WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

35 TECHNOLOGY DRIVE
WARREN, NJ 07059
908.668.7777
FAX 908.754.5936
www.whitestoneassoc.com

REPORT OF GEOTECHNICAL INVESTIGATION

PROPOSED FOUR-STORY BUILDING
811 LEXINGTON AVENUE
BOROUGH OF BROOKLYN, KINGS COUNTY, NEW YORK

Prepared for:

IMPAACT BROOKLYN
1224 Bedford Avenue
Brooklyn, New York 11216

Prepared by:

WHITESTONE ASSOCIATES, INC.
35 Technology Drive
Warren, New Jersey 07059

Kyle J. Kopacz
Geotechnical Engineer

Kevin A. Feath, P.E.
Project Manager

Whitestone Project No.:GJ1714824.000
January 30, 2018

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January 30, 2018

via email

IMPAACT BROOKLYN
1224 Bedford Avenue
Brooklyn, New York 11216

Attention: Mr. Lorne Norton

Regarding: REPORT OF GEOTECHNICAL INVESTIGATION
PROPOSED FOUR-STORY BUILDING
811 LEXINGTON AVENUE
BOROUGH OF BROOKLYN, KINGS COUNTY, NEW YORK
WHITESTONE PROJECT NO.: GJ1714824.000

Dear Mr. Norton:

Whitestone Associates, Inc. (Whitestone) is pleased to submit the attached *Report of Geotechnical Investigation* for the above-referenced project. The attached report presents the results of Whitestone's soils exploration efforts and presents recommendations for design of the proposed structural foundations, floor slabs, pavements, and related earthwork associated with the proposed redevelopment.

Whitestone's geotechnical division appreciates the opportunity to be of service to IMPACCT Brooklyn (IMPAACT). Please note that Whitestone has the capability to perform the additional geotechnical engineering services recommended herein. Please contact us at (908) 668-7777 with any questions or comments regarding the enclosed report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Kyle J. Kopacz
Geotechnical Engineer

Kevin A. Feath, P.E.
Project Manager

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Enclosures
Copy: Laurence W. Keller, P.E., Whitestone Associates, Inc.

REPORT OF GEOTECHNICAL INVESTIGATION
PROPOSED FOUR-STORY BUILDING
811 Lexington Avenue
Borough of Brooklyn, Kings County, New York

TABLE OF CONTENTS

REPORT OF GEOTECHNICAL INVESTIGATION
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TABLE OF CONTENTS
(Continued)

FIGURES

APPENDICES

SECTION 1.0
Summary of Findings

Whitestone Associates, Inc. (Whitestone) has completed an exploration and evaluation of the subsurface conditions for the proposed four-story building located at 811 Lexington Avnue in the Borough of Brooklyn, Kings County, New York. The site of the proposed construction is shown on the *Test Location Plan* included as Figure 1.

At the time of Whitestone's exploration, the site consisted of an existing one-story to two-story abandoned building with a cellar and associated pavements, landscaped areas, and utilities. A topographic survey of the site was not available at the time of this report, however, based on visual observation, the site appeared to be relatively flat lying with grade changes on the order of one foot to two feet.

Based on the April 27, 2017 *Suggested Test Pit & Boring Locations Plan* prepared by Cuono Engineering, PLLC (Cuono) and correspondence with IMPACCT Brooklyn (IMPACCT), the proposed redevelopment will include demolition of the existing site building and construction of an approximately 9,455 square feet (maximum footprint) four-story residential building with associated pavements, stormwater management (SWM) detention system, and utilities. The proposed building will include a partial cellar with a footprint of approximately 4,500 square feet.

The subsurface exploration included performing a reconnaissance of the project site, drilling soil borings, excavating test pits, and collecting soil samples for laboratory analyses. The data from this exploration were analyzed by Whitestone in light of the project information provided by IMPACCT.

A summary of Whitestone's findings and recommendations is presented in the following:

- **Subsurface Conditions:** The soil borings and test pits were performed within asphalt paved and concrete floor slab portions of the subject site. Tests performed within existing asphalt paved areas encountered one inch to two inches of asphalt at the surface underlain by approximately one inch to two inches of gravel subbase materials. The tests performed within concrete floor slab portions of the site encountered one inch to three inches of concrete at the surface with no apparent subbase. Underlying the surface cover, the borings and test pits encountered existing fill materials (NYC Class 7) that generally consisted of silty sand with variable amounts of gravel and debris. The debris encountered consisted of concrete, brick, and cinders. Borings B-1, B-1A as well as all eight test pits were terminated within the existing fill materials at depths ranging from approximately six feet below ground surface (fbgs) to 13.0 fbgs. Within the remaining borings, the existing fill materials extended to depths ranging between approximately 10.0 fbgs and 12.0 fbgs. Underlying the existing fill material, the borings encountered natural glacial deposits (NYC Class 3b). The glacial deposits generally consisted of: silty sand (USCS: SM)

with variable amounts of gravel, and/or poorly graded sand (USCS: SP and SP-SM) with variable amounts of silt and gravel. The borings that extended past the existing fill materials were terminated within the glacial deposits at the approximate depth of 40.0 fbgs. Static groundwater was not encountered as part of this investigation to a maximum depth explored of approximately 40.0 fbgs. Groundwater conditions likely will fluctuate seasonally and following periods of precipitation.

Recommendations developed upon consideration of these results are summarized below and presented in greater detail in the following report.

- **Foundations and Floor Slabs:** Whitestone recommends supporting the proposed structure on conventional shallow foundations and a ground-supported floor slab designed to bear within the underlying medium dense natural site soils and/or on controlled structural fill materials provided they are properly placed and compacted as described herein. Although not generally anticipated throughout the proposed building footprint based on the proposed cellar floor final bearing elevation and the borings performed as part of this investigation, existing fill materials should be completely overexcavated if encountered at or below foundation and floor slab bearing elevations within areas of the proposed building that does not include a cellar due to the significant debris encountered. Foundations bearing within the medium dense natural glacial soils and/or controlled structural fill materials may be designed using a maximum allowable net bearing pressure of 2.0 tons per square foot (tsf). Due to the potential variability within the existing fill materials, areas of existing fill materials below the proposed foundation and floor slab bearing elevations may require additional overexcavation and replacement in controlled lifts. Reuse of the existing fill materials for foundation and/or floor slab support will be contingent upon construction phase evaluation, as described in Sections 5.2, 5.3, and 5.10.

- **Soil Reusability:** Whitestone anticipates that only portions of the existing fill materials and the majority of underlying natural materials may be reusable as structural fill and/or backfill below proposed foundations and floor slabs where free of deleterious materials and moisture contents are controlled within two percent of the optimum moisture content. The existing fill materials containing significant amounts of deleterious debris, such as the cinders/ash, should not be used as structural backfill. Reuse of the existing fill materials will be contingent on careful inspection in the field by the owner's geotechnical engineer by visual observation and/or test pit excavations during construction as recommended herein. Therefore, soil exchange should be anticipated within the areas of the proposed building footprint that does not include a cellar during overexcavation of the existing fill materials prior to foundation and floor slab support.

- **Shoring/Adjacent Structures:** Due to the close proximity of the proposed cellar footprint to existing public sidewalks and adjacent structures, a temporary shoring system and potential underpinning will be necessary during construction of the below grade structures associated with the proposed development. Whitestone anticipates that the shoring system will require drilling or substantial pre-excavation to install vertical elements as driving will encounter refusal on obstructions within existing fill materials. Whitestone recommends a pre-construction and post-construction survey of the structures adjacent to the proposed development. These surveys should include documentation, photographs, and/or videotapes of the existing conditions of the adjacent structures prior to construction activities at the subject site and a comparison to a post-

construction survey should be performed to determine possible construction impacted settlements and/or damage to the adjacent structures. These surveys should be conducted to monitor the potential progression of building cracks and the existing pavement condition/distress along the sidewalk and pavement areas. In addition, test explorations to confirm existing foundation conditions are recommended prior to development of underpinning costs and designs.

- **Excavation Difficulties:** Based on the elevation of the proposed cellar, excavation difficulties should be expected throughout the site due to the presence of obstructions within the existing fill materials. Based on proposed grades, removal of up to approximately 13.0 feet of existing fill will be required for the cellar. Where site grades are lowered, additional excavation difficulties should be anticipated. Conventional excavating equipment likely will be effective in removing most obstructions. However, planned excavation in confined excavations, such as for footing and utility trenches, may require ripping tools and/or pneumatic hammers.

Detailed design criteria and construction recommendations for proposed foundations, slabs, pavements, and earthwork are discussed in the following report.

SECTION 2.0
Introduction

2.1 AUTHORIZATION

Mr. Lorne Norton of IMPACCT issued authorization to Whitestone to perform a geotechnical investigation on this site relevant to the construction of a proposed five-story building. The geotechnical investigation was performed in general accordance with Whitestone's August 25, 2017 revised proposal to IMPACCT.

2.2 PURPOSE

The purpose of this subsurface exploration and analysis was to:

- ascertain the various soil profile components at test locations;
- estimate the engineering characteristics of the proposed foundation bearing and subgrade materials;
- provide geotechnical criteria for use by the design engineers in preparing the foundation, and slab designs;
- provide recommendations for required earthwork and subgrade preparation;
- record groundwater and bedrock levels (where encountered) at the time of the investigation and discuss the potential impact on the proposed construction; and
- recommend additional investigation and/or analysis (if warranted).

2.3 SCOPE

The scope of the exploration and analysis included the subsurface exploration; field testing and sampling; laboratory analysis; and a geotechnical engineering analysis and evaluation of the subsurface materials. This *Report of Geotechnical Investigation* is limited to addressing the site conditions related to the physical support of the proposed construction. Any references to suspicious odors, materials, or conditions are provided strictly for the client's information.

2.3.1 Field Exploration

Field exploration of the project site was conducted by means of six soil test borings (identified as B-1 through B-5 and offset B-1A) and excavating eight test pits (identified as TP-1 through TP-8) performed

within accessible locations at the subject site. The soil borings were performed with a truck-mounted drill rig using hollow stem augers and split-spoon sampling techniques and the test pits were performed with a track-mounted backhoe. All borings and test pits were performed in accessible areas within the proposed building footprint to depths ranging from approximately six fbgs to 40.0 fbgs. Soil borings and test pits were backfilled to the surface with soils generated during the investigation upon completion and patched with asphaltic pavement cold patch, where appropriate and as necessary. The locations of the tests are shown on the accompanying *Test Location Plan* included as Figure 1.

