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September 17, 2019

*via email*

**SULLIVAN & COMERFORD, P.C.**

80 Washington Street  
Building B  
Suite 7  
Norwell, Massachusetts 02061

Attention: Mr. Walter Sullivan  
Shareholder & Director

**Regarding: GEOTECHNICAL DOCUMENT REVIEW  
EXISTING COMMERCIAL BUILDINGS  
1309 & 1319 BEACON STREET  
BROOKLINE, NORFOLK COUNTY, MASSACHUSETTS  
WHITESTONE PROJECT NO: GM1916630.000**

Dear Mr. Sullivan:

Whitestone Associates, Inc. (Whitestone) is pleased to present this letter following review of documents associated with the proposed development at 1299 Beacon Street in Brookline, Norfolk County, Massachusetts. The proposed development is adjacent to your properties at 1309 and 1319 Beacon Street. Whitestone reviewed a January 2019 *Geotechnical Report for 1299 Beacon Street, Brookline Massachusetts* prepared by GEI Consultants, Inc. (GEI) of Woburn, Massachusetts and a March 28, 2019 *Geotechnical/Environmental Technical Review* letter prepared by Fuss & O'Neil for the Town of Brookline Planning and Community Development Department. This document review was performed in accordance with Whitestone's July 30, 2019 proposal. Whitestone also performed an environmental document review, which was submitted under separate cover.

Whitestone is performing this review early in the overall design process. Only a geotechnical report and commentary on the geotechnical report are available. The geotechnical report provides recommendations, which in Whitestone's opinion are appropriate for the site. However, the implementation of the geotechnical recommendations in the next stage of design has not yet been addressed. The onus will be on the developer and his structural engineer to show that their design will not result in damage to adjacent buildings. Whitestone recommends that Sullivan & Comerford, P.C. request access to the subsequent design documents with regard to the implementation of the geotechnical recommendations, so that Whitestone would have the opportunity to review.

***PROJECT DETAILS***

Whitestone understands that the property at 1299 Beacon Street will be redeveloped with the demolition of the existing structures and construction of an 11-story mixed residential and commercial use building

*Other Office Locations:*

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303.670.6905

with four below-grade parking levels that will extend to a depth of about 41 feet below ground surface (fbgs). This property abuts 1309 Beacon Street. The property at 1319 Beacon Street is adjacent to the property at 1309 Beacon Street. The property at 1309 Beacon Street is developed with a three-story commercial building with five commercial units predominantly used for retail. The property at 1319 Beacon Street is developed with a three-story commercial building with five commercial units and predominantly used as a bank.

### ***GEOTECHNICAL CONCERNS***

Whitestone considers that GEI geotechnical report is thorough and provides an appropriate analysis of the geotechnical issues at the site. The site is underlain by existing fill, sand, stratified sand and clay, clay, and another layer of sand to depths of at least 51 fbgs, the depth at which the borings were terminated. Groundwater level was typically around 25 fbgs, which is about 15 feet above the level of the bottom of the proposed excavation. With regard to the adjacent properties, the key concerns would be:

- ▶ soil movement, due to the excavation, of the shoring system used to support the sides of the excavation; and
- ▶ settlement of adjacent structures due to lowering of the groundwater level.

These key concerns are discussed in more detail below. However, in overall terms, these concerns would manifest themselves in excessive movement, either lateral movement towards the proposed excavation or downward movement (settlement) of the buildings adjacent to the excavation. The geotechnical report recommends pre-construction surveys, crack monitoring, and other measures. Whitestone recommends that Sullivan & Comerford, P.C. take advantage of all monitoring programs undertaken by the developer

**Excavation/Shoring:** The sides of the excavation within the adjacent property will be supported by a shoring system. The geotechnical report recommends either a “secant pile wall” or a “slurry wall”, which will be installed before the excavation proceeds. Secant pile walls are constructed by boring large diameter holes with drilling mud support, installing reinforcing steel, and then displacing the drilling mud with concrete to form the piles. Initial piles are installed with a gap between them to allow secondary piles to be installed partially (by a few inches) intersecting with the initial piles to form a complete wall. Slurry walls are similar, except reinforced concrete panels are created in a deep trench to support the adjacent soil, rather than cylindrical piles. The intent would be to incorporate the concrete of the shoring system into the permanent basement structure.

As the excavation of proceeds, the secant pile or slurry wall will require lateral support. Because of lack of space outside the property within which tie-back soil anchors could be installed, the support will be provided by internal bracing, consisting of horizontal structural steel beams at several levels within the full depth of the excavation. The steel beams are temporary, being replaced by the several reinforced concrete floor slabs of the basement, which will be designed to provide permanent lateral support.

The developer’s structural engineer will perform a preliminary design of the shoring system to establish its feasibility. However, the shoring contractor will be required to provide working drawings and calculations sealed by a Massachusetts Professional Engineer. The working drawings and calculations will be checked by the developer’s structural engineer. Part of the shoring system design will be a determination of expected deflections and their effect on adjacent structures. Of all shoring systems, a

properly design and constructed reinforced concrete secant pile/slurry wall with internal bracing would be expected to experience the smallest deflections.

Whitestone recommends that Sullivan & Comerford, P.C. request access to all shoring designs and have them reviewed by a Professional Engineer. Whitestone would be pleased to perform this review.

**Groundwater/Settlement:** The groundwater at the site is significantly above the level of the proposed excavation. The groundwater level will therefore have to be lowered by dewatering (pumping) to allow construction of the basement. Without appropriate measures being taken, lowering the groundwater level for the excavation will also lower the groundwater level under the adjacent properties.

Removing water from the soil under a building can cause consolidation (reduction in volume) of the soil and associated settlement of the structure supported on the soil. This is a particular problem for the clay soils that were encountered in the GEI borings. The geotechnical report recommends that the soil to be excavated be sealed off from the surrounding properties by extending the secant pile/slurry wall into impermeable clay or bedrock around the entire site. This would theoretically allow the groundwater to be removed within the secant pile/slurry wall without significantly changing the groundwater level under adjacent properties. However, the borings neither encountered a consistent thickness of impermeable clay, nor extended to bedrock. Additional explorations may be planned. Further analysis of the groundwater regime in the area would also be required prior to implementing this approach.

The geotechnical report also recommends that groundwater level measuring wells be installed on adjacent properties to be able to monitor groundwater levels outside the secant pile/slurry wall while the dewatering is in progress inside the wall. A drop in the groundwater level in these measuring wells would indicate that the secant pile/slurry wall is not providing an effective seal.

Whitestone recommends that Sullivan & Comerford, P.C. request access to the dewatering design, when available, and have it reviewed by a Professional Engineer. Whitestone would be pleased to perform this review.

Whitestone appreciates the opportunity to be of service to Sullivan & Comerford, P.C. Please do not hesitate to contact us with any questions regarding this letter.

Sincerely,

**WHITESTONE ASSOCIATES, INC.**



Richard W.M. McLaren, P.E.  
Senior Consultant



Ryan R. Roy, P.E.  
Principal, New England Region