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GEOTECHNICAL ENGINEERING REPORT

for

15 Beekman Street
Manhattan, New York

Prepared For:

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INTRODUCTION

This report by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology D.P.C., (Langan) presents the results of our geotechnical engineering evaluation for the proposed Pace University Performing Arts Center and Student Housing at 15 Beekman Street in Manhattan, New York. We have summarized the results and evaluation of our subsurface exploration results, and provided geotechnical engineering recommendations for the foundation design and construction of the proposed development.

The general sidewalk grade fronting the site varies between about el. 38 along Nassau Street and about el. 35 along Beekman Street. Elevations reported here are referenced to the North American Vertical Datum of 1988 (NAVD88)[1] and obtained from a Topographic, Boundary and Utility survey performed by Langan, dated 13 March 2020.

Our understanding of the proposed project is based on a review of the Design Development (DD) architectural and structural drawings by the Ismael Leyva Architects (ILA) and Thornton Tomasetti (TT), respectively. Based on our review, the proposed building is planned to be 27-stories and havetwo below-grade levels. The second cellar level is planned to occupy a portion of the site footprint, with the lowest level of the building extending about 25 feet below sidewalk grade. A summary of our findings and recommendations is presented herein.

SITE DESCRIPTION

The project is on the city block bordered by Beekman Street on the north, William Street to the east, Ann Street to the south, and Nassau Street to the west. The site is identified as Block 92 Lot 30 and has a footprint of about 12,000 square feet. A 4- and 14-story building currently occupies the site. The existing building has a cellar and partial sub-cellar level; the partial sub-cellar is under the 14-story side and extends about 24 feet below sidewalk. Additionally, existing vault spaces are located below the sidewalks along Nassau and Beekman streets, and accessible from the below grade levels of the existing buildings.

We note that the site is located in close proximity to numerous buildings, several of which are landmark buildings[2], identified as 138 Nassau Street, 3 – 9 Beekman Street and 38 Park Row. Additionally, a New York City Transit subway lines, J and Z run below Nassau Street, and the 2 and 3 run below Beekman Street. A site location map is presented as Drawing No. 1. The following briefly describes the nearby buildings:

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[1] The North American Vertical Datum (NAVD88) is 1.1 ft above the U.S. Coast and Geodetic Survey Datum mean sea level at Sandy Hook, New Jersey, 1929, (NGVD).

[2] Based on the 4th Edition "Guide to New York City Landmarks" prepared by the New York City Preservation Commission.

Figure No. 1: Site Layout

Adjacent Properties

There are adjacent structures that directly border the site along the eastern and southern property limits. At the time of this report, existing foundation drawings and recorded elevations of below-grade levels for the adjacent structures were not available. The information provided below is based on our review of the Certificate of Occupancies (C/O) posted on the New York City Department of Buildings (NYCDOB) website[3], and discussions with building personnel. At this time, we recommend the lowest level slabs of the adjacent buildings be surveyed. A brief description of each adjacent building is given below:

- 19 – 21 Beekman Street (Block 92, Lot 32) is a six-story commercial building bordering the entire eastern property line. The C/O indicates the building has two below-grade levels with a footprint of about 4,600 square feet. Based on discussions with building personnel, we understand the lowest level extends about 17 feet below sidewalk grade.

- 47 Ann Street (Block 92, Lot 17) is a seven-story mix-use building bordering a small portion (about 13 to 14 feet) along the southeastern property line. The C/O indicates the building has two below-grade levels with a footprint of about 4,300 square feet.

- 39 Ann Street (Block 92, Lot 24) is a 12-story commercial building bordering a portion of the southern property line (about 27 feet) with a footprint of about 12,200 square feet.

[3] New York City Department of Buildings website property profile and certificate of occupancy (www.nyc.gov)

There was no C/O on the NYCDOB website, therefore, the number of below grade levels is unknown at the time of this report.

- 124 Nassau Street (Block 92, Lot 29) is a five-story mix-use building bordering about 78 lineal feet of the southwestern property line. The C/O indicates the building has a below-grade level with a footprint of about 1,400 square feet. Based on discussions with building personnel and our site visits, we understand the portion of the building that borders the site has a retaining/freestanding wall that extends down to the lowest level of 126 Nassau Street. The retaining/freestanding wall appears to be located within the project site and is about 12 feet tall.

Landmarked Structures

According to a review of the New York City Landmarks Preservation Commission (LPC) website[4], three landmarked buildings are located within a 90-foot radius of the site. The buildings are identified as 3 – 9 Beekman Street, 138 Nassau Street and 38 Park Row. These buildings do not directly border the project site; however, the presence of these landmark buildings within 90 feet of the project site triggers special monitoring requirements in accordance with DOB Technical Policies and Procedures Notice (TPPN) #10/88, a copy of which is included in Appendix D.

- 3 – 9 Beekman Street (Block 90, Lot 14): is a 9- to 10-story commercial and office building built circa 1883 across Nassau Street, about 40 feet northwest of the site. The building is also known as the Temple Court Building and was designated a landmark in 1998.
- 138 Nassau Street (Block 100, Lot 26): is a 14-story commercial and office building built circa 1880 across Beekman Street, about 50 feet northeast of the site. The building is also known as the Morse Building and was designated a landmark in 2006.
- 38 Park Row (Block 101, Lot 1) is an 11-story commercial and office building built circa 1886 directly across Nassau and Beekman streets, about 65 feet north of the site. The building is also known as the Potter Building and was designated a landmark in 1996.

Adjacent New York City Transit (NYCT) Structures

Based on a review of record New York City Transit drawings (Copies included in Appendix A), there are four existing subway lines that run below Nassau and Beekman streets. The J and Z lines operate below Nassau Street about 6 feet to the west of the project site with a base-of-rail at about 36 feet below the sidewalk, corresponding to el 2±. The 2 and 3 lines operate below Beekman Street about 10 feet to the north of the project site with a base-of-rail at a depth of

[4] Information regarding the location of landmarked buildings within 90 feet of the project site was based on a review of the LPC website: http://www1.nyc.gov/site/lpc/index.page

about 38 feet below the sidewalk, corresponding to el -3±. However, we note that NYCT ventilation shafts and passageways are located directly up against the northwestern part of the project site.

In addition to the subway tunnels below Nassau and Beekman streets, NYCT record drawings indicate a passageway below Nassau Street. However, because of the limited information on the record drawings, it is difficult to verify if and where the passageway is located with respect to the existing building. Further investigations, including surveying, will likely be required by NYCT to determine the locations of nearby tunnels and passageways.

PROPOSED DEVELOPMENT

As indicated herein, the schematic architectural drawings provided by ILA indicate that the proposed development will consist of the design and construction of a 27-story performing art center and student housing for Pace University. The proposed building is planned to have two below-grade levels extending about 24 feet below sidewalk grade; however as discussed herein the lowest below grade level will only occupy a portion of the site footprint. The first through 13 floors including the below-grade levels will be used for the Performing Arts Center with the exception of floors 6 and 13 that are proposed mechanical and structural transfer floors. The remainder of the building is proposed to be used as student housing.

Based on discussions with the project structural engineer, Thornton Tomasetti (TT), we understand that typical column loads are on the order of about 200 to 4,000 kips.

REVIEW OF PUBLISHED INFORMATION

Historical Land Use

A review of the historical "Sanitary & Topographical Map of the City and Island of New York" (Viele, 1865) indicates that meadows previously occupied the site. The map indicates that there were no identified stream channels at the site. Refer to Drawing No. 2 for a section of the Viele Map with the location of the site indicated.

Local Geology

The site is on Manhattan Island, which is within the southern terminus of the Manhattan Prong of the New England Upland province. Bedrock near the site generally consists of granite and schist. Bedrock is overlain by glacial and fluvial soil, and extensive fill. The soil in this vicinity above bedrock is locally known as "Bull's Liver" and is a normally consolidated, nonplastic (the capability of being molded, receive shape or being made into a desired form) silt deposit. The Bull's Liver has been determined to be deposited at the bottom of a large lake that was formed

as the last glaciers retracted. Additional details regarding Bull's Liver is provided in the subsurface conditions.

SUBSURFACE EXPLORATION

Langan performed a subsurface exploration program that included drilling six test borings and excavating four test pits within the below-grade levels of the existing building. The borings and test pits were performed at the site by Warren George, Inc. (WGI) under the full-time special inspection of a Langan engineer. A summary of the results is provided below and the boring and test pit locations are shown on Drawing No. 3.

Test Boring Exploration

Six borings (identified as LB-1 through LB-6) have been completed at the site, which were drilled between 21 February and 12 March 2020. The borings were drilled at the site with a limited access electric drill rig and were performed under the full-time special inspection of Langan.

The borings were advanced through the overburden soil using mud-rotary drilling techniques and a tricone roller bit with drilling fluid and steel casing providing soil support. The borings were advanced to between 52 and 105 feet below existing grade elevations, corresponding to about el -40± and -94±, respectively. A copy of the boring logs are included in Appendix B.

Standard Penetration Tests (SPT)[5] (N-values) were measured and typically obtained continuously through the upper 12 feet and through any cohesive material. Samples were retrieved using a 2-inch-diameter standard split-spoon sampler driven by a 140-pound donut hammer in general accordance with ASTM D1586. Recovered soil samples were visually examined and classified in the field in accordance with the Unified Soil Classification System (USCS) and the New York City Building Code.

Bedrock was cored using an NX-sized double-tube core barrel. The core barrel was equipped with a diamond cutting bit in accordance with ASTM D-2113 (Rock Core Drilling). Rock type, percent core recoveries (REC)[6], and Rock Quality Designation (RQD)[7] values were determined where applicable.

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[5] The Standard Penetration Test is a measure of the soil density and consistency. The SPT N-value is defined as the number of blows required to drive a 2-in. outer diameter split-barrel sampler 12-in. using a 140 lb hammer falling freely for 30-in.

[6] Core recovery is defined as the ratio of the total length of rock recovered to the total length of core run.

[7] Rock Quality Designation (RQD) is defined as the sum of the lengths of all core pieces over 4-inches in length divided by the total core run length (for NX size cores). The RQD is an indicator of the overall rock mass quality.

Test Pit Exploration

Test pits, TP-1, TP-2 and TP-4, were excavated and backfilled by WGI between 21 and 26 February 2020, and TP-3 was performed between 12 and 13 March 2020. The test pits were performed to identify type, depth, and bearing materials of the perimeter foundations of the existing building. The footing depths encountered within each of the test pits are summarized in Table No. 1 below.

Table No. 1 – Test Pit Summary Table

Test Pit Identification	Existing Cellar Grade (Approx. Elev.)	Depth to Top Of Footing (Approx. Elev.)	Depth to Bottom Of Footing (Approx. Elev.)
TP-1	El. 12±	1.0 ft. (El. 11.0±)	3.0 ft. (El. 9.0±)
TP-2	El. 15±	1.5 ft. (El. 13.5±)	3.5 ft. (El. 11.5±)
TP-3	El. 24±	0.5 ft. (El. 23.5±)	3.0 ft. (El. 21±)
TP-4	El. 12±	-0.5 ft. (El. 12.5±)	4.0 ft. (El. 8.0±)

The conditions encountered within each test pit were documented in the field with sketches and photographs, and the details are presented in Appendix C. The test pit locations are shown on the boring and test pit location plan included as Drawing No. 3.

Groundwater Observation Wells

Groundwater monitoring wells were installed in completed borings LB-1 and LB-5. The wells consisted of 10 feet of 2-inch-diameter Schedule 40 PVC slotted screen and 40 to 50 feet of solid riser pipe. The annulus around the slotted PVC pipe was backfilled with silica sand and covered with a well cap. The well-construction logs are included in Appendix B.

SUBSURFACE CONDITIONS

The general subsurface profile consists of uncontrolled fill underlain by inorganic silt (Bull's Liver), underlain by sand, which overlies weathered bedrock and competent bedrock. Representative subsurface profiles are included as Drawing Nos. 4 and 5. Detailed descriptions of each subsurface stratum are given below in order of increasing depth.

Fill [Class 7][8]

A surficial layer of fill was encountered in all borings, extending to depths from about 33 to 36 feet below existing sidewalk grade. The fill generally consists of brown coarse to fine sand with varying amounts of silt, gravel and concrete and brick fragments. The range of SPT N-values in

[8] Numbers in brackets indicate classification of soil and rock materials in accordance with the 2014 New York City Building Code.

the fill was 3 to 42 blows for foot (bpf) and averaged about 14 bpf, which is indicative of a medium-dense soil deposit.

The fill is considered loose to medium-dense and is classified as Building Code Class 7 material, Controlled/Uncontrolled Fills.

Sand [Class 3]

A layer of brown coarse- to fine-grained sand containing various amounts of gravel and silt was encountered in all borings. The top of the sand layer varied from about 33 to 36 feet below existing grade. The layer is about 10 to 16 feet thick. SPT N-values in the sand varied from 11 to 42 bpf, with an average of about 22 bpf, which is indicative of a medium-dense to dense sand. The density of the sand generally increased with depth.

The sand is classified as Building Code Class 3a and 3b material, Dense to Medium Dense Granular Soils.

Silt [Class 5] – "Bull's Liver"

A 23- to 27-foot-thick layer of reddish-brown and dark-brown inorganic silt with varying amounts of fine sand (Bull's Liver) was encountered in all borings. The Bull's Liver is a silt soil with little or no plasticity. This material is difficult to work with because of its unconventional engineering properties and behaviors, particularly when drilling. In a saturated state, it has the potential to tremor like a gelatin from shock or vibration, and even flow like a liquid, and potentially liquefy. In an unsaturated state, the material becomes brittle and can easily be turned into "dust".

The top of the silt layer varied from 30 to 50 feet below the existing sidewalk grade, while the range of SPT N-values was 10 to 58 bpf, an averaging about 30 bpf; which is indicative of dense to medium-dense to silt.

The silt is classified as Building Code Class 5a and 5b material, Dense to Medium Dense Silt.

Glacial Till [Class 2]

A layer of brown very coarse- to fine-grained sand containing various amounts of gravel, silt and likely cobbles and/or boulders, was encountered in all borings. The top of the glacial till layer varied from about 34 to 56 feet below existing sidewalk grade. SPT N-values in the sand varied from 28 to 100/2-inches with, which is indicative of a dense to very dense sand, and the presence of gravel and cobbles. The density of the till layer generally increased with depth as bedrock was approached.

The glacial till is classified as Building Code Class 2 material, Dense Granular Soils.

Weathered Rock [Class 1d]

A layer of weathered rock was encountered directly below the till layer. The top of weathered rock was about 105 to 120 feet below existing sidewalk grade, corresponding to el. -57± to - 85± (NAVD88). Core samples taken in this layer had recoveries between 19 to 100 percent and Rock Quality Designations (RQD) between 0 to 33 percent, with an average of about 25 percent.

The weathered rock layer is classified as Building Code Class 1d material, Soft Rock.

Bedrock [Class 1b]

Competent bedrock was encountered directly below the weathered rock from about 115 to 125 feet below the existing sidewalk, corresponding to el -67± to -89± (NAVD88). Rock core recoveries were from 42 to 100 percent, with an average of about 84 percent. Rock Quality Designation (RQD) values from 25 to 78 percent, with an average of about 60 percent. We have provided photos of the rock cores that were performed that are included within Appendix D.

The bedrock at the site is classified as Building Code Class 1b material, Medium Hard Rock.

Groundwater

During the subsurface exploration, the groundwater levels were measured in boreholes LB-1 and LB-5. During the subsurface exploration, groundwater levels were measured to be about 34 to 37 feet below existing sidewalk grade, corresponding to approximately el 1±. Based on the subsurface conditions encountered, we anticipate that the groundwater is in between the fill and sand layer.

Groundwater can be expected to fluctuate with weather, seasonal conditions, construction activity, or nearby groundwater pumping. We recommend continuing to monitor the groundwater level every two to three weeks, throughout the design phase.

SEISMIC EVALUATION

This section provides the results of our seismic evaluation for the site in general accordance with the procedures outlined in the Building Code. Based on the review of the architectural and structural DD level drawings, we understand the proposed structure will be Structural Occupancy/Risk Category III. With two below-grade levels, the foundation will be at bedrock, we recommend the site be designated as Site Class D – Stiff Soil Profile.

Table No. 2 below provides our recommended parameters for use in seismic design of the propose structure. We note that if the depth of the proposed building is altered, the seismic design parameters could change and will need to be evaluated.

Table No. 2 - Building Code Seismic Design Parameters

Seismic Design Parameter	Recommended Value	2014 NYCBC Reference
Mapped Spectral Acceleration for short periods (S_s)	0.281 g	Section 1613.5.1
Mapped Spectral Acceleration for 1-second period (S_1)	0.073 g	
Site Class	D	Table 1613.5.2
Site Coefficient for short periods (F_a)	1.57	Tables 1613.5.3(1) and 1613.5.3(2)
Site Coefficient for 1-second period (F_v)	2.40	
Design spectral response acceleration at short periods (S_{DS})	0.294 g	Section 1613.5.4
Design spectral response acceleration at 1-sec period (S_{D1})	0.116 g	
Seismic Design Category	B	Section 1613.5.6

Liquefaction Potential

The seismic provision of the Building Code requires evaluation of the liquefaction potential of sand, silt, and noncohesive materials below the groundwater table and up to 50 feet below the ground surface. In accordance with the Building Code screening process, uncorrected SPT N-values versus depth are plotted on the Liquefaction Screening Chart in Drawing No. 6. About 33 percent of the recorded SPT N-values fall into "Liquefaction likely" zone.

The potential for soil liquefaction was evaluated further using the procedure outlined by Youd et al. (2001). The Youd et al. evaluation is based on the procedure for liquefaction evaluation developed by Seed and Idriss (1982) and is currently considered to be the state-of-practice, as recommended by the National Earthquake Hazard Reduction Program. This evaluation presents an empirical relationship between the earthquake demand, represented by the Cyclic Stress Ratio (CSR), and the soil's resistance to dynamic loading, represented by the Cyclic Resistance Ratio (CRR). The CSR is related to the Peak Ground Acceleration (PGA) of the design earthquake event and the in situ soil stresses. The CRR is related to SPT N-values obtained in the field. The field-measured N-values are normalized to N60, cs values by applying correction factors for such variables as soil overburden pressure, hammer energy and fines content.

The project site was evaluated using a magnitude 5.73 earthquake, a Peak Ground Acceleration of 0.24g for site class D (Table 1813.2.1), and a Magnitude Scaling Factor of 2.2. Drawing No. 7 shows a plot of the factor of safety with depth using the Youd et al. procedure. All but one point have a factor of safety against liquefaction greater than 1. Therefore, in our judgment, there is an adequate margin of safety against liquefaction for the site, and liquefaction related phenomena need not be considered in the foundation design.

A majority of the N-Values indicate liquefaction is unlikely per the Building Code screening process. However, when addressing the Bull's Liver soil, because of the "unconventional" engineering properties of this non-plastic silt, the Building Code requirements may be either overly conservative or significantly unconservative. Because of the complexities associated with the engineering properties of the Bull's Liver soil, we recommend a site-specific seismic study be performed at the site. The low plasticity of the Bull's Liver material is known to have a potential to liquefy either partially or completely. The site-specific analyses would evaluate the liquefaction potential of soils situated below the groundwater table.

EVALUATION AND DISCUSSION

Several items present geotechnical-related design and construction challenges, such as:

1. The site's proximity to landmark structures, the New York City Landmarks Preservation Commission (LPC) will likely require a review and approval of the proposed monitoring, protection of the nearby landmarked structures.

2. With the presence of subway structures below Nassau and Beekman streets, NYCT will require a review and final approval of all foundation and support of excavation plans with regards to the impact on their structures.

3. Groundwater was encountered at about 34 to 37 feet below existing sidewalk grade. With excavation anticipated to be about 27 feet below sidewalk grade, dewatering of the full project site is not expected; however, for localized deeper excavations (i.e., elevator pits, sump pits, etc.) localized dewatering may be required to properly control the groundwater during construction. For example, if an elevator is planned to access the lowest level of the building, the elevator pit will likely be close or within the groundwater table. This needs to be taken into consideration during the elevator planning and design.

4. The presence of Bull's Liver soil may present construction related issues because it is highly unstable condition when saturated and/or disturbed. In its loose state, the soil may rise into a drill hole or shaft as if it were a thick viscous fluid. Therefore, installing deep foundations, such as drilled elements through this material, will require additional precautions to reduce the drilling difficulty and soil disturbance.

5. Likely presence of cobbles and/or boulders within the very dense glacial till layer will need to be considered when installing deep foundations.

6. The current design plans have the cellar level extending the full footprint of the site, therefore the retaining/freestanding wall is within the project limits. Currently, the cellar subgrade is located at about the top of the existing retaining/freestanding wall, which is about 10 feet above the bottom of the wall. Based on the current plan, the existing wall

would need to be backfilled against to meet the cellar grade, therefore a structural evaluation of the existing wall to receive the fill material will be required.

FOUNDATION RECOMMENDATIONS

As discussed herein, the reported structural loads are on the order of about 200 to 4,000 kips. In following, we have outlined the NYCT design requirements and provided our foundation recommendations and other geotechnical-related design parameters.

New York City Transit Requirements

The design and construction of the foundation system must consider the NYCT subway structures. The NYCT requires that construction within 200 feet from NYCT structures must be reviewed and approved by the NYCT. NYCT requirements do not permit construction of foundations bearing within limits of a theoretical influence line drawn from the base of a NYCT structure.

Generally, the NYCT requires that foundations adjacent to their structures must be carried below a theoretical "influence" line that extends from the bottom of their structure. Table No. 3 below presents the theoretical NYCT influence line slopes based on N-values and groundwater level.

Table No. 3 – New York City Transit Authority Influence Line Slopes

N-Value	Slope Above Groundwater	Slope Below Groundwater
$N < 20$	2H:1V	2H:1V
$20 \leq N < 40$	1.5H:1V	2H:1V
$N \geq 40$	1H:1V	1.5H:1V

Based on a review of the specific subsurface conditions for the site, the NYCT theoretical influence line will be taken as 1 vertical to 2 horizontal for soil conditions below the groundwater level, and 1 vertical to 1.5 horizontal for soil conditions above the groundwater level.

The NYCT will request substantially complete documentation (i.e. construction documents) for design of the demolition, support of excavation, and foundations for their review for impact on the subway. The NYCT may also require pre-construction conditions documentation of the adjacent subway tunnels fronting the property line along Nassau and Beekman streets and monitoring of the tunnel for construction-induced vibrations and movement of the tunnel during demolition, excavation, and below-grade construction.

Foundation System

With the presence of Bull's Liver soil, the proximity of the NYCT subway lines and adjacent structures, and estimated high building loadings (27 stories tall), we recommend the proposed building be supported by a deep foundation element that will transfer the loading to the competent bedrock. Given the presence of adjacent buildings, subway structures and likely presence of cobbles and/or boulders within the glacial till stratum, driving piles is not recommended. In order to advance thru the glacial till stratum and down to bedrock, a deep foundation system consisting of drilled caissons socketed into rock is recommended.

As discussed herein, structural loads were reported by TT to be on the order of about 200 to 4,000 kips.

Drilled Caissons

Drilled caissons[9] will allow the transferring of the structural loads down to the bedrock below. Caissons are elements socketed into the bedrock and is dependent on the side adhesion of the bedrock and possibly end bearing based on caisson details (size, depth, loads, etc.). The recommended allowable shear resistance between concrete and Class 1c rock or better rock is expected to be up to 200 pounds per square inch for compression loads and 100 pounds per square inch for tension loads. We recommend that the top 2 feet of the rock socket (bond zone) be neglected because of the normally fractured and uneven nature of the bedrock surface encountered. End bearing feasibility will need to be evaluated during upcoming design phases, once details on loadings, etc are further advanced. The choice of the actual caisson size and design capacity will depend on economic, structural, scheduling and coordination with the NYCT.

In accordance with Section 1810.7.7 of the Building Code, compressive load tests are not required on the caissons if rock quality is verified by a Professional Engineer through rock-socket video observation. The following table presents the estimated design axial, uplift and lateral allowable design capacities for varying diameter mini-caissons with varying length of rock sockets.