The soil borings and test pit were conducted in the presence of a Whitestone engineer who performed field tests, recorded visual classifications, and collected samples of the various strata encountered. The borings and test pits were located in the field using normal taping procedures and estimated right angles. These locations are presumed to be accurate within a few feet.

Soil borings and Standard Penetration Tests (SPTs) were conducted in general accordance with American Society for Testing and Materials (ASTM) designation D 1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations.

Groundwater level observations, if encountered, were recorded during and immediately after the completion of field operations prior to backfilling the borings. Seasonal variations, temperature effects, man-made effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

2.3.2 Laboratory Testing Program

In addition to the field investigation, a supplemental laboratory testing program was conducted to determine additional, pertinent engineering characteristics of representative samples of on-site soils. The laboratory testing program was performed in general accordance with applicable ASTM standard test methods and included physical testing of anticipated proposed foundation subgrade bearing soil.

Physical/Textural Analysis: Representative samples of selected strata encountered were subjected to a laboratory testing program that included Atterberg limits determinations (ASTM D 4318), moisture content determinations (ASTM D-2216) and washed gradation analyses (ASTM D-422) in order to perform supplementary engineering soil classifications in general accordance with ASTM D-2487. The soil strata tested were classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table. Quantitative test results are provided in Appendix B.

PHYSICAL/TEXTURAL ANALYSES SUMMARY							
Boring	**Sample**	**Depth (fbgs)**	**Natural Moisture Content (%)**	**Percent Passing No. 200 Sieve**	**Liquid Limit (%)**	**Plastic Index (%)**	**USCS Classification**
B-2	S-1	0.0 - 2.0	10.5	14.8	NP	NP	SM (FILL)
B-3	S-4	15.0 - 17.0	3.5	6.9	NP	NP	SP-SM

Notes: NP = Non-Plastic

The engineering classifications are useful when considered in conjunction with the additional site data to estimate properties of the soil types encountered and to predict the soil's behavior under construction and service loads.

SECTION 3.0
Site Description

3.1 LOCATION AND DESCRIPTION

The proposed site redevelopment is located at 811 Lexington Avenue in the Borough of Brooklyn, Kings County, New York. The site is bound to the north by a residential building, to the south by Lexington Avenue followed by commercial buildings, to the east by a vacant lot, and to the west by a commercial building. The site of the proposed construction is shown on the *Test Location Plan* included as Figure 1.

3.2 HISTORIC AND EXISTING CONDITIONS

Surface Cover/Development: At the time of Whitestone's exploration, the site consisted of an existing one-story to two-story abandoned building with a cellar and associated pavements, landscaped areas, and utilities.

Topography: A topographic survey of the site was not available at the time of this report; however, based on visual observation, the site appeared to be relatively flat lying with grade changes on the order of one foot to two feet.

Utilities: At the time of Whitestone's subsurface field investigation, the subject site was serviced by utilities including electric, telephone, natural gas, water, sanitary and stormwater sewer lines. The utility information contained in this report is presented for general discussion only and is not intended for construction purposes.

Site Drainage: Surface run-off for the site generally follows existing topography draining in the southeasterly direction towards curb inlets located within the adjacent roadways. The termini of these inlets are unknown.

3.3 SITE GEOLOGY

The subject site is situated within the western portion of the Coastal Plain Geomorphic Province of Long Island, New York. The area generally is underlain by marine and alluvial deposits of clay, silt, sand, and gravel deposited during the late Cretaceous age. Surficial materials in the site area typically include terminal moraine glacial deposits associated with the Wisconsinan Advance that ended approximately 10,000 years ago. Long Island is the result of glacial ice sheet advances and retreats. The uplands of Long Island are a product of moraines and kames, while depressed areas are associated with kettles or valleys carved by meltwater. Surficial soils also included artificial fill associated with past and present development.

3.4 PROPOSED CONSTRUCTION

Based on the aforementioned *Suggested Test Pit & Boring Locations Plan* prepared by Cuono and correspondence with IMPACCT, the proposed redevelopment will include demolition of the existing site building and construction of an approximately 9,455 square feet (maximum footprint) four-story residential building with associated pavements, SWM detention system, and utilities. The proposed building will include a partial cellar with a footprint of approximately 4,500 square feet.

Maximum design loads are assumed to be less than the following:

- column loads - 375 kips;
- wall loads - 4.0 kips/linear foot; and
- floor slab loads - 125 pounds per square foot (live load).

The above-referenced structural loads were assumed based upon Whitestone's previous experience with similar facilities and are presented herein for confirmation by the project structural engineer. The average structural loads are anticipated to be less than 1.0 kip per square foot. The scope of Whitestone's investigation and the professional advice contained in this report were generated based on the project details and loading noted herein. Any revisions or additions to the design details enumerated in this report should be brought to the attention of Whitestone for additional evaluation as warranted.

SECTION 4.0
Subsurface Conditions

Details of the subsurface materials encountered are presented on the *Records of Subsurface Exploration* presented in Appendix A of this report. The subsurface soil conditions encountered in the soil test borings and test pits consisted of the following generalized strata in order of increasing depth.

4.1 SUBSURFACE SOIL CONDITIONS

Surface Cover Materials: The soil borings and test pits were performed within asphalt paved and concrete floor slab portions of the subject site. Tests performed within existing asphalt paved areas encountered one inch to two inches of asphalt at the surface underlain by approximately one inch to two inches of gravel subbase materials. The tests performed within concrete floor slab portions of the site encountered one inch to three inches of concrete at the surface with no apparent subbase.

Existing Fill Materials (NYC Class 7): Underlying the surface cover, the borings and test pits encountered existing fill materials that generally consisted of silty sand with variable amounts of gravel and debris. The debris encountered consisted of concrete, brick, and cinders. Borings B-1, B-1A as well as all eight test pits were terminated within the existing fill materials at depths ranging from approximately six fbgs to 13.0 fbgs. Within the remaining borings, the existing fill materials extended to depths ranging between approximately 10.0 fbgs and 12.0 fbgs. Standard Penetration Test (SPT) N-values within the existing fill materials ranged between two blows per foot (bpf) and refusal (refusal defined as greater than 50 blows per six inches of split-spoon sampler penetration), and averaged approximately 31 bpf.

Glacial Deposits (NYC Class 3b): Underlying the existing fill material, the borings encountered natural glacial deposits. The glacial deposits generally consisted of: silty sand (USCS: SM) with variable amounts of gravel, and/or poorly graded sand (USCS: SP and SP-SM) with variable amounts of silt and gravel. The borings that extended beyond the existing fill materials were terminated within the glacial deposits at the approximate depth of 40.0 fbgs. STP N-values within this stratum ranged between 15 bpf and 26 bpf, generally indicating a medium dense relative density and averaging approximately 18 bpf.

4.2 GROUNDWATER

Groundwater was not encountered as part of this investigation to a maximum depth explored of 40.0 fbgs. Groundwater conditions likely will fluctuate seasonally and following periods of precipitation.

4.3 EXISTING FOUNDATIONS

All eight test pits (identified as TP-1 through TP-8) were excavated adjacent to the foundations on the exterior of the neighboring buildings or the interior of existing site building to expose and document readily-observable existing foundation dimensions. The approximate test pit location is shown on the *Test Location Plan* included as Figure 1. The foundation details disclosed by the test pit are shown on the *Existing Foundation Plans* included as Figures 2A through 2C.

SECTION 5.0
Conclusions and Recommendations

5.1 GENERAL

The results of the investigation indicated that the proposed structure may be supported on a conventional shallow foundation system and ground-supported floor slab following overexcavation of existing fill materials where encountered at or below bearing elevations. The underlying medium dense natural soils and/or controlled structural fill will be suitable for support of the proposed foundations and floor slab provided these materials are properly recompacted, proofrolled, and evaluated during the construction phase as described herein. Although not generally anticipated throughout the proposed building footprint based on the proposed cellar floor final bearing elevation and the borings performed as part of this investigation, existing fill materials should be completely overexcavated if encountered at or below foundation and floor slab bearing elevations within areas of the proposed building that does not include a cellar due to the significant debris encountered.

Apparent boulder-sized construction debris were encountered within the existing fill materials as part of this investigation. As such, excavation difficulties should be expected during earthwork performed to achieve final cellar subgrade elevation and footing excavations.

Due to the close proximity of the proposed cellar footprint to existing New York City public sidewalks and adjacent structures, a temporary shoring system and potential underpinning is anticipated to be necessary during construction of below-grade structures associated with the proposed development. Based on the subsurface materials including obstructions within the existing fill materials, Whitestone anticipates that the shoring will need to be drilled or include substantial pre-excavation in order to achieve required bearing depths. Driven or vibrated shoring installation is not expected to be feasible without substantial pre-excavation of the existing fill materials.

5.2 SITE PREPARATION AND EARTHWORK

Surface Cover Stripping and Demolition: Prior to stripping and demolition operations, all utilities should be identified and secured. Existing structural elements, such as foundation walls, or any concrete foundations, walls or slabs encountered during excavations, should be removed entirely from below proposed foundations and their zones of influence (as determined by lines extending at least one foot laterally beyond footing edges for each vertical foot of depth) and excavated to at least two feet below proposed construction subgrade levels elsewhere. The resulting excavations should be backfilled to elevations consistent with proposed construction subgrades in accordance with the recommendations of Section 5.3. The demolition contractor should be required to perform all earthwork in accordance with the recommendations in this report including backfilling any excavation, foundation, cellars, etc. with structural fill.

Surface Preparation/Proofrolling: Prior to placing any fill or subbase materials to raise grades to the desired subgrade elevations, the existing exposed soils should be compacted to a firm and unyielding surface with several passes in two perpendicular directions of a minimum 10 ton, vibratory drum roller. The surface should be proofrolled with a loaded tandem axle truck in the presence of the geotechnical engineer to help identify loose pockets which may require removal and replacement or further investigation. Fill and backfill should be placed and compacted in accordance with Section 5.3.

Excavation Difficulties: Based on the elevation of the proposed cellar, excavation difficulties should be expected throughout the site due to the presence of obstructions within the existing fill materials. Based on proposed grades, removal of approximately 13.0 feet of existing fill materials will be required for the cellar. Heavy excavating equipment with ripping tools will typically be effective in removing obstructions. The speed and ease of excavation will depend on the type of grading equipment and the skill of the equipment operators. Planned excavation in confined excavations, such as for footing and utility trenches, may require ripping tools and/or pneumatic hammers.

