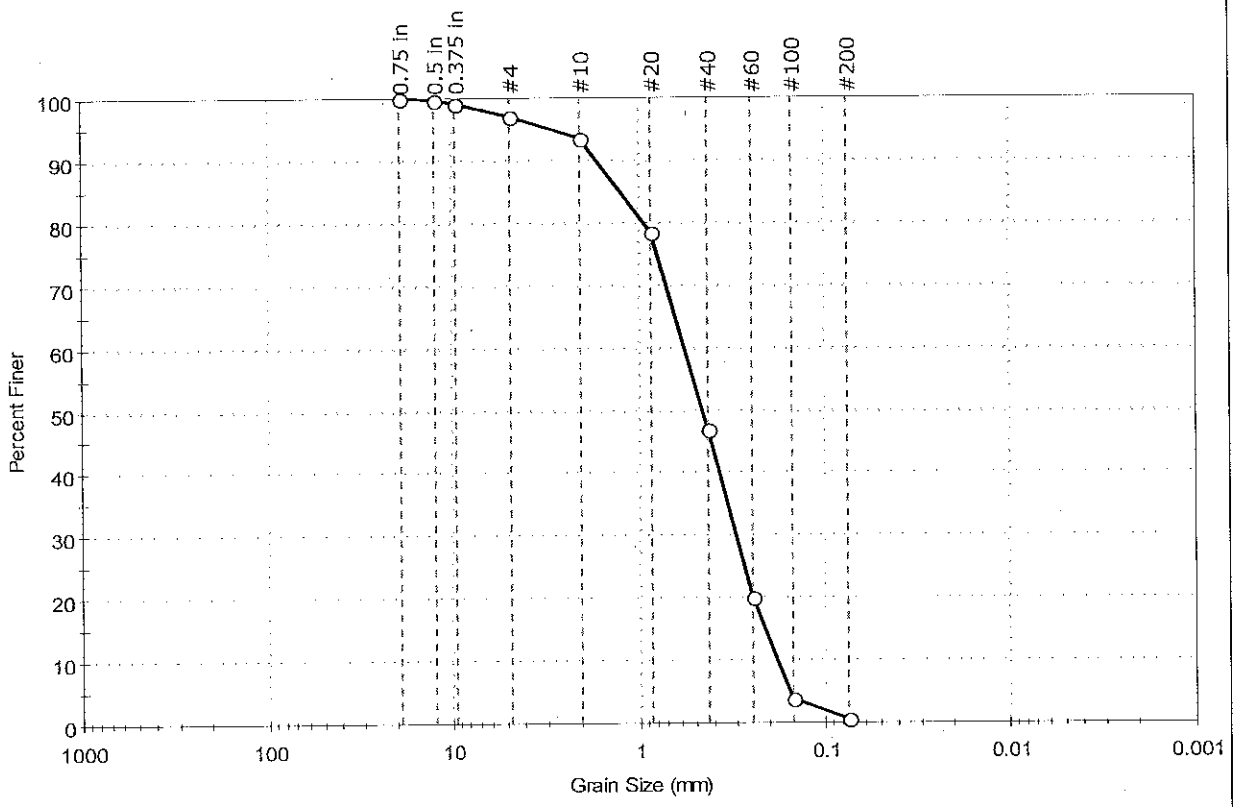
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	TP-109	Sample Type:	bag	Tested By:	jbr
Sample ID:	TP-109-4'-5'	Test Date:	09/02/14	Checked By:	jdt
Depth :	4-5 ft	Test Id:	306856		
Test Comment:	---				
Sample Description:	Moist, pale yellow sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	3.0	96.3	0.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	97		
#10	2.00	94		
#20	0.85	78		
#40	0.42	47		
#60	0.25	20		
#100	0.15	4		
#200	0.075	0.7		

Coefficients

D_{85} =1.2329 mm	D_{30} =0.3042 mm
D_{60} =0.5664 mm	D_{15} =0.2132 mm
D_{50} =0.4542 mm	D_{10} =0.1820 mm
C_u =3.112	C_c =0.898

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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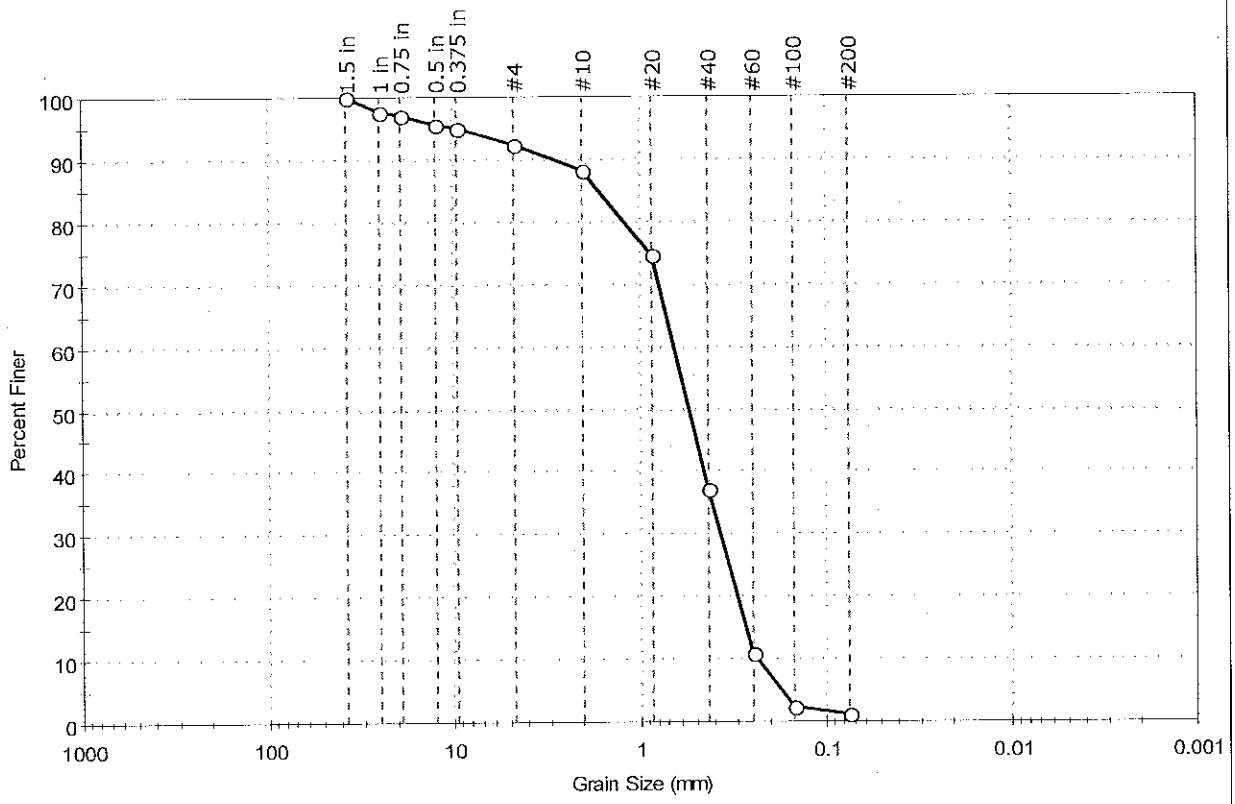
GeoTesting EXPRESS

