FINAL FOUNDATION ENGINEERING REPORT

FRANKLIN ELEMENTARY SCHOOL

NEWTON, MASSACHUSETTS

MARCH 26, 2024

Prepared For:

HMFH Architects, Inc.
130 Bishop Allen Drive
Cambridge, MA 02139

PROJECT NO. 7708.2.01

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March 26, 2024

HMFH Architects, Inc.
130 Bishop Allen Drive
Cambridge, MA 02139

Attention: James Liebman

Reference: Franklin Elementary School; Newton, Massachusetts
Final Foundation Engineering Report – Executive Summary

Enclosed is our Foundation Engineering Report for the above-referenced project. The following is an executive summary of the report.

The proposed redevelopment of the subject site is understood to include the construction of a two (2) to three (3)-story elementary school building that will contain no below-grade space. The proposed "L" shape building will occupy an approximately 40,600-square-foot footprint. The proposed building lowest level slab is proposed to generally match the existing or proposed exterior grade.

It is recommended that the proposed structure be founded on conventional footing foundations either bearing directly on the undisturbed, natural glacial till deposit or on the existing fill deposit which has been improved with a ground improvement such as aggregate piers. Footings should be proportioned utilizing an allowable design net bearing pressure of three (3) tons per square foot. The lowest level slab is recommended to consist of a conventional soil-supported slab-on-grade.

Other detailed geotechnical engineering recommendations and criteria for foundation design are documented in the report, as well as foundation construction considerations such as preparation of foundation and slab bearing surfaces, dewatering, and on-site reuse of excavated soil. Furthermore, construction observation considerations are also presented herein.

We look forward to continued participation with the design team during the remainder of the project. Should you have any questions concerning the recommendations presented herein, please do not hesitate to call us.

Very truly yours,

McPHAIL ASSOCIATES, LLC

Jason S. Huestis

Jonathan W. Patch, P.E.

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JSH/jwp

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1.0 - INTRODUCTION

1.1 - GENERAL

This report presents the results of our subsurface exploration programs and foundation design study for the proposed new Franklin Elementary School to be located at 125 Derby Street in Newton, Massachusetts. Refer to the Project Location Plan, **Figure 1**, for the general site locus.

The subsurface exploration programs were conducted and the foundation engineering services were performed in accordance with our proposal for geotechnical engineering services dated May 23, 2023 and the subsequent authorization of HMFH Architects, Inc. These services are subject to the limitations contained herein.

1.2 – PURPOSE AND SCOPE

The purposes of the subsurface exploration program and foundation design study are to assess the subsurface soil, rock, and groundwater conditions at the site as they relate to foundation design and construction and, based on this information, to provide safe and economic design recommendations for the proposed building.

Foundation design includes foundation support of the proposed building structure and the lowest level slabs, treatment of the lowest level slabs in consideration of groundwater, lateral earth pressures on foundation walls, and seismic design considerations in accordance with the provisions of the Ninth Edition of the Massachusetts State Building Code (Code). Foundation construction considerations relating to geotechnical aspects of the proposed construction are also presented herein.

1.3 – AVAILABLE INFORMATION

Information available to McPhail Associates, LLC (McPhail) included the following:

- A report entitled "Preliminary Foundation Engineering Report – Franklin Elementary School, Newton, Massachusetts" prepared by McPhail Associates, LLC, and dated September 20, 2023.
- A 40-scale site survey entitled "Existing Conditions Plan of Land" prepared by Samiotes Consultants, Inc., and dated November 11, 2022.
- An untitled electronic file of the proposed site landscaping and grading dated February 22, 2024.
- A plan entitled "First Floor Site Plan" prepared by HMFH Architects, Inc., and dated March 7, 2024.
- Historic plans of the 1938 School Building prepared by Albert M. Kreider, Architect dated March, 1938.

- Historic plans of the addition to the Franklin School prepared by Albert M. Kreider, Architect dated February, 1949.
- Historic Plans of the addition of the Franklin School prepared by A. B. Sziklas Architect & Engineer dated 1954.

1.4 – ELEVATION DATUM

Elevations cited herein are in feet and are referenced to the City of Newton Datum which is 5.72 feet below the National Geodetic Vertical Datum 1929.

2.0 – SITE AND PROJECT DESCRIPTION

2.1 – EXISTING SITE CONDITIONS

The subject site consists of a rectangular-shaped parcel having a footprint of about 5.4 acres which fronts to the south onto Derby Street and is bounded by residential properties to the north, east and west. A right-of-way access onto Cherry Street is located along the east side of the site. Russell Road terminates at the northern property line near the western end of the site.

The existing elementary school building is located on the eastern half of the site and consists of an approximately 34,000-square-foot (plan area) irregularly-shaped, two- to three-story school building. The original portion of the school building, constructed in 1938, is located closest to Derby Street and contains a full below-grade level with a lowest-level slab varying between Elevation +80 and Elevation +88. Both the 1949 and 1954 additions contain no below-grade space with lowest level slabs varying from about Elevation +95 to Elevation +101. The existing building is understood to be supported on conventional spread footing foundations.

The remainder of the site is occupied by at-grade parking, playgrounds, and athletic fields. Ground surface slopes gently down from north to south from about Elevation +98 to Elevation +94. The northeast corner of the site is benched into an existing slope that rises to about Elevation +105 and the grade along Derby Street drops down immediately adjacent to the roadway to about Elevation +90.

2.2 – PROPOSED DEVELOPMENT

The proposed site redevelopment consists of a new "L-shaped" school building which would be located where the current athletic fields and playground are located on the western portion of the site. The proposed building would be two to three stories and have an approximate 40,600-square-foot footprint. The proposed lowest level slab is generally at Elevation +95.5 with two small areas in the southern wing where lowest-level slabs are +94.6 and +97.0, respectively.

Surface parking would be located immediately to the west of the proposed building along the western property line. New soccer and baseball fields and a basketball court would be located on the eastern portion of the site following the demolition of the existing school building.

3.0 – SUBSURFACE EXPLORATIONS

The approximate location of the subsurface explorations is indicated on the enclosed Subsurface Exploration Plan, **Figure 2**. The following subsurface explorations were completed at the project site under contract to McPhail:

- Six (6) borings (B-1 through B-6) completed during the period of August 21 and 22, 2023 by CarrDee Corp.
- Nine (9) borings (B-101 through B-109) completed during the period of February 20 to 22, 2024 by CarrDee Corp.

Exploration procedures and soil classification methods are contained in **Appendix A**.

The borings were drilled to depths ranging from 16.0 to 21.3 feet below the existing ground surface and were terminated within either a glacial till deposit or the underlying bedrock. Boring logs are contained in **Appendix B**.

4.0 – SUBSURFACE CONDITIONS

4.1 – SOIL AND BEDROCK CONDITIONS

A detailed description of the subsurface conditions encountered in the explorations is documented on the logs contained in **Appendix B** as referenced above. Based on the explorations performed at the site, the following is a description of the generalized subsurface conditions across the site encountered from ground surface downward.

Generalized Subsurface Strata	***Approximate Thickness (Feet)***	***Top of Soil Strata (Elevation)***
Fill	3 to 9	Ground Surface (El. +94.0 to El. +98.2)
Marine Clay	Not Encountered to 2.5	El. +87.1 to El. +87.9 (where encountered)
Glacial Till	Not Encountered to Greater than 13.5	El. +84.6 to El. +94.7 (where encountered)
Bedrock (Argillite)	-	El. +79.4 to El. +88.8 (where encountered)

A contour plan indicating the top of natural glacial till deposit based on the borings is enclosed as **Figure 3**.

Fill Material: The fill material generally consists of loose to compact, gray to brown sand and gravel with a trace silt to a well-graded silt, sand and gravel. Grain size analyses of the fill material are presented on the enclosed **Figure 4**.

Marine Clay: Borings B-104 and B-107 encountered a 2.5-foot thickness of very stiff to hard, mottled, blue-gray and yellow-gray silty clay underlying the fill.

Glacial Till: The glacial till was observed below the fill and/or marine clay and generally consists of a compact to very dense well-graded mixture of silt, sand and gravel. Cobbles and boulders are also anticipated to be present within the glacial till. Grain size analyses of the glacial till material are presented on the enclosed **Figure 5**.

Bedrock: The bedrock generally consists of severely to completely weathered kaolinized argillite consisting of compact to very dense purplish gray to white silt with some sand and rock fragments.

4.2 – GROUNDWATER CONDITIONS

Groundwater was observed in completed boreholes B-1, B-2, B-4, B-102 and B-106 upon completion of drilling at depths varying from 6 to 15.5 feet below the existing ground surface corresponding to Elevation +80.3 at boring B-1 and Elevation +89.4 at boring B-4. The groundwater observed is likely perched on the surface of the relatively impervious glacial till and/or bedrock deposits. It is anticipated that future groundwater levels across the site may vary from those reported herein due to factors such as normal seasonal changes, runoff particularly during or following periods of heavy precipitation, and alterations of existing drainage patterns.

5.0 – GEOTECHNICAL RECOMMENDATIONS

5.1 –FOUNDATION DESIGN RECOMMENDATIONS

Based on the scope of the proposed construction and the subsurface conditions encountered at the site, it is recommended that the proposed structure be founded on conventional spread footing foundations in conjunction with soil-supported slab-on-grade construction.

The elevation of the top of the natural glacial till deposit based on the borings is anticipated to vary from about Elevation +85 to Elevation +92 across the proposed building footprint. Based upon the location of the proposed building, the elevation of the lowest level slab, anticipated design footing depth, and depth to the natural glacial till deposit, it is anticipated that footings at the eastern end of the building may bear directly on the glacial till deposit or on a few feet of structural fill placed over the natural glacial till. However, at locations where the glacial till deposit is more than about 2 feet deeper than the design bottom of footing elevation, in lieu of excavating the existing uncontrolled fill and placing compacted

structural fill, it is anticipated to be more economical to leave the existing fill in place and improve the characteristics of the fill by employing a ground improvement method, aggregate piers, as described below.

The viability of a conventional earthwork overexcavation option in lieu of ground improvement is highly dependent on the time of year and weather in which the earthwork operations for preparation of the building pad would be performed. Grain size distributions of representative samples of the fill material indicate that the fines content (e.g. silt and clay) ranges from about 10 to 45 percent and is typically greater than 30 percent. Due to the generally silty nature of the on-site fill, it is anticipated that on-site reuse of the over-excavated fill material as structural fill in a bulk excavation and backfilling operation may be difficult, particularly in consideration of the limited site area available for stockpiling. Furthermore, if the earthwork operations are performed during a wet and/or cold period, it is anticipated that significant portions of the on-site soil may become unsuitable for re-use as structural fill if it becomes too wet. This would trigger import of gravel borrow from an off-site source and the off-site disposal of the unsuitable on-site soil at a potential premium cost. Therefore, for these reasons, we consider ground improvement to generally be the preferred option for support of the footings.

The following parameters are recommended for the design of the new foundations:

- Footings, along with haunched or thickened slabs supporting structural load, should bear directly on the existing fill deposit after it has been improved with ground improvement elements, or directly on the undisturbed, natural glacial till deposit.
    - Topsoil and existing surface treatments should be removed at footing locations.
- Footings, along with haunched or thickened slabs supporting structural load, should be proportioned utilizing an allowable design net bearing pressure of three (3) tons per square foot (tsf).
- The minimum footing width for continuous footings and isolated footings should be 24 inches and 36 inches, respectively.
- Perimeter foundations and interior foundations below unheated areas should be provided with a minimum 4-foot thickness of soil cover as frost protection. Interior foundations below heated areas should be located such that the top of foundation concrete is a minimum of six inches below the underside of the lowest level slab.
- Foundations should be located such that they bear below a theoretical line drawn upward and outward at 2 to 1 (horizontal to vertical) from the bottom exterior edge of all adjacent existing or proposed footings, structures, and/or utilities.
- Foundations should be designed in accordance with the Code.

5.2 – GROUND IMPROVEMENT (AGGREGATE PIERS)

Aggregate piers (APs) are a ground improvement technique that involves ramming aggregate stone into a predrilled hole or by vertical displacement to reinforce unsuitable soils. Specialized equipment is used to place and compact the aggregate using a large static force augmented by dynamic vertical impact energy. The compaction densifies the aggregate and increases the lateral stress in the soil matrix beneath the proposed building. Thus, the potential for large settlements is reduced by improving the unsuitable soils to a stiffer composite soil matrix.

Ground improvement techniques such as APs are designed by a specialty Ground Improvement Designer employed by the Ground Improvement Installer. The Ground Improvement Designer will determine the layout of the ground improvement elements beneath the footings based on structural loads provided by the Project Structural Engineer, which should be included in the Contract Documents. The ground improvement design calculations and layout submittal should be reviewed by the Project Geotechnical and Structural Engineers.