[9] A mini-caisson consists of open-ended steel casing sections (unbonded zone) drilled into place down through the overburden soils and extending to the required bearing stratum. An uncased hole is drilled into the rock, down from the unbonded zone, to create the bond zone. After drilling, the entire shaft is filled with cement-grout and steel reinforcement. The structural load is transferred from the mini-caisson to the rock through the bond zone.

Table No. 4: Typical Drilled Caisson Capacity in Rock

Mini-Caisson Outer Diameter (in)	Minimum Rock Socket Length (ft)	Estimated Design Capacity (kips)			Grout Compressive Strength (PSI)
		Axial	Uplift	Lateral[1]	
13.375	10	1,200 (2 #24 Bar) (2 #28 Bar)	600 (2 #24 Bar) (2 #28 Bar)	11	6,500
18	15	1,800 (4 #28 Bar)	900 (4 #28 Bar)	19[2]	6,500
24	15	2,400 (6 #24 Bar)	1,200 (6 #24 Bar)	24	7,000

Note:

1. Lateral capacities provided are for pinned-head connections. We note that lateral capacities will need to be proved with load tests.
2. Lateral capacity for the 18-inch outer diameter caissons increases from 19 to 25 kips if the caisson cap is design as a fixed-head condition.

The capacities presented in Table No. 4 are for compression, tension and lateral loads for the caisson size selected. It is important to note that Langan should review the foundation layouts and the anticipated tension forces for global stability. Caissons should be installed no closer than three diameters (center to center), or a minimum of 4 feet. The actual caisson design should be checked when final building loads are developed.

Lateral Load Test

In accordance with section 1808.3.5 of the Building Code, the maximum allowable lateral load of a caisson is to be taken as 1 ton (2 kips) unless verified by a lateral load test, along with analysis to demonstrate capacity and group effects. The lateral load test shall be performed in accordance with ASTM D3966, with a minimum of two caissons tested for each different type of caisson. The maximum allowable lateral load shall be determined by one of the following criterion:

1. For piles that have a pinned-head connection, the allowable lateral load is determined to be not more than one-half the test load producing a gross lateral movement of 1 inch at the ground surface; or

2. For piles that have a fixed-head connection, the allowable lateral load is determined to be the test load producing a gross lateral movement of 3/8 inch at the ground surface;

Frictional resistance along the base of pile caps should not be used for lateral resistance, as consolidation of the underlying compressible clayey soils may cause a gap to form beneath the

pile cap. Passive pressure along the face of the pile cap may be used for lateral resistance; however, consideration must be given to compatible deflection-resistance relationships to evaluate the contribution of lateral resistance provided by the piles and cap. Passive pressure on the cap can be evaluated further if higher lateral capacity must be resisted than can be provided by the pile design alone.

Groundwater Control

During our subsurface exploration, the static groundwater level was measured about 34 to 37 feet from the sidewalk grade at the site, corresponding to about el 1±. We recommend that the permanent design groundwater level be taken at 4 feet above the highest measured hydrostatic groundwater level, or at el 5±. The elevated design groundwater level should help reduce risks associated with periods of prolonged precipitation, sewers backing up (i.e., clogged or antiquated sewer lines), or utility breaks.

Waterproofing

Considering the planned below grade use, we recommend that lowest level slab, foundation walls and pits are fully waterproofed using a fully bonded membrane type waterproofing system such as those manufactured by GCP Applied Technologies, Carlisle Coatings and Waterproofing, or an approved equivalent. In addition, we recommend that a waterproofing membrane be used in lieu of damp-proofing below slab-on-grade floors.

Horizontally applied waterproofing membranes should be installed on a minimum 2-inch-thick lean concrete mud slab placed over an approved subgrade to provide a smooth, uniform application surface. Vertically applied waterproofing membranes should extend up to grade. Substrate preparation should be per the manufacturer's recommendation.

Quality control is critical to a successful waterproofing project. The waterproofing installation should be inspected daily, especially during placement of reinforcement for the floor slabs and perimeter walls. Any holes or tears should be repaired in accordance with the manufacturer's recommendations and utility penetrations should be carefully sealed. All seams, including separations between wall and slab membranes should be checked for tightness. We recommend that the waterproofing manufacturer inspect the waterproofing operations during construction and approve all work prior to placement of concrete. We also suggest discussing waterproofing detailing with the selected manufacturer.

Slab Support

Given the depth to groundwater level was measured about 5 feet below the lowest proposed level slab, we believe that the below grade slabs can be designed as a slab-on-grade provided

that proper subgrade preparation is implemented. For proper subgrade preparation, the exposed subgrade should be proofrolled before constructing the slab. Proofrolling can be achieved by a numerous overlapping passes of a heavy drum compactor having a static drum weight of at least 10 tons. For confined areas, or adjacent to the NYCT structures, we recommend that a laborer use a minimum 1-ton self-propelled drum roller or similar compactor. Vibratory plate compactors are not recommended. Waterproofing beneath the ground-floor slab is recommended as outlined in the "Groundwater Control" section.

Over-excavation at sections of the proposed building subgrade may be required to remove any disturbed or deleterious material encountered. In addition, during proof-rolling if the soil is observed to be exhibiting evidence of instability; i.e., rutting or weaving beneath the compactor, etc., the soils should be removed and replaced with compacted structural fill (gravel, well-graded sand, etc.). Soils removed during excavation must be replaced with structural fill as discussed below in the "Fill Material, Placement and Compaction Criteria" section.

Permanent Below-Grade Walls

Permanent below-grade walls (such as at the cellar, sub-cellar and elevator pit walls) should be designed to resist lateral loadings from static earth pressure and vertical surcharge. Backfill should not be placed against below-grade walls until the concrete has reached its 28-day compressive design strength and after adequate lateral bracing has been provided to prevent rotation of the wall, or as otherwise directed by the structural engineer. For preliminary design assumptions, we recommend the following:

- A triangular earth pressure distribution with an equivalent fluid weight of 60 pounds per square foot per foot of depth for unsaturated soil above the static groundwater level.

- Lateral pressures from surcharge loads should be added as a uniform soil pressure equal to one-half the vertical pressure applied over the first 15 feet of the wall within soil. We recommend using a minimum surcharge load of 600 pounds per square foot to account for fire truck loading scenarios.

The recommended design earth pressures for the perimeter walls may need to be updated as the building design advances. The (preliminary) lateral earth pressure diagrams are included as Drawing No. 8.

SITE PREPARATION AND GEOTECHNICAL CONSTRUCTION RECOMMENDATIONS

The following sections discuss typical geotechnical related construction issues including excavation, backfill, excavation support and foundation underpinning.

Temporary Excavation Support

As discussed herein, the existing building has a "stepped" basement geometry, a portion with a single cellar level and a portion with up to two below grade levels. The proposed excavation will extend below the existing sub-cellar level for portions of the existing fourteen-story building on the eastern part of the site. A final review of other adjacent buildings needs to be performed to evaluate underpinning requirements for the entire site. In addition to the varying existing below grade levels at the site, there are also boundary conditions that need to be considered when planning the excavation support system.

In reviewing available NYCT drawings, the subway tunnels appear to extend below the proposed excavation level. Additionally, there are NYCT ventilation shafts and a passageway directly bordering the northwestern foundation wall. As discussed herein, NYCT record drawings indicated a passageway below Nassau Street. The shafts and passageways may require underpinning and needs to be evaluated as the design further develops.

With the close proximity of the subway structure to the site, there appears to be minimal space available to install a SOE system along Nassau and a majority of the Beekman Street site frontage. We would recommend to have the location of the tunnels and passageways be surveyed to have a better understanding of the location of the below grade structures to determine if a SOE system (and type) can be installed outside the property limits.

Existing vault spaces are located below Nassau and of portions of Beekman Street that are accessible from the below grade levels of the existing buildings. We understand the demolition-bracing engineer is currently proposing to fill in the vaults spaces along both Nassau and Beekman Streets prior to demolition of the existing building on site. The proposed filling of the vault spaces is planned to include a low strength flowable fill material. One option to limit impacts to the NYCT tunnel, is to brace the flowable fill mass as required and use the flowable fill as part of the SOE. The flowable fill should be braced with the use of internal bracing where required, to provide the required lateral stability. However, due to the constraint of the adjacent NYCT ventilation shafts and passageways, the north-western foundation wall may require to remain in place to avoid conflict with the NYCT structures. The lateral support for the existing foundation walls is presently provided by the floor slabs. Therefore, when the existing floor slabs are demolished, proper lateral support of the existing foundation walls must be provided.

In addition, the existing western foundation wall may need to be underpinned (see Underpinning Section below) to reach subgrade level for the proposed caisson caps, which is about 2 to 3 feet deeper than the existing western foundation wall. The contractor must take appropriate measures to stabilize the work area and prevent lateral movement of the adjacent areas during excavation. We note that keeping the existing foundation walls would require the new structure

to be inboard of the walls. This approach will require additional coordination and discussion with the design team.

We strongly recommend that the excavation support system be stiff to provide proper lateral support. Considering the presence of the subway structures and the adjacent buildings, the site perimeter must be restrained from moving laterally or settling. The proposed excavation support system will have to be reviewed and coordinated with the NYCT. Careful consideration must be given to instrumentation monitoring of the NYCT structure during excavation and construction.

Underpinning

If the option to use the flowable fill within the vaults as SOE, the existing western wall and/or vault may require underpinning to reach the final subgrade elevation. In addition, as discussed herein, the adjacent buildings located to the south and east do have below grade levels; however, we believe underpinning may be required for these buildings to excavate to the final subgrade elevation. We have provided preliminary recommendations for the potential underpinning for both the existing foundation walls on site and for the adjacent structures located to the south and east of the site. Final underpinning needs and details will need to be developed as the project design advances.

Underpinning of Existing Foundation Walls

Localized excavations for the proposed caisson caps are planned to extend about 2 to 3 feet below the existing western foundation wall and vault area below Nassau Street. According to the existing plans, the building foundations are shallowest along the west (only a single cellar level currently exist) and become deeper as you move to the east (where two cellar levels currently exist). If the existing walls are to remain, or if the flowable fill of the vault is to be used as the SOE, underpinning will be required for either the wall of the vault located to the west, which will likely consist of reinforced concrete piers.

Underpinning of Adjacent Structures

Upon reviewing available certificates of occupancy for the adjacent buildings and our site visits, these buildings are believed to have existing below grade levels. However, the basement slab elevations are not known. Therefore, in order to excavate and construct the proposed below-grade levels, all or portions of the adjacent buildings be required to be underpinned. A comprehensive study of adjacent buildings (structural stability, foundation types, basement slab levels, etc.) will be required by Code to plan and design underpinning systems.

At a minimum, we recommend the new underpinning extend at least 2 feet below the lowest proposed excavation level. It is important to note that underpinning piers exceeding say 6 to 8 feet in height typically require lateral bracing (i.e. struts, rakers, tiebacks, etc).

During underpinning construction, measures should be taken to prevent raveling or moving of soil beneath the structure (foundation and slab elements). We recommend that a survey of all adjacent structures, including basement slabs and walls be performed; which is also a requirement by the DOB for underpinning, sheeting, and shoring design. Underpinning is required to be designed by a Professional Engineer licensed in the state of New York and meet all Code requirements

Structural Stability Analysis of Adjacent Buildings Prior to Construction

We recommend performing a structural stability analysis for the adjacent buildings to the east and south to evaluate the existing structural conditions of the buildings before on-site demolition, excavation and construction, including underpinning. The need for structural stability analysis is mandated by Section 1704.19 of the Building Code. Structural stability requirements are scheduled to be expanded as part of the updated 2020 NYC Building Code. Specifically, the results of the structural stability analysis will allow for a better understanding of which method would be a feasible option for demolishing the existing building at the site, bracing the building during excavation, and underpinning. This analysis may determine that additional measures are needed to brace the adjacent buildings before work begins.

Fill Material, Placement, and Compaction Criteria

All imported fill should be controlled fill as defined by the Building Code. Controlled fill must be well-graded sand and gravel having not more than 10% by dry weight passing the No. 200 sieve. The maximum particle size should be 4 inches. The fill should be free of organics, clay, and other deleterious or compressible materials. The on-site natural sand materials conforming to the above gradation criteria can be reused as controlled fill. The use of recycled concrete aggregate (RCA) or the byproduct of blasting–tunneling (commercially known as mole rock), for backfill behind the foundation walls, or below the cellar slab, is not recommended.

Controlled fill should be placed in uniform 12-inch-thick loose lifts and compacted to at least 95% of its maximum dry unit weight as determined by a Modified Proctor Test (ASTM D1557). In restricted areas where only hand-operated compactors can be used, the maximum lift thickness should be limited to 4 inches. The moisture content of fill at the time of compaction should be plus or minus 2 percentage of optimum moisture content point as determined by the Modified Proctor test of proposed fill. No backfill should be placed on areas where free water is standing or on frozen subsoil areas.

Pre-Construction Conditions Documentation and Monitoring During Construction

Preconstruction documentation of all buildings, NYCT subway tunnels and structures and utilities should be performed. The documentation would provide the owner and foundation contractor and others with documentation of existing conditions in the event of a future damage claim. On the basis of this documentation, an observational and instrumentation program should be designed for monitoring the adjacent structures and evaluating construction procedures.

During active excavation, a precise optical survey program should be implemented to monitor for vertical and horizontal movements of surrounding structures. The survey should be performed weekly, with measurements taken to the nearest 0.005 feet. The survey should be performed by a licensed surveyor. Criteria for allowable movements of structures should be finalized after a building preconstruction documentation is completed.

Ground vibrations may develop during construction and excavation. Ground vibrations in nearby structures should be monitored using seismographs during construction. The ground vibrations should be monitored using a threshold-type seismograph capable of measuring to 0.02 inches per second.

In addition to survey points and seismographs, telltale crack reference gauges should be monitored within the adjacent structures. The crack gauges should be sensitive to 0.001 inches and should be read at least once daily.

We recommend that a monitoring plan and project specifications be completed before construction and excavation. These specifications would detail the methods and equipment required for monitoring vibration and movement and would provide movement criteria and requirements for frequency of readings and reporting. We anticipate that monitoring of the adjacent NYCT structures will be required.

Landmarks Preservation Commission Requirements

The project is within 90 feet of landmark structures and it requires interaction with the Landmarks Preservation Commission during design, permitting process and building construction. General procedures for avoiding damage to Landmark Structures and buildings are outlined in The City of New York Department of Buildings Technical Policy and Procedure Notice (TPPN) #10/88, "Procedures for Avoidance of Damage to Historic Structures" (June 6, 1988). TPPN #10/88 defines adjacent properties as being within 90 feet of the site where work is being performed. The monitoring requirements of adjacent properties includes measuring peak particle velocities, monitoring horizontal and vertical deflections of temporary retaining wall structures, monitoring horizontal and vertical deflections of adjacent buildings, groundwater table fluctuations, ground settlements, crack monitoring, preconstruction conditions documentation, and photograph documentation of adjacent buildings. A copy of TPPN #10/88 is attached as Appendix E.

We anticipate that these additional documents should be prepared and submitted to the LPC for approval:

1. A detailed Preconstruction Conditions Documentation Report of buildings within 90 feet or less away from the construction.
2. A Construction Protection Plan (CPP) should be prepared based on the findings from the Preconstruction Conditions Documentation. The CPP would need to be implemented during the construction of the new structure.
3. A comprehensive monitoring program in accordance with the CPP will need to be implemented during the construction of the new structure. At a minimum, the program is expected to consist of vibration monitoring, surveying of vertical and horizontal movements, and installation of telltales reference crack gauges on existing cracks.
4. Special inspection reports for the monitoring program and the installation of the excavation support and underpinning (as required) systems.

TPPN #10/88 provides requirements for the Construction Protection Plan, Preconstruction Conditions Documentation Report, and Monitoring Program. The time line for the submittal and approval should be considered in the project schedule as the approval process could take several months.

CONSTRUCTION DOCUMENTS AND CONSTRUCTION QUALITY ASSURANCE

Technical specifications and design drawings should consider and incorporate our recommendations to ensure that subsurface conditions and other geotechnical issues at the site are adequately addressed in the construction documents. Langan should assist the design team in preparing specification sections related to geotechnical issues such as earthwork, excavation support, and waterproofing. Langan should also review foundation drawings and details, and all contractor submittals and construction procedures related to geotechnical work.

Excavation and foundation work is subject to various controlled engineering inspections per the Building Code. A Professional Engineer familiar with the site subsurface conditions and design intent should perform the engineering inspection and testing of geotechnical-related work during construction. We recommend that Langan perform this work to verify proper implementation of our recommendations and to maintain continuity of our responsibility for this project. Construction activities that require quality-control inspections as required by the Building Code include, but are not limited to, foundation subgrade inspection, excavation support installation, and compacted fill placement.

OWNER AND CONTRACTOR RESPONSIBILITIES

The contractor is responsible for construction quality control, which includes satisfactorily constructing the foundation system and any associated temporary works to achieve the design intent while not adversely impacting or causing loss of support to neighboring structures. Construction activities that can alter the existing ground conditions such as excavation, fill placement, foundation construction, ground improvement, pile driving/drilling, dewatering, etc., can also potentially induce stresses, vibrations, and movements in nearby structures and utilities, and disturb occupants of nearby structures. Contractors working at the site must ensure that their activities will not adversely affect the performance of the structures and utilities, and will not disturb occupants of nearby structures. Contractors must also take all necessary measures to protect the existing structures during construction. By using this report, the owner agrees that Langan will not be held responsible for any damage to adjacent structures.

The preparation and use of this report is based on the condition that the project construction contract between the owner and their contractors will include (1) Langan being added to the Project Wrap and Contractor's General Liability insurance as an additional insured, and (2) language specifically stating the foundation contractor will defend, indemnify, and hold harmless the owner and Langan against all claims related to disturbance or damage to adjacent structures or properties.

LIMITATIONS

The conclusions and recommendations provided in this report are based on subsurface conditions observed through our field explorations, our company database and project information provided to us. The recommendations given here are contingent upon one another and no recommendation should be followed independent of the others. Any changes should be brought to our attention so that we may determine how such changes may affect our recommendations.

Information on subsurface strata and groundwater levels shown on the logs represent conditions encountered only at the locations indicated and at the time of investigation. If different conditions are encountered during construction, they should immediately be brought to Langan's attention for evaluation because they may affect our recommendations.

This report has been prepared for 126 Nassau Street, Manhattan, New York, to assist the owner, architect, and structural engineer in the design process and is only applicable to the design of the specific project identified. The information in this report cannot be used or depended on by engineers or contractors involved in evaluations or designs of facilities (including underpinning, grouting, stabilization, etc.) on adjacent properties, which are beyond the limits of the specific subject of this report.

Environmental issues (such as potentially contaminated soil and groundwater) are outside the scope of this study and should be addressed in a separate study.

Drawings

NOTE: ELEVATIONS ARE REFERENCES TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

SOURCE: "CENTRAL PARK QUADRANGLE MAP, NEW YORK–NEW JERSEY – 7.5–MINUTE SERIES," U.S. GEOLOGICAL SURVEY, 2019.

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Project	126 NASSAU STREET BLOCK No. 92, LOT No.30 NEW YORK NEW YORK NEW YORK
Drawing Title	SITE LOCATION PLAN
Project No.	170545701
Date	06/22/2020
Drawn By	JLY
Checked By	SCS
Drawing No.	1
Sheet	1 of 9

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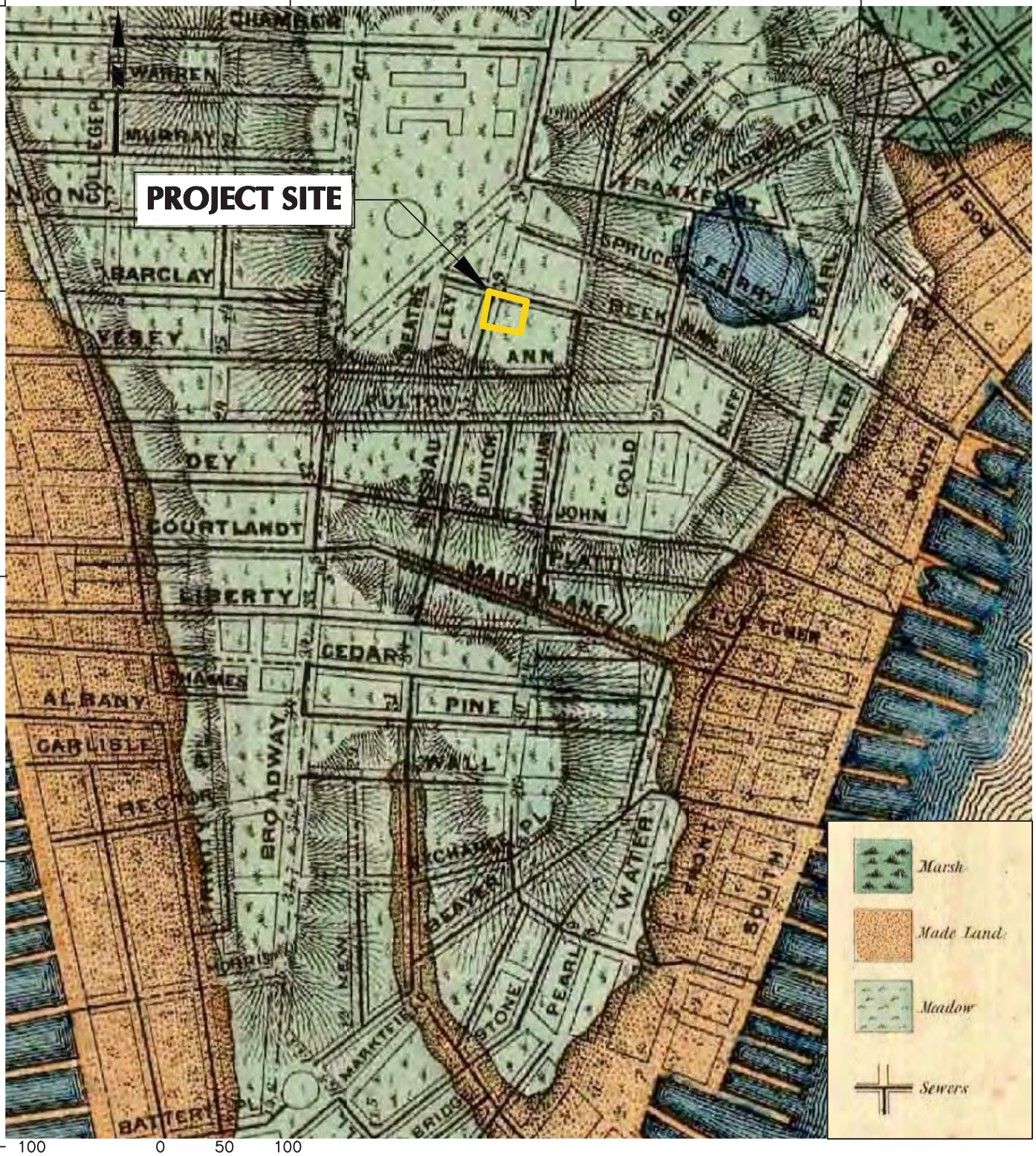

Notes: Basemap is the "TOPOGRAPICAL ATLAS OF THE CITY OF NEW YORK" prepared by Egbert L. Viele dated 1874. map is provided by the New York Public Library Digital Collections.

