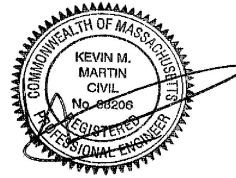


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## MEMORANDUM

**TO:** N.E. Construction Development  
661 Main Street  
Malden, MA 02148

**FROM:** Kevin M. Martin, P.E.  
Geotechnical Engineer



**DATE:** June 1, 2018

**RE: PRELIMINARY GEOTECHNICAL REVIEW  
PROPOSED RESIDENTIAL BUILDING  
165 CEDAR STREET  
SOMERVILLE, MASSACHUSETTS**

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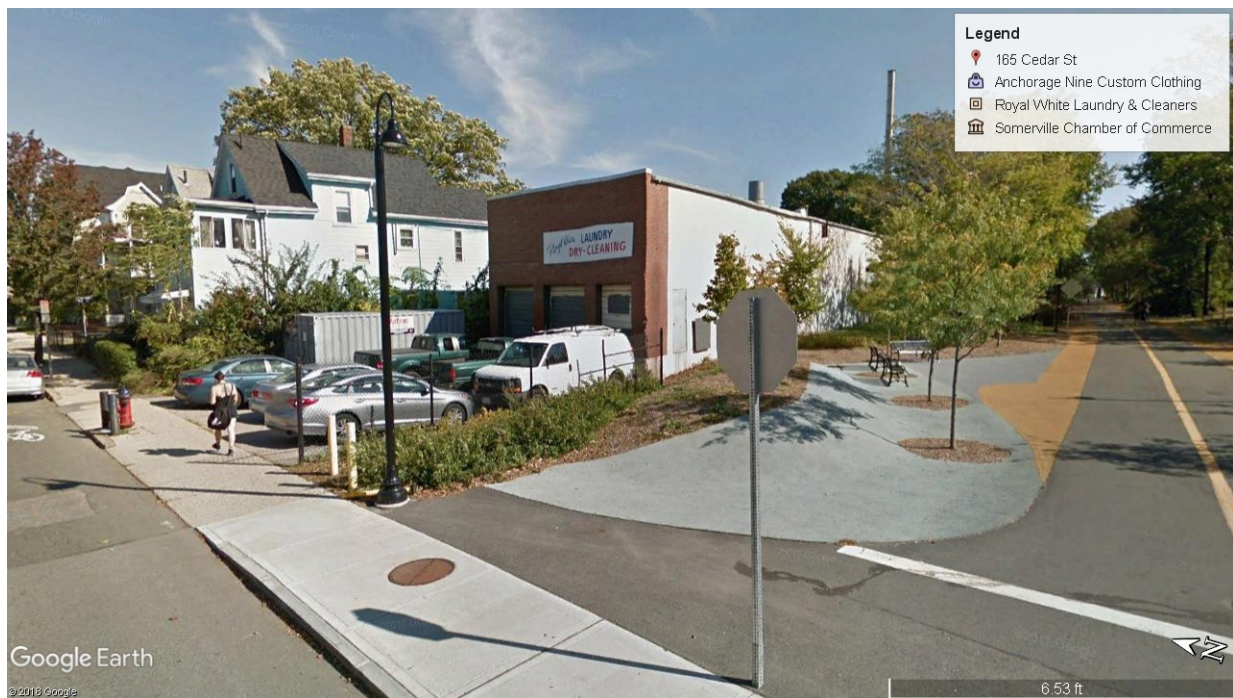
This memorandum report serves as a preliminary geotechnical summary for the referenced project. The contents of this memorandum are subject to the attached *Limitations*.