Detailed design calculations should be prepared by the Ground Improvement Designer and submitted to the project design team for review prior to the beginning of construction. A detailed explanation of the design approach and parameters for capacity and settlement calculations should be included in the design submittal. The design submittal should also include a testing program to demonstrate the capacity of each utilized type or design of ground improvement element. All calculations and drawings should be prepared and sealed by a Professional Engineer who is licensed in the Commonwealth of Massachusetts and retained by the Contractor who is to perform the work.

The following general criteria should be utilized in the design of ground improvement:

- APs installed below foundations (footings and mats) should extend through the fill material to the surface of the natural, inorganic glacial till deposit.
- The maximum allowable bearing pressure should be equal to 3 tsf for foundations bearing on existing site soils in combination with ground improvement.
- A minimum of one (1) modulus load test should be performed on each utilized type or design of ground improvement element.
    - Modulus tests on APs should be performed to 150 percent of the maximum design stress to confirm the design parameters unless Code requirements dictate stricter requirements.
    - The modulus load test set-ups should include installation of a tell-tale to measure the movement at the tip of the element.

5.3 – OVEREXCAVATION AND REPLACEMENT FOR EASTERN WING

Within the eastern end of the wing at the northeast corner of the proposed building footprint the surface of the natural undisturbed glacial till is anticipated to be within 1 to 3 feet of the design bottom of footing. At these locations, the existing fill could potentially be overexcavated and replaced with compacted structural fill instead of being improved with ground improvement. At locations where the surface of the glacial till deposit is lower than the proposed bottom of footing elevation and APs are not installed, structural fill should be used as backfill up to the design subgrade. The following parameters are recommended for the use of structural fill for support of proposed footings:

- Structural Fill
    - The plan limits of the placement of structural fill should extend laterally beyond the edges of the footings for a horizontal distance equal to the depth measured from the design bottom of footing elevation to the surface of the natural, inorganic glacial till deposit, plus two feet.
        - Example: where the surface of the natural soil is 2 feet below the design bottom of footing elevation, compacted structural fill will be required to extend laterally outward from the edge of the footing for a horizontal distance of 4 feet.
    - Structural fill should consist of either suitable existing on-site granular fill which may be limited by its moisture and silt content, or an off-site gravel borrow which consists of a well-graded sand and gravel with less than 8 percent by weight passing the No. 200 sieve.
    - Structural fill placed should be placed in lifts having a compacted thickness of 6 inches and be compacted to a minimum of 95 percent of its modified Proctor maximum dry density.

5.4 – LOWEST LEVEL SLAB RECOMMENDATIONS

The lowest level slab is recommended to consist of a conventional soil-supported slab-on-grade. The slab-on-grade should be underlain by a polyethylene vapor barrier spread across the surface of a minimum 9-inch thickness of compacted 3/4-inch crushed stone placed over a layer of filter fabric that is spread across the subgrade. Where existing fill material is present at the subgrade elevation, it should be proof-compacted as discussed in *Section 6.3 – Proof Compaction of Slab-On-Grade Subgrade* below.

In consideration that the soil-supported slab-on-grade is being constructed over uncontrolled fill soil, cosmetic cracking and minor settlement of the slab may occur over time. Frequent control joints in the lowest level slab should be used to minimize the potential for cracking.

5.5 – GROUNDWATER CONSIDERATIONS

For most of the building the surface of the lowest level slab is at or above the proposed exterior finished grade. However, two areas located along the north foundation wall are indicated to have perimeter finished grades up to about 2 feet above the interior slab level. As such a perimeter and underslab drainage system is considered to be required along the north foundation wall.

The perimeter and underslab drains are intended to minimize groundwater intrusion into the occupied space due to conditions when groundwater may become temporarily elevated due to precipitation events, surface water run-off, and/or seasonal groundwater changes. The underslab and perimeter drainage systems are not intended to lower the existing groundwater level.

A conceptual foundation drainage detail is attached as **Figure 6**. In addition, the following parameters are recommended for the design of the perimeter drains:

- The perimeter and underslab drainage systems should consist of 4-inch diameter perforated PVC pipe.
- The drainage systems should have highest invert elevations a minimum of 12 inches below the underside of the lowest level slab.
- The drainage pipes should be pitched down at a minimum 0.5 percent slope in the direction of flow.
- The perimeter drainage pipes should be surrounded by a minimum 6-inch thickness of 3/4-inch crushed stone surrounded by a thickness of filter fabric such as Mirafi 140N, or equivalent.
- The underslab drainage pipes should be located within the crushed stone drainage layer beneath the lowest level slab and should be surrounded by a minimum of 6-inch thickness of 3/4-inch crushed stone.
    - Localized trenching will be required at the underslab drainage pipe locations.
- The perimeter and underslab drain lines should be gravity drained to a storm drain line that is not subject to surcharge or terminated within a sump pit that discharges into the storm drain system.
    - The sump pit should be equipped with duplex pumps, a high-water alarm, and a backup power supply.
    - The recommended design discharge flow rate from the foundation drainage system is 20 gallons per minute (gpm).

All below-grade walls should receive a troweled-on bitumastic damp-proofing. A prefabricated drainage product, such as Miradrain 6000, should be installed directly against the below-grade perimeter foundation walls where a foundation drain is and be tied into the perimeter drainage system. Where drainage board is utilized backfill against the perimeter

foundation walls may consist of ordinary fill. Additionally, the exterior site grades should be sloped away from the perimeter of the proposed building to minimize surface water infiltration.

All pits and depressions extending below the slab (e.g., elevator pits, etc.) should be provided with properly tied continuous waterstops in all construction joints and be waterproofed. Also, pits and depressions below the slab should be designed for hydrostatic uplift pressures corresponding to the design groundwater level being present 1 foot below the bottom of the proposed slab.

5.6 – RADON MITIGATION SYSTEM

Pursuant to the current American Association of Radon Scientists and Technologists (AARST) guidelines for new construction, the installation of passive radon system(s) is recommended for portions of foundation systems where there is enclosed space immediately above crawl spaces or lowest level slabs.

McPhail can be engaged upon request to provide passive radon system design services. In general, the passive radon mitigation system(s) should consist of a minimum of 6" thickness of ¾-inch crushed stone and a minimum 15-mil thick polyethylene vapor barrier installed below the slab with a specified number of solid 4" PVC vertical risers installed through the slab that exhaust above the roof line of the proposed building. Pipe sleeve(s) should be constructed to traverse sub-slab structural elements such as footings or grade beams if the crushed stone layer is discontinuous and does not extend below structural elements.

5.7 – RESISTANCE TO LATERAL FORCES

Below-grade foundation walls receiving lateral support at the top and bottom (i.e., restrained walls) should be designed for a lateral earth pressure corresponding to an equivalent fluid density of 60 pounds per cubic foot (pcf). To these values must be added the pressures attributable to earthquake forces per Section 1610.2 of the Code.

Lateral forces can be transmitted from the structure to the soil by passive pressure on the footings utilizing an equivalent fluid density of 120 pcf providing that these structural elements are designed to resist these pressures. Lateral forces can also be considered to be transmitted from the structure to the soil by friction on the base of the footings using a frictional coefficient of 0.4 to which a factor of safety of 1.5 should be applied.

5.8 – SEISMIC DESIGN CONSIDERATIONS

For the purposes of determining parameters for structural seismic design, this site is considered to be a Site Class C as defined in Chapter 20 of American Society of Civil Engineers (ASCE) Standard 7-10 "Minimum Design Loads for Buildings and Other Structures". Further, the bearing strata on the proposed site are not considered to be subject to liquefaction during an earthquake based on the criterion of Section 1806.4 of the Code.

6.0 – PRELIMINARY FOUNDATION CONSTRUCTION CONSIDERATIONS

6.1 – GENERAL RECOMMENDATIONS

This section addresses geotechnical aspects of the proposed foundation construction which are considered by McPhail to be critical to proper foundation performance of the completed development as well as mitigating potential adverse foundation construction impacts on surrounding buildings, streets, utilities, and other site improvements, as applicable.

Prospective contractors should be provided with the following information regarding the foundation construction considerations; however, each contractor should perform an independent assessment based on their own equipment, personnel, and anticipated procedures with input from specialty foundation subcontractors.

6.2 – PREPARATION AND PROTECTION OF FOUNDATION BEARING SURFACES

It is anticipated that specific precautions will be required for the preparation of foundation bearing surfaces due to the fine-grained nature of the fill and glacial till deposits and their susceptibility to increase in moisture content. Specifically, the final excavation of the footing bearing surface subgrade consisting of fill improved with ground improvement or natural glacial till deposit and should be accomplished using an excavator that is equipped with smooth-edged bucket (smooth, toothless cutting edge or a steel plate welded across the teeth) to avoid disturbance of the bearing surface. Further, it is recommended that as soon as the bearing surface is exposed, it be immediately covered with a minimum 3-inch thickness of compacted 3/4-inch crushed stone to prevent disturbance of the subgrade during subsequent forming operations. A maximum 12-inch thickness of compacted 3/4-inch crushed stone may be placed beneath footing locations where limited overexcavation and replacement is required. Crushed stone should be placed in maximum 6-inch loose lifts and compacted using static or vibratory methods, depending on proximity to groundwater.

6.3 – PROOF COMPACTION OF SLAB-ON-GRADE SUBGRADE

For preparation of the slab-on-grade subgrade soils, following the removal of topsoil and existing surface treatments, the exposed fill subgrade should be proofrolled with at least four passes of a double-drum vibratory roller or large vibratory plate compactor. Depending on proximity to groundwater, static compaction methods may be required. All soft and/or compressible areas detected by the proofrolling should be excavated and replaced with compacted structural fill.

6.4 – REUSE OF ON-SITE SOILS

As noted by the enclosed boring logs and grain size analyses, the onsite fill and glacial till deposits are variably silty but generally having greater than 30% by weight passing the No. 200 sieve and are considered to be highly susceptible to disturbance or becoming unsuitable

for reuse due to the presence of moisture. Existing on-site soil, with the exception of excavated marine clay, may be considered for reuse within the building footprint provided it is excavated and maintained in a dry condition and is able to be compacted as described above. Existing on-site soil may also be considered for reuse outside the building footprint as ordinary fill subject to the provisions contained herein.

It is recommended that the placement and compaction of the on-site materials be completed during relatively dry and non-freezing conditions. Stockpiled excavated material designated for reuse on-site should be covered at all times with 6-mil polyethylene for protection from precipitation and also as a dust mitigation measure. If, due to any of the above conditions, the excavated material becomes unsuitable for reuse, it may require removal from the site at premium disposal costs and subsequent replacement with imported fill.

The existing fill and glacial till deposits to be excavated may also be suitable for reuse as ordinary fill outside the building footprint if they are properly maintained in a relatively dry condition and can be properly compacted should be placed in maximum 12-inch loose lifts and compacted to 92 percent of the material's modified Proctor maximum dry density.

If suitable on-site material is not available for reuse inside the building footprint, gravel borrow should be utilized. Gravel borrow should consist of a well-graded, natural sand and gravel from an off-site source, conforming to the following gradation requirements:

U.S. Sieve No.	Percent Passing by Weight
3"	100
½"	50 – 85
#4	40 – 75
#50	8 – 28
#200	0 – 8

6.5 – WORKING SUBGRADE MAINTENANCE

Due to the high silt content of the existing fill which is anticipated to be present at the working subgrade during foundation excavation and construction, specific care to maintain the exposed subgrade may be necessary depending on the time of year and level of precipitation. Maintaining trafficability of the subgrade may require removal of soil which becomes frozen or oversaturated due to precipitation events. Trafficability of the subgrade may be improved with the placement of a layer of gravel borrow or crushed stone over the subgrade.

Specifically, the existing fill contains a relatively high amount of fines and if the surface of the fill becomes wet, it will easily be disturbed. Even with proper control of both surface water and groundwater, it is probable that during periods of wet weather off-site gravel borrow and/or crushed stone may be required to maintain trafficability for construction equipment. It is recommended that construction equipment work at least 12 inches above the subgrade for the slab and footing bearing surfaces to minimize potential disturbance.

6.6 – OFF-SITE REMOVAL OF EXCESS SOILS

If excess soil requiring off-site disposal is generated, off-site disposal of excess soil should be performed in accordance with the current Department of Environmental Protection (DEP) policies and regulations for off-site reuse of excess excavated soil require environmental characterization of the excavated soil prior to its off-site reuse. These services are available to be provided by McPhail, if necessary.

6.7 – GROUNDWATER CONTROL

Proper control of surface water run-off and any perched groundwater that may accumulate in excavations will be necessary to maintain a firm subgrade to support construction traffic. In consideration that groundwater was observed within the completed boreholes at 6 to 15.5 feet below the existing ground surface, it is not anticipated that significant groundwater control will be required during the construction period. Dewatering by means of conventional sumping should suffice for groundwater control during periods of high precipitation. It is recommended that all pumped groundwater be recharged on-site to the extent feasible. If pumped groundwater cannot be recharged on-site, it would be necessary to dispose of pumped groundwater into a nearby storm drain or combined sewer which would require the need for a temporary construction dewatering discharge permit.