Weather Performance Criteria: Because the site soils may soften when exposed to water, every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations and prepared subgrades to rainfall. Accordingly, excavation and fill placement procedures should be performed during favorable weather conditions. Overexcavation of saturated soils and replacement with structural fill per Section 5.3 of this report may be required prior to resuming work on disturbed subgrade soils.

Subgrade Protection and Inspection: Every effort should be made to minimize disturbance of the on-site soils by construction traffic and surface runoff. The on-site soils may deteriorate when subjected to repeated construction traffic or precipitation and may require removal and replacement. These materials also may require drying and aeration during wet periods. The contractor should be responsible for protection of subgrades and minimization of exposure of the site soils to precipitation by covering stockpiles and subgrades with plastic and preventing ponding of water by sealing subgrades before precipitation events and grading the site to allow proper drainage of surface water. All rutting from construction equipment should be removed prior to any forecasted or actual precipitation. The owners's geotechnical engineer should be retained to inspect soil conditions during construction and verify the suitability of prepared foundations and floor slabs subgrades for support of design loads.

The site contractors should employ necessary means and methods to protect the subgrade including, but not limited to the following:

- sealing exposed subgrade soils on a daily basis with a smooth drum roller operated in static mode;
- regrading the site as needed to maintain positive drainage away from open earthwork construction areas and to prevent standing water;

- removing wet surficial soils immediately; and

- limiting exposure to construction traffic especially following inclement weather and subgrade thawing.

5.3 STRUCTURAL FILL AND BACKFILL

Imported Fill Material: Any imported material placed as structural fill or backfill to raise elevations or restore design grades should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 10 percent of material finer than a #200 sieve. Silts, clays, and silty or clayey sands and gravels with higher percentage of fines and with a liquid limit less than 40 and a plasticity index less than 20 may be considered subject to the owner's approval, provided that the required moisture content and compaction controls are met during favorable weather conditions. The material should be free of clay lumps, organics, and deleterious material. Imported structural fill material should be approved by a qualified geotechnical engineer prior to delivery to the site.

On-Site Material: Whitestone anticipates that only limited portions of the existing fill materials and a majority of underlying natural materials may be reusable as structural fill and/or backfill below proposed foundations, floor slabs and pavements provided that they are free of deleterious materials and moisture contents are controlled within two percent of the optimum moisture content. The existing fill materials containing significant amounts of deleterious debris, such as the cinders/ash, should not be used as structural backfill. Reuse of the existing fill materials will be contingent on careful inspection in the field by the owner's geotechnical engineer by visual observation and/or test pit excavations during construction as recommended herein. Immediate re-use of on-site soil should not be anticipated. Therefore, soil exchange should be anticipated within the areas of the proposed building footprint that does not include a cellar during overexcavation of the existing fill materials prior to foundation and floor slab support.

Alternatively, imported fill materials may be used to attain the desired grades and expedite earthwork operations during wet weather periods. Allotments in the project schedule, budget, and site area should be provided for soil moisture control and segregation. The use of imported material should be anticipated and included in the site work budget.

Compaction and Placement Requirements: All structural fill and backfill should be placed in maximum nine-inch loose lifts and compacted to 95 percent of the maximum dry density within two percent of the optimum moisture content as determined by ASTM D 1557 (Modified Proctor). Whitestone recommends using a vibratory drum roller to compact the on-site soils or a small hand-held vibratory compactor within excavations. Particular attention should be brought to the backfill following demolition and removal of the foundations of the existing building, cellars and/or any below ground structures associated with the former site development.

Structural Fill Testing: A sample of the imported fill material or any on-site material proposed for reuse as structural fill or backfill should be submitted to the geotechnical engineer for analysis and approval at least one week prior to its use. The placement of all fill and backfill should be monitored by a qualified engineering technician to ensure that the specified material and lift thicknesses are properly installed. A sufficient number of in-place density tests should be performed to ensure that the specified compaction is achieved throughout the height of the fill or backfill.

5.4 GROUNDWATER CONTROL

Static groundwater was not encountered during this investigation to a maximum depth explored of approximately 40.0 fbgs. Based on the site redevelopment including a full-depth cellar and groundwater levels recorded during this investigation, static groundwater conditions are not anticipated to have a significant impact on the proposed construction. However, trapped/perched groundwater may be encountered within the existing fill materials and/or at the existing fill materials/natural soil interface. Therefore, temporary construction phase dewatering may be necessary for the proposed development. Dewatering of deeper excavations can be expected to require limited overexcavation in order to stabilize disturbed subgrades, installing multiple sump pumps or well points, and backfilling with submerged fill per Section 5.3.

Because the subsurface soils will soften when exposed to water, every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations to rainfall. Overexcavation of saturated soils and replacement with controlled structural fill and/or one foot to two feet of open graded gravel (such as 3/4 inch clean crushed stone) may be required prior to resuming work on disturbed subgrade soils.

5.5 FOUNDATIONS

Shallow Foundation Design Criteria: Following complete overexcavation of existing fill materials below foundation influence zones, Whitestone recommends that the proposed structure be supported on conventional shallow spread and continuous wall footings designed to bear either within the medium dense natural glacial deposits and/or controlled structural fill soils provided they are properly placed and compacted as described herein. Foundations bearing within the medium dense glacial deposits and/or controlled structural fill materials may be designed using a maximum allowable net bearing pressure of 2.0 tsf.

Although not generally anticipated throughout the proposed building footprint based on the proposed cellar floor final bearing elevation and the borings performed as part of this investigation, existing fill materials should be completely overexcavated if encountered at or below foundation and floor slab bearing elevations within areas of the proposed building that does not include a cellar due to the

significant debris encountered. If site grades are raised and/or within areas of the proposed building that does not include a cellar, overexcavation of existing fill materials within the proposed building footprint prior to foundation support will be required. All footing bottoms should be improved by in-trench compaction in the presence of the geotechnical engineer. Regardless of loading conditions, proposed foundations should be sized no less than minimum dimensions of 24 inches for continuous wall footings and 36 inches for isolated column footings.

Footings subject to overturning should be designed so that the maximum toe pressure due to the combined effect of vertical loads and overturning moment does not exceed the recommended maximum allowable net bearing pressure. In addition, positive contact pressure should be maintained throughout the base of the footings such that no uplift or tension exists between the base of the footings and the supporting soil. Uplift loads should be resisted by the weight of the concrete. Side friction should be neglected when proportioning the footings so that lateral resistance should be provided by friction resistance at the base of the footings. A coefficient of friction against sliding of 0.35 is recommended for use in the design of the foundations bearing within the underlying natural materials or imported structural fill soils.

Inspection/Overexcavation Criteria: Whitestone recommends that the suitability of the bearing soils along the footing bottoms be verified by a geotechnical engineer prior to placing concrete for the footings. Special attention should be given to areas of the site with unsuitable existing fill. In the event that isolated areas of unsuitable materials are encountered in footing excavations, overexcavation and replacement of the materials or deeper foundation embedment may be necessary to provide a suitable footing subgrade. Any overexcavation to be restored with structural fill will need to extend at least one foot laterally beyond footing edges for each vertical foot of overexcavation. Lateral overexcavation may be eliminated if grade is restored with lean concrete. The bottoms of overexcavated areas should be compacted with static smooth drum rollers, walk-behind compactors, vibrating plates or plate tampers ("jumping jacks") to compact locally disturbed materials and densify any underlying loose zones.

Settlement: Whitestone estimates post construction settlements of proposed building foundations on the order of less than approximately one inch if the recommendations outlined in this report are properly implemented.

Foundation Embedment/Adjacent Foundations: Footings subject to frost action should be placed at least 48 inches below adjacent exterior grades or the depth required by local building codes to provide protection from frost penetration. Interior footings not subject to frost action may be placed at a minimum depth of 18 inches below the first floor slab subgrade. Foundations in areas adjacent to the existing neighboring building will require special consideration and should be placed at or below the bottom of adjacent footing so additional pressure is not placed on the foundation walls of the adjacent structures. Care should be exercised during construction to avoid undermining the existing foundations.

5.6 FLOOR SLAB

Whitestone anticipates that the underlying medium dense natural glacial deposits and/or compacted structural fill placed to raise or restore design elevations are expected to be suitable for support of the proposed floor slab provided these materials are properly compacted and proofrolled in accordance with Sections 5.2, 5.3 and 5.10 of this report during favorable weather conditions.

Existing fill materials should be completely overexcavated where encountered at or below the proposed floor slab bearing elevation. Any areas that become softened or disturbed as a result of wetting and/or repeated exposure to construction traffic should be removed and replaced with compacted structural fill. The properly prepared on-site soils are expected to yield a minimum subgrade modulus (k) of 150 psi/in.

Unless water proofing is provided, a minimum four inch layer of stone should be installed below the floor slabs to provide a capillary break and an impervious membrane should also be provided as a moisture vapor barrier beneath all floor slabs.

5.7 LATERAL EARTH PRESSURES

General: Based on project information provided, no site retaining walls are proposed for site development. However, the redevelopment will include a cellar within approximately half of the proposed building footprint. Additionally, due to the close proximity of adjacent sidewalks and structures, a temporary shoring system is anticipated to be necessary during construction of the below-grade structures associated with the proposed development.

While the design of the temporary and permanent retaining structures are beyond Whitestone's current scope of work, Whitestone would be pleased to assist with the calculation of lateral earth pressures based on the soil parameters presented herein during the structural design phase when final grading and wall geometries are available.

Lateral Earth Pressures: Temporary retaining structures and permanent below-grade walls may be required to resist lateral earth pressures. Proposed retaining structures must be capable of withstanding active and at-rest earth pressures. Due to the additional excavation required for the proposed below-grade levels of the proposed building, the use of temporary retaining structures are anticipated during construction. Retaining/below-grade walls free to rotate generally can be designed to resist active earth pressures. Retaining/below-grade walls corners and restrained walls need to be designed to resist at-rest earth pressures. Such structures should be properly designed by the Owner's engineer. The following soil parameters apply to the encountered subsurface strata and may be used for design of the proposed temporary and permanent retaining structures.