### **SITE & PROJECT DESCRIPTION**

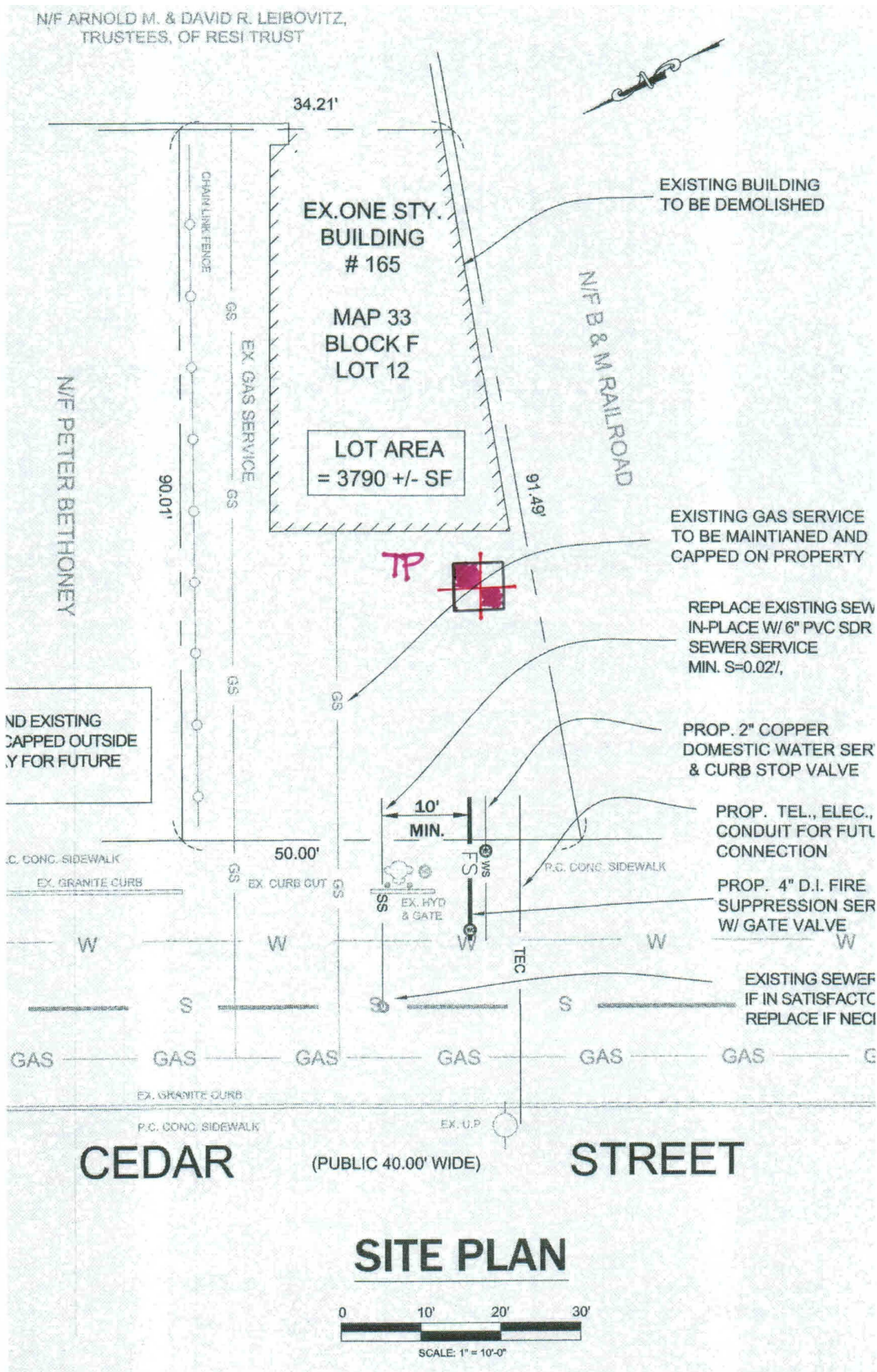
Present development includes a single-story, CMU building with pavement to the front. The site includes a small lot about 3,790 ft<sup>2</sup> in area. Site grades appear relatively level. KMM has no knowledge of past construction, use and/or development of the property except what is visibly apparent or shown on the *Site Plan*.

There were NO project plans available at this time. We suspect wood-framed residential construction.

The purpose of this study is to review the subgrade conditions and provide a preliminary geotechnical evaluation related to foundation design and construction. This report does not include an environmental assessment relative to oil, gasoline, solid waste and/or other hazardous materials. The environmental conditions of the property should be addressed by others as necessary. This study also does not include review of site design or construction issues such as infiltration systems, dry wells, excavation support systems, underground utilities, protection of surrounding buildings, crane pads, temporary shoring, water-proofing or other site and/or temporary design unless specifically addressed herein.