6.8 – RELOCATION OF EXISTING UTILITIES

Existing utilities and structures present within the footprint of the proposed building should be relocated prior to construction. The resulting abandoned utility/structure and associated backfill should be removed and replaced with compacted structural fill.

7.0 – FUTURE WORK

7.1 - DESIGN ASSISTANCE

McPhail has been retained to provide design assistance to the design team during the final design phase of this project. The purpose of this involvement is to review the structural foundation drawings and foundation notes for conformance with the recommendations presented herein, to generate the geotechnical-related specification sections for inclusion into the Contract Documents for construction.

7.2 – CONSTRUCTION OBSERVATION

It is recommended that McPhail be retained during the construction period to observe the installation of ground improvement elements, over-excavation of unsuitable soils, final preparation of the foundation bearing surfaces, preparation of the slab-on-grade subgrade, installation of the foundation drainage system, and to monitor placement and compaction of structural fill in accordance with the provisions of the Code and the provisions of the Contract Documents. Our involvement during the construction phase of the work should

minimize costly delays due to unanticipated field problems since our field representative would be under the direct supervision of our project manager who was responsible for the subsurface explorations and foundation design recommendations documented herein.

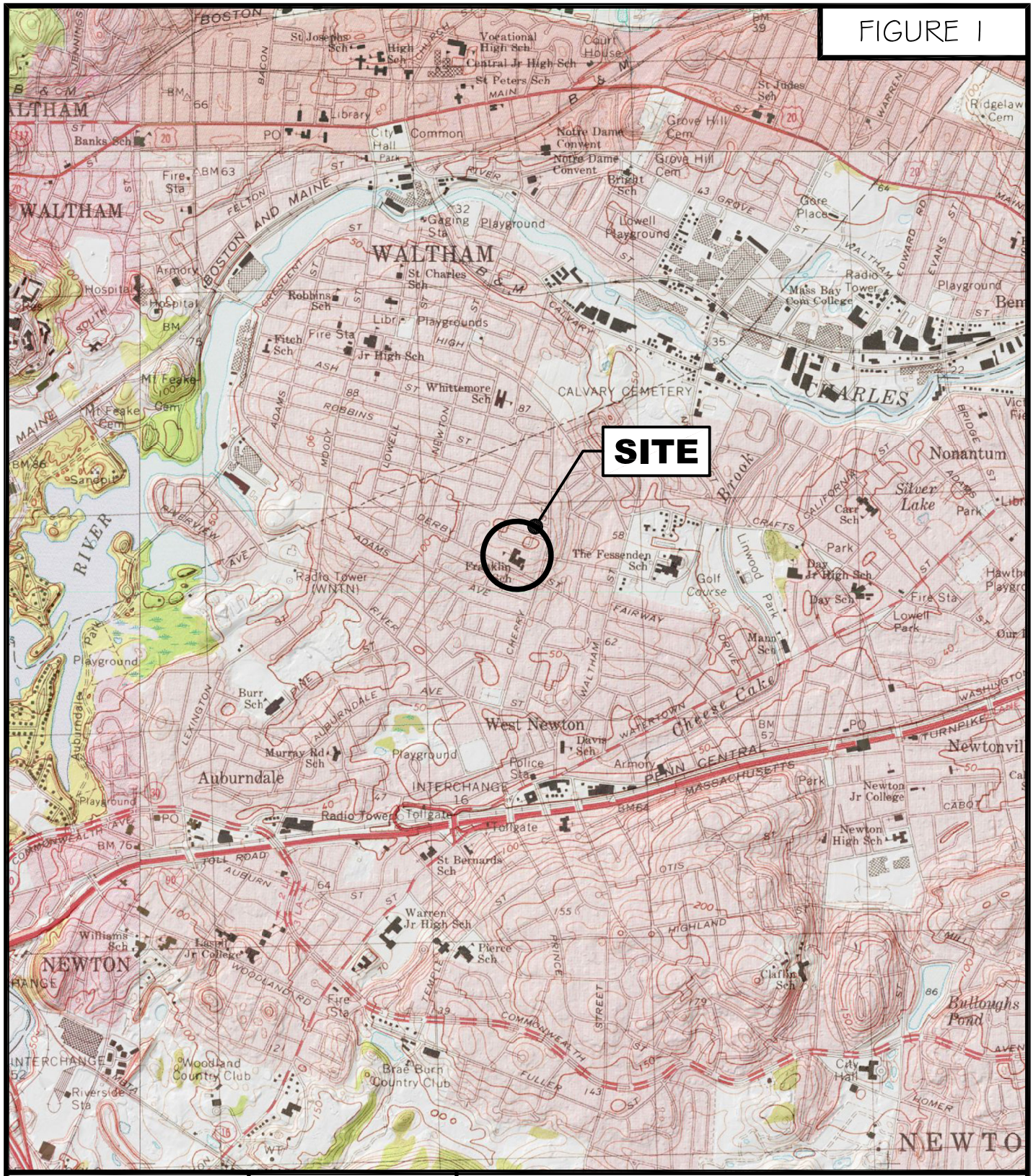
8.0 – LIMITATIONS

This report has been prepared in accordance with generally accepted soil and geotechnical engineering practices. No other warranty, expressed or implied, is made. If any changes in nature or design of the proposed construction are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by McPhail.

The analyses and recommendations presented in this report are based upon the data obtained from the subsurface explorations performed at the approximate locations indicated on the enclosed plan. If variations in the nature and extent of subsurface conditions between the widely spaced explorations become evident during construction, it will be necessary for a re-evaluation of the recommendations of this report to be made after performing on-site observations during the construction period and noting the characteristics of any variations.

FIGURES

FIGURE 1



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SCALE 1:25,000

PROJECT LOCATION PLAN

FRANKLIN ELEMENTARY SCHOOL

NEWTON MASSACHUSETTS

NORTH

APPROXIMATE LIMITS OF SUBJECT PROPERTY

APPROXIMATE LIMITS OF PROPOSED BUILDING

CLARK ROAD (PUBLIC – 40' WIDE)

RUSSELL ROAD (PUBLIC – 40' WIDE)

PLEASANT STREET

CHERRY STREET (PUBLIC – 40' WIDE)

DERBY STREET (PUBLIC – 40' WIDE)

PERSHING ROAD

HOWARD STREET

B-1 B-101 B-102 B-103 B-104 B-105 B-106 B-107 B-108 B-109 B-2 B-3 B-4 B-5 B-6

FIRST FLOOR SLAB EL.+95.5

FIRST FLOOR SLAB EL.+94.6

FIRST FLOOR SLAB EL.+97.0

PROJECT BENCHMARK: NAIL IN LIGHT/UTILITY POLE ELEVATION=97.56

PROJECT BENCHMARK: NAIL IN UTILITY POLE ELEVATION=104.36

PROJECT BENCHMARK: X-CUT ON HYDRANT BOLT ELEVATION=91.21

FRANKLIN ELEMENTARY SCHOOL
125 DERBY STREET NEWTON, MA

CITY OF NEWTON
PARCEL 1 (REGISTERED LAND)
DEED BOOK 6140, PAGE 200
177,392±S.F. (4.072±ACRES)

CITY OF NEWTON
PARCEL 2 (RECORDED LAND)
DEED BOOK 6168, PAGES 334-336
59,771±S.F. (1.372±ACRES)

167 DERBY STREET N/F JANET A. LEBLOND & DANIEL R. FITZPATRICK DEED BOOK 73049, PAGE 219

28 RUSSELL ROAD N/F DEBORAH J. DONAHUE REVOCABLE TRUST & MICHAEL F. MCGRATH REVOCABLE TRUST DEED BOOK 72341, PAGE 280

54 CLARK ROAD N/F GEOFFREY KEENAN & COLLEEN MURPHY DEED BOOK 49646, PAGE 420

48 CLARK ROAD N/F AMY GROSYK SHEIBER & RICK LESLIE SHEIBER DEED BOOK 75632, PAGE 46

38 CLARK ROAD N/F 38 CLARK ROAD REALTY TRUST DEED BOOK 59864, PAGE 374

32 CLARK ROAD N/F ADELE HARTSIS & ROBERT S. POIRIER, Jr. DEED BOOK 28845, PAGE 26

28 CLARK ROAD N/F RAYMOND B. FAWSON, Jr. DEED BOOK 75608, PAGE 58

20 CLARK ROAD N/F CLAUDIO & JESSICA BACCARI DEED BOOK 75148, PAGE 57

14 CLARK ROAD N/F JAY P. & KATHERINE S. CIVETTI DEED BOOK 59187, PAGE 584

157 CHERRY STREET N/F JUDITH KARP & HARRY O. LOHR, Jr. DEED BOOK 20320, PAGE 1

167 CHERRY STREET N/F BENJAMIN M. BORNE & JACQUELINE L. SAVAGE BORNE DEED BOOK 44399, PAGE 165

171 CHERRY STREET N/F WILLIAM V. & DALE M. ROONEY DEED BOOK 22295, PAGE 232

177 CHERRY STREET N/F ROBERT F. & THERESA SAMPSON DEED BOOK 27800, PAGE 455

183 CHERRY STREET N/F THOMAS C. FORSTER DEED BOOK 42933, PAGE 92

187 CHERRY STREET N/F JAN D., KATHLEEN W., DANIEL P., & MICHELLE M. MOEHL DEED BOOK 62377, PAGE 101

99 DERBY STREET N/F CARDUCCI FAMILY TRUST DEED BOOK 61641, PAGE 159

N21° 27' 38"E 266.20'

S16° 32' 35"W 340.84'

N71° 21' 53"W 115.00'

N74° 21' 12"W 49.50'

S18° 43' 55"E 53.81'

L=18.85' R=12.00'

L=31.42' R=20.00'

N64° 08' 55"W 190.40'

N64° 08' 55"W 60.60'

N64° 08' 55"W 174.96'(C) 175.24'(R)

N64° 08' 55"W 119.73'

S25° 38' 48"E 226.68'

N15° 38' 48"W 40.64'

GRAPHIC SCALE
30 0 30 60 120

LEGEND

– APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. ON AUGUST 21 AND 22, 2023 FOR McPHAIL ASSOCIATES, LLC

– APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. DURING THE PERIOD OF FEBRUARY 20 THROUGH 22, 2024 FOR McPHAIL ASSOCIATES, LLC

REFERENCE: THIS PLAN WAS PREPARED FROM A 40-SCALE DRAWING ENTITLED "EXISTING CONDITIONS PLAN OF LAND" DATED NOVEMBER 11, 2022 BY SAMIOTES CONSULTANTS INC. AND A 40-SCALE DRAWING ENTITLED "SKETCH PLAN - A1, A2, B1 AND C" DATED SEPTEMBER 13, 2023 BY LEMON BROOKE, LLC

McPHAIL ASSOCIATES, LLC
Geotechnical and Geoenvironmental Engineers
2269 Massachusetts Avenue
Cambridge, MA 02140
617/868-1420
617/868-1423 (Fax)
www.mcphailgeo.com