LATERAL EARTH PRESSURE PARAMETERS		
Parameter	**On-Site Soils**	**Imported Granular Backfill**
Moist Density (γ_{moist})	135 pcf	140 pcf
Internal Friction Angle (φ)	28°	30°
Active Earth Pressure Coefficient (K_a)	0.36	0.33
Passive Earth Pressure Coefficient (K_p)	2.77	3.00
At-Rest Earth Pressure Coefficient (K_o)	0.53	0.50

Lateral earth pressure will depend on the backfill slope angle and the wall batter angle. A sloped backfill will add surcharge load and affect the angle of the resultant force. The effect of other surcharges will also need to be included in earth pressure calculations, including the loads imposed by adjacent structures and traffic. The effects of proposed sloped backfill surface grades, and proposed slopes beyond the toe of the retaining structure, if applicable, must be considered when calculating resultant forces to be resisted by the retaining structure. A coefficient of friction of 0.35 against sliding can be used for concrete on the existing site soils. Retaining/below-grade wall footings should be designed so that the combined effect of vertical and horizontal resultants and overturning moment does not exceed the maximum soil bearing capacity provided in Section 5.5.

Backfill Criteria: Whitestone recommends that granular soils be used to backfill behind the proposed below-grade walls. The granular backfill materials should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 15 percent of material finer than a #200 sieve. The material should be free of clay lumps, organics, and deleterious material. Portions of the on-site existing fill materials encountered consisted of poorly graded sand (USCS: SP and SP-SM) which are anticipated to be satisfactory for retaining/below-grade wall backfill. Accordingly, imported granular soils may be required. Maximum density of backfill soil should not exceed the values presented in the table above to avoid creating excessive lateral pressure on the walls during compaction operations.

Whitestone recommends that backfill directly behind any walls be compacted with light, hand-held compactors. Heavy compactors and grading equipment should not be allowed to operate within a zone of influence measured at a 45-degree angle from the base of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

Wall Drainage: Positive gravity drainage of the backfill should be provided at the base of the retaining/below-grade walls by a series of perforated pipes surrounded by at least 12 inches of clean crushed stone that discharges into a stormwater sewer or daylight to appropriate site surface drainage. Whitestone recommends that a two-foot wide zone of clean crushed stone or washed sand, separated from the backfill by a filter fabric, be constructed adjacent to the back of the wall. This zone should prevent the buildup of hydrostatic pressures and pressures from freezing moisture in the backfill. The vertical drain should be tied into the gravity drainage system (perforated pipe) installed at the base of the wall.

Alternatively, temporary retaining walls may include weep holes instead of a drain tied to the site drainage system. If wall drainage is not provided, the wall should be designed to withstand full hydrostatic pressure.

Whitestone should be notified if any other retaining structures or design considerations requiring lateral earth pressure estimations are proposed. Specific recommendations for temporary retaining structures are beyond Whitestone's scope of work.

5.8 SEISMIC AND LIQUEFACTION CONSIDERATIONS

Based on a review of the subsurface conditions relevant to the *2014 New York City Building Code*, the subject site may be assigned a Site Class D. Based on the seismic zone and soil profile liquefaction considerations are not expected to have a substantial impact on design.

5.9 EXCAVATIONS

Temporary excavations less than 20 feet in height should be performed and evaluated in accordance with 29 CFR Part 1926 (OSHA). Based on the results of this investigation, soil conditions and preliminarily estimated soil types are outlined in the table below. Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA) to ensure that safe excavation methods and/or shoring and bracing requirements are implemented.

TEMPORARY SLOPES		
Material Type	**Soil Type**	**Maximum Allowable Slope[1]**
Existing Fill	Type C	1.5 (H) : 1.0 (V)
Dry to Moist, Natural Soil, Free of Water	Type C	1.5 (H) : 1.0 (V)

Note 1 - As required by OSHA, each soil and rock deposit shall be classified daily by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with 29 CFR Part 1926.

The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

5.10 SUPPLEMENTAL POST INVESTIGATION SERVICES

Supplemental Evaluation of Existing Fill Materials: Whitestone anticipates that the existing fill material will not be suitable for foundation and/or floor slab support (if encountered at or below proposed bearing elevations) in its current condition due to the deleterious debris encountered but may be suitable for selective reuse as structural backfill. Whitestone anticipates that only limited portions of the existing fill materials will be suitable for reuse as structural backfill materials following segregation of oversized

and/or objectionable debris and following careful inspection in the field by the owner's geotechnical engineer during construction. There is a potential risk of variability in existing fill, evidenced by the deleterious and significant debris encountered, which may not be disclosed by soil borings performed within accessible areas of the site due to the limited sample size exposed by conventional drilling and sampling methods. Whitestone recommends confirming further the condition of the existing fill for re-use as structural fill by means of supplemental evaluation prior to or during the early stages of construction to identify areas requiring additional removal and possible uncontrolled conditions or deleterious materials not disclosed by the soil borings conducted during this exploration.

Final Grading Plan Review: Whitestone recommends that this report be reviewed in its entirety once a final grading plan is developed to evaluate any impacts to the recommendations as a result of any proposed grading alterations.

Vibration Monitoring: The subject site is situated within a developed area. The surrounding developments include public sidewalks and buildings. Therefore, care should be maintained while commencing the below-grade excavations and constructing the excavation support system.

While the exact excavation support system is not known at this time, steady state vibrations which are typically generated by driving or drilling are transmitted to the varying distances from the point of impact (pile location). When performing the driving or drilling activities within the interior of a large site, the off-site effects of the ground vibrations are usually negligible. However, when driving piles or drilling large diameter holes near the edges of the property in developed area such as the subject site, ground vibrations can be transmitted into the adjacent facilities and in some instances may cause annoyance or structural damage. Therefore, Whitestone recommends monitoring vibrations during construction, especially during pile driving and backfilling operations, to ensure that vibrations don't effect or damage the adjacent structures.

Based on the U.S. Bureau of Mines studies, risk of structural damage is minimized if the peak velocities generated due to driving operation do not exceed 0.75 inches per second (in/sec) within the range of 10 HZ and 40 HZ for modern structures, 0.25 in/sec within 1 HZ and 10 HZ for historic buildings, and three in/sec within the range of 10 HZ and 100 HZ for buried utilities. Higher allowable peak velocities could be allowed, based on field testing and site specific subsurface conditions.

Pre-/Post-Construction Surveys: Whitestone also recommends pre-construction and post-construction surveys of the structures adjacent to the proposed development. These surveys should include documentation, photographs and/or videotapes of the existing conditions of the adjacent structures prior to construction activities at the subject site and a comparison to a post-construction survey should be performed to determine possible construction impacted settlements and/or damage to the adjacent structures. These surveys should be conducted to monitor the potential progression of building cracks and the existing pavement condition/distress along the sidewalks.

SECTION 6.0
General Comments

Supplemental recommendations may be required upon finalization of construction plans or if significant changes are made in the characteristics or location of the proposed structure. Soil bearing conditions should be checked at the appropriate time for consistency with those conditions encountered during Whitestone's geotechnical investigation.

The recommendations presented herein should be utilized by a qualified engineer in preparing the project plans and specifications. The engineer should consider these recommendations as minimum physical standards which may be superseded by local and regional building codes and structural considerations. These recommendations are prepared for the sole use of IMPACCT Brooklyn. for the specific project detailed and should not be used by any third party. These recommendations are relevant to the design phase and should not be substituted for construction specifications.

The possibility exists that conditions between borings may differ from those at specific boring locations, and conditions may not be as anticipated by the designers or contractors. In addition, the construction process may alter soil and rock conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered.

Whitestone assumes that a qualified contractor will be employed to perform the construction work, and that the contractor will be required to exercise care to ensure all excavations are performed in accordance with applicable regulations and good practice. Particular attention should be paid to avoiding damaging or undermining adjacent properties and maintaining slope stability.

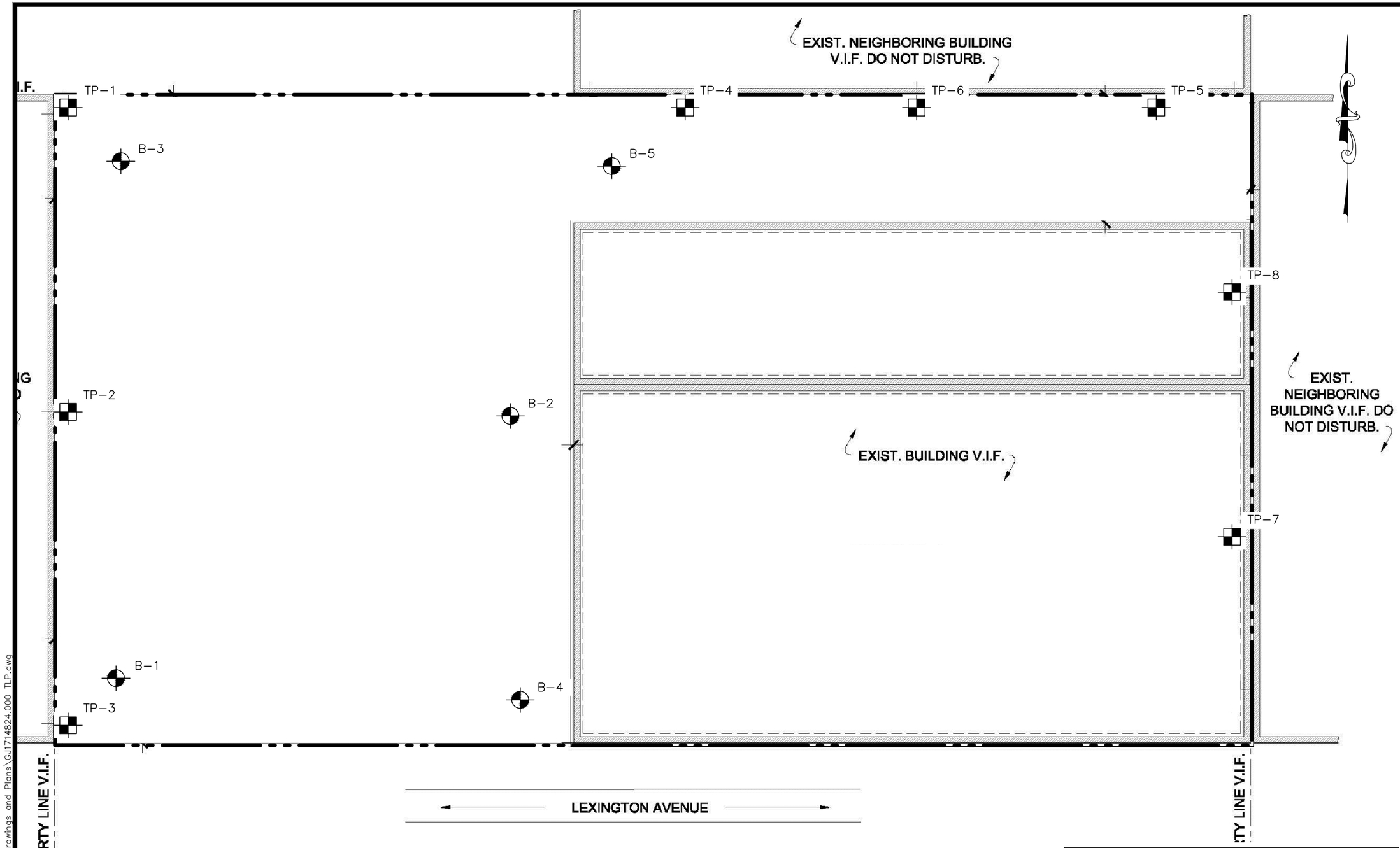
Whitestone recommends that the services of the geotechnical engineer be engaged to test and evaluate the soils in the footing excavations prior to concreting in order to determine that the soils will support the bearing capacities. Monitoring and testing also should be performed to verify that suitable materials are used for controlled fills and that they are properly placed and compacted over suitable subgrade soils.