Client:	Lahlaf Geotechnical Consulting				
Project:	Proposed Plymouth South High School				
Location:	Plymouth, MA			Project No:	GTX-301642
Boring ID:	TP-112	Sample Type:	bag	Tested By:	jbr
Sample ID:	TP-112-4'-5'	Test Date:	09/02/14	Checked By:	jdt
Depth :	4-5 ft	Test Id:	306854		
Test Comment:	---				
Sample Description:	Moist, light yellow sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	7.7	91.1	1.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	98		
0.75 in	19.00	97		
0.5 in	12.50	95		
0.375 in	9.50	95		
#4	4.75	92		
#10	2.00	88		
#20	0.85	75		
#40	0.42	37		
#60	0.25	11		
#100	0.15	2		
#200	0.075	1.2		

Coefficients

D_{85} =1.6369 mm	D_{30} =0.3668 mm
D_{60} =0.6469 mm	D_{15} =0.2707 mm
D_{50} =0.5377 mm	D_{10} =0.2348 mm
C_u =2.755	C_c =0.886

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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LGCI
Lahlaf Geotechnical Consulting, Inc.

May 4, 2015

Mr. L. Scott Dunlap, AIA
Ai3 Architects, LLC
526 Boston Post Road
Wayland, MA 01778
phone: (508) 358-0790
fax: (508) 358-0791

Re. Logs of additional Borings
Proposed Plymouth South High School
Plymouth, Massachusetts
LGCI Project No. 1408

Dear Mr. Dunlap:

Lahlaf Geotechnical Consulting, Inc. (LGCI) recently completed additional borings at the site of the proposed Plymouth South High School in Plymouth, Massachusetts. This letter contains the results of our additional borings. Our services were performed in general accordance with the scope and terms and conditions of our proposal No. 15019 dated April 10, 2015.

Subsurface Explorations

LGCI engaged Northern Drill Service of Northborough, Massachusetts to advance twelve (12) soil borings (B-201 to B-212) in the existing athletic fields on April 24 and 25, 2015 using a rubber-track mounted drill rig. The borings were advanced within the northern portion of the proposed building footprint. The purpose of the borings was to further explore the thickness of the existing fill and organic soil within the proposed building footprint.

The borings were advanced using 3-¼-inch hollow stem augers (HSAs) and extended to depths ranging between 10 and 23 feet beneath the ground surface.

The drillers performed Standard Penetration Tests (SPT) and obtained split spoon samples with an automatic hammer semi-continuously or at five-foot intervals as noted in the boring logs in general accordance with ASTM D-1586. Upon completion, the boreholes were backfilled the drill cuttings. Unless notified otherwise, we will dispose of the soil samples after three months.

The attached figure shows the locations of additional borings. The boring logs are attached to this letter.

Subsurface Conditions

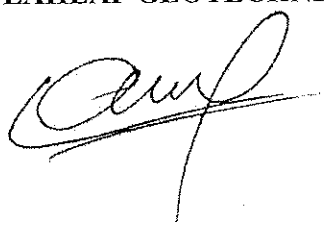
The additional borings indicated a surficial layer of topsoil, overlying fill, overlying a buried layer of topsoil and subsoil, overlying natural sand. The borings were terminated in the natural sand. The depth to the bottom of the buried topsoil and subsoil ranged between 4.2 and 14 feet beneath

the ground surface. The depths to the bottom of the buried topsoil and subsoil, was generally consistent with those reported for the previous borings.

If you have any questions, please call us at (978) 330-5912.

Sincerely,

LAHLAF GEOTECHNICAL CONSULTING, INC.



Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

Attachments: Figure 4A – Boring and Test Pit Location Plan (1 sheet)
Boring Logs (12 sheets)

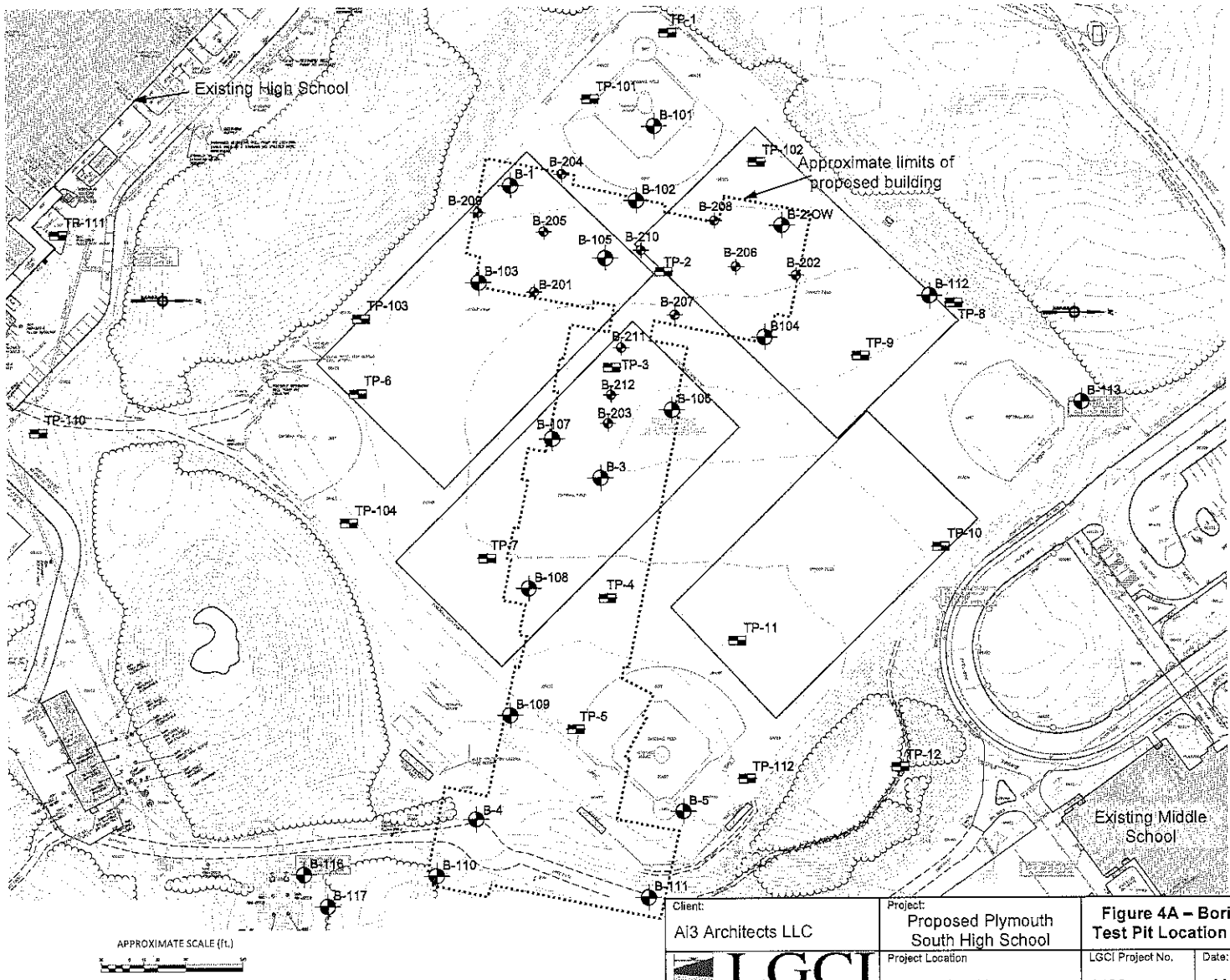
Note – Figure based on a survey plan provided to us by Pare Corporation (Pare) on April 22, 2014 and on a Plan titled "Overall Site Plan," prepared by Pare and dated July 2014.