FRANKLIN ELEMENTARY SCHOOL

NEWTON MASSACHUSETTS

SUBSURFACE EXPLORATION PLAN

FOR

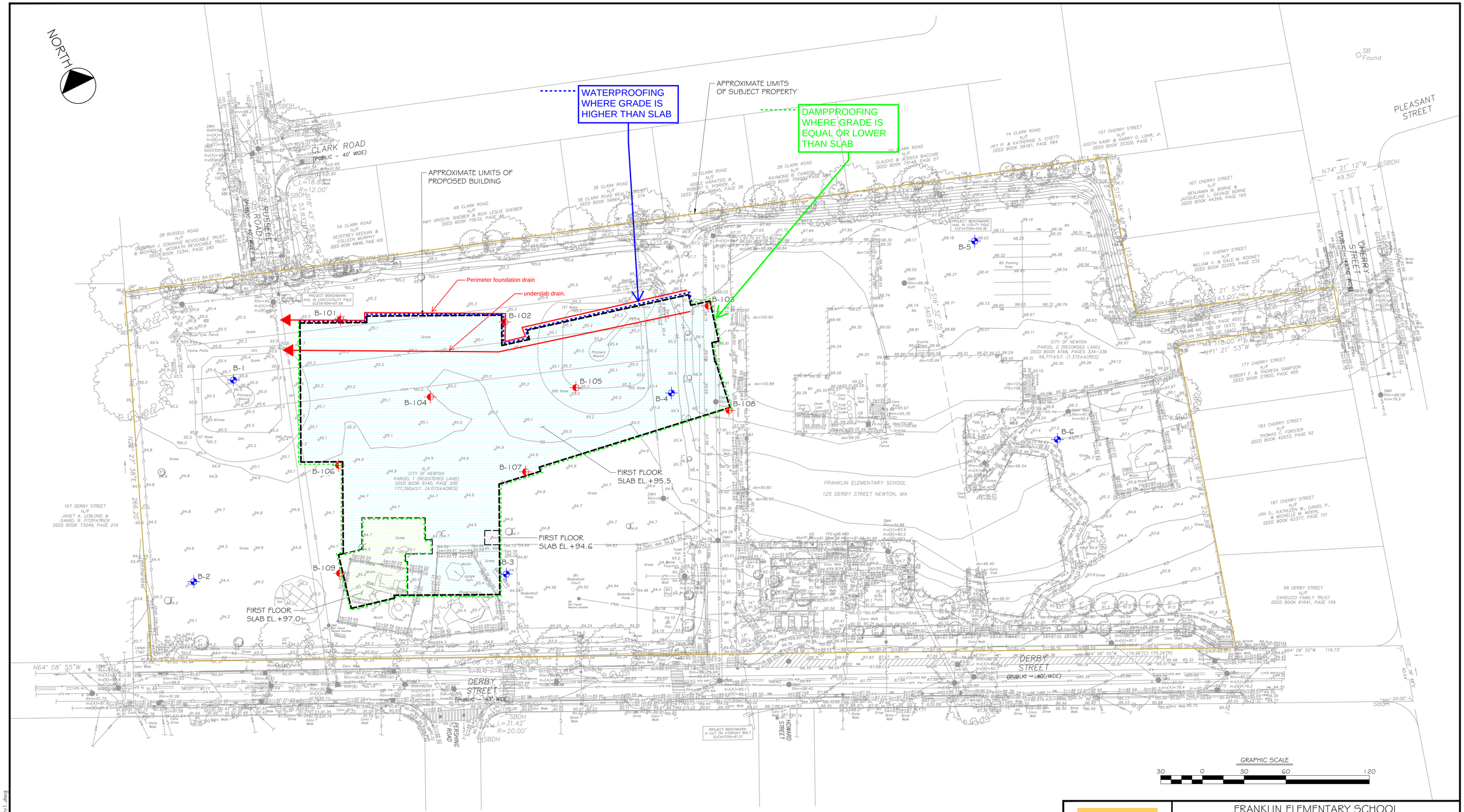
HMFH ARCHITECTS, INC

BY

McPHAIL ASSOCIATES, LLC

Date: MARCH 2024	Dwn: F.G.P.	Chkd: J.S.H.	Scale: 1" = 30'
Project No: 7708			FIGURE 2

FILE NAME: N:\Acad\JOBS\7708\7708-FO2Rev1.dwg



LEGEND

— APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. ON AUGUST 21 AND 22, 2023 FOR McPHAIL ASSOCIATES, LLC

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FRANKLIN ELEMENTARY SCHOOL

NEWTON MASSACHUSETTS

SUBSURFACE EXPLORATION PLAN

FOR

HMFH ARCHITECTS, INC

BY

McPHAIL ASSOCIATES, LLC

Date: MARCH 2024	Dwn: F.G.P.	Chkd: J.S.H.	Scale: 1" = 30'
Project No: 7708			FIGURE 2

FILE NAME: N:\Acad\JOBS\7708\7708-F02Rev1.dwg

NORTH

APPROXIMATE LIMITS OF SUBJECT PROPERTY

APPROXIMATE LIMITS OF PROPOSED BUILDING

CLARK ROAD (PUBLIC - 40' WIDE)

RUSSELL ROAD (PUBLIC - 40' WIDE)

CHERRY STREET (PUBLIC - 40' WIDE)

PLEASANT STREET

DERBY STREET (PUBLIC - 40' WIDE)

PERSHING ROAD

HOWARD STREET

B-1 (+87.3)
B-101 (+87.3)
B-102 (+86.4)
B-103 (+90.7)
B-104 (+84.6)
B-105 (+89.0)
B-4 (+88.4)
B-108 (+91.8)
B-106 (+87.9)
B-107 (+85.4)
B-108 (+89.6)
B-2 (+87.0)
B-3 (+87.7)
B-5 (+94.7)
B-6 (+87.7)

FRANKLIN ELEMENTARY SCHOOL
125 DERBY STREET NEWTON, MA

GRAPHIC SCALE
30 0 30 60 120

LEGEND

— APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. ON AUGUST 21 AND 22, 2023 FOR McPHAIL ASSOCIATES, LLC

— APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. DURING THE PERIOD OF FEBRUARY 20 THROUGH 22, 2024 FOR McPHAIL ASSOCIATES, LLC

+87 — CONTOUR ELEVATION OF TOP OF GLACIAL TILL (REFER TO NOTE 1)

(+87.3) — ELEVATION OF TOP OF GLACIAL TILL ENCOUNTERED AT EXPLORATION LOCATION

NOTE:
CONTOURS PRESENTED ARE BASED ON LINEAR INTERPOLATION BETWEEN EXPLORATIONS. THE ACTUAL FIELD CONDITIONS MAY VARY FROM THE INDICATED CONTOURS.

REFERENCE: THIS PLAN WAS PREPARED FROM A 40-SCALE DRAWING ENTITLED "EXISTING CONDITIONS PLAN OF LAND" DATED NOVEMBER 11, 2022 BY SAMIOTES CONSULTANTS INC. AND A 40-SCALE DRAWING ENTITLED "SKETCH PLAN - A1, A2, B1 AND C" DATED SEPTEMBER 13, 2023 BY LEMON BROOKE, LLC

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FRANKLIN ELEMENTARY SCHOOL

NEWTON MASSACHUSETTS

TOP OF GLACIAL TILL CONTOUR PLAN

FOR

HMFH ARCHITECTS, INC

BY

McPHAIL ASSOCIATES, LLC

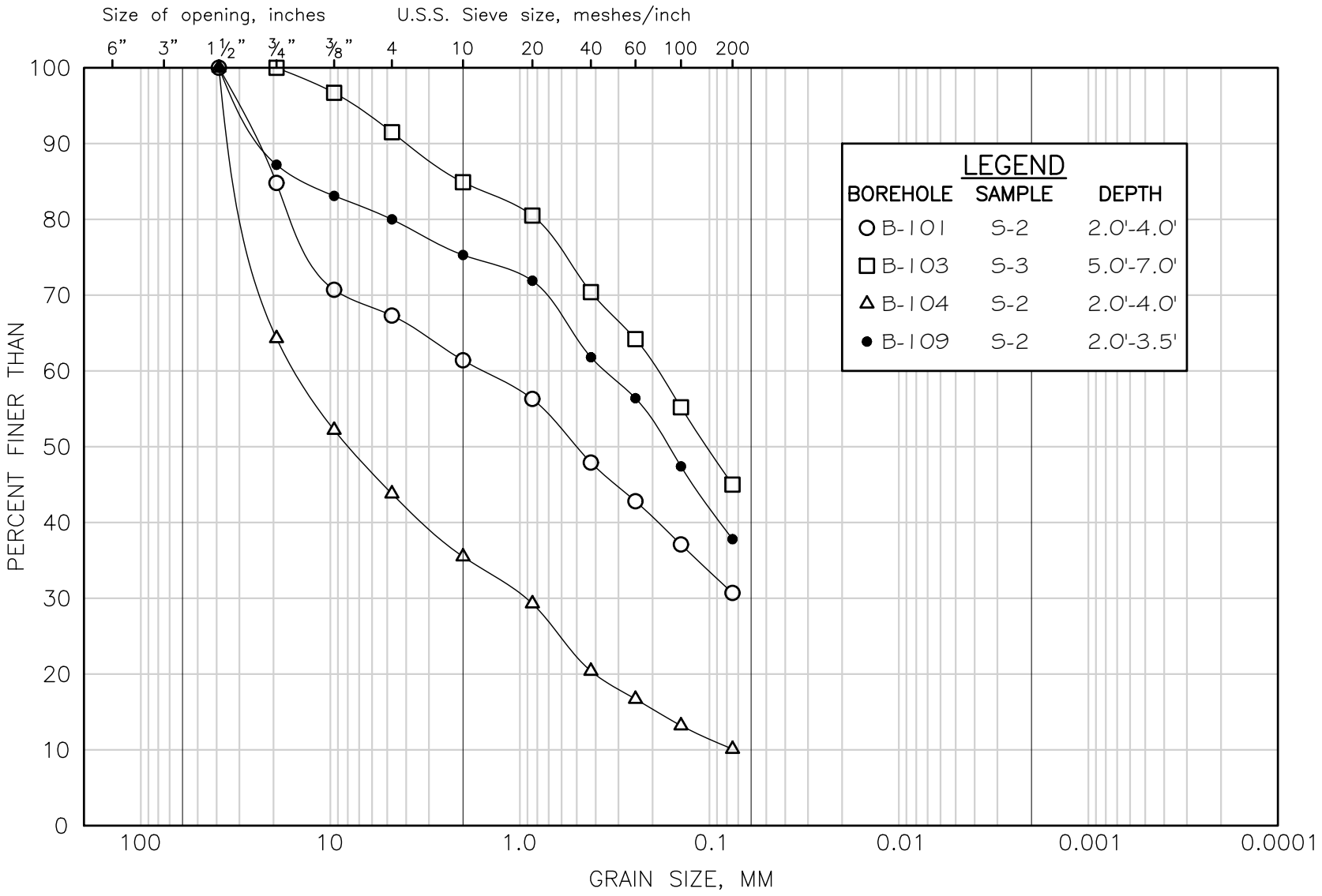
Date: MARCH 2024	Dwn: F.G.P.	Chkd: J.S.H.	Scale: 1" = 30'
Project No: 7708			FIGURE 3