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Project	126 NASSAU STREET BLOCK No. 92, LOT No.30 NEW YORK NEW YORK NEW YORK
Drawing Title	VIELE MAP 1874
Project No.	170545701
Date	06/22/2020
Drawn By	SK
Checked By	SCS
Drawing No.	2
Sheet	2 of 9

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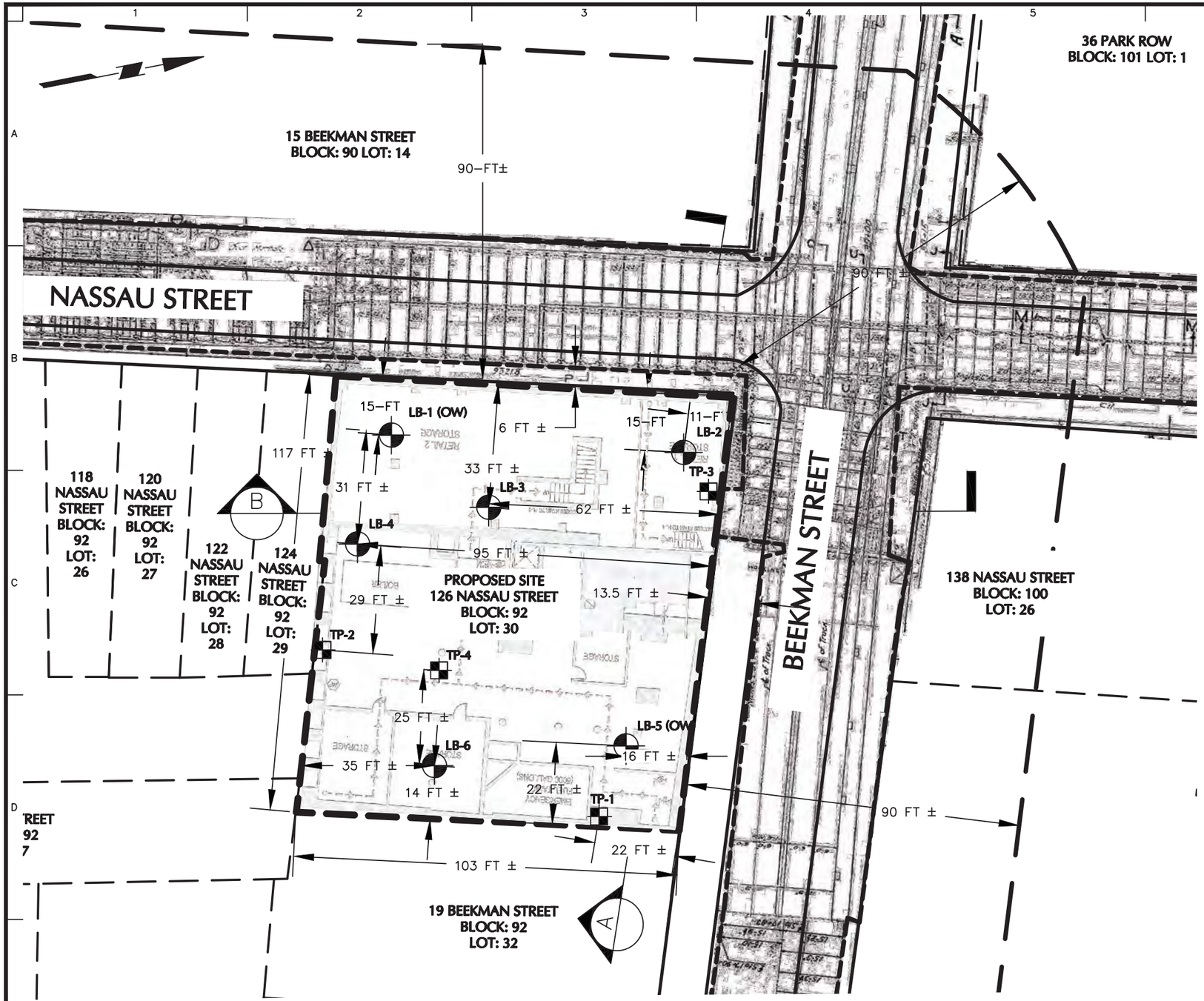

BORING LOCATION PLAN
SCALE: 1"=30'

30 0 15 30
SCALE IN FEET

LEGEND:

- LB-# (OW) — PROPOSED LANGAN GEOTECHNICAL BORING LOCATION W/OBSERVATION WELL
- LB-# — PROPOSED LANGAN GEOTECHNICAL BORING LOCATION
- TP-# — PROPOSED LANGAN TEST PIT LOCATION
- CURB LINE
- NYCTA TUNNEL & TRACK LIMITS
- EXISTING 126 NASSAU STREET PROPERTY LIMITS
- ADJACENT PROPERTY LIMITS
- EXTENTS OF HISTORICAL LANDMARK BUILDINGS

GENERAL NOTES:

1. PROPOSED SITE PLAN DRAWING OBTAINED FROM ISMAEL LEYVA ARCHITECTS., "126 NASSAU STREET, PACE UNIVERSITY, PERFORMING ARTS CENTER AND STUDENT HOUSING, PRELIMINARY FEASIBILITY STUDY", DATED 26 JULY 2018.
2. LIMITS OF NEW YORK CITY TRANSIT (NYCT) STRUCTURE TAKEN FROM:
   A. PLANS
      a. THE 'J & Z' LINE ESTIMATED FROM NYCTA ROUTE 45 SECTION 1, DRAWING #330 'LIBERTY ST TO PARK ROW, FULTON ST. STATION, STA 34+55 TO STA. 37+55, STRUCTURAL PLANS", DATED 19 APRIL 1928.
      b. THE 'J & Z' LINE ESTIMATED FROM NYCTA ROUTE 45 SECTION 1, DRAWING #332 'LIBERTY ST TO PARK ROW, FULTON ST. STATION, STA 37+55 TO STA. 39+15, STRUCTURAL PLANS, ROOF AND INVERT PLANS", DATED 19 APRIL 1928.
      c. THE 'J & Z' LINE ESTIMATED FROM NYCTA ROUTE 45 SECTION 1, DRAWING #346 'LIBERTY ST TO PARK ROW, FULTON ST. STATION, STA 39+55 TO STA. 43+65, STRUCTURAL PLANS", DATED 16 MARCH 1928.
      c. THE '2 & 3' LINE ESTIMATED FROM NYCTA DRAWING ROUTE 48 SECTION 2, #27 'WILLIAM ST. – BEEKMAN TO ANN STS., STA 19+22 TO STA 22+15, STRUCTURAL PLANS, NORTH APPROACH TO FULTON ST. STATION, FOUNDATION PLAN", DATED 17 MARCH 1915.
      d. THE '2 & 3' LINE ESTIMATED FROM NYCTA DRAWING ROUTE 48 SECTION 2, #71 'BEEKMAN ST., STA 17+87 TO STA 19+22, STRUCTURAL PLANS, EXCAVATION PLANS', DATED 6 FEBRUARY 1916.
      e. THE '2 & 3' LINE ESTIMATED FROM NYCTA DRAWING ROUTE 48 SECTION 2, #39 'BEEKMAN ST. AT NASSAU ST., STA 13+65 TO STA 17+87, STRUCTURAL PLANS, PLAN OF TUNNEL", DATED 26 AUGUST 1915.
      e. THE ENTRANCE ESTIMATED FROM NYCTA DRAWING ROUTE 45 SECTION 1, #408 'LIBERTY ST TO PARK ROW, STATION AT FULTON ST., S.E. ENTRANCE AT BEEKMAN ST, STRUCTURAL PLANS, PLAN OF TUNNEL", DATED 7 FEBRUARY 1929.
      f. THE ENTRANCE ESTIMATED FROM NYCTA DRAWING ROUTE 45 SECTION 1, #407 'LIBERTY ST TO PARK ROW, STATION AT FULTON ST., N.E. ENTRANCE AT BEEKMAN ST, STRUCTURAL PLANS, PLAN OF TUNNEL", DATED 7 FEBRUARY 1929.
      g. THE '2 & 3' LINE TUNNEL RETRIEVED FROM NYCTA DRAWING ROUTE 48 SECTION 1, BEEKMAN ST. AT NASSAU ST., STA 13+65 TO STA. 17+87, STRUCTURAL PLANS, "SECTION A–A", DATED 26 AUGUST 1915.

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Project	126 NASSAU STREET BLOCK No. 92, LOT No.30 NEW YORK NEW YORK NEW YORK
Drawing Title	BORING LOCATION PLAN
Project No.	170545701
Date	06/22/2020
Drawn By	DR
Checked By	LEF
Drawing No.	3
Sheet	3 of 9

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LIMITS OF PROJECT SITE
126 NASSAU STREET
BLOCK 92 LOT 30

NASSAU STREET

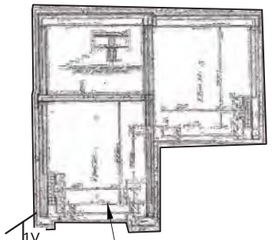
EXISTING CELLAR
EL.24± (NAVD88)
EL.122.5± (NYCT)

STREET GRADE
EL.37± (NAVD88)
EL.135.5± (NYCT)

EXISTING SUB-CELLAR
EL.12± (NAVD88)
EL.110.5± (NYCT)

LB-6 EL. 12±
LB-5(OW) EL. 12±
LB-4 EL. 12±
LB-3 EL. 24±
LB-2 EL. 24±

GROUND WATER
NAVD88 EL. ±1
NYCT. EL. ±100



1V
1.5H

BASE-OF-RAIL
EL.2± (NAVD88)
EL.102± (NYCT)

NYCT INFLUENCE LINE

11 FT ±

6 FT ±.

33 FT±

45 FT ±

95 FT±

103 FT±

NEW YORK CITY TRANSIT DATUM (NYCT DATUM)

NORTH AMERICAN VERTICAL DATUM (NAVD 88)

A SECTION A – FACING SOUTH
SCALE: 1"=20'

20 0 5 10 20
SCALE IN FEET

GENERAL NOTES:

1. SUBSURFACE LITHOLOGY INTERPRETED FROM RECOVERED SOIL AND ROCK CORE SAMPLES. REFER TO BORING LOGS FOR ADDITIONAL INFORMATION.
2. REFER TO FIGURE NO.4 FOR LOCATION OF SECTION
3. REFER TO FIGURE LS-1 FOR LANGAN STANDARDS.
4. THIS PROFILE REPRESENTS A GENERALIZED SOIL AND ROCK CROSS SECTION INTERPRETED FROM TWO BORINGS, SOIL AND GROUNDWATER MAY VARY IN TYPE, LOCATION, ELEVATION, AND ENVIRONMENTAL AND ENGINEERING PROPERTIES BETWEEN POINTS OF EXPLORATION VARIATIONS IN SUBSURFACE CONDITION SHOULD BE EXPECTED BETWEEN BORINGS

MATERIAL SYMBOLS

- F — UNCONTROLLED FILL
- S — SAND
- SM — SILT
- WEATHERED ROCK
- G — GLACIAL TILL
- CONCRETE SLAB
- ASPHALT
- ROCK

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Project
126 NASSAU STREET
BLOCK No. 92, LOT No.30
NEW YORK
NEW YORK NEW YORK

Drawing Title
SECTION A

Project No. 170545701
Date 06/22/2020
Drawn By DR
Checked By LEF

Drawing No. 4
Sheet 4 of 9

LIMITS OF PROJECT SITE
126 NASSAU STREET
BLOCK 92 LOT 30

BEEKMAN STREET

STREET GRADE
EL.36± (NAVD88)
EL.134.5± (NYCT)

LB-1(OW)
EL. 24±

LB-3
EL. 24±

LB-2
EL. 24±

EXISTING CELLAR
EL.24± (NAVD88)
EL.122.5± (NYCT)

GROUND WATER
NAVD88 EL. ±1
NYCT. EL. ±100

EXISTING ABANDONED
PASSAGEWAY SLAB
EL.21± (NAVD88)
EL.119.5± (NYCT)

BASE-OF-RAIL
EL.-3± (NAVD88)
EL.88.5± (NYCT)

NYCT INFLUENCE LINE

12 FT±

1V
1.5H

12 FT±

62 FT±

90 FT±

NEW YORK CITY TRANSIT DATUM (NYCT DATUM)
NORTH AMERICAN VERTICAL DATUM (NAVD 88)

B SECTION B – FACING NORTH WEST
SCALE: 1"=20'

20 0 5 10 20
SCALE IN FEET

GENERAL NOTES:

1. SUBSURFACE LITHOLOGY INTERPRETED FROM RECOVERED SOIL AND ROCK CORE SAMPLES. REFER TO BORING LOGS FOR ADDITIONAL INFORMATION.
2. REFER TO FIGURE NO.4 FOR LOCATION OF SECTION
3. REFER TO FIGURE LS-1 FOR LANGAN STANDARDS.
4. THIS PROFILE REPRESENTS A GENERALIZED SOIL AND ROCK CROSS SECTION INTERPRETED FROM TWO BORINGS, SOIL AND GROUNDWATER MAY VARY IN TYPE, LOCATION, ELEVATION, AND ENVIRONMENTAL AND ENGINEERING PROPERTIES BETWEEN POINTS OF EXPLORATION VARIATIONS IN SUBSURFACE CONDITION SHOULD BE EXPECTED BETWEEN BORINGS

MATERIAL SYMBOLS

- F — UNCONTROLLED FILL
- SAND
- SM — SILT
- WEATHERED ROCK
- GLACIAL TILL
- CONCRETE SLAB
- ASPHALT
- ROCK

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Project	126 NASSAU STREET BLOCK No. 92, LOT No.30 NEW YORK NEW YORK NEW YORK
Drawing Title	SECTION B
Project No.	170545701
Date	06/22/2020
Drawn By	DR
Checked By	LEF
Drawing No.	5
Sheet	5 of 9

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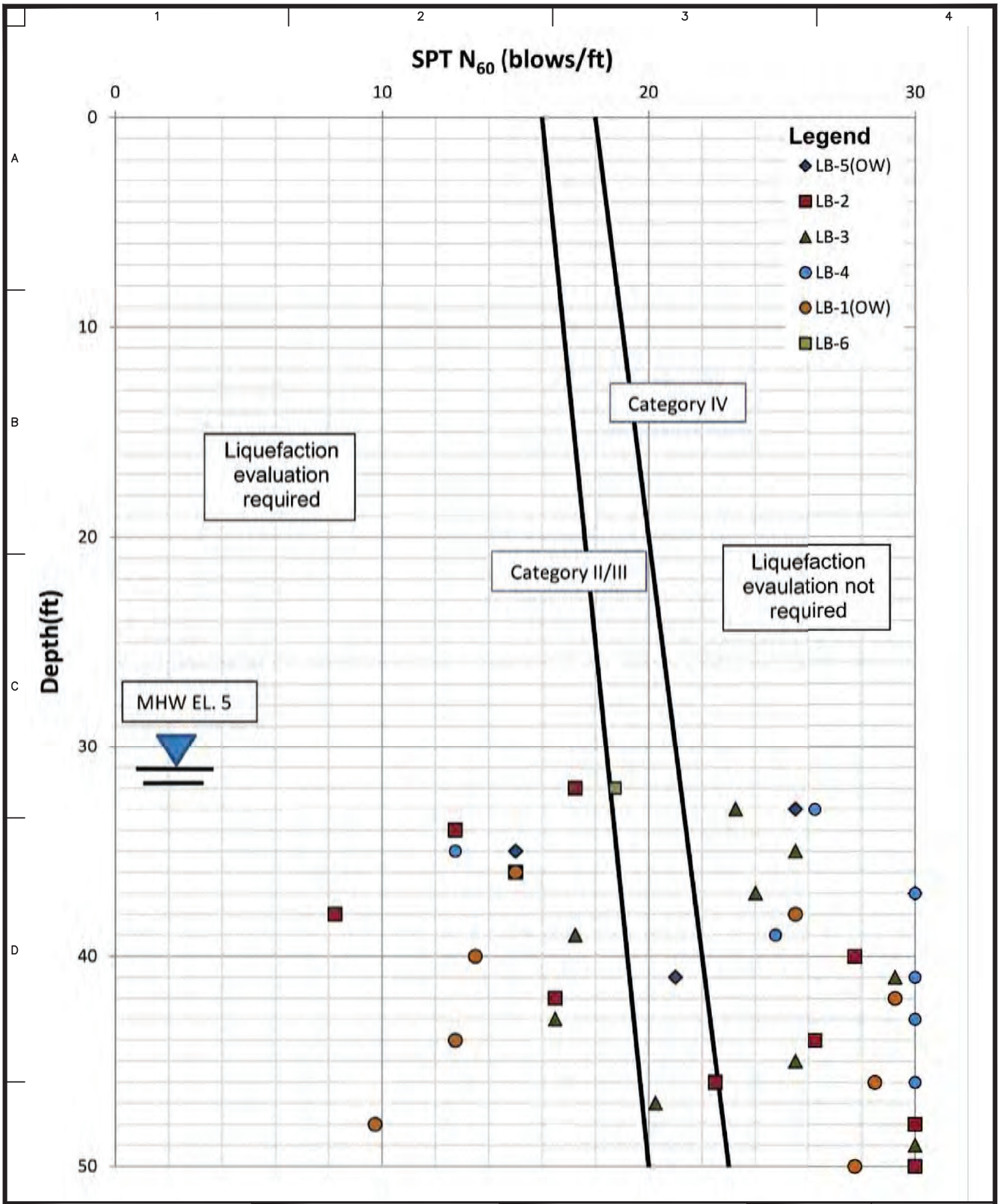

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Project
126 NASSAU STREET
BLOCK No. 92, LOT No.30
NEW YORK
NEW YORK NEW YORK

Drawing Title
NYCBC LIQUEFACTION ANALYSIS

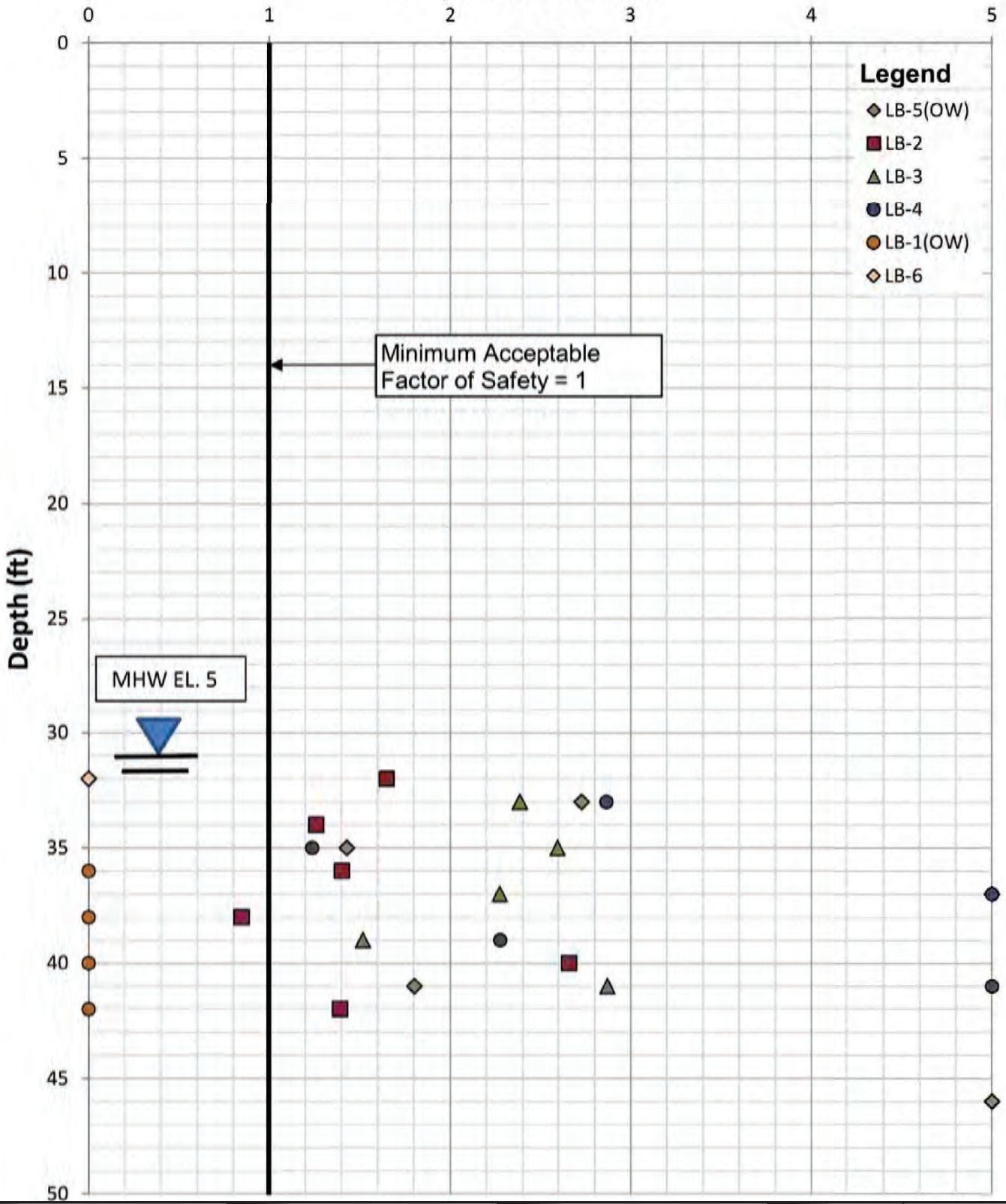
Project No.	170545701
Date	06/22/2020
Drawn By	SK
Checked By	LEF

Drawing No. 6

Sheet 6 of 9

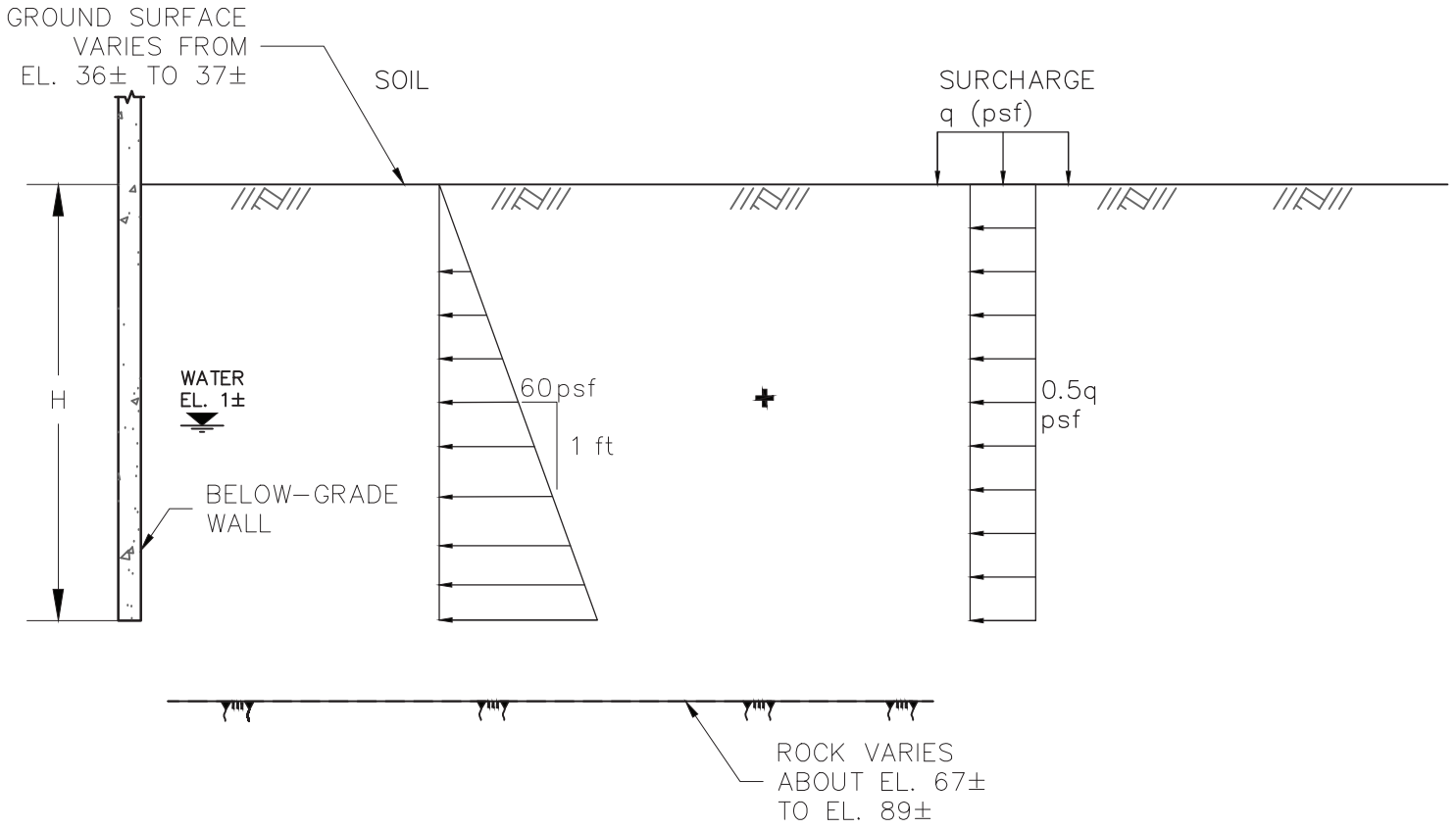
Filename: \\langan.com\data\NYC\data7\170545701\project data\CAD\01\sheetfiles\Geotechnical\Subsurface Investigation\170545701-BL001-0101.dwg Date: 3/30/2020 Time: 16:21 User: skarki Style Table: Langan.stb Layout: ANSIA-BP (1)