Legend

⊕ Approximate location of boring. Borings B-1 to B-5 advanced by Northern Drill Service (NDS) of Northborough, MA between April 5 and 7, 2014. Borings B-101 to B-117 advanced by New Hampshire Boring of Brockton, MA between August 13 and 18, 2014. All borings were observed by Lahlaf Geotechnical Consulting, Inc. (LGCI).
OW denotes that a groundwater observation well was installed in the borehole.

⊕ Approximate location of boring advanced by NDS on April 24 and 25, 2015 and observed by LGCI.

▬ Approximate location of test pit excavated by J. C. Engineering, Inc. of East Wareham, MA. TP-1 to TP-12 excavated on April 3 and 4, 2014. TP-101 to TP-112 excavated on August 11 and 12, 2014. All test pits were observed by LGCI.



Client: Al3 Architects LLC	Project: Proposed Plymouth South High School	**Figure 4A – Boring and Test Pit Location Plan 1/2**	
LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Plymouth, MA	LGCI Project No.: 1408	Date: May 2015

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-201
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/25/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/25/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 214.5 ft (see remark 1)	Total Depth:	15 feet
Groundwater Depth:	Perched water table 5 ft	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	3	8	13	12	24	22		Topsoil / Fill	Hand dug 6" of topsoil S1 - Top 1": Topsoil Bot. 21": Poorly Graded SAND (SP), fine to medium, ~5% fines, trace fine gravel, brown, moist (fill)
5ft	5 - 7	S2	3	6	7	9	24	18			S2: Poorly Graded SAND (SP), fine to medium, <5% fines, trace fine gravel, brown and gray, wet (fill)
	7 - 9	S3	13	17	15	18	24	24		8.5' Buried Topsoil	S3 - Top 18": Similar to S2 Bottom 6": Poorly Graded SAND with Silt (SP-SM), fine, trace medium, 10-15% fines with organics, gray, moist
10ft	9 - 11	S4	2	10	7	7	24	22		9.5' Sand	S4 - Top 6": Similar to bottom of S3 Bottom 16": Poorly Graded SAND (SP), fine to medium, <5% fines, light brown, moist
	11 - 13	S5	4	10	14	19	24	18			S5: Similar to bottom of S4
	13 - 15	S6	9	16	15	17	24	18			S6: Similar to bottom of S4
15ft											Bottom of boring at 15 ft, backfilled with auger cuttings
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-202
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/24/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/24/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 215 ft (see remark 1)	Total Depth:	14 ft
Groundwater Depth:	Perched water table 2.5	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	3	6	8	7	24	22		Topsoil	Hand dug 6" of topsoil S1 - Top 3": Topsoil Bottom 19": Poorly Graded SAND (SP), fine to medium, ~5% fines, trace fine gravel, brown, moist (fill)
	2.5-4.5	S2	5	3	3	6	24	16		Fill	S2: Similar to bottom of S1, except wet
5ft	4.5 - 6	S3	3	8	9		18	14			S3: Poorly Graded SAND (SP), fine to medium, trace coarse, <5% fines, brown, wet (fill)
	6 - 8	S4	17	11	14	13	24	22		7'	S4 - Top 12": Similar to S3
	8 - 10	S5	7	9	7	7	24	16		Buried Topsoil/ Subsoil	Bottom 10": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% organic fines, dark brown, moist S5 - Top 3": Similar to bottom of S4 Bottom 13": Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, trace fine gravel, orange brown, moist
10ft	10 - 12	S6	3	3	3	4	24	18			S6: Similar to bottom of S5
	12 - 14	S7	4	8	7	9	24	16		12' Sand	S7: Poorly Graded SAND (SP), fine to medium, trace coarse, <5% fines, light brown, moist
15ft											Bottom of boring at 14 ft, backfilled with auger cuttings
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-203