FILE NAME: N:\Acad\JOBS\7700\7708\F03_Contour.dwg

FILE NAME: N:\Acad\JOBS\7708\7708-F04_Sieve.dwg

PROJECT No. 7708

M.I.T. GRAIN SIZE SCALE



COBBLE SIZE	GRAVEL SIZE			SAND SIZE			FINE GRAINED	
	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE

McPHAIL ASSOCIATES, LLC

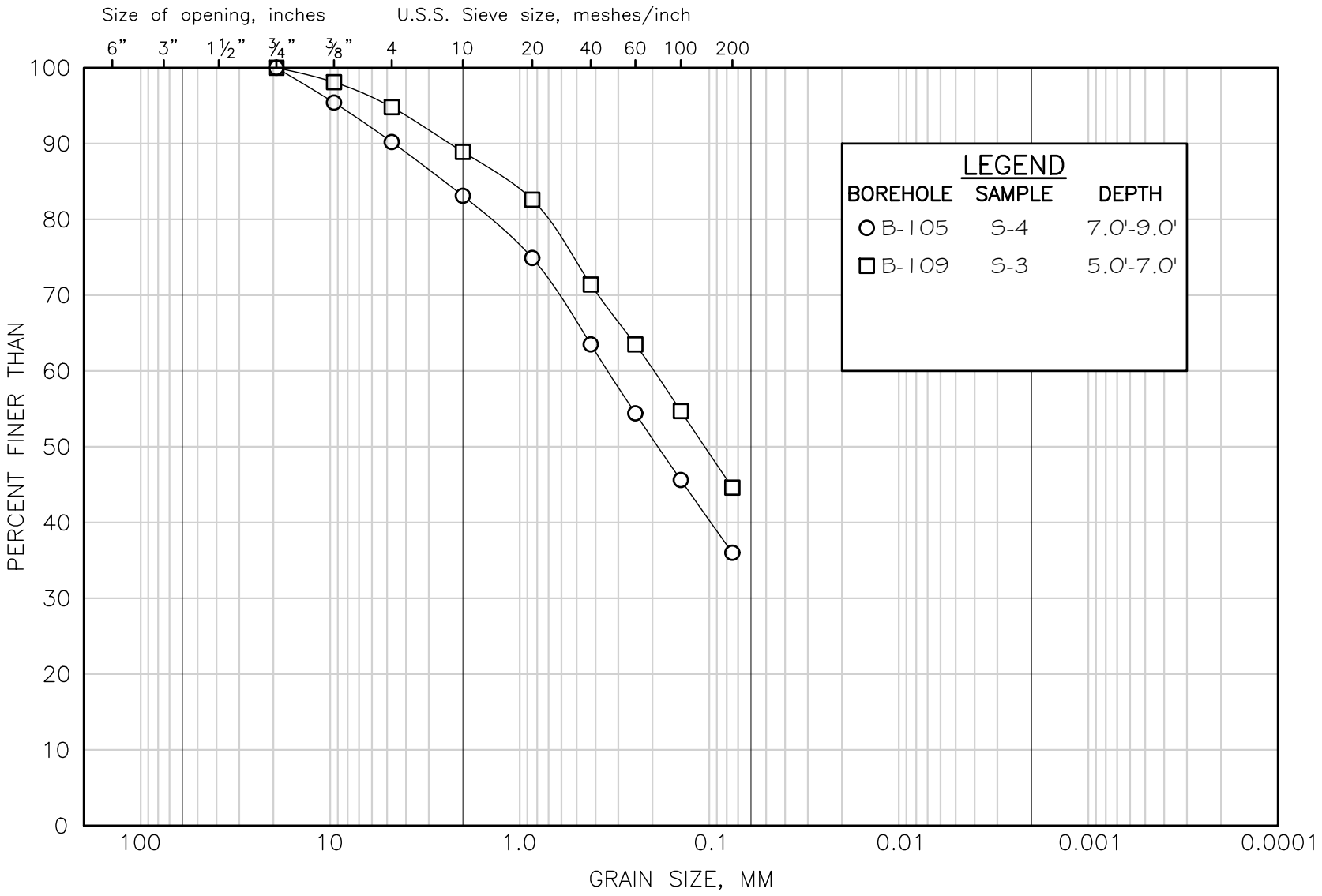
GRAIN SIZE DISTRIBUTION
FILL

FIGURE 4

FILE NAME: N:\Acad\JOBS\7708\7708-F05_Sieve.dwg

PROJECT No. 7708

M.I.T. GRAIN SIZE SCALE



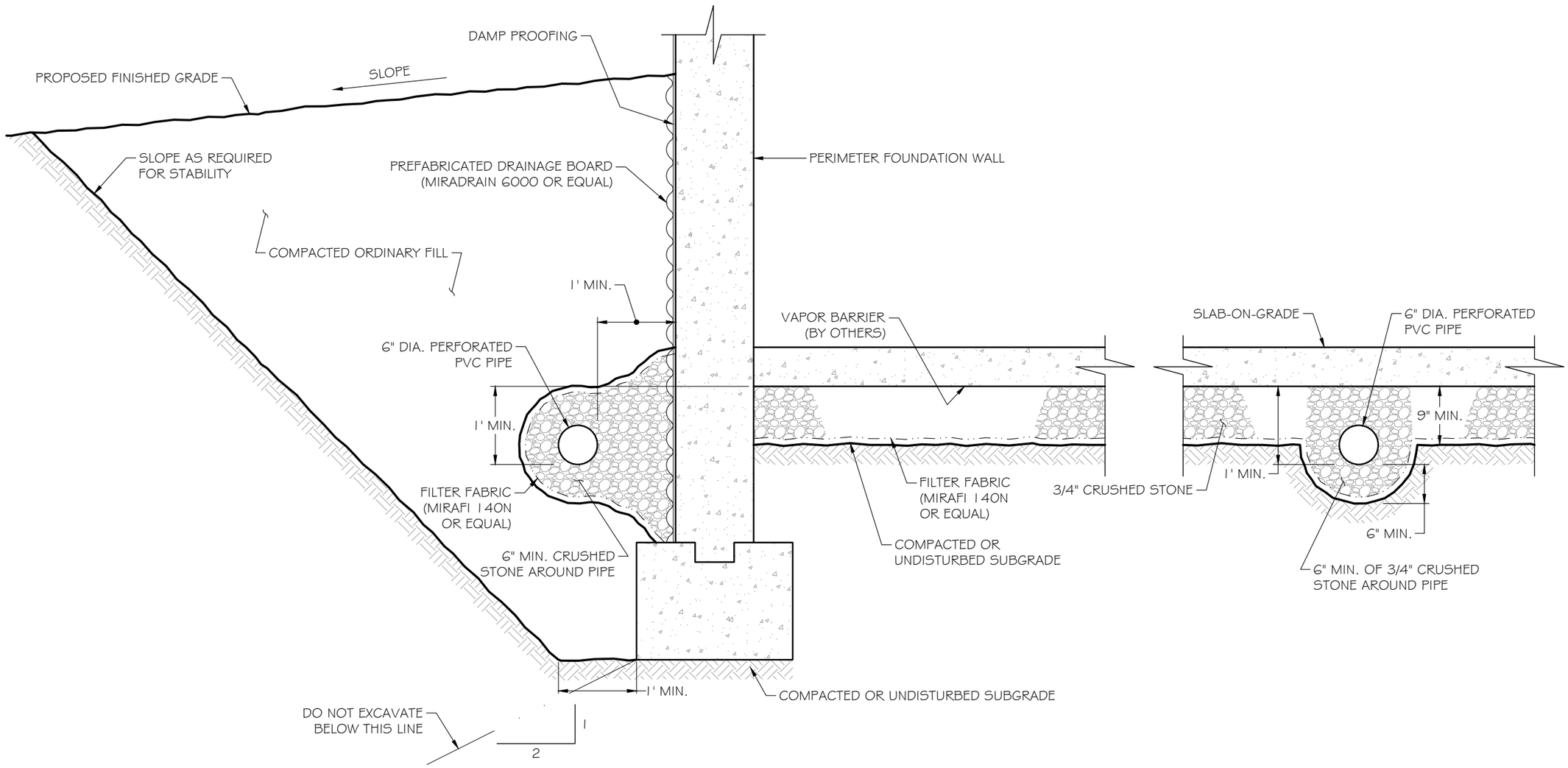
COBBLE SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE
	GRAVEL SIZE			SAND SIZE			FINE GRAINED	

McPHAIL ASSOCIATES, LLC

GRAIN SIZE DISTRIBUTION
GLACIAL TILL

FIGURE 5

FIGURE 6



PERIMETER AND UNDERSLAB DRAINAGE DETAIL

N.T.S.

NOTE:
THE ABOVE IS PROVIDED AS A CONCEPTUAL FOUNDATION DRAINAGE DETAIL. PLEASE REFER TO THE CONTRACT DOCUMENTS FOR THE PROJECT FOUNDATION DRAINAGE DESIGN AND REQUIREMENTS.

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FRANKLIN ELEMENTARY SCHOOL
NEWTON MASSACHUSETTS

FOUNDATION DRAINAGE DETAIL

FOR
HMFH ARCHITECTS, INC
BY
McPHAIL ASSOCIATES, LLC

Date: MARCH 2024	Dwn: F.G.P.	Chkd: J.S.H.	Scale: N.T.S.
Project No: 7708			

FILE NAME: N:\Acad\JOBS\7708\7708-FOG.dwg

APPENDIX A:

EXPLORATION AND LABORATORY TESTING PROCEDURES

The borings were performed using a truck-mounted drill rig and advanced utilizing HW casing and the wet rotary drilling method. Standard 2-inch O.D. split-spoon samples and standard penetration test results were obtained at minimum 5-foot intervals. The split-spoon sampling was performed in general accordance with the standard procedures described in ASTM D1586.

The explorations were monitored by McPhail field representatives who performed field layout, prepared field logs, obtained and visually classified soil samples, monitored groundwater conditions in the open boreholes and observation wells, and determined the required exploration depth based upon the actual subsurface conditions encountered.

Field locations of the explorations were determined by taping from existing site features included on the available drawings. Unless noted otherwise, the existing ground surface elevation at each exploration location was determined by a level survey performed by our field staff utilizing vertical control information on the available drawings.

At the completion of the field work, soil samples were returned to our laboratory for more detailed classification, analysis, and testing. The laboratory testing consisted of sieve analyses to determine the gradations and confirm the visual classifications of the fill material and glacial till deposit. Laboratory test procedures were in general accordance with applicable ASTM Standards.

SOIL CLASSIFICATION SYSTEM

The soil classifications contained herein were determined using the Modified Massachusetts Institute of Technology (MIT) Soil Classification System, which utilizes the following definitions and descriptive terms to describe the soil components, percentage of soil components, and soil densities:

Soil Type	Grain Size Range (millimeters)
Gravel	60 – 2
Sand	2 – 0.06
Silt	0.06 – 0.002
Clay	<0.002

Descriptive Term	Proportion of Total (%)
"Trace"	0 - 10
"Some"	10 - 20
ADJECTIVE (e.g., sandy, silty)	20 - 35
"And"	35 - 50

Granular Soils	
Density	**Penetration Resistance (blows per foot)**
Very Loose	0 - 4
Loose	4 - 10
Compact	10 - 30
Dense	30 - 50
Very Dense	>50

Cohesive Soils		
Density	**Penetration Resistance (blows per foot)**	**Undrained Shear Strength (pounds per foot)**
Very Soft	0 - 2	0 - 250
Soft	2 - 4	250 - 500
Firm	4 - 8	500 - 1000
Stiff	8 - 15	1000 - 2000
Very Stiff	15 - 30	2000 - 4000
Hard	>30	>4000

APPENDIX B:

BORING LOGS

Project: Franklin Elementry School
Location: 125 Derby Street
City/State: Newton, Massachusetts

Job #: 7708.2.00
Date Started: 8-21-23
Date Finished: 8-21-23

Boring No. B-1

Contractor: Carr-Dee Corp
Driller/Helper: S. DeSimone Jr./F. Landers
Logged By/Reviewed By: T.M. Cormican
Surface Elevation (ft): 95.8

Casing Type/Depth (ft): 2.25" I.D. Hollow Stem Augers
Casing Hammer (lbs)/Drop (in): N/A
Sampler Size/Type: 1-3/8" I.D. Split Spoon
Sampler Hammer (lbs)/Drop (in): 140 lbs./30 inches

Groundwater Observations

Date	Depth	Elev.	Notes
8-21-23	15.5	80.3	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample: TVOC (ppm)	Sample: N-Value / RQD	Sample: No.	Sample: Pen./Rec. (in)	Sample: Depth (ft)	Sample: Blows/6" / Min/ft	Sample Description and Boring Notes
1	95		1.0 / 94.8	TOPSOIL		10	S-1	24/14	0.0-2.0	2 3 7 10	Loose to compact gray-brown silty SAND and GRAVEL. (FILL)
2	94			FILL							
3	93					13	S-2	24/16	2.0-4.0	4 5 8 8	Compact dark gray-brown SILT, SAND and GRAVEL. (FILL)
4	92										
5	91										
6	90					12	S-3	24/13	5.0-7.0	6 4 8 10	Compact mottled orange-brown and gray-brown SILT, SAND and GRAVEL. (FILL)
7	89		7.0 / 88.8								
8	88			COMPLETELY WEATHERED SANDSTONE to VERY SEVERELY WEATHERED ARGILLITE - BEDROCK		21	S-4	24/20	7.0-9.0	10 9 12 13	Compact light gray SILT and fine SAND. (COMPLETELY WEATHERED SANDSTONE - BEDROCK)
9	87										
10	86										
11	85					27	S-5	24/20	10.0-12.0	10 10 17 23	Compact mottled orange-brown, gray-brown and light gray SILT and fine SAND. (COMPLETELY WEATHERED SANDSTONE - BEDROCK)
12	84										
13	83										
14	82										
15	81										
16	80					104	S-6	24/24	15.0-17.0	38 46 58 46	Very dense light gray SILT and fine SAND. (COMPLETELY WEATHERED SANDSTONE to VERY SEVERELY WEATHERED ARGILLITE - BEDROCK) NOTE: Split Spoon wet at ~ 15.5 ft.
17	79		17.0 / 78.8								
18	78			Bottomof Borehole at 17.0 feet below existing grade.							
19	77										
20	76										
21	75										
22	74										
	73										

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Used Automatic hammer to drive Spilt Spoon.

Total Volatile Organic Compounds (TVOC) measured w/ PID Model:
TVOC Background: ppm
Weather: Varible
Temperature:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project: Franklin Elementry School
Location: 125 Derby Street
City/State: Newton, Massachusetts

Job #: 7708.2.00
Date Started: 8-21-23
Date Finished: 8-21-23

Boring No. B-2

Contractor: Carr-Dee Corp
Driller/Helper: S. DeSimone Jr./F. Landers
Logged By/Reviewed By: T.M. Cormican
Surface Elevation (ft): 94.0

Casing Type/Depth (ft): 2.25" I.D. Hollow Stem Augers
Casing Hammer (lbs)/Drop (in): N/A
Sampler Size/Type: 1-3/8" I.D. Split Spoon
Sampler Hammer (lbs)/Drop (in): 140 lbs./30 inches

Groundwater Observations

Date	Depth	Elev.	Notes
8-21-23	11.5	82.5	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample: TVOC (ppm)	N-Value / RQD	No.	Pen./Rec. (in)	Depth (ft)	Blows/6" / Min/ft	Sample Description and Boring Notes
			0.6 / 93.4	TOPSOIL							
1	93					6	S-1	24/16	0.0-2.0	4 3 3 1	Loose gray-brown SILT and SAND, some gravel. (FILL)
2	92										
3	91					5	S-2	24/6	2.0-4.0	1 2 3 6	Loose gray-brown SILT, SAND and GRAVEL. (FILL)
4	90			FILL							
5	89										
6	88					16	S-3	24/9	5.0-7.0	3 9 7 12	Compact brown SAND and GRAVEL, some silt. (FILL)
7	87		7.0 / 87.0			57	S-4	12/10	7.0-8.0	23 34	Very dense mottled orange-brown and gray-brown silty SAND and GRAVEL. (GLACIAL TILL)
8	86					59	S-4a	12/10	8.0-9.0	25 23	Very dense gray-brown SILT, SAND and GRAVEL. (GLACIAL TILL)
9	85										
10	84			GLACIAL TILL							
11	83					19	S-5	24/20	10.0-12.0	8 9 10 10	Compact gray-brown SILT, SAND and GRAVEL. (GLACIAL TILL) NOTE: Split Spoon wet at ~ 11.5 ft.
12	82										
13	81		13.5 / 80.5			20	S-6	18/4	12.0-13.5	12 10 10	Compact gray-brown SILT, SAND and GRAVEL. (GLACIAL TILL)
14	80					34	S-6a	6/4	13.5-14.0	17	Compact to dense purple SILT. (COMPLETELY WEATHERED ARGILLITE - BEDROCK)
15	79					26	S-7	24/14	14.0-16.0	16 14 12 13	Compact mottled purple/gray-brown SILT. (COMPLETELY WEATHERED ARGILLITE - BEDROCK)
16	78										
17	77			WEATHERED ARGILLTE/KOALINITE - BEDROCK							
18	76										
19	75										
20	74										
21	73		21.3 / 72.7			123/10"	S-8	24/16	20.0-22.0	22 23 100/4"	Very dense white/light yellow SILT. (COMPLETELY WEATHERED KOALINITE - BEDROCK)
22	72			Bottom of Borehole at 21,3 feet below existing grade.							