The exploration and analysis of the foundation conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the foundation design. The recommendations submitted for the proposed construction are based on the available soil information and the design details furnished by IMPACCT BROOKLYN. Deviations from the noted subsurface conditions encountered during construction should be brought to the attention of the geotechnical engineer.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.

WHITESTONE
ASSOCIATES, INC.

FIGURE 1
Test Location Plan



LEGEND

- TP-1 — TEST PIT LOCATION (APPROX.)
- B-1 — BORING LOCATION (APPROX.)
- SUBJECT PROPERTY BOUNDARY (APPROX.)

REFERENCE

THIS PLAN IS BASED ON AN APRIL 27, 2017 SUGGESTED TEST PIT LOCATION PLAN PREPARED BY CUONO ENGINEERING, PLLC.

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
35 TECHNOLOGY DRIVE, WARREN, NJ 07059
908.668.7777 WHITESTONEASSOC.COM

DRAWING TITLE: **TEST LOCATION PLAN**

CLIENT: **IMPACCT BROOKLYN**

PROJECT: PROPOSED FOUR-STORY BUILDING
811 LEXINGTON AVENUE
BROOKLYN, KINGS COUNTY, NY

PROJECT #: **GJ1714824.000**

DESIGNED BY:	PROJ. MGR.:
GR	KAF
DATE: 1/30/18	FIGURE: 1
SCALE: 1" = 15'	

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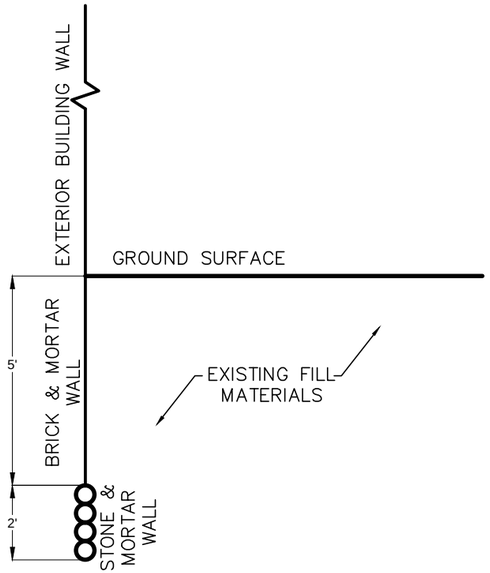
WHITESTONE ASSOCIATES, INC.

FIGURES 2A through 2C
Existing Foundation Plans

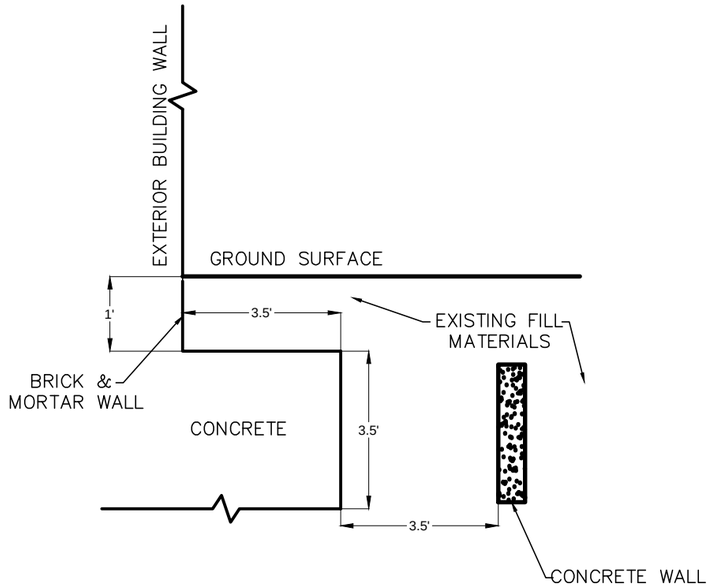


CROSS SECTION

TP-1 DETAIL

ELEVATION

TEST PIT TP-1



CROSS SECTION

TP-2 DETAIL

ELEVATION

TEST PIT TP-2

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Environmental & Geotechnical Engineers & Consultants
35 TECHNOLOGY DRIVE, WARREN, NJ 07059
908.668.7777 WHITESTONEASSOC.COM

DRAWING TITLE: **EXISTING FOUNDATION PLAN**

CLIENT: **IMPACCT BROOKLYN**

PROJECT: PROPOSED FOUR-STORY BUILDING
811 LEXINGTON AVENUE
BROOKLYN, KINGS COUNTY, NY

PROJECT #: GJ1714824.000	
DESIGNED BY: GR	PROJ. MGR.: KAF
DATE: 1/30/18	FIGURE: 2A
SCALE: N.T.S.	

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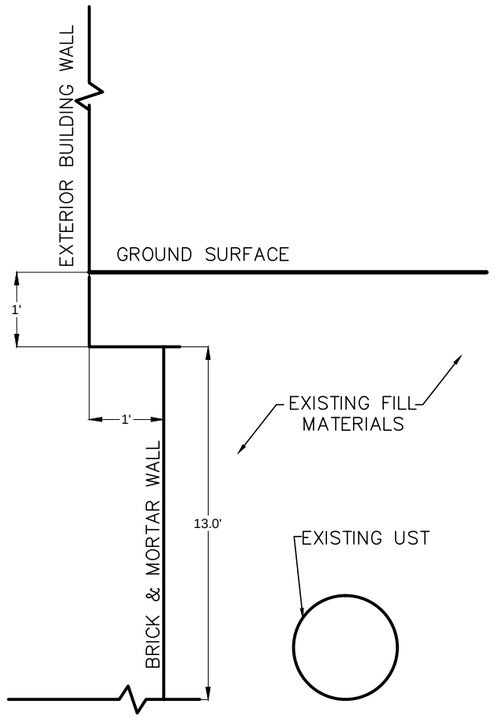
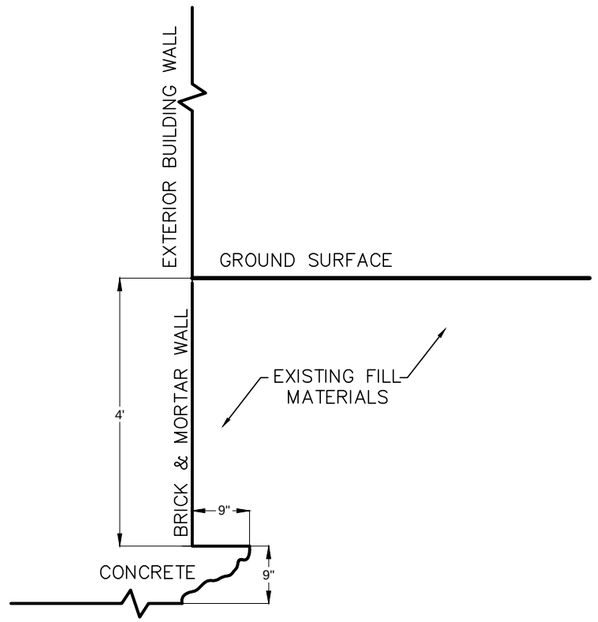


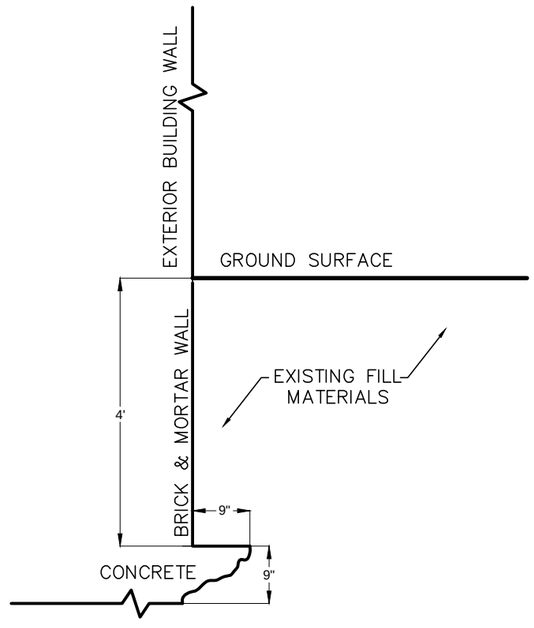
CROSS SECTION

TP-3 DETAIL



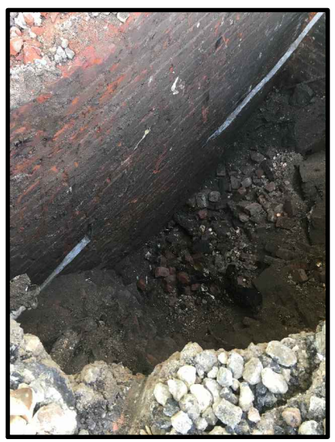
CROSS SECTION

TP-4 DETAIL



CROSS SECTION

TP-5 DETAIL



ELEVATION

TEST PIT TP-3

ELEVATION

TEST PIT TP-4

ELEVATION

TEST PIT TP-5

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Environmental & Geotechnical Engineers & Consultants
35 TECHNOLOGY DRIVE, WARREN, NJ 07059
908.668.7777 WHITESTONEASSOC.COM

DRAWING TITLE: **EXISTING FOUNDATION PLAN**

CLIENT: **IMPACCT BROOKLYN**

PROJECT: PROPOSED FOUR-STORY BUILDING
811 LEXINGTON AVENUE
BROOKLYN, KINGS COUNTY, NY

PROJECT #: GJ1714824.000	
DESIGNED BY: GR	PROJ. MGR.: KAF
DATE: 1/30/18	FIGURE: 2B
SCALE: N.T.S.	