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/25/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/25/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 215 ft (see remark 1)	Total Depth:	10 ft
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0 - 2	S1	2	3	4	5	24	18		Topsoil / Fill 4'	S1 - Top 6": Topsoil Bottom 12": Poorly Graded SAND (SP), fine to medium, ~5% fines, brown, moist (fill) S2: Similar to bottom of S1
	2 - 4	S2	5	10	12	17	24	20			
5ft	4 - 6	S3	7	9	6	7	24	22		Topsoil 4.2' / Sand	S3 - Top 3": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines with organics, brown, moist Bottom 19": Poorly Graded SAND (SP), fine to medium, ~5% fines, brown, moist S4: Poorly Graded SAND (SP), fine to medium, <5% fines, light brown, moist S5: Similar to S4
	6 - 8	S4	6	8	4	4	24	16			
	8 - 10	S5	4	10	9	11	24	16			
10ft											Bottom of boring at 10 ft, backfilled with auger cuttings
15ft											
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-204
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**	LGCI Project No.:	1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/24/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/24/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 213.5 (see remark 1)	Total Depth:	23 ft
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	3	4	7	13	24	16		Topsoil / Fill	Hand dug 6" of topsoil S1: Poorly Graded SAND (SP), fine to medium, <5% fines, 5-10% fine gravel, brown, moist (fill)
5ft	5 - 7	S2	5	9	11	11	24	15			S2: Similar to bottom of S1, except <5% fine gravel
10ft	10 - 12	S3	6	6	3	3	24	18		Topsoil / Subsoil	S3 - Top 15": Similar to S1 Bottom 3": Silty SAND (SM), fine, 15-20% organic fines, black, wet
	12 - 14	S4	3	3	4	4	24	16			S4: Poorly Graded SAND with Silt (SP-SM), fine, trace medium, ~10% fines, orange brown, moist
15ft	14 - 16	S5	3	3	3	3	24	21		Sand	S5: Poorly Graded SAND (SP), fine, trace medium, <5% fines, brown, moist
	16 - 18	S6	9	10	13	13	24	12			S6: Poorly Graded SAND (SP), fine to medium, <5% fines, ~5% fine gravel, light brown, moist
20ft	19 - 21	S7	18	10	10	12	24	20			S7: Poorly Graded SAND (SP), fine to coarse, <5% fines, ~10% fine gravel, light brown, moist
	21 - 23	S8	12	13	11	15	24	16			S8: Similar to S7
											Bottom of boring at 23 ft, backfilled with auger cuttings

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-205
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**	LGCI Project No.:	1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/24/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/24/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 214 ft (see remark 1)	Total Depth:	14 ft
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	6	8	10	27	24	20		Topsoil	Hand dug 6" of topsoil
											S1 - Top 4": Topsoil
											Bottom 16": Poorly Graded SAND (SP), fine to medium, ~5% fines, brown, moist (fill)
5ft										Fill	
	5 - 7	S2	5	9	11	11	24	15			S2: Similar to bottom of S1
	8 - 10	S3	8	8	4	5	24	22			S3 - Top 16": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, gray, moist (fill)
10ft										9.3'	
										Topsoil/ Subsoil	Bottom 6": Poorly Graded SAND with Silt (SP-SM), fine, 10-15% fines with organics, gray, moist, 1" layer of peat
	10 - 12	S4	3	3	3	4	24	20		11'	S4 - Top 12": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, orange brown, moist
										Sand	Bottom 8": Poorly Graded SAND (SP), fine to medium, <5% fines, brown, moist
	12 - 14	S5	3	2	4	9	24	14			S5: Similar to bottom of S4
15ft											Bottom of boring at 14 ft, backfilled with auger cuttings
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-206
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/24/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/24/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 214.5 ft (see remark 1)	Total Depth:	14 ft
Groundwater Depth:	Perched water table 6 to 7.5 ft	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	6	9	8	12	24	20		Topsoil	Hand dug 6" of topsoil S1 - Top 4": Topsoil Bottom 16": Poorly Graded SAND (SP), fine to medium, <5% fines, trace fine gravel, brown, moist (fill)
5ft	4 - 6	S2	6	10	14	15	24	20		Fill	S2: Similar to bottom of S1, except trace organic lenses
	6 - 8	S3	8	6	6	4	24	24		7.5'	S3 - Top 18": Similar to bottom S1, except wet
	8 - 10	S4	3	4	5	5	24	18		Topsoil/ Subsoil	Bottom 6": Poorly Graded SAND with Silt (SP-SM), fine, 10-15% fines with organics, dark brown, wet S4 - Top 12": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, orange brown, moist
10ft	10 - 12	S5	4	6	7	7	24	18		9' Sand	Bottom 6": Poorly Graded SAND (SP), fine to medium, trace coarse, ~5% fines, brown, moist S5: Similar to bottom of S4, except light brown
	12 - 14	S6	6	7	8	9	24	20			S6: Poorly Graded SAND (SP), fine, <5% fines, light brown, moist
15ft											Bottom of boring at 14 ft, backfilled with auger cuttings
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-207
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**	LGCI Project No.:	1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/25/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/25/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 215 ft (see remark 1)	Total Depth:	14 ft
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	7	8	12	8	24	22		Topsoil	Hand dug 6" of topsoil S1 - Top 2": Topsoil Bottom 20": Poorly Graded SAND (SP), fine to medium, 5-10% fines, brown, moist (fill)
5ft	4 - 6	S2	5	8	10	12	24	20		Fill	S2: Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, gray and brown, moist
	6 - 8	S3	14	6	5	6	24	20		7'	S3 - Top 12": Similar to S2 Middle 1": Poorly Graded SAND with Silt (SP-SM), fine, 10-15% organic fines, black, moist
	8 - 10	S4	3	2	3	4	24	18		Topsoil/ Subsoil	Bottom 7": Poorly Graded SAND with Silt (SP-SM), fine, trace medium, 10-15% fines, orange brown, moist
10ft										9'	S4 - Top 12": Similar to bottom of S3 Bottom 6": Poorly Graded SAND (SP), fine to medium, <5% fines, brown, moist
	10 - 12	S5	3	5	8	10	24	14		Sand	S5: Similar to bottom of S4
	12 - 14	S6	10	12	14	14	24	20			S6: Similar to bottom of S4, except trace gravel
15ft											Bottom of boring at 14 ft, backfilled with auger cuttings
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-208
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/24/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/24/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 214 ft (see remark 1)	Total Depth:	13 ft
Groundwater Depth:	Perched water table 5 to 9.5 ft	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	5	9	9	10	24	22		Topsoil	Hand dug 6" of topsoil S1 - Top 6": Topsoil Bottom 16": Poorly Graded SAND (SP), fine to medium, ~5% fines, trace fine gravel, trace organics, brown, moist (fill)
5ft	5 - 7	S2	5	7	11	13	24	18		Fill	S2: Poorly Graded SAND (SP), fine to medium, trace coarse, ~5% fines, ~5% fine gravel, trace organics, brown, wet (fill)
	7 - 9	S3	10	15	16	16	24	24		9.5'	S3 - Top 18": Similar to S2
10ft	9 - 11	S4	3	6	6	6	24	16		Buried Topsoil/ Subsoil	Bottom 6": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% organic fines, dark brown, wet S4 - Top 6": Similar to bottom of S3
	11 - 13	S5	6	8	8	7	24	16		11' Sand	Bottom 10": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, orange brown, moist S5: Poorly Graded SAND (SP), fine, trace medium, ~5% fines, trace gravel, brown, moist
15ft											Bottom of boring at 13 ft, backfilled with auger cuttings
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