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Used Automatic hammer to drive Spilt Spoon.

Total Volatile Organic Compounds (TVOC) measured w/ PID Model:
TVOC Background: ppm
Weather: Varible
Temperature:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project: Franklin Elementry School
Location: 125 Derby Street
City/State: Newton, Massachusetts

Job #: 7708.2.00
Date Started: 8-22-23
Date Finished: 8-22-23

Boring No. B-3

Contractor: Carr-Dee Corp
Driller/Helper: S. DeSimone Jr./F. Landers
Logged By/Reviewed By: T.M. Cormican
Surface Elevation (ft): 94.7

Casing Type/Depth (ft): 2.25" I.D. Hollow Stem Augers
Casing Hammer (lbs)/Drop (in): N/A
Sampler Size/Type: 1-3/8" I.D. Split Spoon
Sampler Hammer (lbs)/Drop (in): 140 lbs./30 inches

Groundwater Observations

Date	Depth	Elev.	Notes
8-22-23	NE		

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample TVOC (ppm)	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
			0.5 / 94.2	TOPSOIL							
1	94					9	S-1	24/15	0.0-2.0	2 3 6 7	Loose yellow-brown SAND, trace silt, gravel. (FILL)
2	93										
3	92					48	S-2	24/14	2.0-4.0	6 17 31 33	Dense light gray-brown SILT and SAND, some gravel. (FILL)
4	91			FILL							
5	90										
6	89					14	S-3	24/18	5.0-7.0	15 8 6 9	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
7	88		7.0 / 87.7								
8	87					28	S-4	24/18	7.0-9.0	12 18 10 17	Compact gray-brown well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
9	86										
10	85										
11	84			GLACIAL TILL		32	S-5	24/22	10.0-12.0	14 15 17 28	Dense gray-brown well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
12	83										
13	82										
14	81										
15	80		15.0 / 79.7								
16	79			COMPLETELY to VERY SEVERELY WEATHERED ARGILLITE - BEDROCK		44	S-6	24/5	15.0-17.0	16 20 24 33	Very dense light gray SILT. (COMPLETELY to VERY SEVERELY WEATHERED ARGILLITE - BEDROCK)
17	78		17.0 / 77.7								
18	77			Bottom of Borehole at 17.0 feet below existing grade.							
19	76										
20	75										
21	74										
22	73										
	72										

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Used Automatic hammer to drive Spilt Spoon.

Total Volatile Organic Compounds (TVOC) measured w/ PID Model:
TVOC Background: ppm
Weather: Varible
Temperature:

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2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project: Franklin Elementry School
Location: 125 Derby Street
City/State: Newton, Massachusetts

Job #: 7708.2.00
Date Started: 8-22-23
Date Finished: 8-22-23

Boring No. B-4

Contractor: Carr-Dee Corp
Driller/Helper: S. DeSimone Jr./F. Landers
Logged By/Reviewed By: T.M. Cormican
Surface Elevation (ft): 95.4

Casing Type/Depth (ft): 2.25" I.D. Hollow Stem Augers
Casing Hammer (lbs)/Drop (in): N/A
Sampler Size/Type: 1-3/8" I.D. Split Spoon
Sampler Hammer (lbs)/Drop (in): 140 lbs./30 inches

Groundwater Observations

Date	Depth	Elev.	Notes
8-22-23	6	89.4	

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample: TVOC (ppm)	Sample: N-Value / RQD	Sample: No.	Sample: Pen./Rec. (in)	Sample: Depth (ft)	Sample: Blows/6" / Min/ft	Sample Description and Boring Notes
1	95			TOPSOIL		9	S-1	24/22	0.0-2.0	2 3 6 3	Loose yellow-brown SAND, trace silt. (FILL)
	94		1.2 / 94.2								
2	93					9	S-2	24/3	2.0-4.0	3 4 5 8	Loose yellow-brown SAND, trace silt. (FILL)
3	92										
4	91			FILL							
5	90					13	S-3	12/10	5.0-6.0	6 7	Compact gray-brown SILT and SAND, some gravel. (FILL)
6	89					19	S-3a	12/10	6.0-7.0	12 17	Compact to dense gray-brown silty fine SAND, trace gravel. (FILL)
7	88		7.0 / 88.4			30	S-4	24/20	7.0-9.0	16 18 12 21	Compact to dense gray-brown well-graded mixture of SILT, SAND and GRAVE. (GLACIAL TILL) NOTE: Split Spoon wet at ~6 ft.
8	87										
9	86										
10	85					68	S-5	24/22	10.0-12.0	37 33 35 61	Very dense gray-brown well-graded mixture of SILT, SAND and GRAVE. (GLACIAL TILL)
11	84			GLACIAL TILL							
12	83										
13	82										
14	81										
15	80					55	S-6	12/12	15.0-16.0	21 34	Very dense gray-brown well-graded mixture of SILT, SAND and GRAVE. (GLACIAL TILL)
16	79		16.0 / 79.4 16.8 / 78.6	VERY SEVERELY WEATHERED ARGILLITE - BEDROCK		188	S-6a	12/10	16.0-17.0	88 100/4"	Very dense gray VERY SEVERELY WEATHERED ARGILLITE. (BEDROCK)
17	78			Bottom of Borehole at 16.8 feet below existing grade.							
18	77										
19	76										
20	75										
21	74										
22	73										

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Used Automatic hammer to drive Spilt Spoon.

Total Volatile Organic Compounds (TVOC) measured w/ PID Model:
TVOC Background: ppm
Weather: Varible
Temperature:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project: Franklin Elementry School
Location: 125 Derby Street
City/State: Newton, Massachusetts

Job #: 7708.2.00
Date Started: 8-21-23
Date Finished: 8-21-23

Boring No. B-5

Contractor: Carr-Dee Corp
Driller/Helper: S. DeSimone Jr./F. Landers
Logged By/Reviewed By: T.M. Cormican
Surface Elevation (ft): 98.2

Casing Type/Depth (ft): 2.25" I.D. Hollow Stem Augers
Casing Hammer (lbs)/Drop (in): N/A
Sampler Size/Type: 1-3/8" I.D. Split Spoon
Sampler Hammer (lbs)/Drop (in): 140 lbs./30 inches

Groundwater Observations

Date	Depth	Elev.	Notes
8-21-23	NE		

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample TVOC (ppm)	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
			0.2 / 98.0	PAVEMENT							
1	97			FILL		10	S-1	24/16	0.5-2.5	7 5 5 9	Loose to compact gray-brown SILT, SAND and GRAVEL. (FILL)
2	96										
3	95		3.5 / 94.7			18	S-2	12/10	2.5-3.5	9 9	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
4	94			GLACIAL TILL		26	S-2a	12/10	3.5-4.5	17 23	Compact to dense gray-brown well-graded SILT, SAND and GRAVEL. (GLACIAL TILL)
5	93										
6	92					38	S-3	24/20	5.0-7.0	13 15 23 31	Dense gray-brown well-graded SILT, SAND and GRAVEL. (GLACIAL TILL)
7	91										
8	90										
9	89										
10	88					56	S-4	24/22	10.0-12.0	15 19 37 55	Very dense gray-brown well-graded SILT, SAND and GRAVEL. (GLACIAL TILL)
11	87										
12	86										
13	85										
14	84										
15	83					63	S-5	24/11	15.0-17.0	32 26 37 35	Very dense gray-brown well-graded SILT, SAND and GRAVEL. (GLACIAL TILL)
16	82										
17	81		17.0 / 81.2	Bottom fo Borehole at 17.0 feet below existing grade.							
18	80										
19	79										
20	78										
21	77										
22	76										

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Used Automatic hammer to drive Spilt Spoon.

Total Volatile Organic Compounds (TVOC) measured w/ PID Model:
TVOC Background: ppm
Weather: Varible
Temperature:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project: Franklin Elementry School
Location: 125 Derby Street
City/State: Newton, Massachusetts

Job #: 7708.2.00
Date Started: 8-21-23
Date Finished: 8-21-23

Boring No. B-6

Contractor: Carr-Dee Corp
Driller/Helper: S. DeSimone Jr./F. Landers
Logged By/Reviewed By: T.M. Cormican
Surface Elevation (ft): 97.2

Casing Type/Depth (ft): 2.25" I.D. Hollow Stem Augers
Casing Hammer (lbs)/Drop (in): N/A
Sampler Size/Type: 1-3/8" I.D. Split Spoon
Sampler Hammer (lbs)/Drop (in): 140 lbs./30 inches

Groundwater Observations

Date	Depth	Elev.	Notes
8-21-23	NE		

Depth (ft)	Elev. (ft)	Symbol	Depth/EL to Strata Change (ft)	Stratum	Sample TVOC (ppm)	Sample N-Value / RQD	Sample No.	Sample Pen./Rec. (in)	Sample Depth (ft)	Sample Blows/6" / Min/ft	Sample Description and Boring Notes
0	97		0.7 / 96.5	TOPSOIL							
1	96					13	S-1	24/15	0.0-2.0	3 6 7 30	Compact gray-brown SILT and SAND, some gravel. (FILL)
2	95										
3	94					23	S-2	24/20	2.0-4.0	29 9 14 13	Compact gray-brown SILT and SAND, some gravel. (FILL)
4	93										
5	92			FILL							
6	91					13	S-3	24/18	5.0-7.0	7 6 7 30	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
7	90										
8	89										
9	88		9.5 / 87.7								
10	87					50	S-4	24/24	10.0-12.0	17 19 31 48	Dense to very dense well-graded SILT, SAND and GRAVEL. (GLACIAL TILL)
11	86										
12	85										
13	84			GLACIAL TILL							
14	83										
15	82					53	S-5	24/22	15.0-17.0	22 21 32 51	Very dense well-graded SILT, SAND and GRAVEL. (GLACIAL TILL)
16	81										
17	80		17.0 / 80.2	Bottom of Borehole at 17.0 feet below existing grade.							
18	79										
19	78										
20	77										
21	76										
22	75										

GRANULAR SOILS	
BLOWS/FT.	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	COMPACT
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS	
BLOWS/FT.	CONSISTENCY
<2	V.SOFT
2-4	SOFT
4-8	FIRM
8-15	STIFF
15-30	V.STIFF
>30	HARD

SOIL COMPONENT

DESCRIPTIVE TERM	PROPORTION OF TOTAL
"TRACE"	0-10%
"SOME"	10-20%
"ADJECTIVE" (eg SANDY, SILTY)	20-35%
"AND"	35-50%

SOIL CONTAINING THREE COMPONENTS EACH OF WHICH COMPRISE AT LEAST 25% OF THE TOTAL ARE CLASSIFIED AS "A WELL-GRADED MIXTURE OF"

Notes:
Used Automatic hammer to drive Spilt Spoon.