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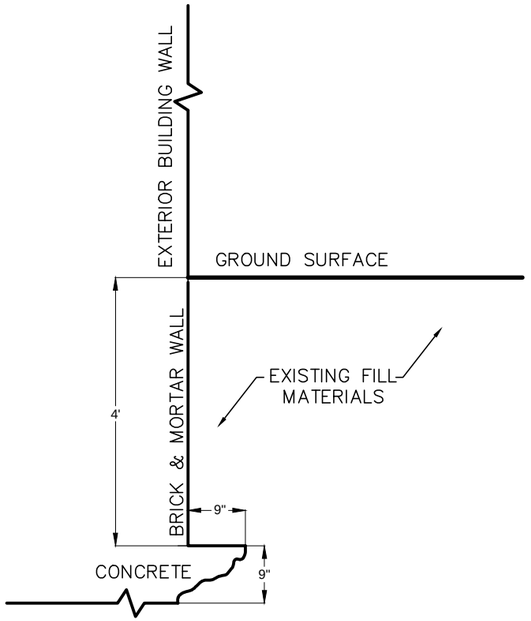
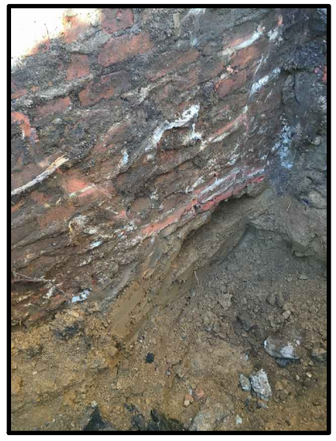


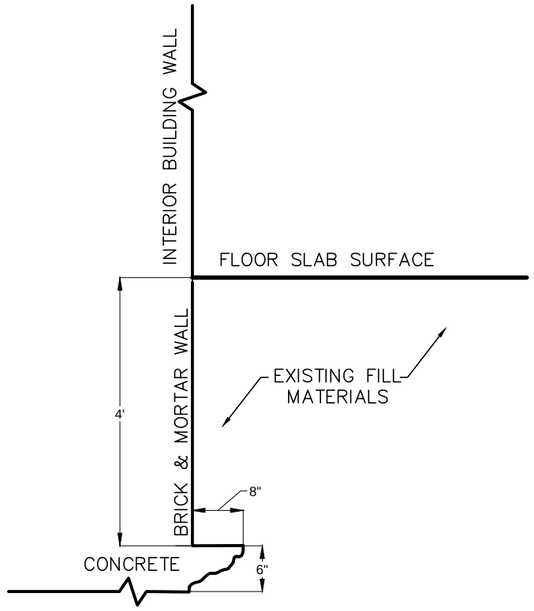
CROSS SECTION

TP-6 DETAIL



ELEVATION

TEST PIT TP-6

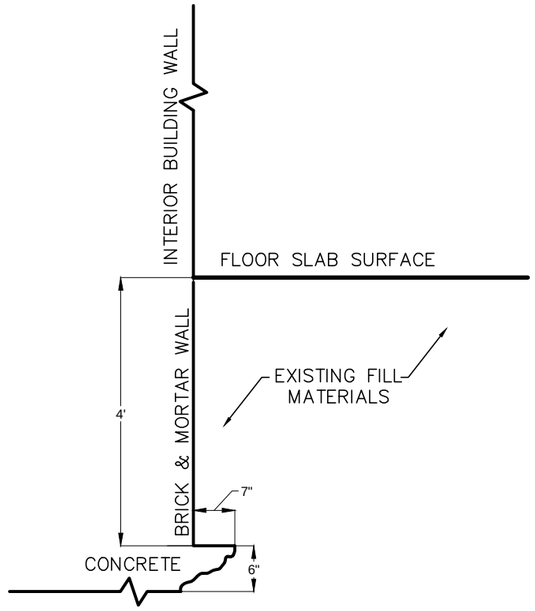


CROSS SECTION

TP-7 DETAIL

ELEVATION

TEST PIT TP-7



CROSS SECTION

TP-8 DETAIL

ELEVATION

TEST PIT TP-8

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants
35 TECHNOLOGY DRIVE, WARREN, NJ 07059
908.668.7777 WHITESTONEASSOC.COM

DRAWING TITLE: **EXISTING FOUNDATION PLAN**

CLIENT: **IMPACCT BROOKLYN**

PROJECT: PROPOSED FOUR-STORY BUILDING
811 LEXINGTON AVENUE
BROOKLYN, KINGS COUNTY, NY

PROJECT #: **GJ1714824.000**

DESIGNED BY:	PROJ. MGR.:
GR	KAF
DATE: 1/30/18	FIGURE: 2C
SCALE: N.T.S.	

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WHITESTONE ASSOCIATES, INC.

APPENDIX A
Records of Subsurface Exploration

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/3/2018
Termination Depth:	12.0 feet bgs	**Date Completed:**	1/3/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	NE	---		
At Completion:	---	---	**At Completion:** DNC	---
24 Hours:	---	---	**24 Hours:** ---	---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0	PAVEMENT		2" Asphalt, 2" Subbase	
0 - 2	S-1	X	16 - 11 - 4 - 3	10	15	0.3	FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	Debris: Brick, Cinders, and Concrete
2 - 4	S-2	X	1 - 3 - 1 - 1	NR	4				No Recovery, Assumed As Above (FILL) (NYC Class 7)	
4 - 6	S-3	X	1 - 1 - 1 - 1	NR	2	5.0			No Recovery, Assumed As Above (FILL) (NYC Class 7)	
6 - 8	S-4	X	1 - 1 - 1 - 1	3	2				As Above (FILL) (NYC Class 7)	
8 - 10	S-5	X	1 - 1 - 2 - 2	2	3				As Above (FILL) (NYC Class 7)	
						10.0				
						12.0				
									Boring Log B-1 Terminated at a Depth of 12.0 Feet Below Ground Surface Due to Auger Refusal on Obstruction; Offset to B-1A	
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-1A

Page 1 of 1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/3/2018
Termination Depth:	13.0 feet bgs	**Date Completed:**	1/3/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	NE	---		
At Completion:	---	---	**At Completion:**	DNC / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0	PAVEMENT		2" Asphalt, 2" Subbase	
							FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	Augered to 13.0 fbgs
						5.0			As Above (FILL) (NYC Class 7)	
						10.0			As Above (FILL) (NYC Class 7)	
						13.0				
									Boring Log B-1A Terminated at a Depth of 13.0 Feet Below Ground Surface Due to Auger Refusal on Obstruction	
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-2

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/3/2018
Termination Depth:	40.0 feet bgs	**Date Completed:**	1/3/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

Water Depth | Elevation (feet bgs) | (feet)		Cave-In Depth | Elevation (feet bgs) | (feet)	
During:	NE | ---		
At Completion:	--- | ---	**At Completion:**	DNC | ---
24 Hours:	--- | ---	**24 Hours:**	--- | ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0	PAVEMENT		2" Asphalt, 2" Subbase	
0 - 2	S-1	X	17 - 20 - 24 - 43	6	44	0.3	FILL		Gray Brown Silty Sand with Gravel and Debris, Moist (FILL) (NYC Class 7)	Debris: Concrete and Brick
2 - 4	S-2	X	79 - 49 - 45 - 46	10	94				As Above (FILL) (NYC Class 7)	
						5.0				Augered Past Obstructions 4.0 fbgs to 10.0 fbgs
						10.0				
10 - 12	S-3	X	12 - 10 - 11 - 10	10	21		GLACIAL DEPOSITS		Tan Brown Silty Sand, Moist, Medium Dense (SM) (NYC Class 3b)	
						15.0				
15 - 17	S-4	X	11 - 8 - 7 - 7	11	15				Tan Poorly Graded Sand, Moist, Medium Dense (SP) (NYC Class 3b)	
						20.0				
20 - 22	S-5	X	12 - 10 - 10 - 10	19	20				As Above (SP) (NYC Class 3b)	
						25.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-2

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/3/2018
Termination Depth:	40.0 feet bgs	**Date Completed:**	1/3/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	NE	---		
At Completion:	---	---	**At Completion:**	DNC / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0			
25 - 27	S-6	X	10 - 10 - 12 - 12	12	22		GLACIAL DEPOSITS	Tan Poorly Graded Sand, Moist, Medium Dense (SP) (NYC Class 3b)	
						30.0			
30 - 32	S-7	X	15 - 9 - 9 - 11	10	18			As Above (SP) (NYC Class 3b)	
						35.0			
38 - 40	S-8	X	14 - 10 - 9 - 10	12	19	40.0		As Above (SP) (NYC Class 3b)	
						45.0		Boring Log B-2 Terminated at a Depth of 40.0 Feet Below Ground Surface	
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-3

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/3/2018
Termination Depth:	40.0 feet bgs	**Date Completed:**	1/3/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	NE	---		
At Completion:	---	---	**At Completion:**	21.0 / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	PAVEMENT	2" Asphalt, 2" Subbase	
0 - 2	S-1		8 - 21 - 19 - 15	6	40	0.3	FILL	Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	Debris: Concrete and Brick
2 - 4	S-2		9 - 13 - 16 - 20	4	29			As Above (FILL) (NYC Class 7)	
						5.0		Augered Past Obstructions	
						10.0			
10 - 12	S-3		16 - 11 - 10 - 11	8	21		GLACIAL DEPOSITS	Tan Brown Silty Sand, Moist, Medium Dense (SM) (NYC Class 3b)	
						15.0			
15 - 17	S-4		10 - 8 - 8 - 8	20	16			Tan Poorly Graded Sand with Silt, Moist, Medium Dense (SP-SM) (NYC Class 3b)	
						20.0			
20 - 22	S-5		13 - 10 - 12 - 16	9	22			As Above (SP-SM) (NYC Class 3b)	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-3