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Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/25/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/25/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 213.5 ft (see remark 1)	Total Depth:	16 ft
Groundwater Depth:	Perched water table 8 to 9.2 ft	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	4	9	10	13	24	22		Topsoil	Hand dug 6" of topsoil S1 - Top 6": Topsoil Bottom 16": Poorly Graded SAND (SP), fine to medium, ~5% fines, trace organics, brown, moist (fill)
5ft	5 - 7	S2	6	9	8	14	24	18		Fill	S2: Similar to bottom of S1
	8 - 10	S3	4	10	8	6	24	22		9.2'	S3 - Top 15": Similar to bottom of S1, except wet
10ft	10 - 12	S4	3	3	5	7	24	14		Buried Topsoil	Bottom 7": Silty SAND (SM), fine, 15-20% organic fines, dark brown, wet S4 - Top 10": Similar to bottom of S3 Bottom 4": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, orange brown, moist
	12 - 14	S5	7	9	13	14	24	16		12' Sand	S5: Poorly Graded SAND (SP), fine to medium, <5% fines, trace fine gravel, light brown, moist
15ft	14 - 16	S6	11	14	13	12	24	16			S6: Similar to S5
20ft											Bottom of boring at 16 ft, backfilled with auger cuttings

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-210
Page 1 of 1

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**	LGCI Project No.:	1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/24/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/24/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 214.5 (see remark 1)	Total Depth:	15 ft
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	5	14	13	12	24	24		Topsoil	Hand dug 6" of topsoil S1 - Top 6": Topsoil Bottom 18": Poorly Graded SAND with Silt (SP-SM), fine to medium, ~10% fines, brown, moist (fill)
5ft	5 - 7	S2	7	23	28	18	24	14		Fill	S2: Poorly Graded SAND with Silt (SP-SM), fine to medium, trace coarse, 10-15% fines, trace fine gravel, gray, moist (fill)
	7 - 9	S3	22	21	16	13	24	18		8.5'	S3: Silty SAND (SM), fine, 15-20% fines, ~5% fine gravel, trace organics, gray, moist (fill), organics in spoon tip
10ft	9 - 11	S4	4	5	5	4	24	18		Buried Topsoil/ Subsoil	S4 - Top 3": Poorly Graded SAND with Silt (SP-SM), fine, 10-15% fines with organics, dark brown, moist Bottom 15": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, orange brown, moist
	11 - 13	S5	3	2	3	5	24	20		11'	S5: Poorly Graded SAND with Silt (SP-SM), fine, 5-10% fines, brown, moist
15ft	13 - 15	S6	3	5	7	6	24	16		Sand	S6: Poorly Graded SAND (SP), fine, <5% fines, light brown, moist
20ft											Bottom of boring at 16 ft, backfilled with auger cuttings

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-211

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/25/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/25/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 215.5 ft (see remark 1)	Total Depth:	13 ft
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	1	3	6	6	24	20		Topsoil	Hand dug 6" of topsoil S1 - Top 6": Topsoil Bottom 14": Poorly Graded SAND (SP), fine to medium, <5% fines, trace fine gravel, trace organics, brown, moist (fill)
5ft	5 - 7	S2	7	8	5	6	24	20		Fill	S2 - Top 9": Poorly Graded SAND with Silt (SP-SM), fine to medium, 10-15% fines, gray, moist (fill)
	7 - 9	S3	5	6	8	11	24	24		Topsoil/ Subsoil	Middle 8": Poorly Graded SAND with Silt (SP-SM), fine, 10-15% fines with organics, dark brown, moist Bottom 3": Poorly Graded SAND with Silt (SP-SM), fine, trace medium, 10-15% fines, orange brown, moist
10ft	9 - 11	S4	4	6	7	8	24	14		7' Sand	S3: Poorly Graded SAND (SP), fine to medium, ~5% fines, brown, moist S4: Poorly Graded SAND (SP), fine to medium, <5% fines, light brown, moist
	11 - 13	S5	6	5	7	8	24	16			S5: Similar to S4
15ft											Bottom of boring at 13 ft, backfilled with auger cuttings
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

LGCI
Lahlaf Geotechnical Consulting, Inc.

BORING LOG

Boring B-212

Project:	**Proposed Plymouth South High School, Plymouth, MA**		
Client:	**Ai3 Architects LLC**		LGCI Project No.: 1408
Drilling Subcontractor:	Northern Drill Service	Date Started:	04/25/2015
Drilling Foreman:	Tim Tucker	Date Completed:	04/25/2015
LGCI Engineer:	Alan Smith	Location:	Northern side of proposed building
Ground Surface El:	~ 215.5 ft (see remark 1)	Total Depth:	10 ft
Groundwater Depth:	Not encountered	Drill Rig Type:	Mobile B-48 track mounted rig
		Drilling Method:	3 ¼" Hollow stem augers
Hammer Weight:	140 lbs	Split Spoon Diameter:	ID - 1.375", OD - 2"
Hammer Type:	Automatic	Rock Core Barrel Size:	N/A
Drop:	30 inches		

Depth Scale	Sample Depth (ft)	Sample No	Blows per 6 inches 0-6	6-12	12-18	18-24	Pen (in)	Rec (in)	Remarks	Strata	Sample Description
	0.5-2.5	S1	1	2	7	8	24	19		Topsoil	Hand dug 6" of topsoil
											S1 - Top 3": Topsoil
											Bottom 16": Poorly Graded SAND (SP), fine to medium, ~5% fines, trace organics, brown, moist (fill)
										Fill	
5ft	4 - 6	S2	5	13	12	12	24	24			S2: Poorly Graded SAND with Silt (SP-SM), fine, trace medium, 10-15% fines, brown, moist (fill)
										6'	
	6 - 8	S3	8	9	9	8	24	22		Topsoil/ Subsoil	S3 - Top 6": Poorly Graded SAND with Silt (SP-SM), fine, 10-15% fines, trace organics, gray, moist
										7'	Middle 6": Poorly Graded SAND with Silt (SP-SM), fine, trace medium, 10-15% fines, orange brown, moist
	8 - 10	S4	5	7	9	14	24	15		Sand	Bottom 10": Poorly Graded SAND (SP), fine to medium, <5% fines, brown, moist
10ft											~~S4: Similar to bottom S3, except light brown~~
											Bottom of boring at 10 ft, backfilled with auger cuttings
15ft											
20ft											

Remarks:
1 - Ground surface elevations estimated from plan titled " Overall Site Plan," dated July, 2014, by Ai3 Architects / Pare Corporation.