Factor Of Safety Against Liquefaction
Simplified Procedure



LANGAN Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. 21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com	Project 126 NASSAU STREET BLOCK No. 92, LOT No.30 NEW YORK NEW YORK NEW YORK	Drawing Title YOUD ET. AL LIQUEFACTION ANALYSIS	Project No. 170545701 Date 06/22/2020 Drawn By SK Checked By LEF	Drawing No. 7 Sheet 7 of 9

Filename: \\langan.com\data\NYC\data7\170545701\project data\CAD\01\sheetfiles\Geotechnical\Subsurface Investigation\170545701-BL001-0101.dwg Date: 3/30/2020 Time: 16:52 User: skarki Style Table: Langan.stb Layout: ANSIA-BP (2)



LEGEND:

H = HEIGHT OF BELOW GRADE WALL

LANGAN
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New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
126 NASSAU STREET
BLOCK No. 92, LOT No.30
NEW YORK
NEW YORK NEW YORK

Drawing Title
LATERAL EARTH PRESSURE DIAGRAM

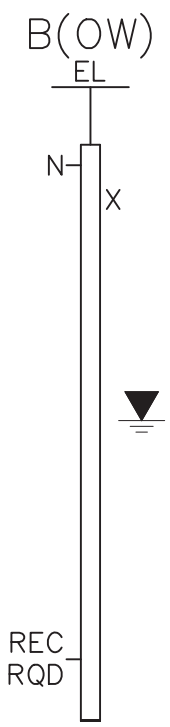
Project No.	170545701
Date	06/22/2020
Drawn By	SK
Checked By	SCS

Drawing No. 8

Sheet 8 of 9

Filename: \\langan.com\data\NYC\data7\170545701\project data\CAD\01\sheetfiles\Geotechnical\Subsurface Investigation\170545701-BL001-0101.dwg Date: 3/30/2020 Time: 16:55 User: skarki Style Table: Langan.stb Layout: ANSIA-BL

BORING KEY



B BORING IDENTIFICATION

EL GROUND SURFACE ELEVATION AT TIME OF BORING

N STANDARD PENETRATION RESISTANCE; NUMBER OF BLOWS OF A 140 LB. HAMMER FREE FALLING 30 IN. TO DRIVE A 2 IN O.D. SPLIT SPOON SAMPLER 12 IN. AFTER 6 INCHES OF INITIAL PENETRATION

REC (LENGTH OF ROCK RETRIEVED)/(LENGTH OF ROCK CORED)*100%

RQD ROCK QUALITY DESIGNATION
(LENGTH OF ROCK PIECES 4 INCHES OR LONGER)/
(LENGTH OF ROCK CORED)*100%

X NEW YORK CITY BUILDING CODE CLASSIFICATION

(OW) GROUNDWATER OBSERVATION WELL

▼ MEASURED GROUNDWATER LEVEL

C–1 ROCK CORE RUN IDENTIFICATION AND LENGTH

MATERIAL SYMBOLS

F UNCONTROLLED FILL

S SAND

SM SANDY SILT/SILTY SAND

R SOFT ROCK–WEATHERED ROCK (CLASS 1D ROCK)

R MEDIUM SOUND ROCK OR BETTER (CLASS 1C ROCK OR BETTER)

NEW YORK CITY BUILDING CODE CLASSIFICATION NUMBER

CLASS 1A	HARD SOUND ROCK
CLASS 1B	MEDIUM SOUND ROCK
CLASS 1C	INTERMEDIATE ROCK
CLASS 1D	SOFT ROCK–WEATHER ROCK
CLASS 2A	DENSE SANDY GRAVEL & GRAVEL
CLASS 2B	MEDIUM SANDY GRAVEL & GRAVEL
CLASS 3A	DENSE GRANULAR SOILS
CLASS 3B	MEDIUM GRANULAR SOILS
CLASS 4A	HARD CLAYS
CLASS 4B	STIFF CLAYS
CLASS 4C	MEDIUM CLAYS
CLASS 5A	DENSE SILTS & SILTY SOILS
CLASS 5B	MEDIUM SILTS & SILTY SOILS
CLASS 6	ORGANIC SILTS & CLAYS, PEATS, SOFT CLAYS LOOSE GRANULAR SOILS, AND VARVED SILTS
CLASS 7	CONTROLLED & UNCONTROLLED FILLS

LANGAN
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21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
126 NASSAU STREET
BLOCK No. 92, LOT No.30
NEW YORK
NEW YORK NEW YORK

Drawing Title
LANGAN STANDARDS

Project No. 170545701
Date 06/22/2020
Drawn By SK
Checked By SCS

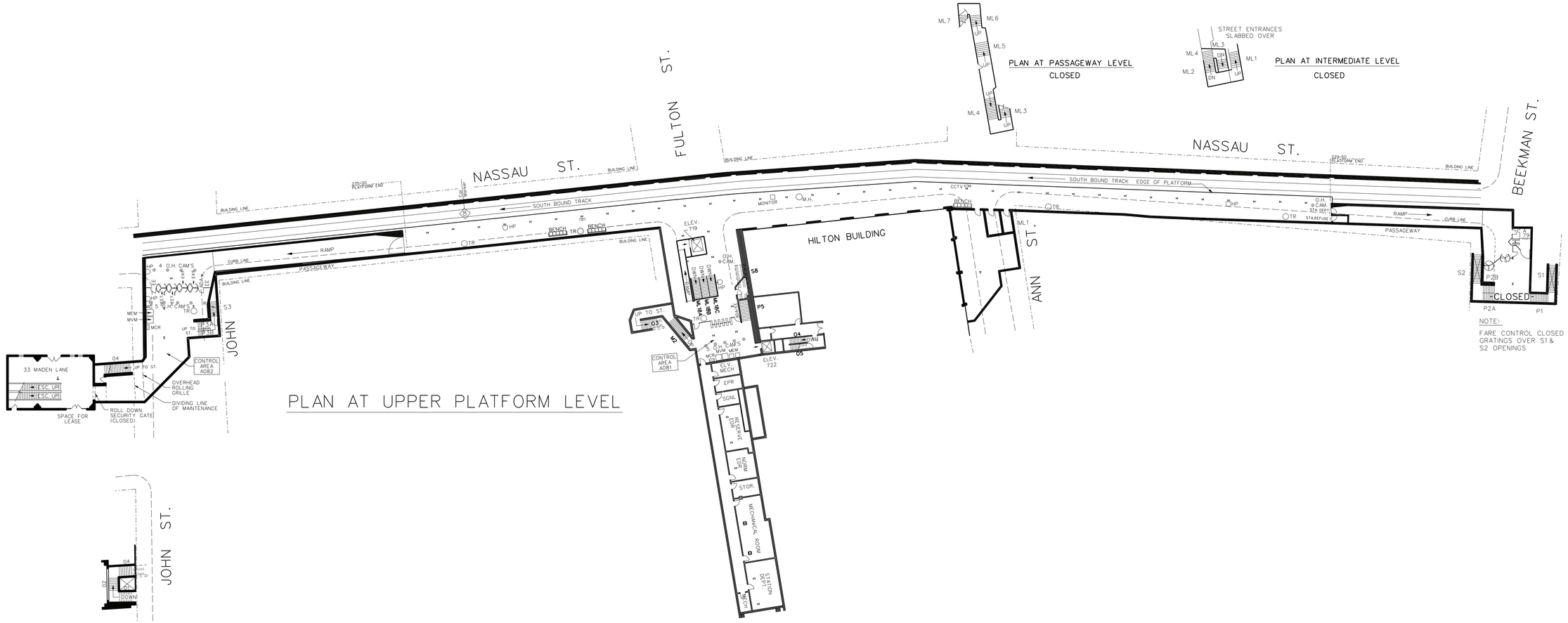
Drawing No.
Sheet 9 of 9

Filename: \\langan.com\data\NYC\data7\170545701\project data\CAD\01\sheetfiles\Geotechnical\Subsurface Investigation\170545701-BL001-0101.dwg Date: 3/30/2020 Time: 16:24 User: skarki Style Table: Langan.stb Layout: ANSIA-BP

APPENDIX A

New York City Transit Authority Drawings

LANGAN



LEGEND:

ADA	AUTOGATE FOR DISABLED ENTRY
CA☐	CUSTOMER ASSISTANCE INTERCOM
EE	EMERGENCY EXIT GATE
EM☐	ELECTRONIC SUBWAY MAP
HP⌂	HELP POINT CUST. ASSIST INTERCOM

NOTE: THIS DRAWING SUPERSEDES DRAWING MS-7417-B DATED 10-16-69.

DATE	REVISIONS	BY
08-21-96	SURVEYED, REVISED FARE CONTROLS	JL
04-13-99	SURVEYED, REVISED FARE CONTROLS	ECS
12-03-01	ALTERATION AT CONTROL AREA AT FULTON ST. ENTRANCE.	DI
9-17-03	REVISED AS PER FIELD SURVEY, NO STRUCTURAL CHANGES.	DI
11-24-03	JOHN STREET FARE CONTROL REVISED.	DI
9-07-05	BOOTH A82 REMOVED AT JOHN STREET, FARE CONTROL REVISED.	HH
4-25-07	EMERGENCY EXIT GATES INSTALLED; HI- EXIT TURNSTILE INSTALLED AT A81K FARE CONTROL	HH
1-6-10	REVISED, STATION REHABILITATED AS PER CONTRACT A-35712.	DI/HH
12-10-11	CONTROL AREA NUMBER ADDED AS PER OPERATIONS PLANNING	DI
12-07-12	REVISED, STATION UNDER REHABILITATION	SG
5-16-13	REVISED, STATION REHABILITATED AS PER CONTRACT A-36121	DI
6-12-14	FARE CONTROL UPDATED- FULTON ST. EXIT	HH
1-15-15	REVISED AS PER FIELD SURVEY, NO STRUCTURAL CHANGES.	DI
7-05-17	SURVEYED- HELP POINTS ADDED	HH

SCALE

0 25 50 100 FT

SHEET 1 of 2

NEW YORK CITY TRANSIT
DEPARTMENT OF SUBWAYS
DIVISION OF ROLLING STOCK & MAINTENANCE OF WAY
ENGINEERING SUBDIVISION
INFRASTRUCTURE SECTION

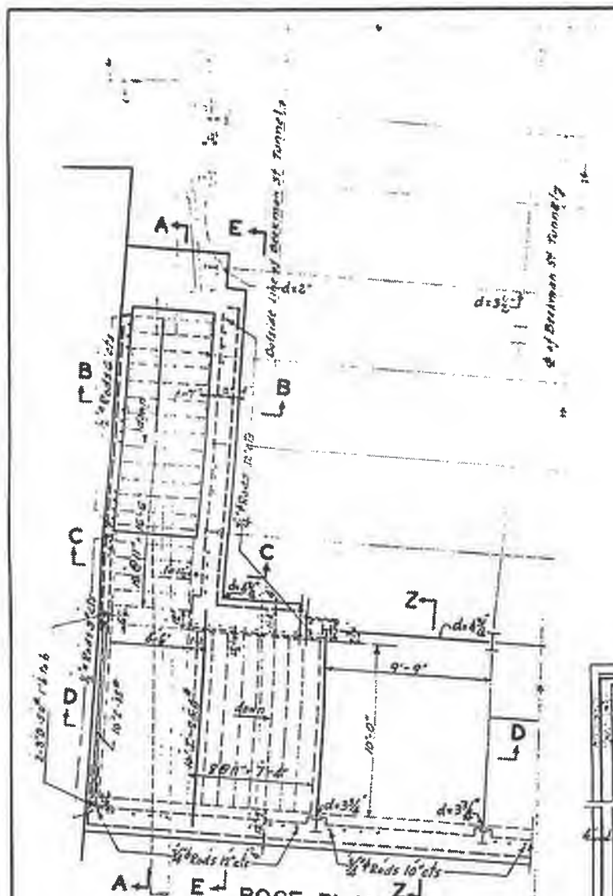
FULTON STREET STATION

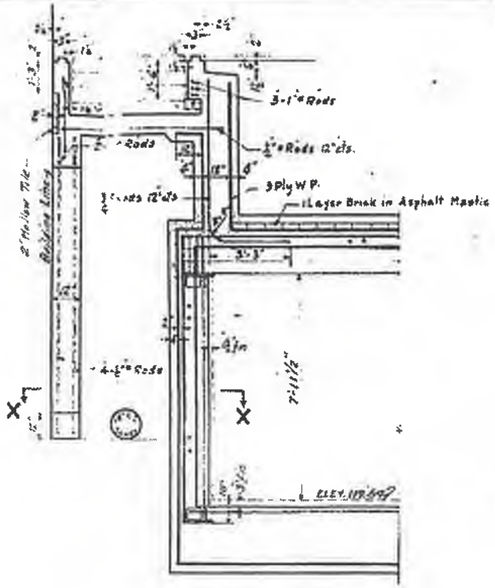
UPPER PLATFORM STATION PLAN

NASSAU LOOP - BMT DIVISION

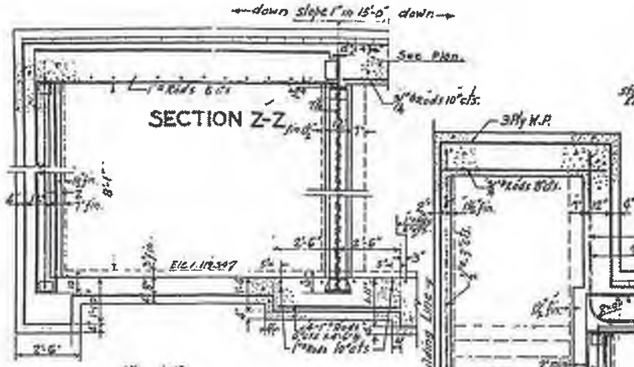
STATION NUMBER: 106 DATE: 08-23-96

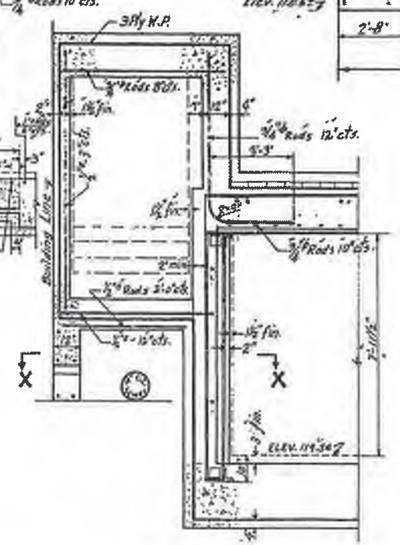
24" x 42"



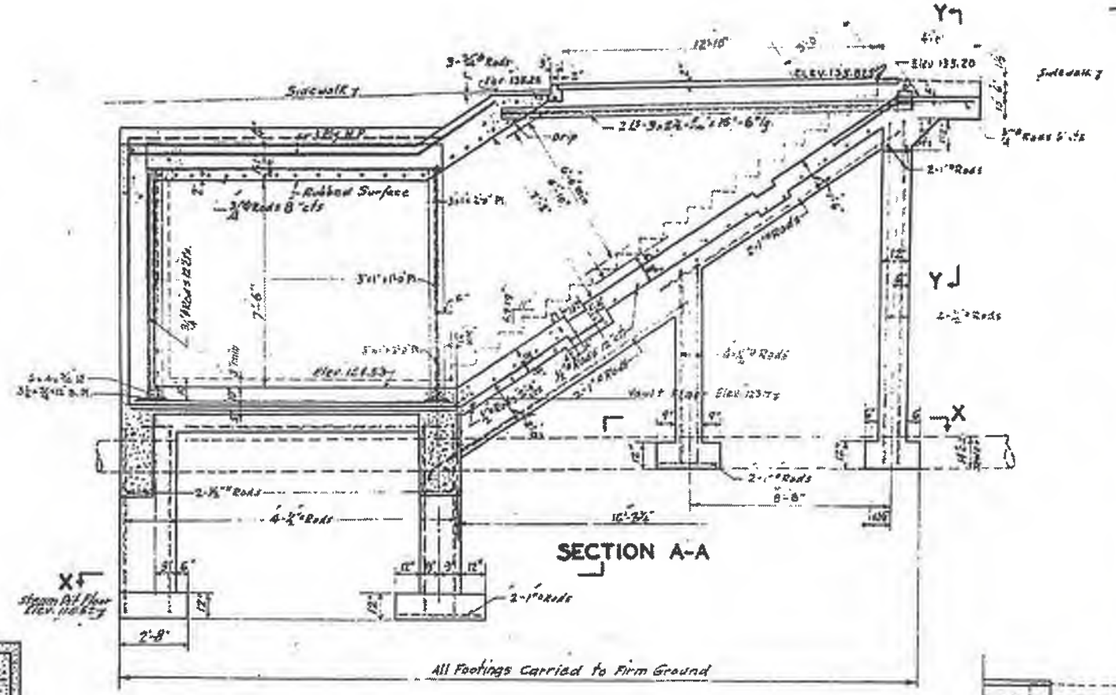


SECTION B-B

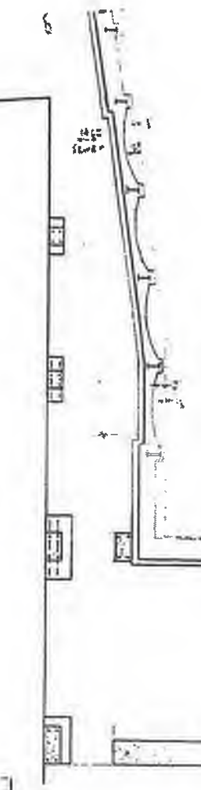




SECTION C-C



SECTION A-A



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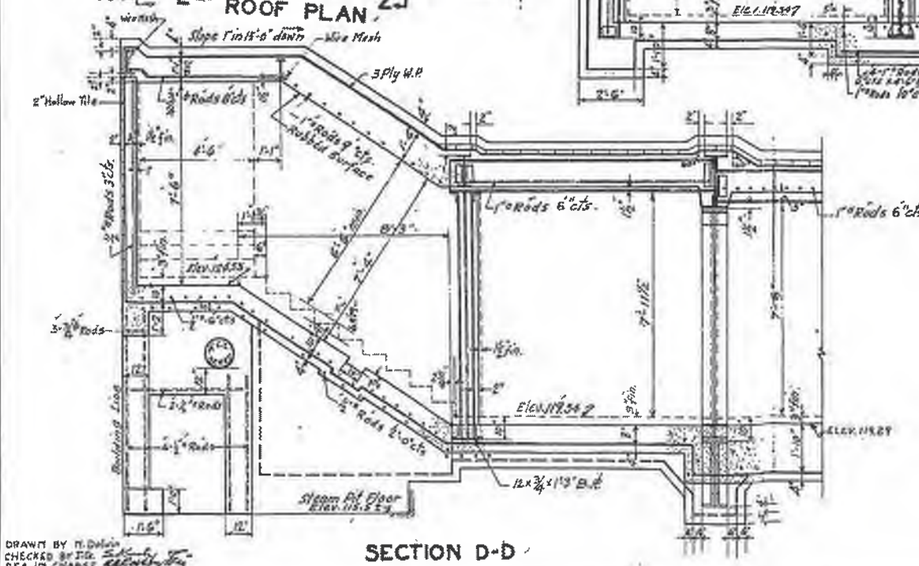
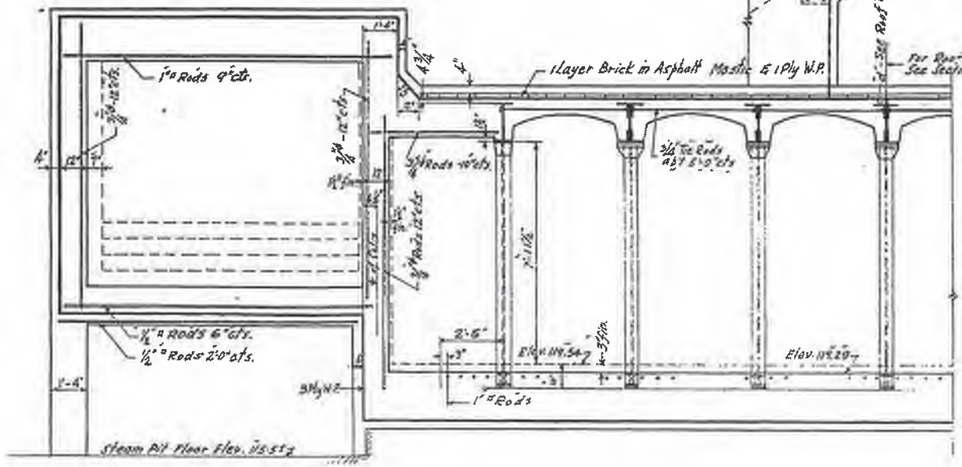


SECTION D-D

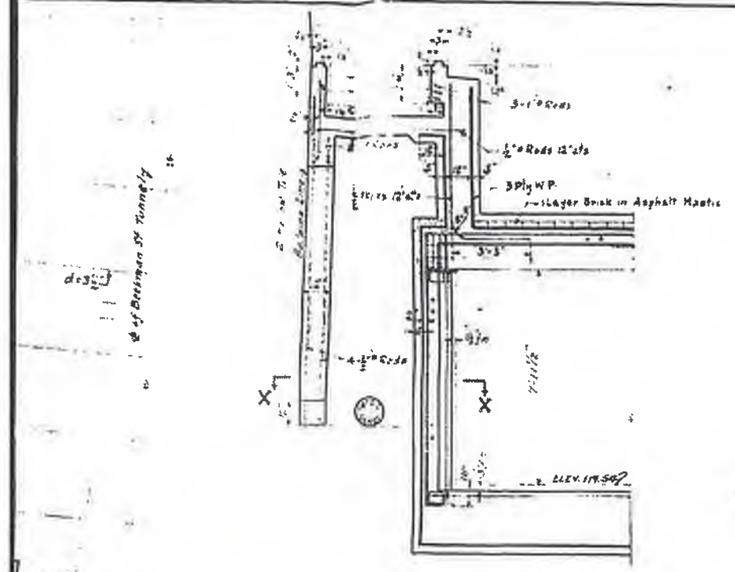


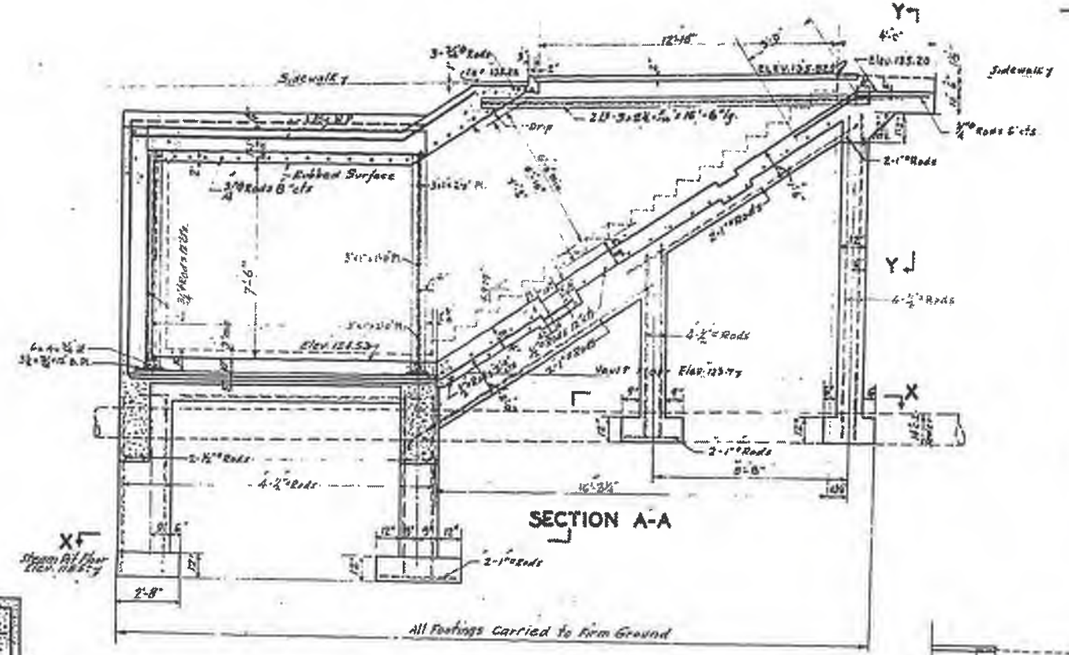
SECTION E-E

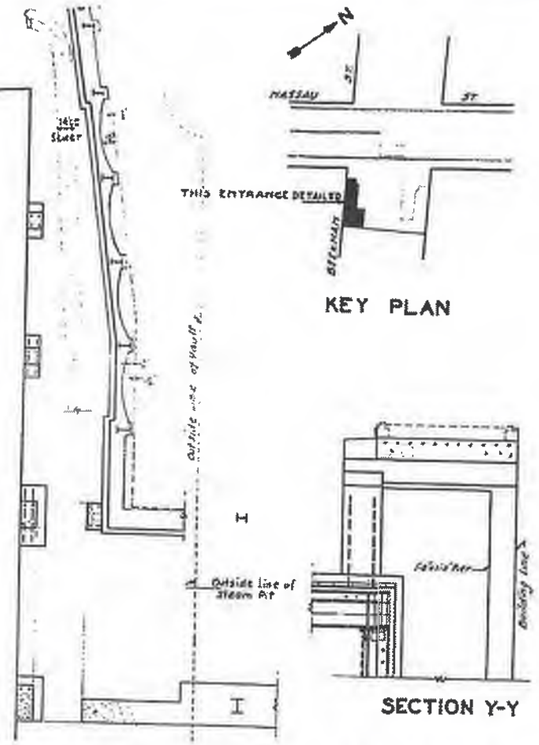
NOTE. 6 Ply. W.P. may be used instead of 1 Ply W.P. & 1 layer of Brick in asphalt mastic, where directed by the Engineer.

