5 GEO-TECH & GEO-ENV. ANALYSES


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5.1 Geo-Technical Analysis

LAHLAF GEOTECHNICAL CONSULTING, INC.
Geotechnical Engineer
Refer to Appendix 21/5.1 for full consultant report.

Lahlaf Geotechnical Consulting, Inc. (LGCI) has performed a site visit and completed a preliminary review of the geotechnical data available for the Site in relation to the proposed Florence Roche Elementary School.

The purpose of this study was to perform preliminary subsurface explorations at the site for the proposed Florence Roche School and to provide preliminary foundation and construction recommendations for the school during the schematic design (SD) phase.

The soil strata encountered in the borings were as follows, starting at the ground surface.

- Topsoil – A layer of surficial organic topsoil was encountered in all borings and extended to depths ranging between 0.3 and 1.3 feet beneath the ground surface.
- Fill – A layer of fill was encountered beneath the surficial organic topsoil in all borings and extended to depths ranging between 1.8 and 4 feet beneath the ground surface. The samples in the fill were mostly described as silty sand or poorly graded sand. The fines content in the fill ranged up to 30 percent and the gravel content ranged between 5 and 35 percent.
- Sand and Gravel – A layer of sand was encountered beneath the fill in all borings except in borings B-4 and B-7. The sand and gravel layer extended to the top of inferred bedrock at depths ranging between 1.8 and 14.7 feet beneath the ground surface. The samples in this layer were mostly described as silty sand and occasionally as silty gravel. The fines content in this layer ranged between 15 and 30 percent, and the gravel content ranged between 10 and 40 percent. The sand content ranged between 35 and 40 percent in the samples described as gravel.
- Bedrock – Rock was encountered in all borings at depths ranging between 1.8 and 14.7 feet beneath the ground surface.

Groundwater was encountered in borings at depths ranging between 5.5 and 9 feet beneath the ground surface.

Surficial organic soil and existing fill were observed in all borings. The surficial organic soil should be entirely removed from within the proposed construction area.

The fill contained traces of organic soil and roots. Existing fill that was not placed with strict moisture, density, and gradation control, and buried organic soil present risk of unpredictable settlement that may result in poor performance of floor slabs and foundations. Due to these risks, the existing fill should be entirely removed from within the proposed building footprint and should be replaced with Structural Fill.

Based on the results of the borings, the subsurface conditions appear suitable for support of new structures with grade-supported floor slabs and shallow foundations.

Based on our field observations and the results of the grain-size analyses, some of the existing fill free of organic soil may be reused as Ordinary and Structural Fill.

We recommend entirely removing the surficial organic soil and the existing fill from within the proposed building footprint. We recommend supporting the proposed building on spread footings bearing on Structural Fill placed directly on the natural sand.

We anticipate that the total settlement will be approximately 1 inch, and that the differential settlement of the footings will be 3/4 inch or less over a distance of 25 feet. We believe that total and differential settlements of this magnitude are tolerable for a similar structure.

Floor slabs should be constructed as a slabs-on-grade bearing on Structural Fill placed directly on top of the natural sand or on rock. We recommend a minimum of 12 inches of Structural Fill beneath the proposed slabs-on-grade. To reduce the potential for dampness in the proposed floor slabs, the project architect may consider placing a vapor barrier beneath the floor slabs.

Based on the SPT data from the borings, the site soils are not susceptible to liquefaction.

Based on the groundwater levels measured in our borings, we do anticipate that major groundwater control procedures will be needed during the removal of the existing fill and during excavations for deep utilities.

LGCI
Lahlaf Geotechnical Consulting, Inc.

5.2 Geo-Environmental Analysis

CDW CONSULTANTS, INC.
Geoenvironmental Engineer

Refer to Appendix 21/5.2 for the full consultant report.

CDW Consultants, Inc. (CDW) conducted an environmental assessment of the Site, which includes 26 acres of land owned by the Town of Groton, Massachusetts. The boundary of the Site contains the current Florence Roche Elementary school and athletic fields on both 342 and 346 Main Street, but does not include either of the Middle School buildings located on each property. The Site also contains a wooded parcel of land with no number address off Common Street.

The Site is improved with a two-story, 69,468 square-foot elementary school building, the main portion of which was built in 1951, with subsequent additions from 1988 to 2001. On December 1 and 6, 2019, CDW personnel performed a Site reconnaissance to conduct a general visual inspection of the Site exterior and observe the interior of the Site building.

The investigation conducted by CDW personnel included a review of available federal, state, and local environmental agency records to identify the presence or likely presence of Recognized Environmental Conditions (RECs), Historical Recognized Environmental Condition (HRECs) and Controlled Recognized Environmental Condition (CRECs).

No RECs or CRECs were identified during the assessment. One HREC was identified during the assessment, which is:

- The listing of the Site under the state sites database with MassDEP Release Tracking Number 2-16340 due to naturally occurring arsenic contamination in the soil

An asbestos survey was beyond the scope of this assessment but CDW did note that there is an Asbestos Operations and Maintenance Program in place at the subject property.