Total Volatile Organic Compounds (TVOC) measured w/ PID Model:
TVOC Background: ppm
Weather: Varible
Temperature:

McPHAIL ASSOCIATES, LLC
2269 MASSACHUSETTS AVENUE
CAMBRIDGE, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Franklin Elementary School	**Job #:**	7708
Location:	125 Derby Street	**Date Started:**	02-20-24
City/State	West Newton, MA	**Date Finished:**	02-20-24

Boring No. B-101

Contractor:	Carr-Dee Corp.	**Casing Type/Depth (ft):**	HSA 2.25" / 15.0 ft.
Driller/Helper:	J. DeSimone	**Casing Hammer (lbs)/Drop (in):**	N/A
Logged By/Reviewed By:	T, M. Cormican	**Sample Size/Type:**	1 3/8" Split Spoon
Surface Elevation (ft):	+95.3	**Sampler Hammer (lbs)/Drop (in):**	140lbs/30" Auto Hammer

Groundwater Observations

Date	Time	Depth	Elev

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	DEPTH/ELEVATION TO STRATA (FT)	STRATUM	SAMPLE NUMBER	SAMPLE DEPTHS (ft)	BLOW COUNTS (N VALUE) MIN/FT	PEN / REC (in)	SAMPLE DESCRIPTION
			1.0 / 94.3	TOPSOIL	S-1	0.0 - 2.0	2-3-4-6 (7)	24/16	Loose brown SAND and GRAVEL. (FILL)
					S-2	2.0 - 4.0	6-10-12-6 (22)	24/18	Compact gray-brown gravelly SILT and SAND. (FILL)
	91			FILL					
5					S-3	5.0 - 7.0	5-9-11-12 (20)	24/20	Compact gray-brown SILT and SAND, some gravel, trace clay. (FILL)
			8.0 / 87.3						
	86			GLACIAL TILL					
10			11.0 / 84.3		S-4	10.0 - 11.0	7-10 (17)	12/11	Compact gray-brown SILT and SAND, trace gravel. (GLACIAL TILL)
				BEDROCK	S-4a	11.0 - 12.0	14-14 (28)	12/10	Compact VERY SEVERELY to COMPLETELY WEATHERED ARGILLITE (BEDROCK)
	81								
15					S-5	15.0 - 17.0	10-25-51-49 (76)	24/18	Very dense purple-gray SILT, with occasional partings of orange-brown fine SAND. VERY SEVERELY to COMPLETELY WEATHERED ARGILLITE (BEDROCK)
			17.0 / 78.3						
	76								End of borehole 17.0 feet below ground surface.

Granular Soils	
Blows/Ft.	**Density**
0-4	V.Loose
4-10	Loose
10-30	Compact
30-50	Dense
>50	V.Dense

Cohesive Soils	
Blows/Ft.	**Consistency**
<2	V.Soft
2-4	Soft
4-8	Firm
8-15	Stiff
15-30	V.Stiff
>30	Hard

Soil Component

Descriptive Term	Proportion of Total
"Trace"	0-10%
"Some"	10-20%
Adjective (e.g. Sandy, Silty)	20-35%
"And"	35-50%

Soil containing three components each of which comprise at least 25% of the total are classififed as "A Well-Graded Mixture Of"

Notes:

Water Level Remarks:
Not Encountered

McPHAIL

McPhail Associates, LLC
2269 Massachusetts Ave
Cambridge, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Franklin Elementary School	**Job #:**	7708
Location:	125 Derby Street	**Date Started:**	02-20-24
City/State	West Newton, MA	**Date Finished:**	02-21-24

Boring No. B-102

Contractor:	Carr-Dee Corp.	**Casing Type/Depth (ft):**	HSA 2.25" / 15.0 ft.
Driller/Helper:	J. DeSimone	**Casing Hammer (lbs)/Drop (in):**	N/A
Logged By/Reviewed By:	T. M. Cormican	**Sample Size/Type:**	1 3/8" Split Spoon
Surface Elevation (ft):	+95.4	**Sampler Hammer (lbs)/Drop (in):**	140lbs/30" Auto Hammer

Groundwater Observations

Date	Time	Depth	Elev
03-20-24	14:00	13.0	82.4

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	DEPTH/ELEVATION TO STRATA (FT)	STRATUM	SAMPLE NUMBER	SAMPLE DEPTHS (ft)	BLOW COUNTS (N VALUE) MIN/FT	PEN / REC (in)	SAMPLE DESCRIPTION
			1.0 / 94.4	TOPSOIL	S-1	0.0 - 2.0	1-2-5-6 (7)	24/16	Loose gray-brown silty SAND, trace gravel, (FILL)
					S-2	2.0 - 4.0	7-7-7-8 (14)	24/24	Compact gray-brown SILT and SAND, some gravel. (FILL)
	91								
5				FILL	S-3	5.0 - 7.0	9-13-17-19 (30)	24/22	Compact to dense gray-brown SILT, SAND and GRAVEL. (FILL)
			9.0 / 86.4						
	86								
10				GLACIAL TILL	S-4	10.0 - 12.0	23-30-27-32 (57)	24/17	Very dense yellow-gray fine to medium SAND, trace silt with occasional partings and seams of gray SILT. (GLACIAL TILL)
			13.0 / 82.4						
	81			BEDROCK	S-5	15.0 - 17.0	23-32-51-58 (83)	24/19	Very dense gray VERY SEVERELY to COMPLETELY WEATHERED ARGILLITE. (BEDROCK) - Auger plug wet at ~ 13 feet.
15			17.0 / 78.4						
	76								End of borehole 17.0 feet below ground surface.

Granular Soils

Blows/Ft.	Density
0-4	V.Loose
4-10	Loose
10-30	Compact
30-50	Dense
>50	V.Dense

Cohesive Soils

Blows/Ft.	Consistency
<2	V.Soft
2-4	Soft
4-8	Firm
8-15	Stiff
15-30	V.Stiff
>30	Hard

Soil Component

Descriptive Term	Proportion of Total
"Trace"	0-10%
"Some"	10-20%
Adjective (e.g. Sandy, Silty)	20-35%
"And"	35-50%

Soil containing three components each of which comprise at least 25% of the total are classififed as "A Well-Graded Mixture Of"

Notes:

McPHAIL

McPhail Associates, LLC
2269 Massachusetts Ave
Cambridge, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Franklin Elementary School	**Job #:**	7708
Location:	125 Derby Street	**Date Started:**	02-22-24
City/State	West Newton, MA	**Date Finished:**	02-22-24

Boring No. B-103

Contractor:	Carr-Dee Corp.	**Casing Type/Depth (ft):**	HSA 2.25" / 15.0 ft.
Driller/Helper:	J. DeSimone	**Casing Hammer (lbs)/Drop (in):**	N/A
Logged By/Reviewed By:	T. M. Cormican	**Sample Size/Type:**	1 3/8" Split Spoon
Surface Elevation (ft):	+98.2	**Sampler Hammer (lbs)/Drop (in):**	140lbs/30" Auto Hammer

Groundwater Observations

Date	Time	Depth	Elev

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	DEPTH/ELEVATION TO STRATA (FT)	STRATUM	SAMPLE NUMBER	SAMPLE DEPTHS (ft)	BLOW COUNTS (N VALUE) MIN/FT	PEN / REC (in)	SAMPLE DESCRIPTION
			0.5 / 97.7	TOPSOIL					
				FILL	S-1	0.0 - 2.0	4-7-6-12 (13)	24/18	Compact gray-brown silty SAND and GRAVEL. (FILL)
					S-2	2.0 - 4.0	13-10-16-12 (26)	24/18	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
	94								
5					S-3	5.0 - 7.0	8-9-7-9 (16)	24/20	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
			7.5 / 90.7		S-4	7.0 - 7.5	11 (11)	6/6	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
				GLACIAL TILL	S-4a	7.5 - 9.0	22-23-20 (43)	18/16	Dense gray-brown well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
	89								
10					S-5	10.0 - 12.0	23-26-31-35 (57)	24/20	Very dense well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
	84								
15					S-6	15.0 - 17.0	25-70-73-58 (143)	24/19	Very dense gray-brown well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
			17.0 / 81.2						
									End of borehole 17.0 feet below ground surface.
	79								

Granular Soils

Blows/Ft.	Density
0-4	V.Loose
4-10	Loose
10-30	Compact
30-50	Dense
>50	V.Dense

Cohesive Soils

Blows/Ft.	Consistency
<2	V.Soft
2-4	Soft
4-8	Firm
8-15	Stiff
15-30	V.Stiff
>30	Hard

Soil Component

Descriptive Term	Proportion of Total
"Trace"	0-10%
"Some"	10-20%
Adjective (e.g. Sandy, Silty)	20-35%
"And"	35-50%

Soil containing three components each of which comprise at least 25% of the total are classififed as "A Well-Graded Mixture Of"

Notes:

Water Level Remarks:
Not Encountered

McPhail Associates, LLC
2269 Massachusetts Ave
Cambridge, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Franklin Elementary School	**Job #:**	7708
Location:	125 Derby Street	**Date Started:**	02-21-24
City/State	West Newton, MA	**Date Finished:**	02-22-24

Boring No. B-104

Contractor:	Carr-Dee Corp,	**Casing Type/Depth (ft):**	HSA 2.25" / 15.0 ft.
Driller/Helper:	J . DeSimone	**Casing Hammer (lbs)/Drop (in):**	N/A
Logged By/Reviewed By:	T. M. Cormican	**Sample Size/Type:**	1 3/8" Split Spoon
Surface Elevation (ft):	+95.1	**Sampler Hammer (lbs)/Drop (in):**	140lbs/30" Auto Hammer

Groundwater Observations

Date	Time	Depth	Elev

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	DEPTH/ELEVATION TO STRATA (FT)	STRATUM	SAMPLE NUMBER	SAMPLE DEPTHS (ft)	BLOW COUNTS (N VALUE) MIN/FT	PEN / REC (in)	SAMPLE DESCRIPTION
			1.0 / 94.1	TOPSOIL	S-1	0.0 - 2.0	3-7-14-10 (21)	24/16	Compact brown silty SAND and GRAVEL. (FILL)
					S-2	2.0 - 4.0	4-7-9-12 (16)	24/8	Compact brown SAND and GRAVEL, trace silt. (FILL)
	91			FILL					
5					S-3	5.0 - 7.0	8-12-14-12 (26)	24/20	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
			8.0 / 87.1						
	86			MARINE CLAY					
10			10.5 / 84.6		S-4	10.0 - 10.5		6/6	Firm to stiff yellow-gray silty CLAY/clayey SILT. (MARINE CLAY)
					S-4a	10.0 - 11.5	22-30-34 (52)	18/18	Very dense gray-brown SILT and SAND, trace gravel with occasional seams of clay and silt. (GLACIAL TILL)
	81			GLACIAL TILL					
15			17.0 / 78.1		S-5	15.0 - 16.0	14-18 (32)	12/11	Dense yellow-gray SILT and SAND with frequent partings and seams of silt and fine sand. (GLACIAL TILL)
					S-6	16.0 - 17.0	53-69 (122)	12/11	Very dense gray-brown SILT and SAND, some gravel. (GLACIAL TILL)
	76								End of borehole 17.0 feet below ground surface.

Granular Soils

Blows/Ft.	Density
0-4	V.Loose
4-10	Loose
10-30	Compact
30-50	Dense
>50	V.Dense

Cohesive Soils

Blows/Ft.	Consistency
<2	V.Soft
2-4	Soft
4-8	Firm
8-15	Stiff
15-30	V.Stiff
>30	Hard

Soil Component

Descriptive Term	Proportion of Total
"Trace"	0-10%
"Some"	10-20%
Adjective (e.g. Sandy, Silty)	20-35%
"And"	35-50%

Soil containing three components each of which comprise at least 25% of the total are classififed as "A Well-Graded Mixture Of"

Notes:

Water Level Remarks:
Not Encountered

McPhail Associates, LLC
2269 Massachusetts Ave
Cambridge, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Franklin Elementary School	**Job #:**	7708
Location:	125 Derby Street	**Date Started:**	02-21-24
City/State	West Newton, MA	**Date Finished:**	02-21-24

Boring No. B-105

Contractor:	Carr-Dee Corp.	**Casing Type/Depth (ft):**	HSA 2.25" / 17.0 ft.
Driller/Helper:	J. DeSimone	**Casing Hammer (lbs)/Drop (in):**	N/A
Logged By/Reviewed By:	T. M. Cormican	**Sample Size/Type:**	1 3/8" Split Spoon
Surface Elevation (ft):	+95.5	**Sampler Hammer (lbs)/Drop (in):**	140lbs/30" Auto Hammer

Groundwater Observations

Date	Time	Depth	Elev

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	DEPTH/ELEVATION TO STRATA (FT)	STRATUM	SAMPLE NUMBER	SAMPLE DEPTHS (ft)	BLOW COUNTS (N VALUE) MIN/FT	PEN / REC (in)	SAMPLE DESCRIPTION
			1.0 / 94.5	TOPSOIL					
					S-1	0.0 - 2.0	3-5-8-8 (13)	24/15	Loose yellow-brown SAND, some gravel trace silt. (FILL)
					S-2	2.0 - 4.0	5-6-8-10 (14)	24/22	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
	91			FILL					
5					S-3	5.0 - 6.5	12-15-14 (29)	18/15	Compact gray-brown SILT and SAND, some gravel. (FILL)
			6.5 / 89.0		S-3a	6.5 - 7.0	25 (25)	6/6	Dense gray-brown well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
					S-4	7.0 - 9.0	36-27-36-29 (63)	24/20	Very dense gray-brown well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
	86								
10				GLACIAL TILL	S-5	10.0 - 12.0	19-29-33-37 (62)	24/22	Very dense gray-brown well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
	81								
15			16.0 / 79.5		S-6	15.0 - 16.0	13-15 (28)	12/10	Compact to dense gray-brown SILT, trace sand with frequent partings of fine SAND. (GLACIAL TILL)
			17.0 / 78.5	BEDROCK	S-6a	16.0 - 17.0	29-21 (50)	12/10	Dense to very dense light gray VERY SEVERELY to COMPLETELY WEATHERED ARGILLITE. ((BEDROCK)
	76								End of borehole 17.0 feet below ground surface.