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/3/2018
Termination Depth:	40.0 feet bgs	**Date Completed:**	1/3/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	NE	---		
At Completion:	---	---	**At Completion:**	DNC / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0			
25 - 27	S-6	X	12 - 10 - 11 - 16	10	21		GLACIAL DEPOSITS	Tan Poorly Graded Sand, Moist, Medium Dense (SP) (NYC Class 3b)	
						30.0			
30 - 32	S-7	X	12 - 8 - 6 - 7	8	14			As Above (SP) (NYC Class 3b)	
						35.0			
38 - 40	S-8	X	13 - 9 - 12 - 13	16	21	40.0		As Above (SP) (NYC Class 3b)	
								Boring Log B-3 Terminated at a Depth of 40.0 Feet Below Ground Surface	
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-4

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/8/2018
Termination Depth:	40.0 feet bgs	**Date Completed:**	1/8/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	NE	---		
At Completion:	---	---	**At Completion:**	17.0 / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	PAVEMENT	2" Asphalt, 2" Subbase	
0 - 2	S-1	X	21 - 10 - 11 - 14	6	21	0.3	FILL	Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	Debris: Concrete and Brick
2 - 4	S-2	X	16 - 8 - 22 - 14	8	30			As Above (FILL) (NYC Class 7)	
4 - 6	S-3	X	15 - 21 - 29 - 30	6	50	5.0		As Above (FILL) (NYC Class 7)	
6 - 8	S-4	X	6 - 10 - 11 - 15	4	21			As Above (FILL) (NYC Class 7)	
8 - 10	S-5	X	16 - 12 - 9 - 9	9	21			As Above (FILL) (NYC Class 7)	
10 - 12	S-6	X	9 - 9 - 10 - 11	10	19	10.0	GLACIAL DEPOSITS	Tan Poorly Graded Sand, Moist, Medium Dense (SP) (NYC Class 3b)	
						15.0			
15 - 17	S-7	X	12 - 10 - 9 - 11	8	19			As Above (SP) (NYC Class 3b)	
						20.0			
20 - 22	S-8	X	17 - 15 - 14 - 14	20	21			As Above (SP) (NYC Class 3b)	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-4

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/8/2018
Termination Depth:	40.0 feet bgs	**Date Completed:**	1/8/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	NE	---		
At Completion:	---	---	**At Completion:**	DNC / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						25.0	GLACIAL DEPOSITS		Tan Poorly Graded Sand, Moist (SP) (NYC Class 3b)	
						30.0				
30 - 32	S-9	X	12 - 11 - 10 - 9	11	21				As Above, Medium Dense (SP) (NYC Class 3b)	
						35.0				
38 - 40	S-10	X	9 - 9 - 8 - 8	6	17	40.0			As Above (SP) (NYC Class 3b)	
									Boring Log B-4 Terminated at a Depth of 40.0 Feet Below Ground Surface	
						45.0				
						50.0				

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-5

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/8/2018
Termination Depth:	40.0 feet bgs	**Date Completed:**	1/8/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	NE	---		
At Completion:	---	---	**At Completion:**	14.0 / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0			
0 - 0.5	S-1	X	17 - 34 - 50/0"	4	84/6"	0.2	PAVEMENT	1" Asphalt, 1" Subbase	
							FILL	Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	Debris: Concrete and Brick Augered Past Obstructions 1.0 fbgs to 10.0 fbgs
						5.0			
						10.0			
10 - 12	S-3	X	14 - 15 - 11 - 9	6	26		GLACIAL DEPOSITS	Tan Brown Silty Sand, Moist, Medium Dense (SM) (NYC Class 3b)	
						15.0			
15 - 17	S-4	X	11 - 10 - 10 - 9	11	20			Tan Poorly Graded Sand, Moist, Medium Dense (SP) (NYC Class 3b)	
						20.0			
20 - 22	S-5	X	19 - 11 - 11 - 13	18	22			As Above (SP) (NYC Class 3b)	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-5

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn
Surface Elevation:	± NS feet	**Date Started:**	1/8/2018
Termination Depth:	40.0 feet bgs	**Date Completed:**	1/8/2018
Proposed Location:	Building Pad	**Logged By:**	KK
Drill / Test Method:	HSA / SPT	**Contractor:**	Lawes
		Equipment:	Geoprobe

	Water Depth (feet bgs)	Elevation (feet)	Cave-In Depth (feet bgs)	Elevation (feet)
During:	NE	---		
At Completion:	---	---	**At Completion:**	DNC / ---
24 Hours:	---	---	**24 Hours:**	--- / ---

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0			
25 - 27	S-6	X	16 - 12 - 13 - 15	10	25		GLACIAL DEPOSITS	Tan Poorly Graded Sand, Moist, Medium Dense (SP) (NYC Class 3b)	
						30.0			
30 - 32	S-7	X	17 - 11 - 9 - 10	8	25			As Above (SP) (NYC Class 3b)	
						35.0			
38 - 40	S-8	X	12 - 10 - 10 - 9	12	18	40.0		As Above (SP) (NYC Class 3b)	
								Boring Log B-5 Terminated at a Depth of 40.0 Feet Below Ground Surface	
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-1

Page 1 of 1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn

Surface Elevation:	± NS feet	**Date Started:**	1/3/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Cave-In Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	8.0 feet bgs	**Date Completed:**	1/3/2018				
Proposed Location:	Existing Foundation	**Logged By:**	KK	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	MC	**At Completion:**	---	---	**At Completion:** DNC / ---
Test Method:	Visual Observation	**Rig Type:**	Deere	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				PAVEMENT		2" Asphalt, 2" Subbase	
			0.3	FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	
			5.0			As Above (FILL) (NYC Class 7)	
			8.0				
						Test Pit Log TP-1 Terminated at a Depth of 8.0 Feet Below Ground Surface	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-2

Page 1 of 1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn

Surface Elevation:	± NS feet	**Date Started:**	1/3/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Cave-In Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	1/3/2018				
Proposed Location:	Existing Foundation	**Logged By:**	KK	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	MC	**At Completion:**	---	---	**At Completion:** DNC / ---
Test Method:	Visual Observation	**Rig Type:**	Deere	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				PAVEMENT		2" Asphalt, 2" Subbase	
			0.3	FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	
			5.0			As Above (FILL) (NYC Class 7)	
			6.0			Test Pit Log TP-2 Terminated at a Depth of 6.0 Feet Below Ground Surface	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-3

Page 1 of 1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn

Surface Elevation:	± NS feet	**Date Started:**	1/3/2018		**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**	
Termination Depth:	13.0 feet bgs	**Date Completed:**	1/3/2018				
Proposed Location:	Existing Foundation	**Logged By:**	KK	**During:**	NE | ---		
Excavating Method:	Test Pit Excavation	**Contractor:**	MC	**At Completion:**	--- | ---	**At Completion:**	DNC | ---
Test Method:	Visual Observation	**Rig Type:**	Deere	**24 Hours:**	--- | ---		

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				PAVEMENT		2" Asphalt, 2" Subbase	
			0.3	FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	
			5.0			As Above (FILL) (NYC Class 7)	
							Existing Tank Observed
			10.0			As Above (FILL) (NYC Class 7)	
			13.0				
						Test Pit Log TP-3 Terminated at a Depth of 13.0 Feet Below Ground Surface	
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-4

Page 1 of 1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn

Surface Elevation:	± NS feet	**Date Started:**	1/3/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Cave-In Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	1/3/2018				
Proposed Location:	Existing Foundation	**Logged By:**	KK	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	MC	**At Completion:**	---	---	**At Completion:** DNC / ---
Test Method:	Visual Observation	**Rig Type:**	Deere	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				PAVEMENT		3" Concrete Slab	
			0.3	FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	
			5.0			As Above (FILL) (NYC Class 7)	
			6.0			Test Pit Log TP-4 Terminated at a Depth of 6.0 Feet Below Ground Surface	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-5

Page 1 of 1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn

Surface Elevation:	± NS feet	**Date Started:**	1/3/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Cave-In Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	1/3/2018				
Proposed Location:	Existing Foundation	**Logged By:**	KK	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	MC	**At Completion:**	---	---	**At Completion:** DNC / ---
Test Method:	Visual Observation	**Rig Type:**	Deere	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				PAVEMENT		3" Concrete Slab	
			0.3	FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	
			5.0			As Above (FILL) (NYC Class 7)	
			6.0			Test Pit Log TP-5 Terminated at a Depth of 6.0 Feet Below Ground Surface	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-6

Page 1 of 1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn

Surface Elevation:	± NS feet	**Date Started:**	1/3/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Cave-In Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	1/3/2018				
Proposed Location:	Existing Foundation	**Logged By:**	KK	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	MC	**At Completion:**	---	---	**At Completion:** DNC / ---
Test Method:	Visual Observation	**Rig Type:**	Deere	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				PAVEMENT		3" Concrete Slab	
			0.3	FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	
			5.0			As Above (FILL) (NYC Class 7)	
			6.0			Test Pit Log TP-6 Terminated at a Depth of 6.0 Feet Below Ground Surface	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-7

Page 1 of 1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn

Surface Elevation:	± NS feet	**Date Started:**	1/8/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Cave-In Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	1/8/2018				
Proposed Location:	Existing Foundation	**Logged By:**	KK	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	MC	**At Completion:**	---	---	**At Completion:** DNC / ---
Test Method:	Visual Observation	**Rig Type:**	Deere	**24 Hours:**	---	---	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				PAVEMENT		3" Concrete Slab	
			0.3	FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	Performed on First Floor
			5.0			As Above (FILL) (NYC Class 7)	
			6.0				
						Test Pit Log TP-7 Terminated at a Depth of 6.0 Feet Below Ground Surface	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-8

Page 1 of 1

Project:	Proposed Four-Story Building	**WAI Project No.:**	GJ1714824.000
Location:	811 Lexington Avenue; Brooklyn, Kings County, NY	**Client:**	IMPACCT Brooklyn

Surface Elevation:	± NS feet	**Date Started:**	1/8/2018		**Water Depth (feet bgs)**	**Elevation (feet)**	**Cave-In Depth (feet bgs)** / **Elevation (feet)**
Termination Depth:	6.0 feet bgs	**Date Completed:**	1/8/2018				
Proposed Location:	Existing Foundation	**Logged By:**	KK	**During:**	NE	---	
Excavating Method:	Test Pit Excavation	**Contractor:**	MC	**At Completion:**	---	---	**At Completion:** DNC / ---
Test Method:	Visual Observation	**Rig Type:**	Deere	**24 Hours:**	---	---	