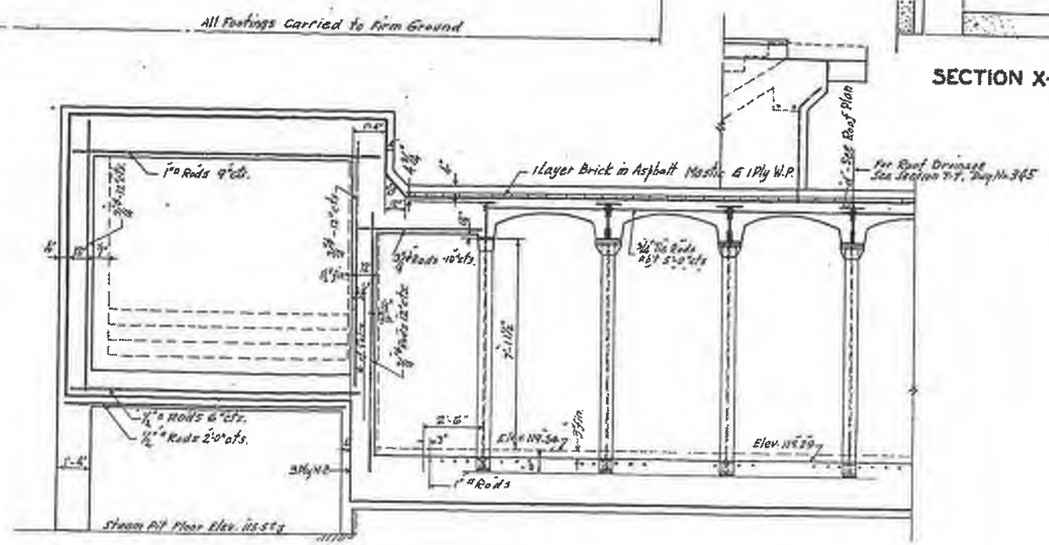
DRAWN BY R. DeVoin
CHECKED BY [illegible]
DES. IN CHARGE [illegible]
MUNICIPAL ENGINEER

F1









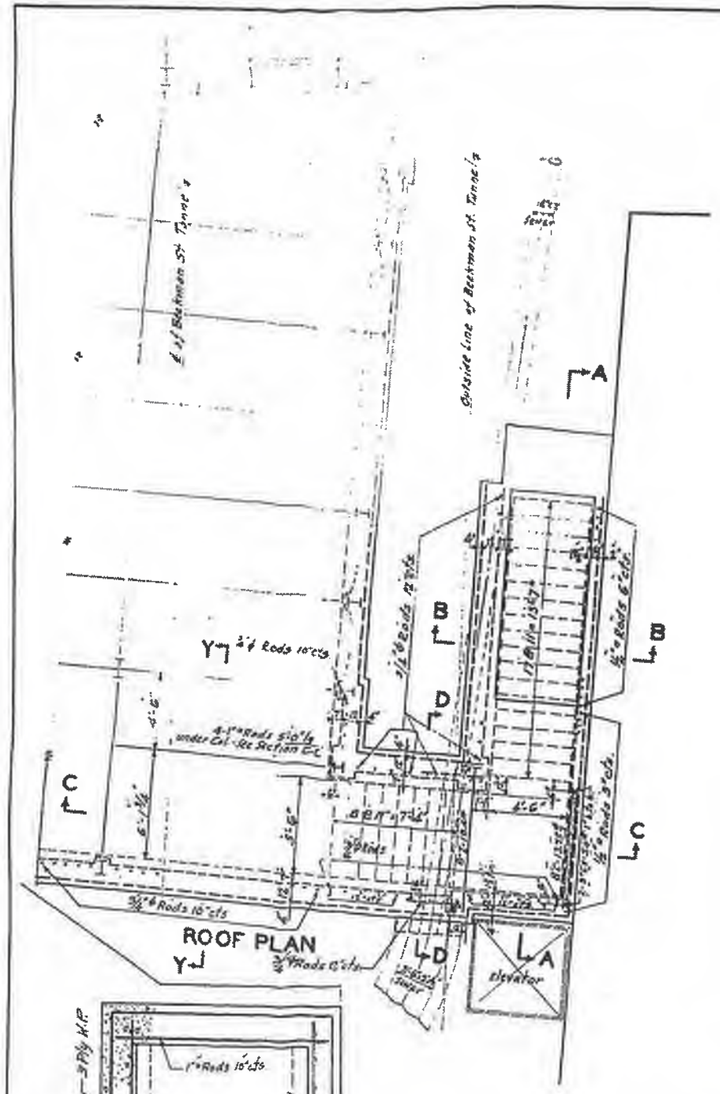
NOTE.
4 Ply. W.P. may be used instead of 1 Ply W.P. & 1 layer of Brick in asphalt mastic, where directed by the Engineer.

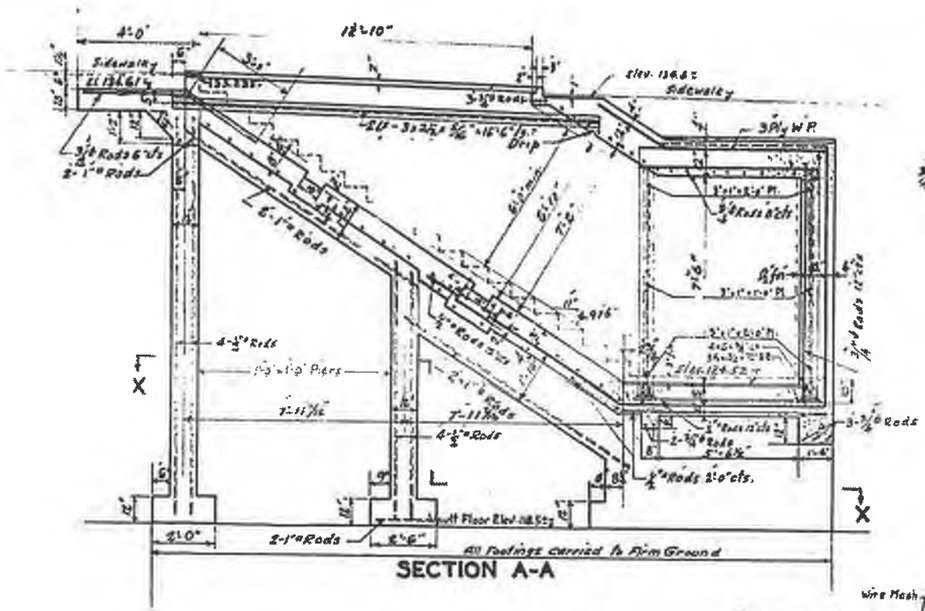
CROSS REFERENCES
For Main Roof and Invert Plan See Dwg. No. 332

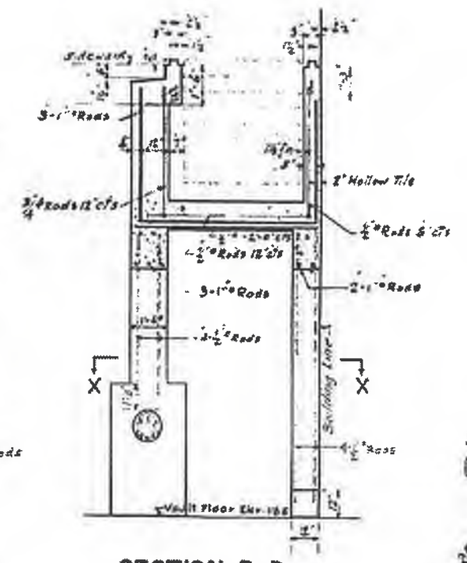
BOARD OF TRANSPORTATION
OF THE CITY OF NEW YORK.
ENGINEERING DEPARTMENT
ROUTE NO. 45 SECTION NO. 1
NASSAU STREET
LIBERTY ST. TO PARK ROW
STATION AT FULTON ST.
S.E. ENTRANCE AT BEEKMAN ST.
STRUCTURAL PLANS
PLAN & SECTIONS

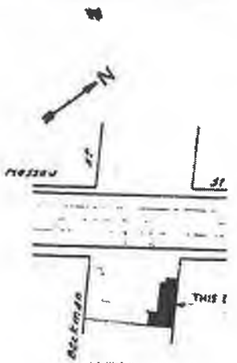
Scale PLAN 1/4"=1'-0" SECTIONS 3/8"=1'-0"
Date Feb. 7, 1929.
Division Engineer
Chief Engineer
File No. 2501
Dwg. No. 408

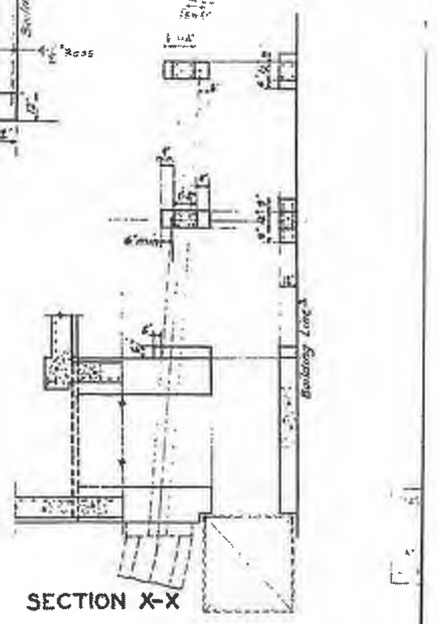
SUB SECTION NO. 7

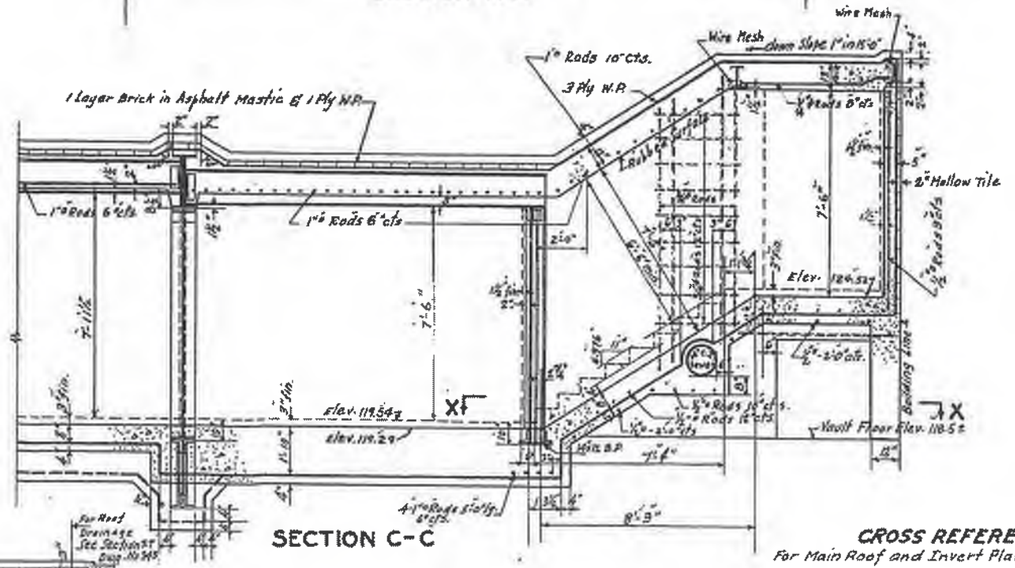


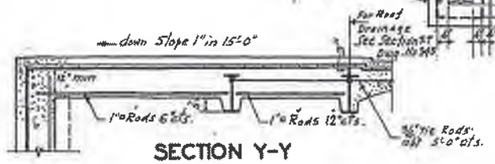












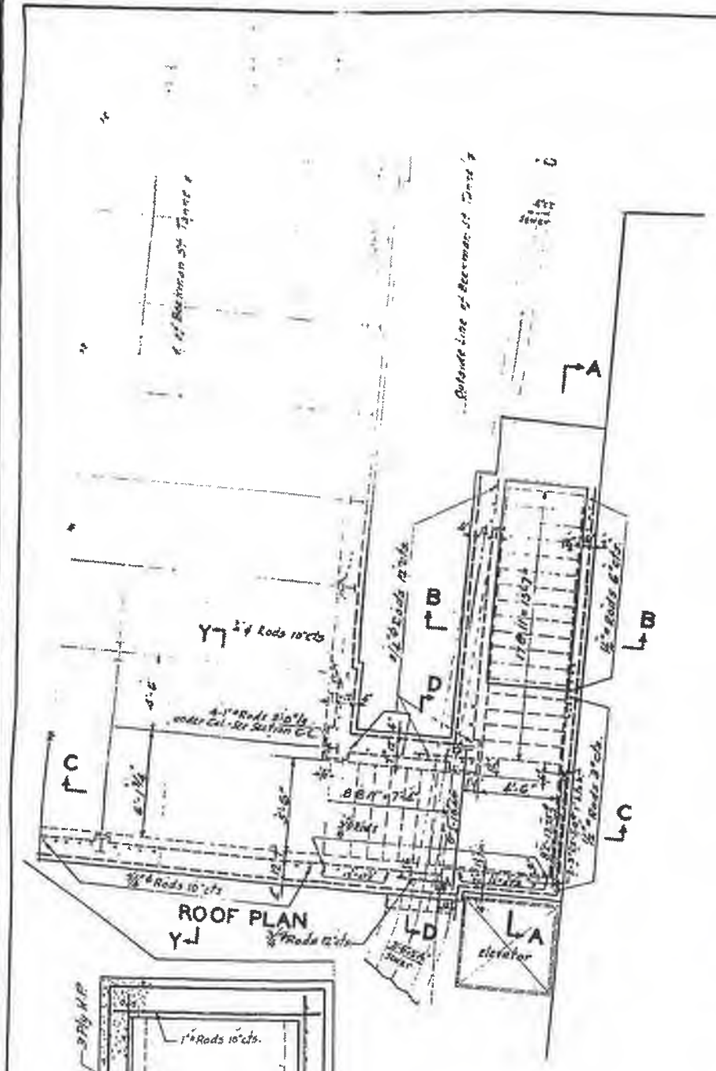
NOTE.
4 Ply. W.P. may be used instead of 1 Ply. W.P. & 1 layer of Brick in asphalt mastic, where directed by the Engineer.

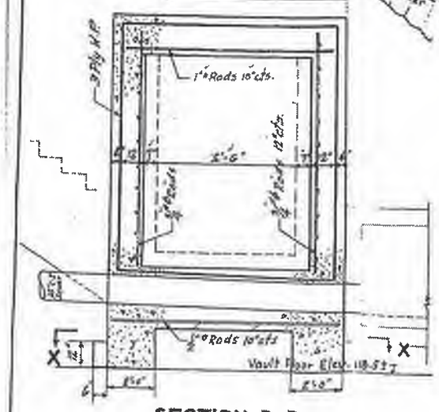
CROSS REFERENCES
For Main Roof and Invert Plan See D'wg. No. 332

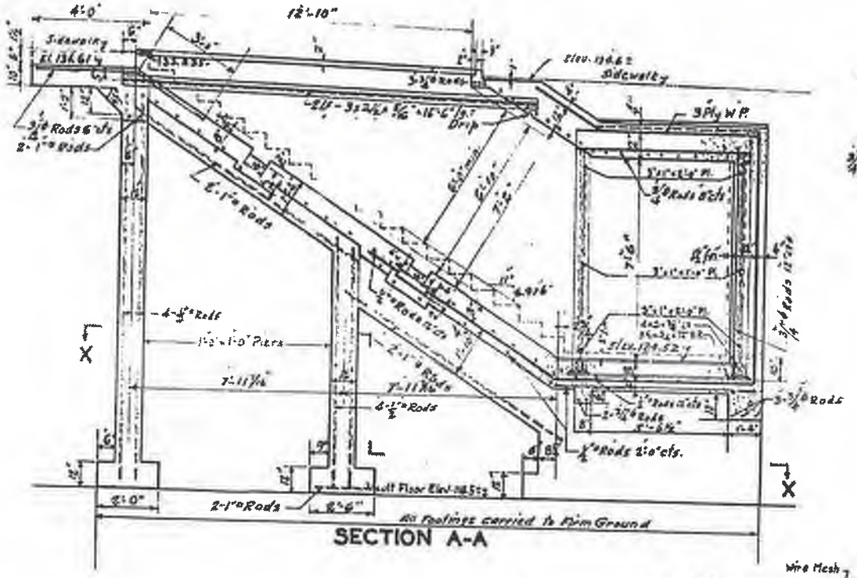
BOARD OF TRANSPORTA
OF THE CITY OF NEW YORK
ENGINEERING DEPARTM
ROUTE NO. 45 SECTIO
NASSAU STREET
LIBERTY ST. TO PAR
STATION AT FULTO
N.E. ENTRANCE AT BEEK
STRUCTURAL PLAN
PLAN & SECTIONS
Scale PLAN - 1/4" = 1'-0" SECTIONS - 3/8" = 1'-0"
Date Feb. 7, 1929.
Division Engineer
File
Dwg.

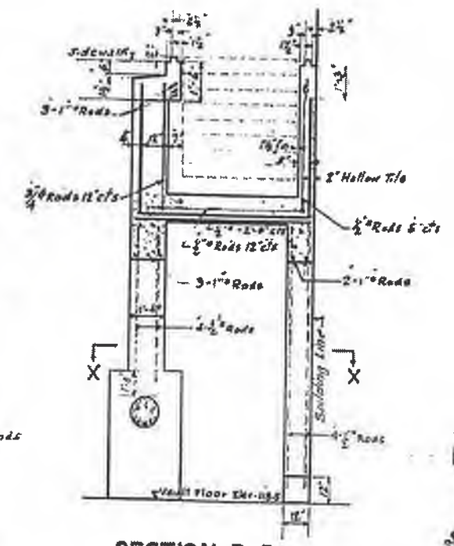
DRAWN BY M. Dolwin
CHECKED BY J.G. - [illegible]
DES. IN CHARGE [illegible]
DESIGNING ENGINEER

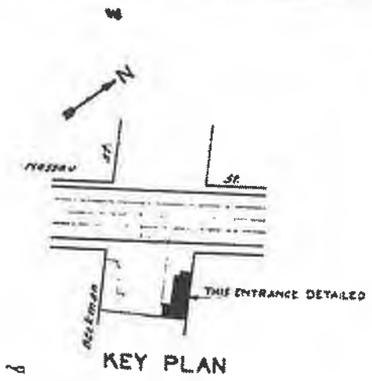
SUB-SECTION

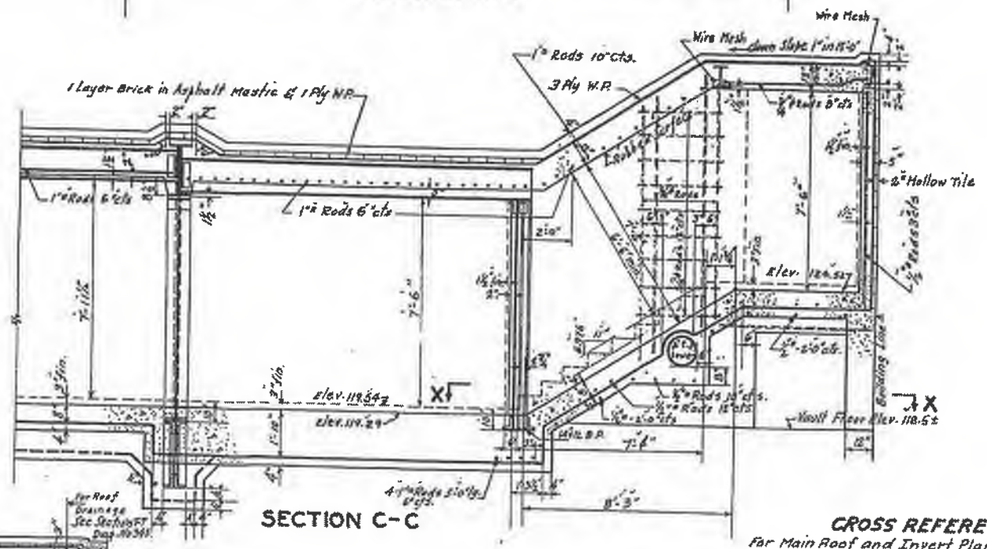


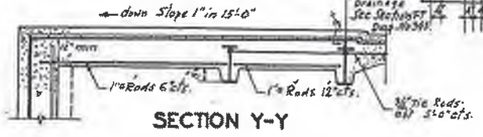




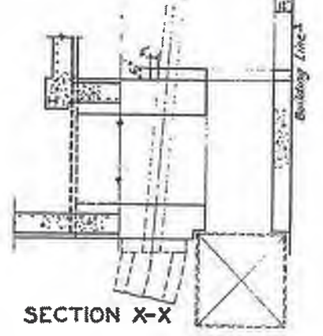








NOTE.
4 Ply. W.P. may be used instead of 1 Ply W.P. & 1 layer of Brick in asphalt mastic, where directed by the Engineer.



CROSS REFERENCES
For Main Roof and Invert Plan See D'wg. No. 332

BOARD OF TRANSPORTATION
OF THE CITY OF NEW YORK
ENGINEERING DEPARTMENT
ROUTE NO. 45 SECTION NO. 1
NASSAU STREET
LIBERTY ST. TO PARK ROW
STATION AT FULTON ST.
N.E. ENTRANCE AT BEEKMAN ST.
STRUCTURAL PLANS
PLAN & SECTIONS

Scale PLAN - 1/4" = 1'-0"
SECTIONS - 3/8" = 1'-0"
Date Feb. 2, 1929.