ATTACHMENT 3

STATEMENT OF SPECIAL INSPECTIONS FOR COMPLIANCE WITH CHAPTER 17 OF THE 8TH EDITION OF THE MASSACHUSETTS STATE BUILDING CODE

Engineers Design Group Inc

350 Main Street
Malden, MA 02148

Phone: 781-396-9007
Fax: 781-396-9008
www.edginc.com

Statement of Special Inspections for Compliance with Chapter 17 of the 8th Edition of the Massachusetts State Building Code

Project: *Plymouth South High School*

Location: *490 Long Pond Road, Plymouth, Massachusetts*

Owner: *Town of Plymouth, MA*

This *Statement of Special Inspections* encompasses the following discipline: **Structural**

(Note: ***Statement of Structural Tests and Inspections*** for other disciplines may be included under a separate cover)

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Structural Tests and Inspection requirements of the Building Code. It includes a Schedule of Tests and Inspections applicable to this project as well as the name of the Structural Engineer of Record (SER) and the identity of approved agencies to be retained for conducting these inspections and tests.

The Special Inspectors shall keep records of all structural tests and inspections and shall furnish inspection and testing reports to the Building Official (BO) and to the Structural Engineer of Record. Reports shall indicate that work was or was not completed in conformance to the approved construction documents. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and to the Structural Engineer of Record prior to completion of that phase of work. The *Statement of Special Inspections* does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official and the Structural Engineer of Record at an interval determined by the Building Official. A *Final Report of Special Inspections* documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted to the Building Official prior to issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

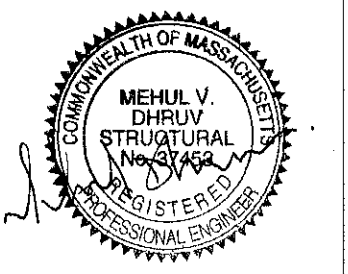
Interim Report Frequency: ☒ *Upon request of Building Official* _____ or ☐ per attached schedule.

Prepared by:

Mehul V. Dhruv, P.E.

(type or print name of the Structural Registered Design Professional in Responsible Charge)

Signature — *June 25, 2015* Date



Design Professional Seal

Owner's Authorization:

Signature Date

Building Official's Acceptance:

Signature Date

Statement of Special Inspections (Continued)

List of Agents

Project: *Plymouth South High School*

Location: *490 Long Pond Road, Plymouth, Massachusetts*

Owner: *Town of Plymouth, Massachusetts*

This *Program of Structural Tests and Inspections* encompasses the following discipline: **Structural**

(Note: *Statement of Structural Tests and Inspections* for other disciplines may be included under a separate cover)

This Statement of *Structural Tests and Inspections* / Quality Assurance Plan includes the following building systems:

- ☒ Soils and Foundations
- ☒ Cast-in-Place Concrete
- ☐ Precast Concrete System
- ☒ Masonry Systems
- ☒ Structural Steel
- ☐ Wood Construction
- ☐ Special Cases

Agencies	Firm	Address, Telephone, e-mail
1. **STRUCTURAL Engineer of Record (SER)**	*Engineers Design Group, Inc.*	*350 Main Street* *Malden, MA 02148* *Phone 781-396-9007 Ext 14* *mdhruv@edginc.com*
2. Geotechnical Engineer (GE)	*Lahlaf Geotechnical Consulting, Inc.*	*23 McGinness Way* *Billerica, MA 01821* *Phone: 978-330-5912* *Fax: 978-330-5056* *Madjid.lahlaf@lgcinc.net*
3. Testing Agency (TA)	*To Be Determined*	
4. Other (O1)		
5.		
6.		

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official, prior to commencing work. **The inspectors and testing agencies shall submit one sample of each report type to the OPM and SER for review and approval of the report content prior to the start of the inspections and testing. The inspectors and testing agencies reports shall be detailed, comprehensive and include written descriptions and photographs of all conforming and non-conforming work observed. The reports shall include highlighted structural foundation or framing plans of the areas or items inspected.**

Statement of Special Inspections (Continued)

Final Report of Structural Tests and Inspections **(SER)**

[To be completed by the Structural Engineer of Record (SER). Note that all Agents' Final Reports must be received prior to issuance.]

Project: *Plymouth South High School*
Location: *490 Long Pond Road, Plymouth, Massachusetts*
Owner: *Town of Plymouth, Massachusetts*
Owner's Address: *Plymouth, Massachusetts*
Architect of Record: *James Jordan, AIA,* (name) *Ai3 Architects, LLC* (firm)

Structural Engineer of Record: *Mehul V. Dhruv, P. E.* (name) *Engineers Design Group, Inc.* (firm)

To the best of my information, knowledge and belief, the Structural Tests and Inspections required for this project, and itemized in the Program of Structural Tests and Inspections submitted for permit, have been performed and all discovered discrepancies have been reported and resolved.

Interim reports submitted prior to this final report form a basis for and are to be considered an integral part of this final report.

Respectfully submitted,
Structural Engineer of Record

Mehul V. Dhruv, P. E.
(Type or print name)

Engineers Design Group, Inc.
(Firm Name)

Signature Date

Licensed Professional Seal

Schedule of Special Tests and Inspections – Structural (Continued)

Qualifications of Inspectors and Testing Technicians

The qualifications of all personnel performing Inspection and testing activities are **subject to the approval of the Building Official**. The credentials of all Inspectors and testing technicians shall be provided to the Structural Engineer of Record for their records. *NOTE: VERIFICATION THAT QUALIFIED INDIVIDUALS ARE AVAILABLE TO PERFORM STIPULATED TESTING AND/OR INSPECTION SHOULD BE PROVIDED TO THE STRUCTURAL ENGINEER OF RECORD (SER), PRIOR TO SUBMITTING STATEMENT. AGENT QUALIFICATIONS IN THE SCHEDULE ARE SUGGESTIONS ONLY;* ***FINAL QUALIFICATIONS ARE SUBJECT TO THE DISCRETION OF THE STRUCTURAL ENGINEER OF RECORD*** *PREPARING THE SCHEDULE.*

Key for Minimum Qualifications of Inspection Agents:

When the Structural Engineer of Record deems it appropriate that the individual performing a stipulated test or inspection have a specific certification, license or experience as indicated below, such requirement shall be listed below and shall be clearly identified within the schedule under the Agent Qualification Designation.