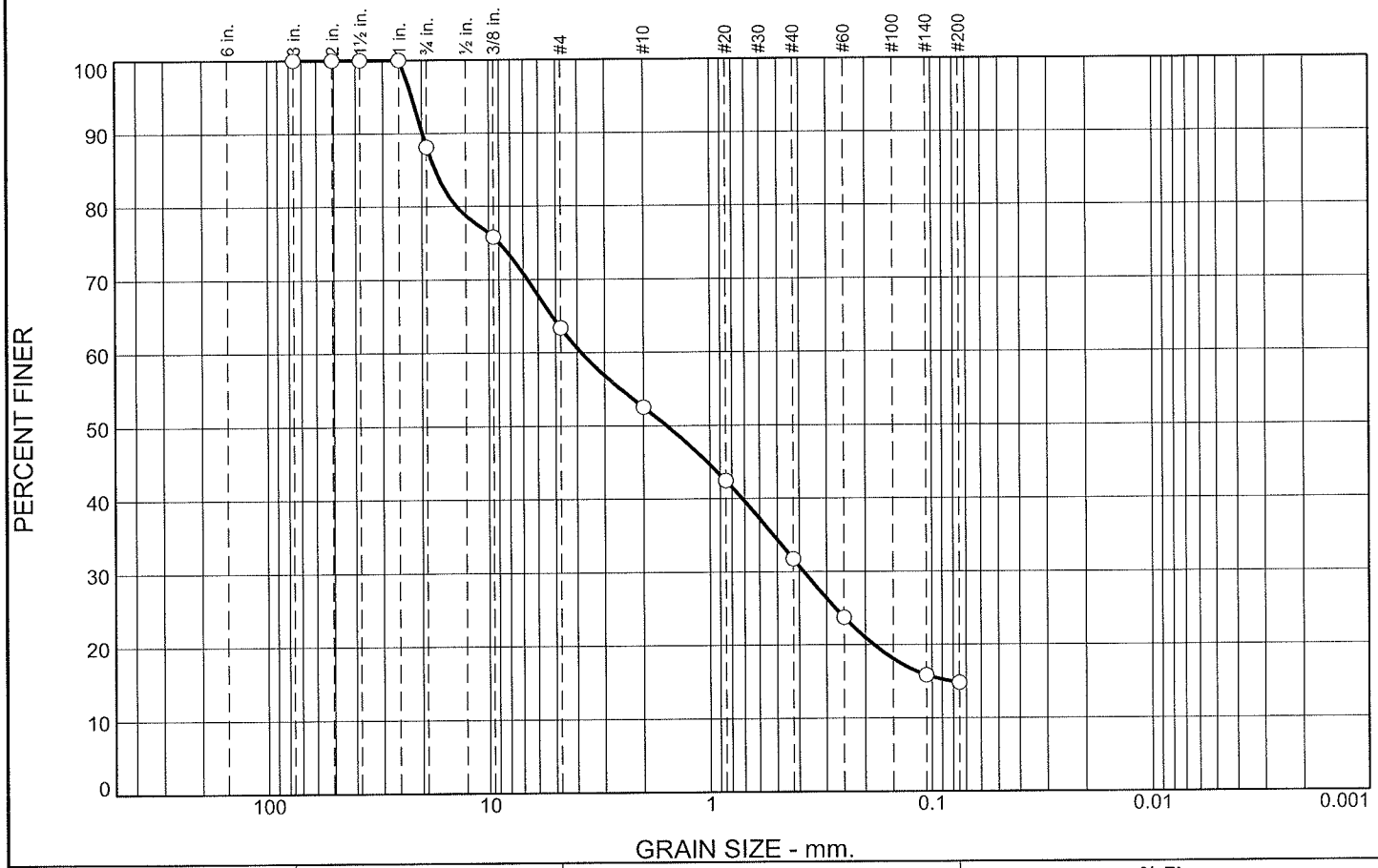
SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0	PAVEMENT		1" Concrete Slab	
			0.1	FILL		Gray Brown Silty Sand with Debris, Moist (FILL) (NYC Class 7)	Performed on First Floor
			5.0			As Above (FILL) (NYC Class 7)	
			6.0			Test Pit Log TP-8 Terminated at a Depth of 6.0 Feet Below Ground Surface	
			10.0				
			15.0				

NOTES: bgs = below ground surface, DNC = Did Not Cave, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

APPENDIX B
Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.9	24.7	10.9	20.7	17.0	14.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	88.1		
.375	75.8		
#4	63.4		
#10	52.5		
#20	42.5		
#40	31.8		
#60	23.8		
#140	15.8		
#200	14.8		

* (no specification provided)

Material Description

Silty Sand with Gravel (FILL)

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 19.9038 D_{85}= 17.4726 D_{60}= 3.8312
D_{50}= 1.5744 D_{30}= 0.3806 D_{15}= 0.0812
D_{10}= C_u= C_c=

Classification

USCS= SM (FILL) AASHTO= A-1-b

Remarks

W_n = 10.5 %

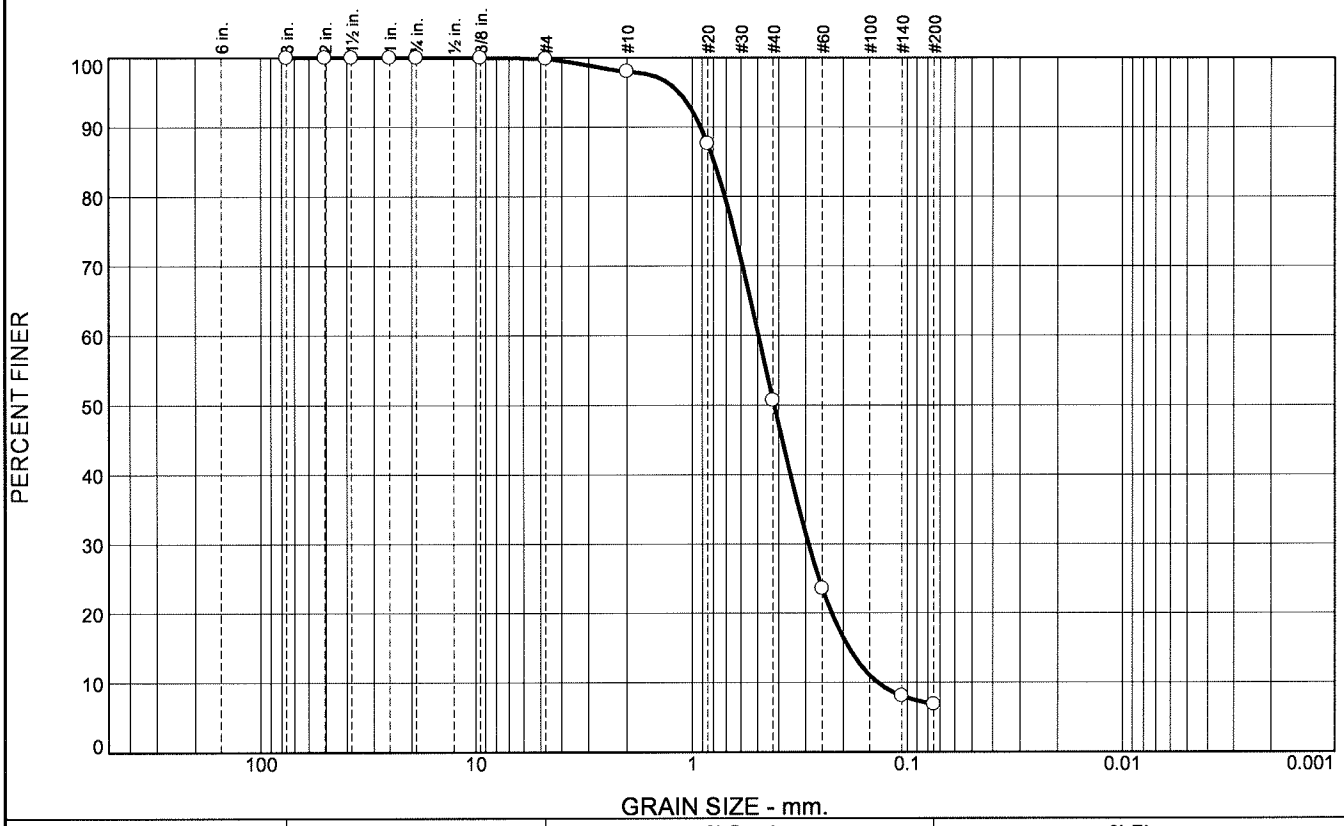
Source of Sample: B-2 **Depth:** 0.0' - 2.0'
Sample Number: S-1

Date: 01/16/2018

WHITESTONE ASSOCIATES, INC.
Warren, New Jersey

Client: IMPACCT Brooklyn
Project: Proposed Four-Story Building
811 Lexington Avenue, Brooklyn, Kings County, New York
Project No: GJ1714824.000 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	1.9	47.3	43.8	6.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.9		
#10	98.0		
#20	87.6		
#40	50.7		
#60	23.6		
#140	8.1		
#200	6.9		

* (no specification provided)

Material Description

Poorly Graded Sand with Silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.9151 D_{85}= 0.7941 D_{60}= 0.4962
D_{50}= 0.4201 D_{30}= 0.2905 D_{15}= 0.1878
D_{10}= 0.1370 C_u= 3.62 C_c= 1.24

Classification

USCS= SP-SM AASHTO= A-3

Remarks

W_n = 3.5 %

Source of Sample: B-3 **Depth:** 15.0' - 17.0'
Sample Number: S-4

Date: 01/16/2018

WHITESTONE ASSOCIATES, INC.
Warren, New Jersey

Client: IMPACCT Brooklyn
Project: Proposed Four-Story Building
811 Lexington Avenue, Brooklyn, Kings County, New York
Project No: GJ1714824.000 **Figure**

WHITESTONE ASSOCIATES, INC.

APPENDIX C
Supplemental Information (USCS, Terms and Symbols)

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

35 TECHNOLOGY DRIVE
WARREN, NJ 07059
908.668.7777
FAX 908.754.5936
www.whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS*
Sand and/or Gravel

RELATIVE DENSITY

LOOSE. ..... 0% TO 40%
MEDIUM DENSE.... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY*
Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... ..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

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Other Office Locations:

CHALFONT, PA 215.712.2700
SOUTHBOROUGH, MA 508.485.0755
ROCKY HILL, CT 860.726.7889
STERLING, VA 703.464.5858
EVERGREEN, CO 303.670.6905

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GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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