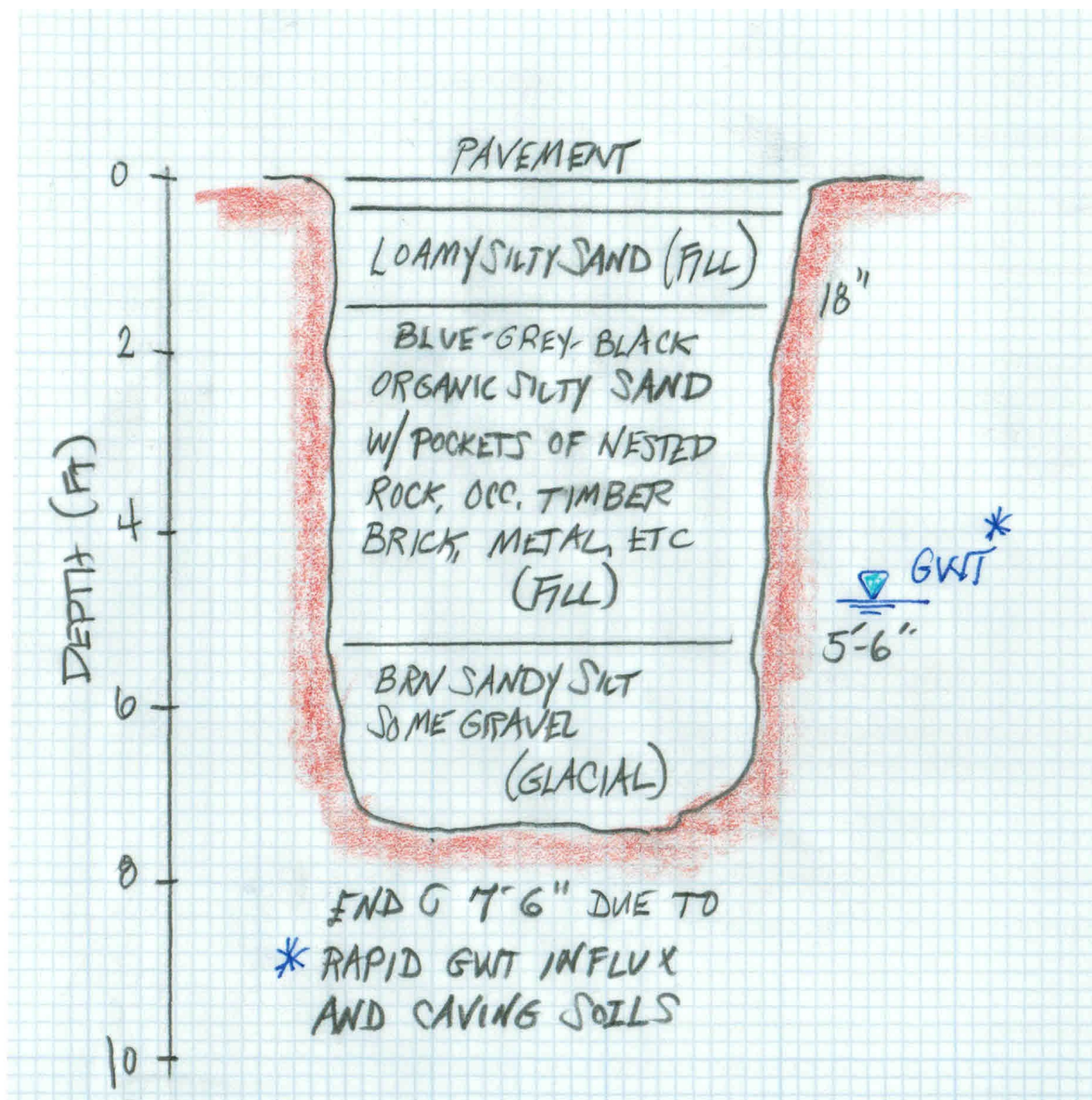






## SUBSURFACE CONDITIONS

The subgrade conditions were reviewed with the excavation of a shallow test pit about  $\approx 7\frac{1}{2}$  ft below grade. The pit was terminated given rapid groundwater influx and collapsing soils.