DRAWN BY M. Polwin
CHECKED BY [illegible]
DES. IN CHARGE [illegible]
DESIGNING ENGINEER

Chief Engineer
Division Engineer

File No. 2501
Dwg. No. 407

SUB-SECTION NO. 7

PLAN AT STREET LEVEL

PLAN AT BASEMENT LEVEL

SECTION A-A

SECTION B-B

SECTION C-C

SECTION X-X

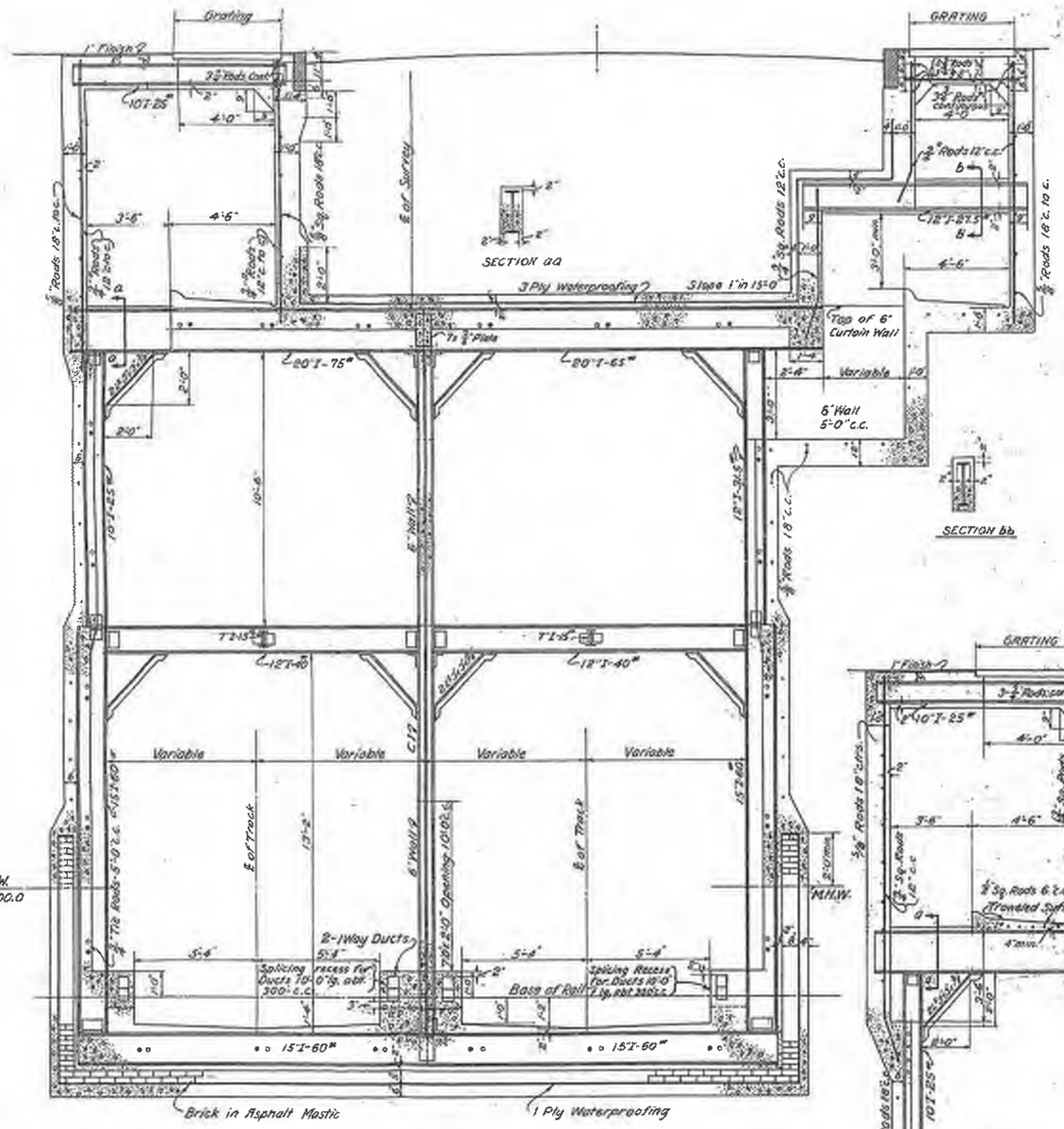
DETAIL OF TREAD & RISER

ELEVATION OF RISER

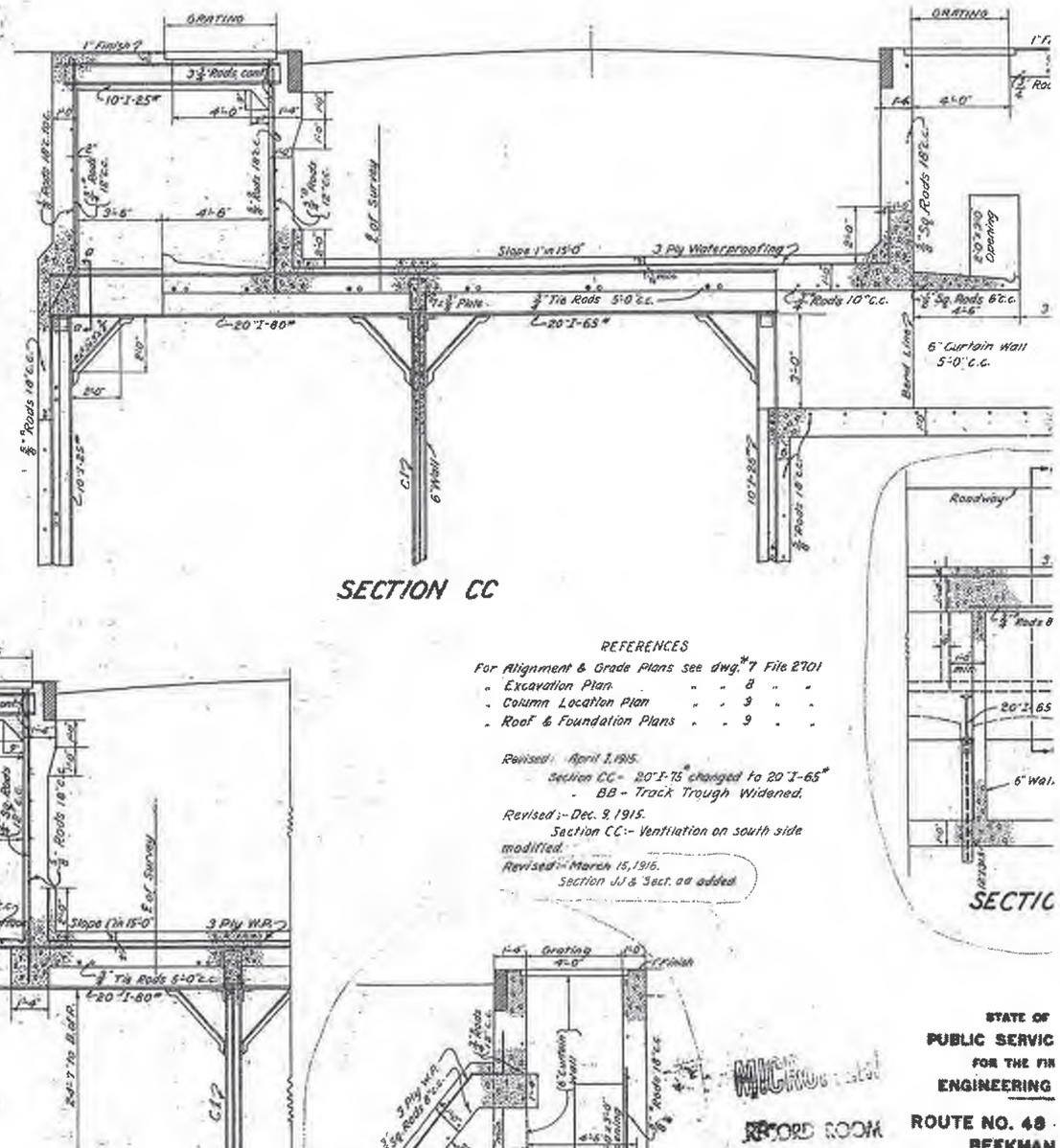
KEY PLAN

JOHN STREET

ROUTE NO. 45 SECTION NO. 4
FULTON STREET STATION
STATION FINISH



SECTION BB

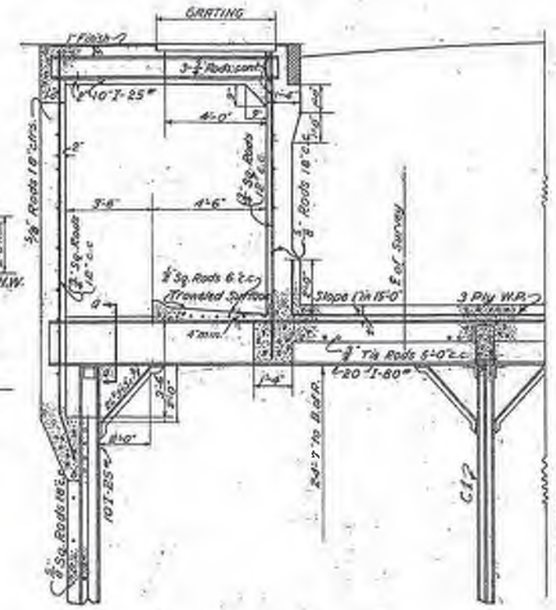


SECTION CC

REFERENCES

For Alignment & Grade Plans see dwg.#7 File 2701
" Excavation Plan " " 8 " "
" Column Location Plan " " 9 " "
" Roof & Foundation Plans " " 9 " "

Revised:- April 7, 1915.
Section CC:- 20"I-75# changed to 20"I-65#
" BB - Track Trough Widened.
Revised:- Dec. 9, 1915.
Section CC:- Ventilation on south side modified.
Revised:- March 15, 1916.
Section JJ & Sect. aa added.



SECTION DD

SECTION aa

STATE OF
PUBLIC SERVIC
FOR THE FIS
ENGINEERING

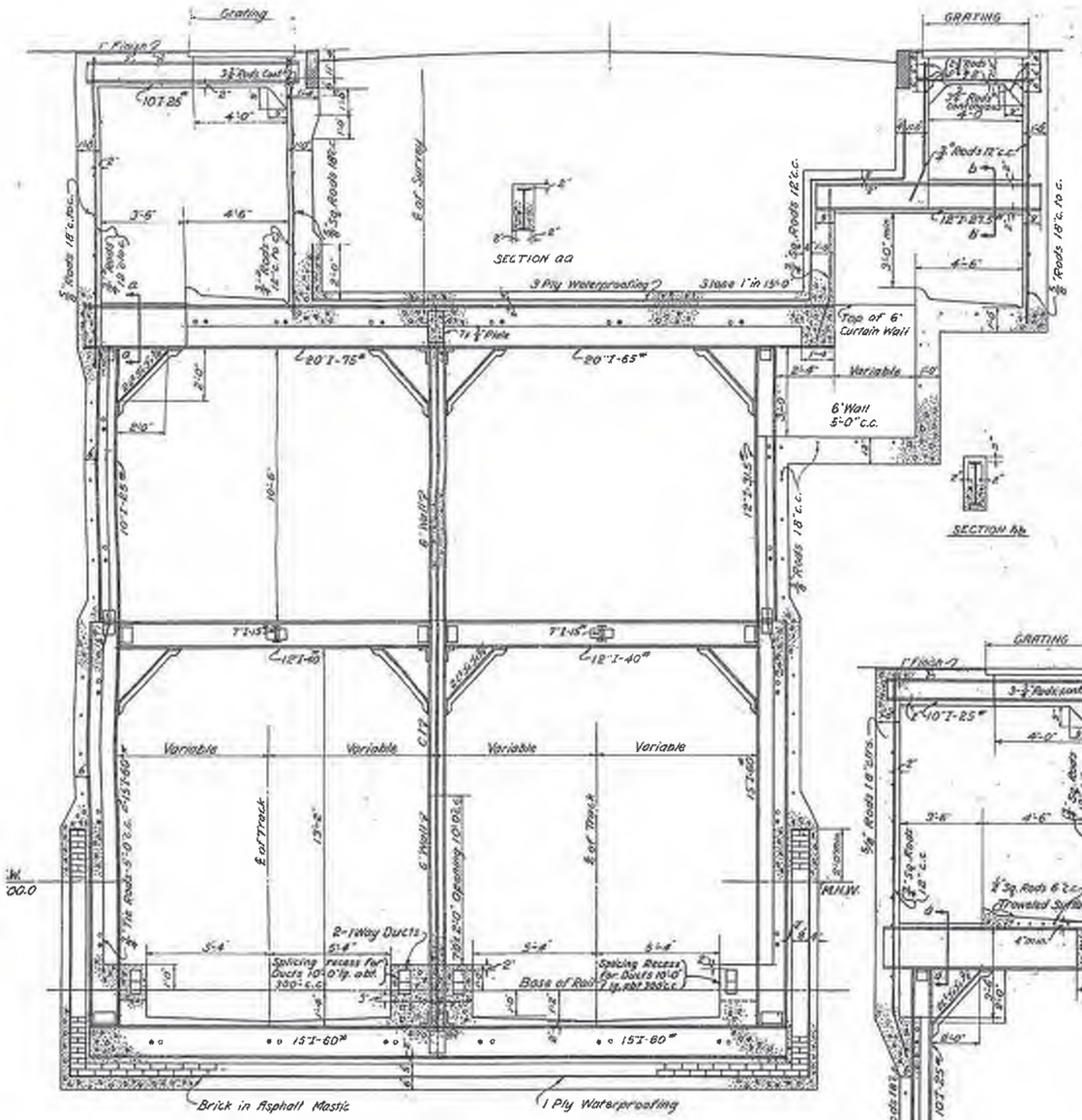
ROUTE NO. 48
BEEKMAN
STA. 17+87 T
STRUCTUI
SECTIONS B-

SCALE ⅜" = 1'-0"

DRAWN BY J.H.
CHECKED BY J.L.O.

SUB SECT. 6

F1



STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTE NO. 46 - SECTION NO. 1
BEEKMAN STREET
STA. 17+87 TO STA. 19+22
STRUCTURAL PLANS
SECTIONS B-B, C-C & D-D

SCALE ⅜" = 1'-0" DATE FEB. 1, 1915.

CHIEF ENGINEER

DRAWN BY J.H. FILE NO. 2701
TRACED BY H.H.O. DWG. NO. 10

SUB SECT. 6

F2

MAIL ST

POST OFFICE

PARK PLACE

BROADWAY

PARK ROW

POTTER BLDG.

BEEKMAN ST.

BEEKMAN BLDG.

TEMPLE COURT BLDG.

THEATRE ALLEY

NASSAU ST.

NASSAU BEEKMAN BLDG.

VANDERBILT BLDG.

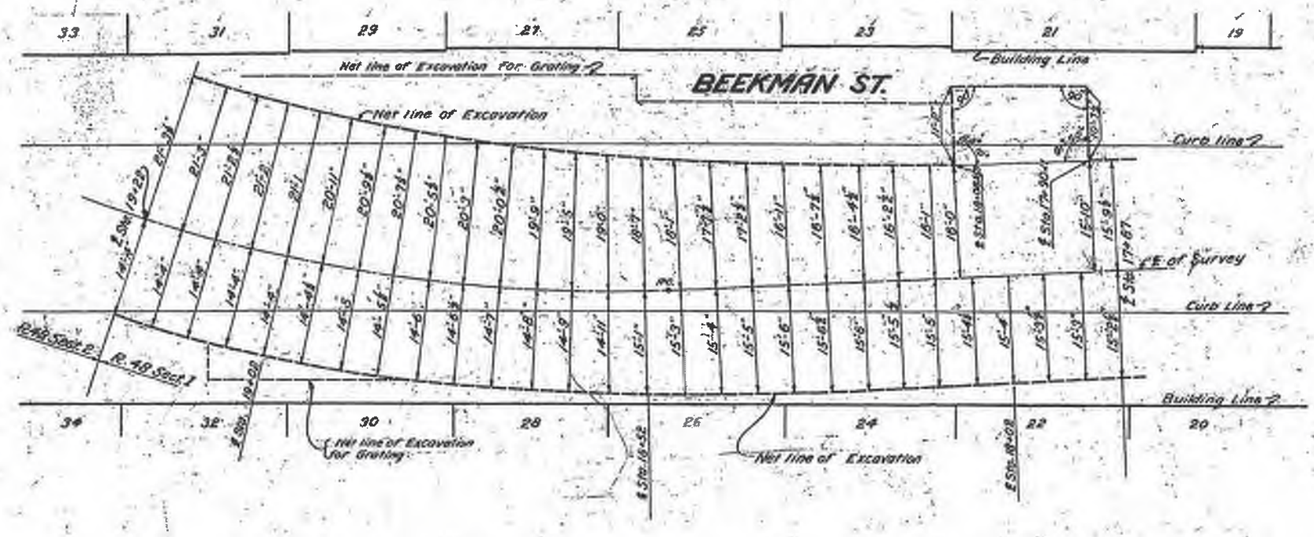
WILLIAM ST.

Revised:- Nov 14, 1914.
Construction base lines & references added.
Drawn by:- J.R.B.
Checked by:- W.B.F.

Revised Feb 8 1916. Offset of 4.9052 on Beekman St. B.L. changed to 22.035

TRANSIT COM.
RECORD DEPT.
Sent SEP 23 '22
Received 3

PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPT.
ENGINEER SEVENTH DIVISION
CONTRACT No. ROUTE 48 SECTION 1 & 2
LOCATION Nassau Beekman Sts.
SUBJECT Referencing Base Line & Grade Line
DRAWING No. ____ FILE 48-90
DRAWN BY J.R.B. CHECKED BY W.B.F.
SCALE 1" = 20' DAT 9/28/1914
ENGINEER SEVENTH DIV.



Note.
Offsets are given at every bent, and are radial or perpendicular to E of Survey.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTE NO. 48 - SECTION NO 1
BEEKMAN STREET
STATION 17+87 TO STATION 19+22
STRUCTURAL PLANS
EXCAVATION PLANS

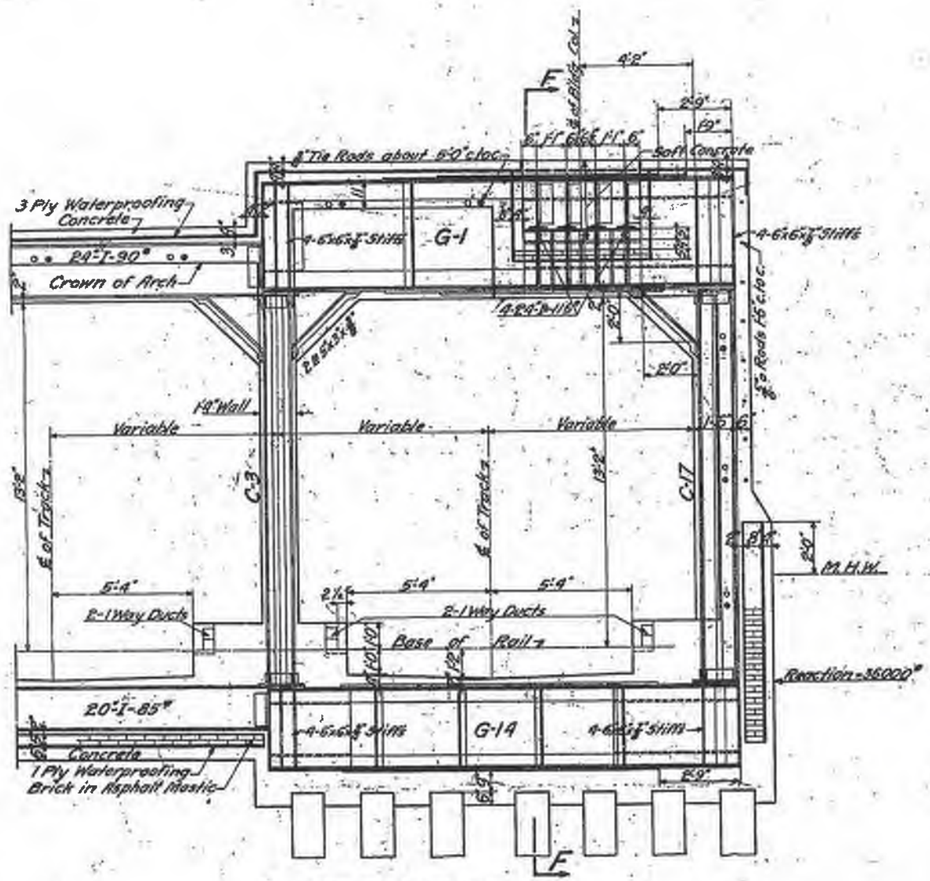
SCALE 1" = 10'-0"

DATE FEB. 5 1917

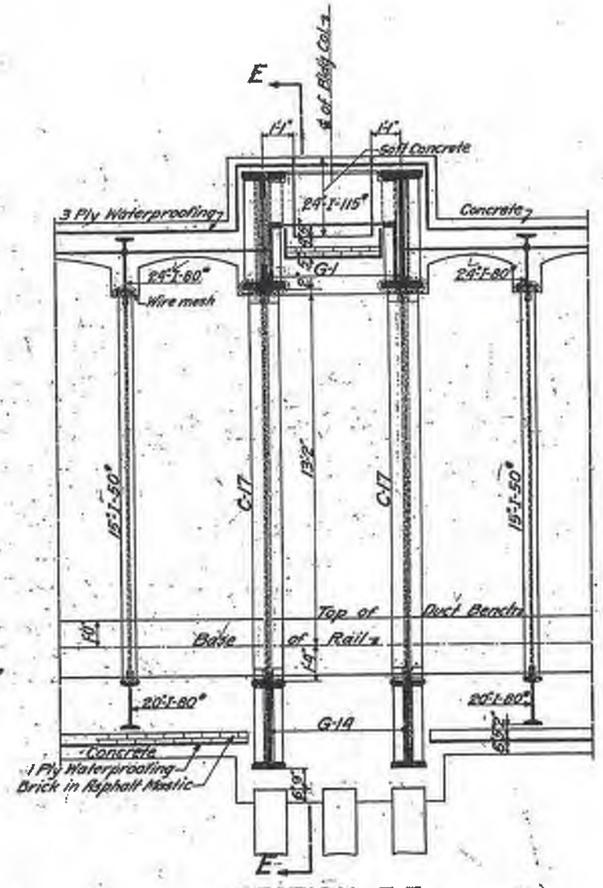
CHIEF ENGINEER

SUB SECT. 6

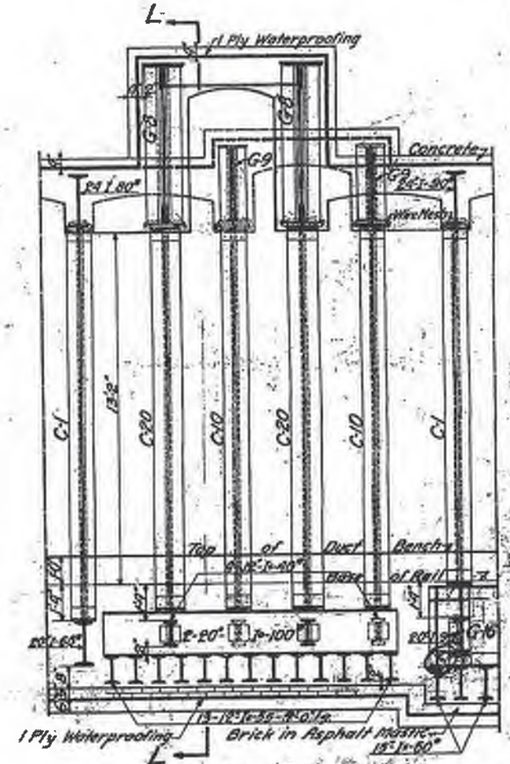
DRAWN BY J.H.



SECTION E-E



SECTION F-F



SECTION M-M

NOTE:-
Leave out Part of Duct Bench as shown dotted, for 10'-0" length about every 300'-0".