PE/SE	Structural Engineer – a licensed SE or PE specializing in the design of building structures
PE/GE	Geotechnical Engineer – a licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – a graduate engineer who has passed the Fundamentals of Engineering examination

Experienced Testing Technician

ETT	Experienced Testing Technician – An Experienced Testing Technician with a minimum 5 years experience with the stipulated test or inspection

American Concrete Institute (ACI) Certification

ACI-CFTT	Concrete Field Testing Technician – Grade 1
ACI-CCI	Concrete Construction Inspector
ACI-LTT	Laboratory Testing Technician – Grade 1&2
ACI-STT	Strength Testing Technician

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector
AWS/AISC-SSI	Certified Structural Steel Inspector

American Society of Non-Destructive Testing (ASNT) Certification

ASNT	Non-Destructive Testing Technician – Level II or III.

International Code Council (ICC) Certification

ICC-SMSI	Structural Masonry Special Inspector
ICC-SWSI	Structural Steel and Welding Special Inspector
ICC-SFSI	Spray-Applied Fireproofing Special Inspector
ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector

National Institute for Certification in Engineering Technologies (NICET)

NICET-CT	Concrete Technician – Levels I, II, III & IV
NICET-ST	Soils Technician - Levels I, II, III & IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III & IV

Other

Schedule of Special Tests and Inspections – Structural (Continued)

SOILS & CONTROLLED STRUCTURAL FILL

VERIFICATION AND INSPECTION	EXTENT	COMMENTS	AGENT
1. Verify existing soil conditions, fill placement and load bearing requirements			
a. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	(P)	IBC 1704.7	TA
b. Verify excavations are extended to proper depth and have reached proper material.	(P)	IBC 1704.7	TA
c. Perform classification and sieve testing of compacted fill materials.	(P)	IBC 1704.7	TA
d. Prior to placement of prepared fill, determine that the site has been prepared in accordance with the approved soils report.	(P)	IBC 1704.7	TA
e. During placement and compaction of fill material, verify material being used and maximum lift thickness comply with the approved soils report.	(C)	IBC 1704.7	TA
f. Test in-place dry density of each lift of compacted fill complies with the approved soils report.	(P)	IBC 1704.7	TA

(C) Continuous, (P) Periodic, (S) Submittal

Schedule of Special Tests and Inspections – Structural (Continued)

CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	EXTENT	COMMENTS	AGENT
1. For each concrete placement, inspect reinforcing steel for size, spacing, positioning, grade, support, clearance and cleanliness.	(P)	ACI 318: 3.5, 7.1-7.7	TA
2. Inspect reinforcing steel weld for weldability and proper grade. Visually inspect all welds for size, quality and any preheat requirements.	(P)	Welding of Reinf Not Allowed	TA
3. Inspect bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased	(C)	IBC 1912.5	TA
4. Inspect concrete batch tickets for compliance with approved design mix.	(P)	ACI 318: Ch 4, 5.2-5.4	TA
5. At time fresh concrete is sampled to fabricate specimens for strength test, perform slump and air content test and temperature. Four (4) cylinders per each 50 yards of concrete, or portion thereof. Provide one 7-day break, one 14-day break and one 28-day break. Retain one cylinder for a 56-day break, if required by the SER. All cylinders shall be lab cured.	(C)	ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8	TA
6. Inspection of concrete placement for proper application techniques	(C)	ACI 318: 5.9, 5.10	TA
7. Inspection for maintenance of specified curing temperature and techniques	(P)	ACI 318: 5.11-5.13	TA
8. Inspect formwork for shape, location and dimensions of the concrete member being formed.	(P)		TA
9. Review plant quality control program for batching and mixing methods.	(P)		TA
10. Inspect all embedded concrete items including anchor rods for proper location, position and securement.	(P)		TA
11. Cold weather protection: inspect protection methods comply with submitted cold weather protection plan. Record ambient temperature and surface temperature of cast concrete.	(P)		TA

(C) Continuous, (P) Periodic, (S) Submittal

Schedule of Special Tests and Inspections – Structural (Continued)

MASONRY CONSTRUCTION

VERIFICATION AND INSPECTION	EXTENT	COMMENTS	AGENT
1. From the beginning of masonry construction, the following shall be verified to ensure compliance:			
a. Proportions of site-mixed mortar and grout.	(P)	ACI530.1, 2.6A	
b. Placement of masonry units and construction of mortar joints.	(P)	ACI530.1, 3.3B	
c. Placement of reinforcement and connectors	(P)	ACI530, 1.12	
d. Grout space prior to grouting.	(P)	ACI530.1, 3.2D	
e. Placement of grout.	(C)	ACI530.1, 3.5	
2. The inspection program shall verify:			
a. Size and location of structural elements.	(P)	ACI530.1, 3.3G	
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.	(P)	ACI530, 1.2.2(e), 2.1.4, 3.1.6	
c. Specified size, grade and type of reinforcement.	(P)	ACI530, 1.12; ACI530.1, 2.4, 3.4	
d. Welding of reinforcement.	(C)	ACI530, 2.1.10.6.2, 3.2.3.4(b);	
e. Protection of masonry during cold weather and (temperature below 40°F) or hot weather (temperature above 90°F).	(P)	IBC 2104.3, 2104.4; ACI530.1, 1.8C, 1.8D	
3. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.	(P)	IBC 2105.2.2, 2105.3; ACI 530.1, 1.4	
4. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.	(P)	ACI530.1, 1.5	

(C) Continuous, (P) Periodic, (S) Submittal

Schedule of Special Tests and Inspections – Structural (Continued)

STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	EXTENT	COMMENTS	AGENT
1. Material verification of high-strength bolts, nuts and washers:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	(P), (S)	Applicable ASTM material specifications; AISC 335, Section A3.4; AISC LRFD, Section A3.3	TA
b. Manufacturer's certificate of compliance required.	(S)		TA
2. Inspection of high-strength bolting			
a. Bearing-type connections.	(P)	AISC LRFD Section M2.5 IBC Sect 1704.3.3	TA
b. Slip-critical connections.	(C) or (P) (method dependent)		TA
3. Material verification of structural steel and cold-formed steel deck:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	(S)	ASTM A 6 or ASTM A 568 IBC Sect 1708.4	TA
b. Manufacturers' certified mill test reports.	(S)	ASTM A 6 or ASTM A 568 IBC Sect 1708.4	TA
4. Material verification of weld filler materials:			
a. Identification markings to conform to AWS specification in the approved construction documents.	(P), (S)	AISC, ASD, Section A3.6; AISC LRFD, Section A3.5	TA
b. Manufacturer's certificate of compliance required.	(S)		TA
5. Submit current AWS D1.1 welder certificate for all field welders who will be welding on this project.	(S)	AWS D1.1	
6. Inspection of welding (IBC 1704.3.1): a. Structural steel and cold-formed steel deck:			
1) Complete and partial penetration groove welds.	(C)	AWS D1.1	TA
2) Multipass fillet welds.	(C)		TA
3) Single-pass fillet welds> 5/16"	(C)		TA
4) Single-pass fillet welds< 5/16"	(P)		TA
5) Floor and roof deck welds.	(P)	AWS D1.3	TA
6) Shear Connectors	(P)		TA
b. Reinforcing steel (IBC Sect 1903.5.2):			
1) Verification of weldability of reinforcing steel other than ASTM A706.	(P)		TA
2) Reinforcing steel-resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement.	(C)	AWS D1.4 ACI 318: 3.5.2	TA
3) Shear reinforcement.	(C)		TA
4) Other reinforcing steel.	(P)		TA