## TEST PIT SUMMARY





There is about  $\approx 5\frac{1}{2}$  ft of collective Fill. The shallow Fill includes alternating layers of loamy Silty Sand and/or Organic Silt, little Gravel. Below  $\approx 2$  ft, there is a bluish- gray to black, Organic Silty Sand with large pockets of nested rock, occasional timber, brick, metal, rubble, etc. At about  $\approx 5\frac{1}{2}$  ft was encountered brown, Sandy Silt, some Gravel (Glacial). The Glacial soils were stable and compact. The pit was ended at  $\approx 7\frac{1}{2}$  ft given rapid groundwater seepage and collapsing soils.

Groundwater was encountered about  $\approx 5$  ft below grade. It should be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, utilities, flooding and other factors differing from the time of the measurements. This study was completed at a time of seasonally normal groundwater.

### **PRELIMINARY FOUNDATION SUBGRADE RECOMMENDATIONS**

The subgrade conditions are favorable for supporting the proposed building on a conventional spread footing foundation. A basement foundation will be complicated by the shallow groundwater. The undocumented Fill, however, is **not** considered suitable for foundation support. As such, these soils, abandoned foundations, intersecting utilities and other questionable matter should be fully removed from the building footprint including the *Footing Zone of Influence (FZOI)*. The *FZOI* is defined as that area extending laterally one foot from the edge of footing then outward and downward at a 1H:1V splay. Structural Fill should conform to *Specification* (Table 1). A 1-inch minus crushed stone may be used as fill in wet areas.

The subgrade should ultimately be stable, dewatered, compact and protected from frost throughout construction. Bearing subgrades that become weakened or disturbed due to wet conditions will be rendered unsuitable for structural support. The Contractor shall ultimately be responsible for the means and methods of temporary groundwater control, subgrade protection and site stability during construction. An Engineer from KMM should be scheduled to review the foundation subgrade conditions and preparation during construction.

### **CLOSING COMMENTS**

This study is considered preliminary given the lack of a definitive Plans for the project. Additional geotechnical exploration and engineering should be necessary as the project progresses. The final foundation design shall be completed in accordance with the *Massachusetts State Building Code*.

We trust the contents of this memorandum report are responsive to your needs at this time. Should you have any questions or require additional assistance, please do not hesitate to contact our office.

## **LIMITATIONS**

### Explorations

1. The analyses, recommendations and designs submitted in this report are based in part upon the data obtained from preliminary subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.
3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

### Review

4. It is recommended that this firm be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the recommendations provided herein.
5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by KMM Geotechnical Consultants, LLC.

### Construction

6. It is recommended that this firm be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

### Use of Report

7. This report has been prepared for the exclusive use of N.E. Construction Development in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
8. This report has been prepared for this project by KMM Geotechnical Consultants, LLC. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to preliminary geotechnical design considerations only.

## TABLE 1

*Proposed Building  
165 Cedar Street  
Somerville, MA*

### ***Recommended Soil Gradation & Compaction Specifications***

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#### ***Gravel Base Fill*** (Crushed Gravel Fill)

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3 inch	100
3/4 inch	60-90
No. 4	20-70
No. 200	2-8

NOTE: For minimum 8 inch base below Concrete Floor Slab  
For minimum 12-inch base for exterior concrete slabs exposed to frost  
Shall have less than 12% fines (No. 200 sieve) based on the Sand fraction

#### ***Structural Fill*** (Gravelly SAND, trace Silt)

SIEVE SIZE	PERCENT PASSING BY WEIGHT
5 inch	100
3/4 inch	50-90
No. 4	20-80
No. 200	0-10

NOTE: For use as structural load support below the foundations  
For use as backfill behind unbalanced foundation/retaining walls  
A ¾-inch crushed stone may be used in wet conditions  
Shall have less than 20% fines (No. 200 sieve) based on the Sand fraction

Structural Fill placed beneath the foundation should include the *Footing Zone of Influence* which is defined as that area extending laterally one foot from the edge of the footing then outward and downward at a 1H:1V splay. Structural Fill should be placed in loose lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors. All Structural Fill should be compacted to at least 95 percent of maximum dry density as determined by the Modified Proctor Test (ASTM-D1557). Structural Fill should be compacted within  $\pm 3\%$  of optimum moisture content. The adequacy of the compaction efforts should be verified by field density testing which is also a requirement of the *Massachusetts State Building Code*.