Revised June 11th 1915
Distance ℄ of Track to Benches changed from 5'-2" to 5'-4".
Distance edge of Bench to Ducts changed from 4" to 5¼"
2 Way Ducts replaced by 1 Way Ducts.
Revised Dec. 2, 1913
Girder G16 in Section M-M Lowered 4"

REFERENCES:-
For Foundation Plan see Drawing "27 File 2702.
" Roof " " " "26 " "
" Piling " " " "28 " "

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTE. NO. 48 - SECTION NO. 2
WILLIAM ST. - BEEKMAN TO ANN STS.
STA. 18+22 TO STA. 22+15
STRUCTURAL PLANS
NORTH APPROACH TO FULTON ST. STATION
SECTIONS E F & M

SCALE 1/8" = 1'-0"
DATED March 17, 1915.
CHIEF ENGINEER
FILE NO. 2702
DRG. NO. 31

BOARD OF TRANSPORTATION
RECORD DEPT.
Rec'd
Index under
File in Case 3 Drawer V

DRAWN BY Judenfreund
CHECKED BY Fenton
Franken

Subsection I

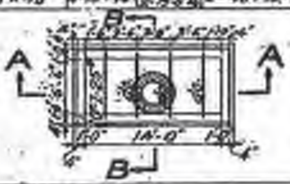
E-D for G5 — For position of Cover Pls. on
E-G for G3 — other Girders see Sections

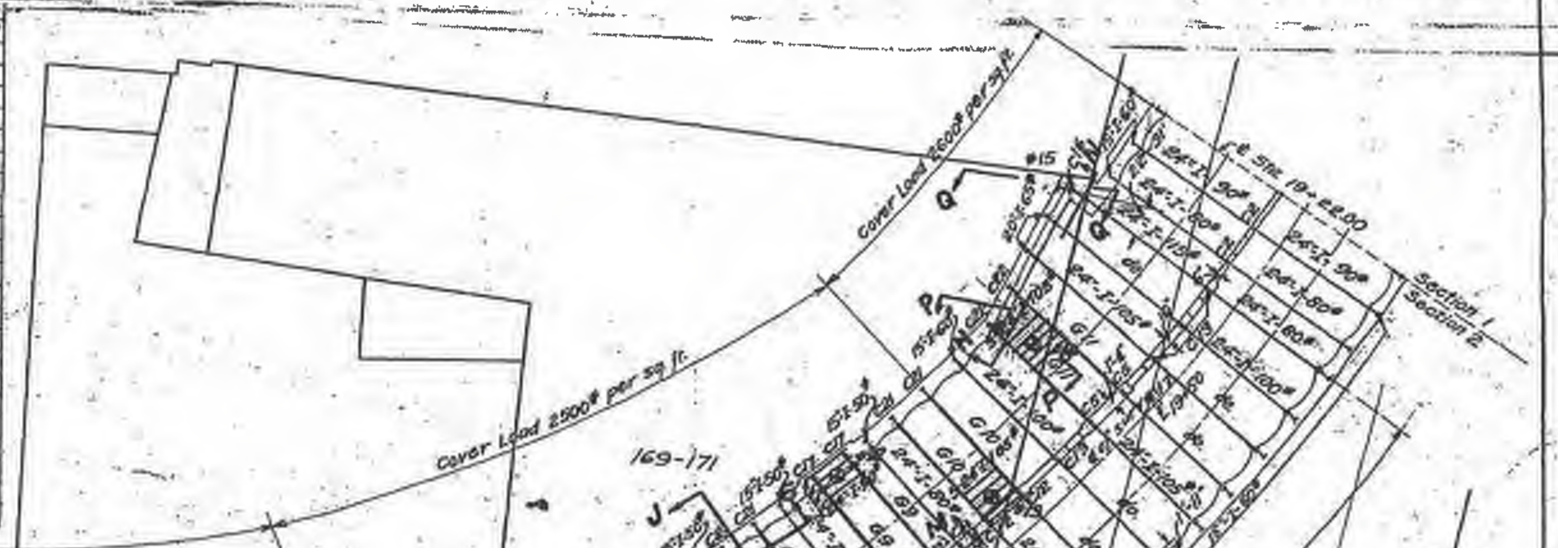
G4

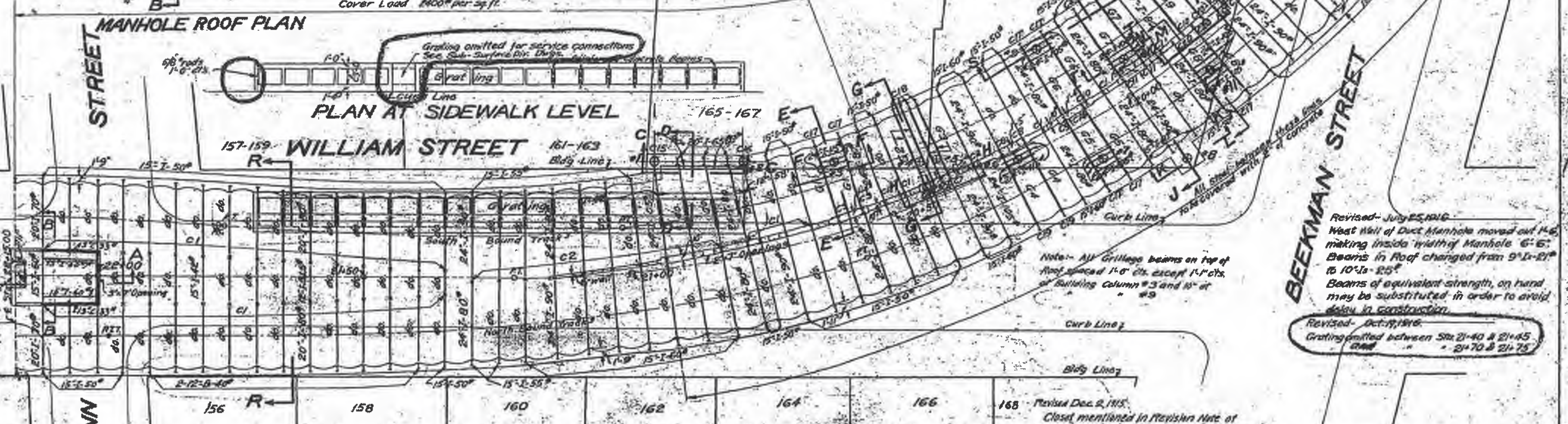
GIRDER SCHEDULE					
Mark	Web	Angles	Cover Pls.	Reinforcing Pls.	Shear in Kips
G1	48"×3/4"	4 L 8"×8"×1/16"	6-18"×3/4" [illegible]	2-3/8" Pls.-7'-6" lg.	295-500
G2	48"×1/2"	4 L 6"×6"×3/4"	4-14"×3/4" [illegible]	2-3/8" Pls.-7'-6" lg.	215-435
G3	48"×1/2"	4 L 6"×6"×9/16"	4-14"×3/4" [illegible]	2-7/16" Pls.-6'-6" lg.	187-553
G4	60"×7/16"	4 L 8"×8"×5/8"	2-18"×1/2"-11'-6" lg.	2-3/8" Pls.-6'-0" lg.	230-625
G5	60"×1/2"	4 L 8"×8"×9/16"	[illegible]	2-3/8" Pls.-6'-0" lg.	260-500
G6	48"×9/16"	4 L 8"×8"×9/16"		2-3/8" Pls.-5'-6" lg.	120-500
G7	48"×7/8"	4 L 8"×8"×9/16"	2-18"×3/4"-10'-0" lg.	2-3/8" Pls.-6'-0" lg.	150-440
G8	72"×3/4"	4 L 8"×8"×9/16"	[illegible]		425-475
G9	36"×3/8"	4 L 6"×6"×9/16"		2-3/8" Pls.-5'-0" lg.	100-250
G10	60"×1/2"	4 L 8"×8"×9/16"		2-3/8" Pls.-5'-0" lg.	120-650
G11	66"×5/8"	4 L 8"×8"×9/16"	4-18"×3/4" [illegible]	2-3/8" Pls.-9'-0" lg.	350-550

COLUMN SCHEDULE				
Mark	Web	Angles	Cover Pls.	Load in Kips
C1	6"×5/16"	4 L-5"×3"×3/8"		183
C2	6"×3/8"	4 L-5"×3"×3/8"		211
C3	12"×3/8"	4 L-6"×3 1/2"×3/8"		400
C4	12"×7/8"	4 L-6"×3 1/2"×7/8"		525
C5	12"×3/4"	4 L-6"×3 1/2"×3/4"		450
C6	12"×5/8"	4 L-6"×3 1/2"×5/8"	2-14"×1/2" Pls.	563
C7	12"×3/4"	4 L-6"×3 1/2"×3/4"	2-14"×1/2" Pls.	650
C8	12"×3/4"	4 L-6"×3 1/2"×3/4"	2-14"×5/8" Pls.	690
C9	10"×3/4"	4 L-5"×3 1/2"×3/4"		300
C10	10"×3/8"	4 L-5"×3 1/2"×3/8"		120
C11	12"×5/8"	4 L-6"×3 1/2"×5/8"		530
C12	12"×3/4"	4 L-6"×3 1/2"×3/4"	2-14"×3/4" Pls.	750
C13	6"×5/16"	4 L-5"×3"×1/2"		233
C14	10"×1/2"	4 L-5"×3 1/2"×1/2"		280
C15	20"×9/16"	4 L-8"×8"×3/4"	4-18"×9/16" Pls.	1347
C16	20"×9/16"	4 L-8"×8"×3/4"	4-18"×9/16" Pls.	1490
C17	14"×5/8"	4 L-6"×6"×9/16"	2-14"×9/16" Pls.	500
C18	14"×5/8"	4 L-6"×6"×5/8"		215
C19	14"×3/4"	4 L-6"×6"×9/16"	2-14"×1/2" Pls.	230
C20	12"×3/4"	4 L-6"×3 1/2"×3/4"		475
C21	14"×1/2"	4 L-6"×6"×5/8"		150
C22	18"×5/8"	4 L-6"×6"×5/8"	2-14"×5/8" Pls.	550

Cover Load 1400# per sq. ft.







Revised- July 25, 1916
West Wall of Duct Manhole moved out 1'-6", making inside width of Manhole 6'-6".
Beams in Roof changed from 9" I-21# to 10" Is-25#.
Beams of equivalent strength, on hand may be substituted in order to avoid delay in construction.

Revised- Oct. 19, 1916.
Grating omitted between Sta. 21+40 & 21+45
and " " 21+70 & 21+75

Revised Dec. 2, 1915.
Closet mentioned in Revision Note of June 11, 1915 removed and Duct Manhole moved back to original position.
15" I-60# Strut in Duct Manhole at Sta. 22+85 removed. 2-15" [-33# and 2-15" I-60# added between Stas. 22+00 + 22+10.

BUILDING COLUMN LOADS			
Mark	Floor & Wall Loads	Wind Load	Total Load
#1	965,000#	275,000#	1,240,000#
#2	1,175,000	180,000	1,355,000
#3	1,175,000	155,000	1,330,000
#4	965,000	220,000	1,185,000
#5	1,181,000	236,000	1,417,000
#6	1,188,000	158,000	1,346,000
#7	1,119,000	185,000	1,304,000
#8	982,000	264,000	1,246,000
#9	986,000	92,000	1,078,000
#10	958,000	112,000	1,070,000
#11	1,231,000	204,000	1,435,000
#12	924,000	58,000	982,000
#13	1,249,000	177,000	1,426,000
#14	1,296,000	186,000	1,482,000
#15	1,137,000	249,000	1,386,000

GENERAL NOTES

Unit Stresses:
- Bending: Steel imbedded in concrete — 25,000# per sq. in.
- " not " " — 20,000 " " "
- Bearing (Stiffeners) — 20,000 " " "
- Shear — net 15,000 " " "

Rivets:
- Shear — 15,000 " " "
- Bearing — 30,000 " " "
- Field Rivets — 20% less

(For steel not supporting Building Columns)

Built up columns faced top and bottom.
I-Beam " " " "
3/4" Tie Rods about 5'-0" c. to c.
Steel surfaces in contact with concrete shall not be painted.
" " " " each other after assembling shall be painted one shop coat.
Exposed surface of steel shall be painted one shop coat and two field coats.
Details of Arches will be furnished later.
" " Drainage " "
Standard connections shall be used where possible.

NOTE

For allowable stresses in part of structure supporting Building Columns see N.Y.C. Building Code.

References:-
For Alignment & Grades see Dwg. #2 File #2702
" Excavation & Column Location Plan see Dwg. #25 File #2702
" Foundation Plan see Dwg. #27 File #2702
" Sections A-A, B-B see Dwg. #29 File #2702
" " C-C, D-D " " #30 " "
" " E-E, F-F, M-M " " #31 " "
" " G-G, H-H " " #32 " "
" " J-J, K-K, T-T " " #33 " "
" " L-L, S-S " " #34 " "
" " N-N, P-P, Q-Q " " #35 " "
" " R-R " " #36 " "

Revised- June 11, 1915
Closet added at end of Station Platform, Duct Manhole moved 10'-0" North, accordingly.
Grating changed.
Spacing of Grillage Beams at Bldg. Col. #5 changed from 1'-0" to 10".
East Sidewall Columns, Sta. 21+40 to 21+90 changed from 15" I-50# to 2-12" I-40#.

Sub-Section 1

BOARD OF TRANSPORTATION
RECORD DEPT.
Rec'd
Index under
File in Case 3 Drawer 72

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTE NO. 48 - SECTION NO. 2
WILLIAM ST. - BEEKMAN TO ANN STS.
STA. 19+22 TO STA. 22+15
STRUCTURAL PLANS
NORTH APPROACH TO FULTON ST. STATION
ROOF PLAN

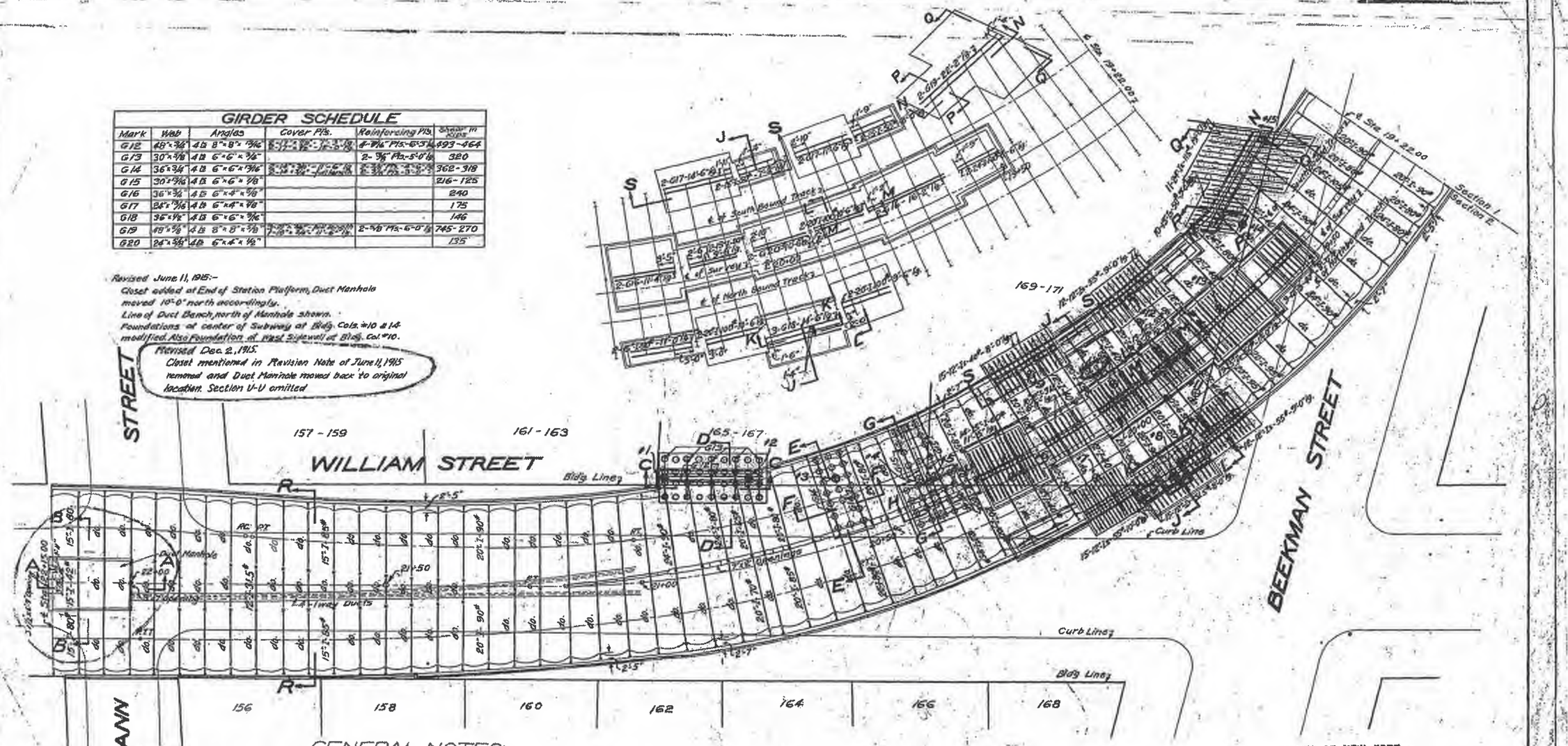
SCALE: 1" = 10'-0"
MARCH 17, 1915
DESIGNED BY WINKLER & JOSEPH
FENTON FRANSSEN
2702

GIRDER SCHEDULE

Mark	Web	Angles	Cover Pls.	Reinforcing Pls.	Stiffeners in Pairs
G12	48"×3/8"	4 L's 8"×8"×13/16"		4-7/16" Pls.-6'-3" L	493-464
G13	30"×3/8"	4 L's 6"×6"×3/8"		2-3/8" Pls.-5'-0" L	320
G14	36"×3/4"	4 L's 6"×6"×13/16"			362-318
G15	30"×5/16"	4 L's 6"×6"×7/8"			216-125
G16	36"×3/4"	4 L's 6"×6"×5/8"			240
G17	24"×5/16"	4 L's 6"×6"×7/8"			175
G18	36"×1/2"	4 L's 6"×6"×5/16"			146
G19	48"×7/8"	4 L's 8"×8"×7/8"		2-5/8" Pls.-6'-0" L	745-270
G20	24"×5/16"	4 L's 6"×6"×1/2"			135

Revised June 11, 1915:-
Closet added at End of Station Platform, Duct Manhole moved 10'-0" north accordingly.
Line of Duct Bench, north of Manhole shown.
Foundations at center of Subway at Bldg. Cols. #10 & 14 modified. Also Foundation at West Sidewall at Bldg. Col. #10.

Revised Dec. 2, 1915.
Closet mentioned in Revision Note of June 11, 1915 removed and Duct Manhole moved back to original location. Section U-U omitted



GENERAL NOTES

Unit Stresses:
- Bending — Steel imbedded in concrete — 25,000# per sq. in.
- " " " not " " " — 20,000 " " "
- Bearing (Stiffeners) — 20,000 " " "
- Shear — net 15,000 " " "
- Shear — 15,000 " " "
- Rivets — Bearing — 20% less — 30,000 " " "
- Field Rivets

Built up columns faced top and bottom.
I-Beam " " " "
3/4" Tie Rods about 5'-0" c. to c.,
Steel surfaces in contact with concrete shall not be painted.
" " " " " each other after assembling shall be painted one shop coat.
Exposed surfaces of steel shall be painted one shop and two field coats.
Standard connections shall be used where possible.
Details of Arches will be furnished later.
" " Drainage " " " "

NOTE:-
14" Steel-Concrete Piles. - Capacity 80,000#

Note:-
For allowable stresses in part of structure supporting Building Columns see New York City Building Code.

References:-

		Dwg #	B File #
For Alignment & Grades	see	- 25	- -
" Excavation & Column Location Plan	see	- 26	- -
" Roof Plan	"	- 28	- -
" Piling "		- 29	- -
" Sections A-A, B-B, U-U		- 30	- -
" " C-C, D-D		- 31	- -
" " E-E, F-F, M-M		- 32	- -
" " G-G, H-H		- 33	- -
" " J-J, K-K		- 34	- -
" " L-L, S-S		- 35	- -
" " N-N, P-P, Q-Q		- 36	- -
" " R-R			

BOARD OF TRANSPORTATION
RECORD DEPT.
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File in Case 2 Drawer 7

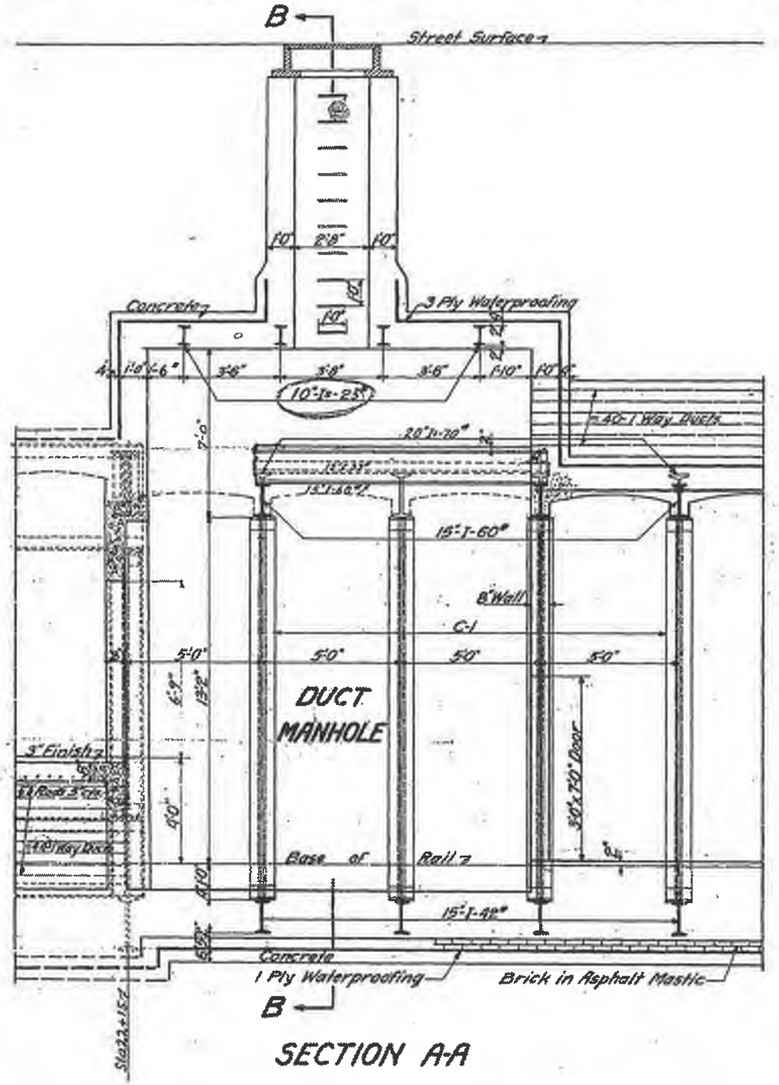
STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTE. NO. 48 - SECTION NO. 2
WILLIAM ST. - BEEKMAN TO ANN STS.
STA. 19+22 TO STA. 22+15
STRUCTURAL PLANS
NORTH APPROACH TO FULTON ST. STATION
FOUNDATION PLAN

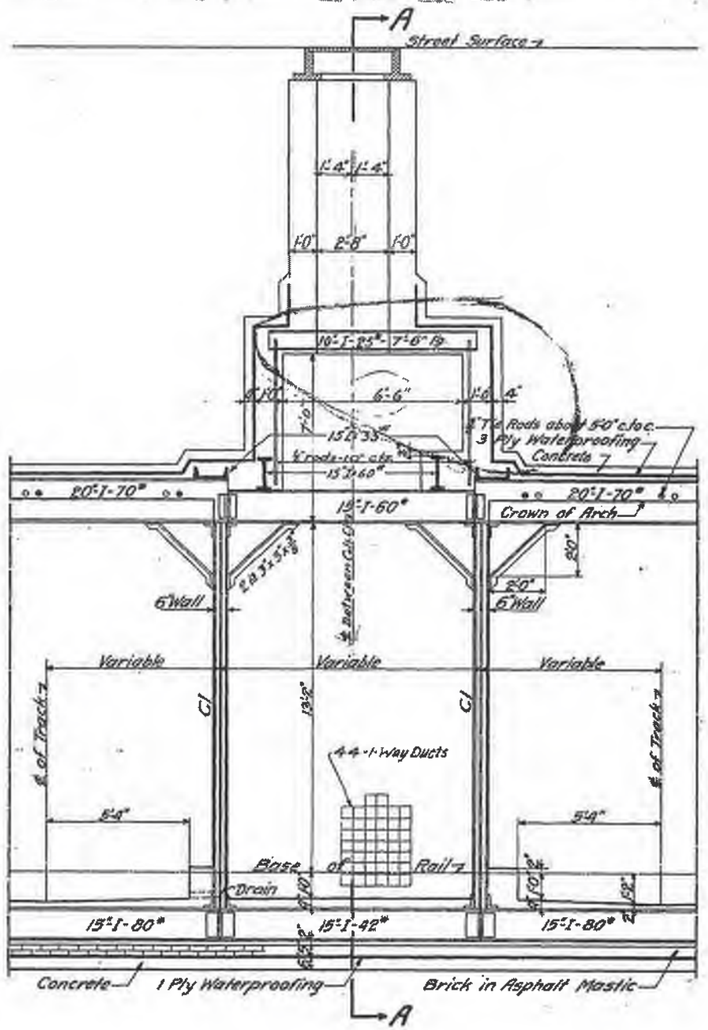
SCALE 1"=10'-0" DATE MARCH 17, 1915

CHIEF ENGINEER

DRAWN BY WINKLER & JOSEPH FILE NO. 2702
TRACED BY FENTON FRANDSEN DWG. NO. 27



SECTION A-A



SECTION B-B

Revised: July 25, 1916.
West Wall of Manhole Moved 1'-6" out in Section B-B and 9"I-21# Beams changed to 10"I-25# in Sections A-A & B-B.