(C) Continuous, (P) Periodic, (S) Submittal

Schedule of Special Tests and Inspections – Structural (Continued)

STEEL CONSTRUCTION (continued)

VERIFICATION AND INSPECTION	EXTENT	COMMENTS	AGENT
7. Inspection of steel frame joint details for compliance (IBC Section 1704.3.2) with approved construction documents:			
a. Details such as bracing and stiffening.	(P)		TA
b. Member locations.	(P)		TA
c. Application of joint details at each connection.	(P)		TA

(C) Continuous, (P) Periodic, (S) Submittal

SHEAR STUDS

VERIFICATION AND INSPECTION	EXTENT	COMMENTS	AGENT
1. Review the quality control procedures of the installer control procedures.	(P)		TA
2. Review the material certificates for stud shear connectors and compliance with the construction documents.	(P)		TA
3. Observe the installation of the connectors and test the percentage as indicated in the project specifications. Review test reports for conformance with construction documents.	(P)		TA

(C) Continuous, (P) Periodic, (S) Submittal

STEEL DECK

VERIFICATION AND INSPECTION IBC Reference 1704.4	EXTENT	COMMENTS	AGENT
1. Review the manufacturer's certificates for production and control procedures.	(P)		TA
2. Inspect decking including laps, screws, and welds as per approved shop drawings and for conformance with the contract documents.	(P)		TA

(C) Continuous, (P) Periodic, (S) Submittal

Schedule of Special Tests and Inspections – Structural (Continued)

FABRICATION AND IMPLEMENTATION PROCEDURES – STRUCTURAL STEEL

VERIFICATION AND INSPECTION	EXTENT	COMMENTS	AGENT
1. Fabrications Procedures: Review of fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved special inspection agency. At the completion of fabrication, the approved fabricator shall submit a certificate of compliance to the building code official stating that the work was performed in accordance with the approved construction documents and a minimum of 3 plant inspections. -OR- 2. AISC Certification and a minimum of 3 plant inspections.	(S)	Fabricator shall submit one of the two qualifications	TA
3. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the building code official stating that the work was performed in accordance with the approved construction documents.	(S)	IBC 1704.2.2	TA

(C) Continuous, (P) Periodic, (S) Submittal

Schedule of Special Tests and Inspections – Structural (Continued)

SEISMIC RESISTANCE - STRUCTURAL

VERIFICATION AND INSPECTION IBC Section 1707	EXTENT	COMMENTS	AGENT
1. Special inspections for seismic resistance. Special inspection as specified in this section is required for the following:		Seismic Design Category: B	
a. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F	(P)	IBC 1707.1	TA
2. Structural steel: Continuous special inspection for structural welding in accordance with AISC 341.	(P)	IBC 1702.2	TA

(C) Continuous, (P) Periodic, (S) Submittal

Special Inspections – Seismic and Wind

SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE CHECK LIST [IBC 1705]

Seismic Design Category	**B**

SEISMIC FORCE RESISTING SYSTEM:

☐ Steel Braced Frames and associated connections/anchorage
☐ Steel Moment Frames and associated connections
☐ Shear walls: ☐ CMU ☐ Wood ☐ Concrete ☒ Diaphragms: ☒ Floor ☒ Roof
☒ Other: Structural Steel System Not Specifically Detailed For Seismic Resistance R=3

	SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE Required ☐ Not Required ☒
☒	Special inspections are not required where the Seismic Design Category is A, B or Seismic Design Category C where the Structural Steel System is not specifically detailed for seismic resistance with response modification factor, R≤3
☐	Special inspections are required where the Seismic Design Category is C, D, E, or F

SPECIAL INSPECTIONS FOR WIND RESISTANCE CHECK LIST [IBC 1706]

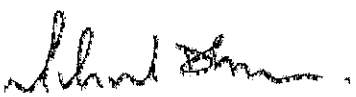
Wind Exposure Category	**B**
Basic Wind Speed	**110 MPH**

	SPECIAL INSPECTIONS FOR WIND RESISTANCE Required ☐ Not Required ☒
☒	Special inspections are not required where the wind exposure Category is A, or Category B where the 3-second-gust basic wind speed is less than 120 miles per hour (mph) (52.8 *m/sec*).
☐	Special inspections are required where the wind exposure Category is C or D, where the 3-second-gust basic wind speed is 110 mph (49 *m/sec)* or greater.

Main Wind-Force-Resisting System and Components
Diaphragms: Corrugated steel roof deck and composite concrete and metal deck floor slabs.
Vertical wind-force-resisting systems: Diagonal braced frames and structural steel moment frames.

Additional inspections are not required for the structural systems and components listed above. Additional inspection is required for roof cladding and wall cladding (IBC 1706).

Prepared by: Mehul V. Dhruv, P. E.



June 25, 2015

Signature Date

Building Code Official's Acceptance:

Signature Date

Contractor's Statement of Responsibility

Each contractor responsible for the construction or fabrication of a system or component designated in the Quality Assurance Plan must submit a Statement of Responsibility. The Statement of Responsibility is required for Seismic Design Category C or higher. Make additional copies of this form as required.

Project: *Plymouth South High School*

Contractor's Name:

Address:

License No.:

Description of designated building systems and components included in the Statement of Responsibility:

Contractor's Acknowledgment of Special Requirements

I hereby acknowledge that I have received, read, and understand the Quality Assurance Plan and Special Inspection program.

I hereby acknowledge that control will be exercised to obtain conformance with the construction documents approved by the Building Official.

Signature _____ Date _____

Contractor's Provisions for Quality Control

Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of reports is attached to this Statement.

Identification and qualifications of the person(s) exercising such control and their position(s) in the organization are attached to this Statement.