Granular Soils

Blows/Ft.	Density
0-4	V.Loose
4-10	Loose
10-30	Compact
30-50	Dense
>50	V.Dense

Cohesive Soils

Blows/Ft.	Consistency
<2	V.Soft
2-4	Soft
4-8	Firm
8-15	Stiff
15-30	V.Stiff
>30	Hard

Soil Component

Descriptive Term	Proportion of Total
"Trace"	0-10%
"Some"	10-20%
Adjective (e.g. Sandy, Silty)	20-35%
"And"	35-50%

Soil containing three components each of which comprise at least 25% of the total are classififed as "A Well-Graded Mixture Of"

Notes:

Water Level Remarks:
Not Encountered

McPHAIL

McPhail Associates, LLC
2269 Massachusetts Ave
Cambridge, MA 02140
TEL: 617-868-1420
FAX: 617-868-1423

Project:	Franklin Elementary School	**Job #:**	7708
Location:	125 Derby Street	**Date Started:**	02-20-24
City/State	West Newton, MA	**Date Finished:**	02-20-24

Boring No. B-106

Contractor:	Carr-Dee Corp.	**Casing Type/Depth (ft):**	HSA 2.25" / 15.0 ft.
Driller/Helper:	J. DeSimone	**Casing Hammer (lbs)/Drop (in):**	N/A
Logged By/Reviewed By:	T, M. Cormican	**Sample Size/Type:**	1 3/8" Split Spoon
Surface Elevation (ft):	+94.9	**Sampler Hammer (lbs)/Drop (in):**	140lbs/30" Auto Hammer

Groundwater Observations

Date	Time	Depth	Elev
02-20-24	11:00	11.5	83.4

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	DEPTH/ELEVATION TO STRATA (FT)	STRATUM	SAMPLE NUMBER	SAMPLE DEPTHS (ft)	BLOW COUNTS (N VALUE) / MIN/FT	PEN / REC (in)	SAMPLE DESCRIPTION
			1.0 / 93.9		S-1	0.0 - 2.0	2-4-14-11 (18)	24/12	Compact gray-brown SILT and SAND, trace gravel. (FILL)
					S-2	2.0 - 2.5	8 (8)	6/6	Loose to compact gray-brown SILT and SAND, some gravel, (FILL)
				FILL	S-2a	2.5 - 4.0	34-24-13 (37)	18/14	Very dense mottled orange-brown and gray SILT and SAND, trace gravel, (FILL)
5	90								
					S-3	5.0 - 7.0	3-5-5-8 (10)	24/22	Loose to compact gray-brown SILT and SAND, some gravel. (FILL)
			7.0 / 87.9						
				GLACIAL TILL	S-4	7.0 - 9.0	9-9-12-12 (21)	24/24	Compact gray-brown SILT and SAND, some gravel. (GLACIAL TILL) - Possible WEATHERED Rock in Split Spoon nose.
			9.0 / 85.9						
10	85				S-5	10.0 - 12.0	8-14-16-16 (30)	24/15	Compact to dense gray-brown VERY SEVERELY to COMPLETELY WEATHERED ARGILLITE. (BEDROCK) - Split Spoon wet at ~ 11.5 ft.
				BEDROCK					
15	80				S-6	15.0 - 17.0	51-55-52-41 (107)	24/16	Very dense gray VERY SEVERELY to COMPLETELY WEATHERED ARGILLITE. (BEDROCK)
			17.0 / 77.9						End of borehole 17.0 feet below ground surface.

Granular Soils

Blows/Ft.	Density
0-4	V.Loose
4-10	Loose
10-30	Compact
30-50	Dense
>50	V.Dense

Cohesive Soils

Blows/Ft.	Consistency
<2	V.Soft
2-4	Soft
4-8	Firm
8-15	Stiff
15-30	V.Stiff
>30	Hard

Soil Component

Descriptive Term	Proportion of Total
"Trace"	0-10%
"Some"	10-20%
Adjective (e.g. Sandy, Silty)	20-35%
"And"	35-50%

Soil containing three components each of which comprise at least 25% of the total are classififed as "A Well-Graded Mixture Of"

Notes:

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Project:	Franklin Elementary School	**Job #:**	7708
Location:	125 Derby Street	**Date Started:**	02-21-24
City/State	West Newton, MA	**Date Finished:**	02-21-24

Boring No. B-107

Contractor:	Carr-Dee Corp.	**Casing Type/Depth (ft):**	HSA 2.25" / 15.0 ft.
Driller/Helper:	J. DeSimone	**Casing Hammer (lbs)/Drop (in):**	N/A
Logged By/Reviewed By:	T. M. Cormican	**Sample Size/Type:**	1 3/8" Split Spoon
Surface Elevation (ft):	+94.9	**Sampler Hammer (lbs)/Drop (in):**	140lbs/30" Auto Hammer

Groundwater Observations

Date	Time	Depth	Elev

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	DEPTH/ELEVATION TO STRATA (FT)	STRATUM	SAMPLE NUMBER	SAMPLE DEPTHS (ft)	BLOW COUNTS (N VALUE) MIN/FT	PEN / REC (in)	SAMPLE DESCRIPTION
			1.0 / 93.9	TOPSOIL	S-1	0.0 - 2.0	7-10-10-11 (20)	24/20	Compact brown SAND and GRAVEL, some silt. (FILL)
				FILL	S-2	2.0 - 4.0	12-13-11-14 (24)	24/24	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
5	90				S-3	5.0 - 7.0	12-12-14-15 (26)	24/20	Compact gray-brown CLAY and SILT, trace gravel to SILT AND SAND, some gravel. (FILL)
			7.0 / 87.9	MARINE CLAY	S-5	7.0 - 9.0	15-16-19-24 (35)	24/23	Hard mottled blue-gray silty CLAY. (MARINE CLAY)
			9.5 / 85.4						
10	85			GLACIAL TILL	S-4	10.0 - 12.0	13-10-15-16 (25)	24/20	Compact yellow-gray SILT and fine SAND, some clay. trace gravel. (GLACIAL TILL)
			14.5 / 80.4						
15	80			BEDROCK	S-5	15.0 - 17.0	37-52-62-57 (114)	24/18	Very dense gray-green VERY SEVERELY to COMPLETELY WEATHERED ARGILLITE. (BEDROCK)
			17.0 / 77.9						End of borehole 17.0 feet below ground surface.

Granular Soils

Blows/Ft.	Density
0-4	V.Loose
4-10	Loose
10-30	Compact
30-50	Dense
>50	V.Dense

Cohesive Soils

Blows/Ft.	Consistency
<2	V.Soft
2-4	Soft
4-8	Firm
8-15	Stiff
15-30	V.Stiff
>30	Hard

Soil Component

Descriptive Term	Proportion of Total
"Trace"	0-10%
"Some"	10-20%
Adjective (e.g. Sandy, Silty)	20-35%
"And"	35-50%

Soil containing three components each of which comprise at least 25% of the total are classififed as "A Well-Graded Mixture Of"

Notes:

Water Level Remarks:
Not Encountered

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Cambridge, MA 02140
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FAX: 617-868-1423

Project:	Franklin Elementary School	**Job #:**	7708
Location:	125 Derby Street	**Date Started:**	02-21-24
City/State	West Newton, MA	**Date Finished:**	02-21-24

Boring No. B-108

Contractor:	Carr-Dee Corp.	**Casing Type/Depth (ft):**	HSA 2.25" / 15.0 ft.
Driller/Helper:	J. DeSimone	**Casing Hammer (lbs)/Drop (in):**	N/A
Logged By/Reviewed By:	T. M. Cormican	**Sample Size/Type:**	1 3/8" Split Spoon
Surface Elevation (ft):	+98.3	**Sampler Hammer (lbs)/Drop (in):**	140lbs/30" Auto Hammer

Groundwater Observations

Date	Time	Depth	Elev

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	DEPTH/ELEVATION TO STRATA (FT)	STRATUM	SAMPLE NUMBER	SAMPLE DEPTHS (ft)	BLOW COUNTS (N VALUE) MIN/FT	PEN / REC (in)	SAMPLE DESCRIPTION
			0.7 / 97.6	TOPSOIL	S-1	0.0 - 2.0	3-4-2-11 (6)	24/17	Loose brown silty SAND, some gravel. (FILL)
				FILL	S-2	2.0 - 4.0	14-10-7-7 (17)	24/22	Compact gray-brown SILT, SAND and GRAVEL. (FILL)
	94								
5					S-3	5.0 - 6.5	10-8-9 (17)	18/16	Compact gray-brown SILT and SAND, trace gravel. (FILL)
			6.5 / 91.8		S3a	6.5 - 7.0	22 (22)	6/5	Compact to dense gray-brown mottled orange-brown and gray-brown SILT and fine SAND. (GLACIAL TILL)
	89			GLACIAL TILL					
10					S-4	10.0 - 12.0	22-26-37-41 (63)	24/20	Very dense well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
	84								
15					S-5	15.0 - 16.5	33-69-83 (152)	18/16	Very dense gray-brown well-graded mixture of SILT, SAND and GRAVEL. (GLACIAL TILL)
			16.5 / 81.8						End of borehole 16.5 feet below ground surface.
	79								

Granular Soils

Blows/Ft.	Density
0-4	V.Loose
4-10	Loose
10-30	Compact
30-50	Dense
>50	V.Dense

Cohesive Soils

Blows/Ft.	Consistency
<2	V.Soft
2-4	Soft
4-8	Firm
8-15	Stiff
15-30	V.Stiff
>30	Hard

Soil Component

Descriptive Term	Proportion of Total
"Trace"	0-10%
"Some"	10-20%
Adjective (e.g. Sandy, Silty)	20-35%
"And"	35-50%

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Notes:

Water Level Remarks:
Not Encountered

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Project:	Franklin Elementary School	**Job #:**	7708
Location:	125 Derby Street	**Date Started:**	02-20-24
City/State	West Newton, MA	**Date Finished:**	02-20-24

Boring No. B-109

Contractor:	Carr-Dee Corp.	**Casing Type/Depth (ft):**	HSA 2.25" / 15.0 ft.
Driller/Helper:	J, DeSimone	**Casing Hammer (lbs)/Drop (in):**	N/A
Logged By/Reviewed By:	T. M. Cormican	**Sample Size/Type:**	1 3/8" Split Spoon
Surface Elevation (ft):	+94.6	**Sampler Hammer (lbs)/Drop (in):**	140lbs/30" Auto Hammer

Groundwater Observations

Date	Time	Depth	Elev

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	DEPTH/ELEVATION TO STRATA (FT)	STRATUM	SAMPLE NUMBER	SAMPLE DEPTHS (ft)	BLOW COUNTS (N VALUE) MIN/FT	PEN / REC (in)	SAMPLE DESCRIPTION
			1.0 / 93.6	TOPSOIL	S-1	0.0 - 2.0	5-3-7-4 (10)	24/19	Compact brown SAND. some silt, trace gravel. (FILL)
				FILL	S-2	2.0 - 4.0	2-3-5-26 (8)	24/10	Loose to compact orange-brown and gray-brown SILT and SAND, some gravel. (FILL)
	90		5.0 / 89.6						
5					S-3	5.0 - 7.0	24-28-23-15 (51)	24/20	Very dense gray-brown SILT and SAND, some gravel, (GLACIAL TILL)
				GLACIAL TILL					
10	85				S-4	10.0 - 12.0	18-12-14-16 (26)	24/18	Compact gray-brown to gray SILT and fine SAND, trace gravel. (GLACIAL TILL)
	80		15.0 / 79.6						
15			16.0 / 78.6	BEDROCK	S-5	15.0 - 16.0	42-81-100/0" (181)	12/12	Very dense gray VERY SEVERELY to COMPLETELY WEATHERED CAMBRIDGE ARGILLITE. (BEDROCK)
	75								End of borehole 16.0 feet below ground surface.

Granular Soils

Blows/Ft.	Density
0-4	V.Loose
4-10	Loose
10-30	Compact
30-50	Dense
>50	V.Dense

Cohesive Soils

Blows/Ft.	Consistency
<2	V.Soft
2-4	Soft
4-8	Firm
8-15	Stiff
15-30	V.Stiff
>30	Hard

Soil Component

Descriptive Term	Proportion of Total
"Trace"	0-10%
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Adjective (e.g. Sandy, Silty)	20-35%
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Notes:

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