Revised June 11th 1915
Closet added at end of Station Platform, Duct Manhole moved 10'-0" North accordingly. Section A-A changed to suit and Section V-V added.
4-Way & 2 Way Ducts replaced by 1-Way Ducts and formation & location modified.
Note about leaving out 10'0" of Bench every 300'-0" omitted.
Distance ℄ of Track to Benches changed from 5'-2" to 5'-9".
Brackets added in Section B-B.

Revised Dec. 2, 1915.
Closet mentioned in Revision Note of June 11, 1915 removed and Duct Manhole moved back to original location. Section V-V omitted.....
15"I-60# Strut in Duct Manhole at Sta 22+05 removed, 2-15"I-33# and 2-15"I-60# added between Stas. 22+80 and 22+10.
20-1 Way Ducts added below Station Platform and on top of roof.

REFERENCES:-
For Foundation Plan see Drawing #27 File 2702.
" Roof " " " 26 " "

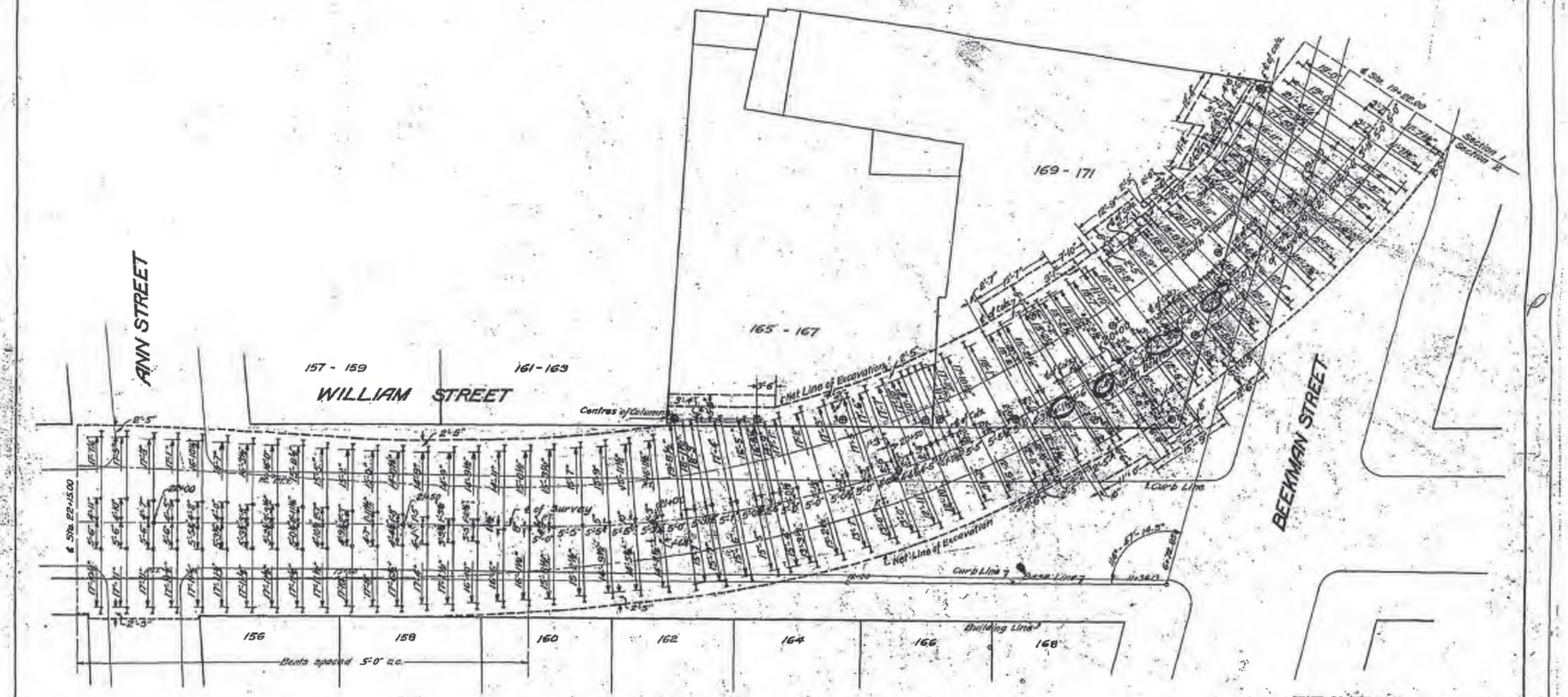
STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTE. NO. 48 - SECTION NO. 2
WILLIAM ST. - BEEKMAN TO ANN STS.
STA. 19+22 TO STA. 22+15
STRUCTURAL PLANS
NORTH APPROACH TO FULTON ST. STATION
SECTIONS A & B

SCALE: 3/4" = 1'-0"
DATE: March 17, 1915
CHIEF ENGINEER
DRAWN BY Judenfreund
TRACED BY Fenton
FILE NO. 2702
SHEET NO. 29

RECORDED
Sec'd.
Index under
File in Case 3 72

Subsection 1



Note:- All bents located radial to ℄ of survey.
Information on Excavation Line for Grating will be furnished later.

References:- For Alignment & Grades see Drwg.# 2, File # 2702.

Revised:- March 22, 1915
Offsets from ℄ to intermediate columns omitted where several columns are on line.
Excavation line slightly modified.
Bent spacing slightly modified.
Revised:- June 1, 1915
Bent spacing slightly modified.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTE NO. 48 - SECTION NO. 2
WILLIAM ST. - BEEKMAN TO ANN STS.
STA. 19+22 TO STA. 22+15
STRUCTURAL PLANS
NORTH APPROACH TO FULTON ST. STATION
COLUMN LOCATION & EXCAVATION PLAN

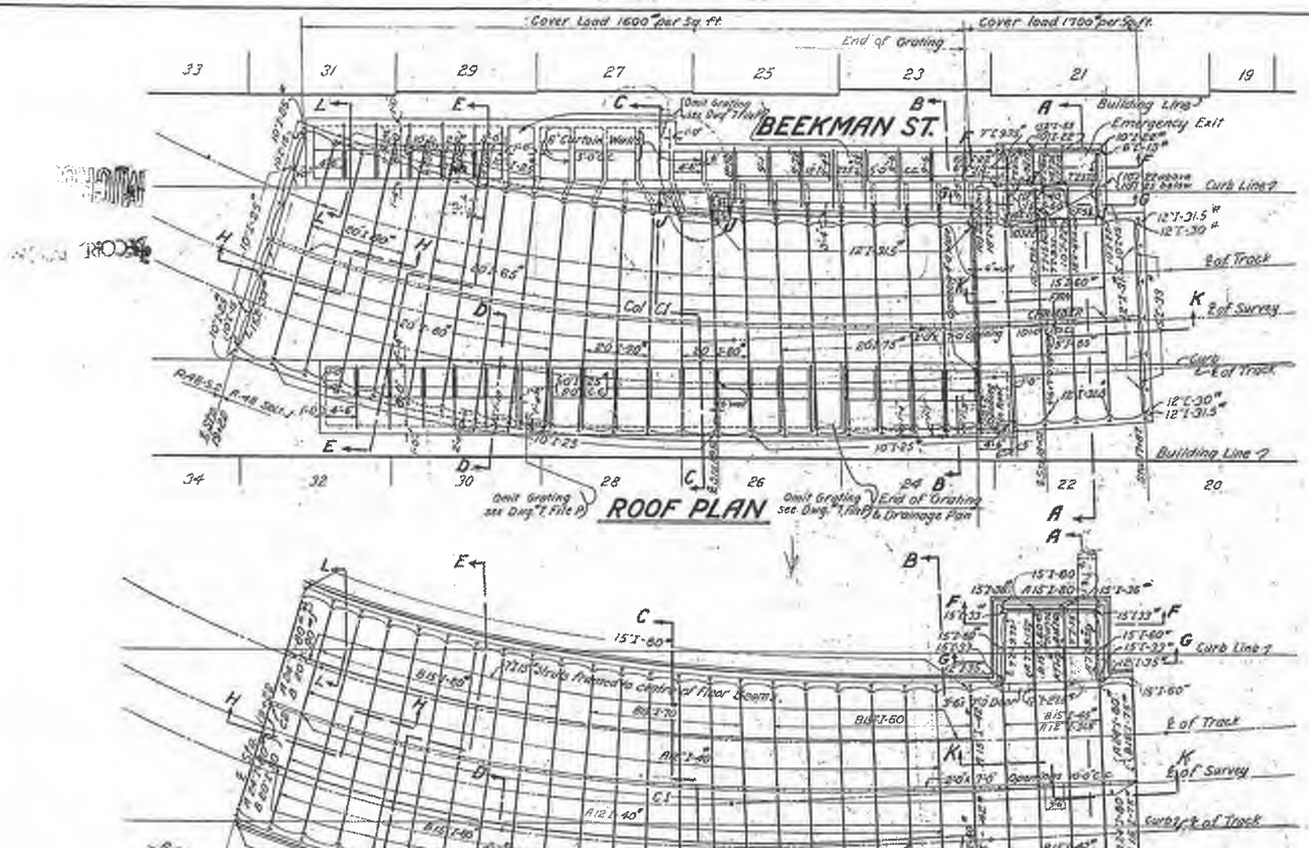
SCALE 1" = 10'-0"
DATE JANUARY 30, 1915

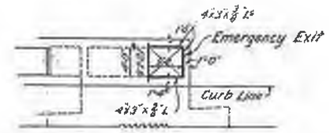
BOARD OF TRANSPORTATION
RECORD DEPT.
Rec'd
Index under
Fil. in Case 3 Drawer 74

DRAWN BY WINKLER & JOSEPH
DESIGNED BY FENTON CHRISTIAN

FILE NO. 2702
DWG. NO. 25

Subsection 1





COLUMN SCHEDULE			
Mark	Web	Angles	Load
C1	6 x 7/16"	4L5x3x 7/8	125 500
C2	6 x 1/2"	4L5x3x 9/16	158 000

GENERAL NOTES

UNIT STRESSES	Bending — Steel imbedded in concrete	25000# per Sq. inch	
	" " " not " " "	20000	" " "
	Bearing (Stiffeners)	20000	" " "
	Shear — not	15000	" " "
RIVETS	Shear	15000	" " "
	Bearing	30000	" " "
	Field Rivets	20% less	

Built up columns faced top & bottom.
I Beam columns resting on steel faced top & bottom.
Tie Rods ¾" ϕ spaced abt 5'-0" ctrs.
Steel Surfaces in contact with concrete shall not be painted.
Exposed surfaces of steel shall be painted one shop coat & two field coats.
Steel Surfaces in contact with each other after assembling shall be painted one shop coat.
Standard connections to be used where possible.

REFERENCES

For Alignment & Grades see dwg. "1	File "2701
" Excavation Plan	" " 9	" 2701
" Section BB, CC, DD, JJ	" " 10	" 2701
" " AA, FF, GG,	" " 11	" 2701
" " EE, HH, KK & LL	" " 12	" 2701

Revised April 1, 1915.
Column Location Plan changed at Sta. 18+32 +19+22
Roof Plan 15'Cs extended at Sta. 17+87
" " of Emergency Exit modified.
Revised: Dec. 9, 1915.
Ventilation bays omitted as shown
Section DD moved 5'-0" East.
Revised:- March 15, 1916.
Grating on South Side, at Sta. 18+55 modified.
Section JJ added.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTE NO. 48 - SECTION NO. 1
BEEKMAN STREET
STA. 17+87 TO STA. 19+22
STRUCTURAL PLANS
COLUMN LOCATION PLAN
ROOF FLOOR AND FOUNDATION PLAN

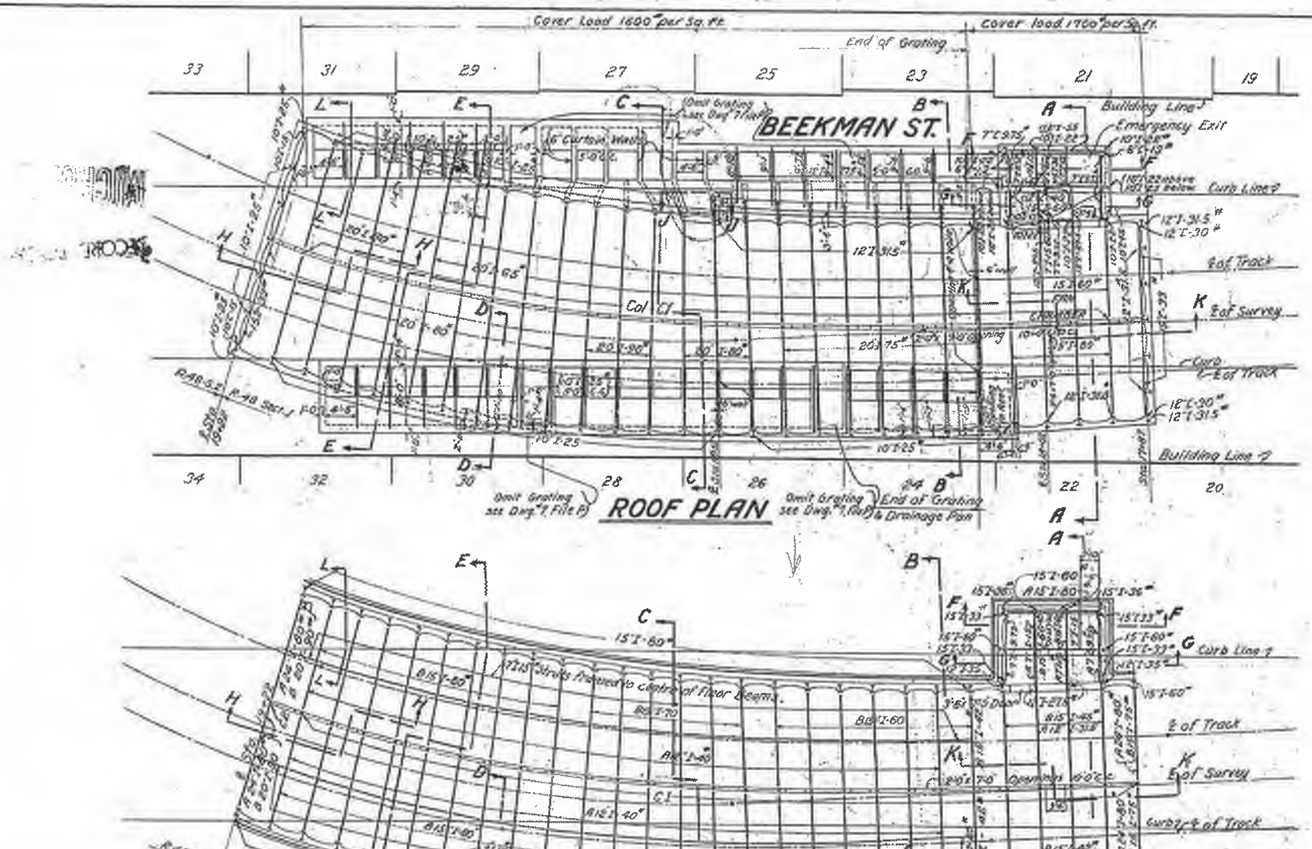
SCALE 1" = 10'-0" DATE FEB. 1, 1915.

Myron Tyrrell
CHIEF ENGINEER

DRAWN BY J.H.
CHECKED BY J.H.C.

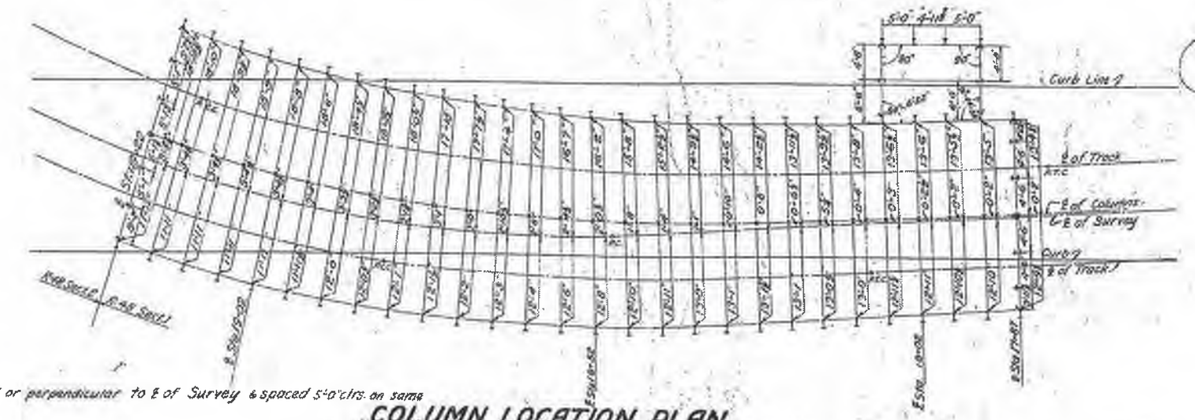
FILE NO. 2701
DWG. NO. 2

SUB SECT. 6



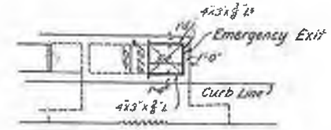
ROOF PLAN

FLOOR & FOUNDATION PLAN



All bents radial or perpendicular to E of Survey & spaced 5'-0" ctrs. on same

COLUMN LOCATION PLAN



PLAN AT SIDEWALK

COLUMN SCHEDULE			
Mark	Web	Angles	Load
C1	6 x 5/16"	4@5 1/2 x 3/8	125300
C2	6 x 1/2"	4@5 1/2 x 5/16	168000

GENERAL NOTES

UNIT STRESSES	Bending — Steel imbedded in concrete	25000#	per Sq. inch
	" " " not " " "	20000	" " "
	Bearing (Stiffeners)	20000	" " "
	Shear net	15000	" " "
RIVETS	Shear	15000	" " "
	Bearing	30000	" " "
	Field Rivets	20% less	

Built up columns faced top & bottom.
I Beam columns resting on steel faced top & bottom.
Tie Rods 3/4" ϕ spaced abt. 5'-0" ctrs.
Steel Surfaces in contact with concrete shall not be painted.
Exposed surfaces of steel shall be painted one shop coat & two field coats.
Steel Surfaces in contact with each other after assembling shall be painted one shop coat.
Standard connections to be used where possible.

REFERENCES

For Alignment & Grades see dwg. 7 File 2701
" Excavation Plan " 8 " 2701
" Sections BB, CC, DD, JJ " 10 " 2701
" " AA, FF, GG, " 11 " 2701
" " EE, HH, KK, & LL " 12 " 2701

Revised April 1, 1915.
Column Location Plan changed at sta. 18+32 + 19+22
Roof Plan 15"I" extended at Sta. 17+87
" " of Emergency Exit modified.
Revised: Dec. 9, 1915.
Ventilation bays. omitted as shown.
Section DD moved 5'-0" East.
Revised:- March 15, 1916.
Grating on South Side. at Sta. 18+55 modified.
Section JJ added.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

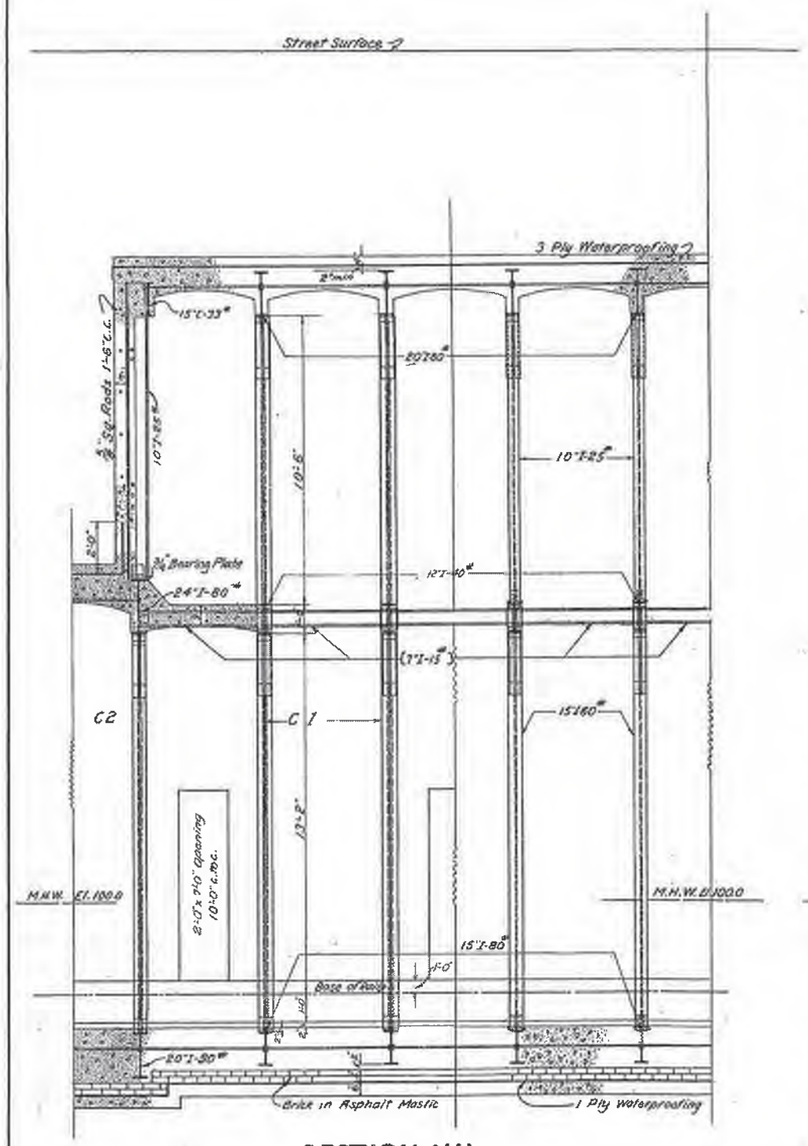
ROUTE NO. 48 - SECTION NO. 1
BEEKMAN STREET
STA. 17+87 TO STA. 19+22
STRUCTURAL PLANS
COLUMN LOCATION PLAN
ROOF FLOOR AND FOUNDATION PLAN

SCALE 1" = 10'-0" DATE FEB. 1, 1915

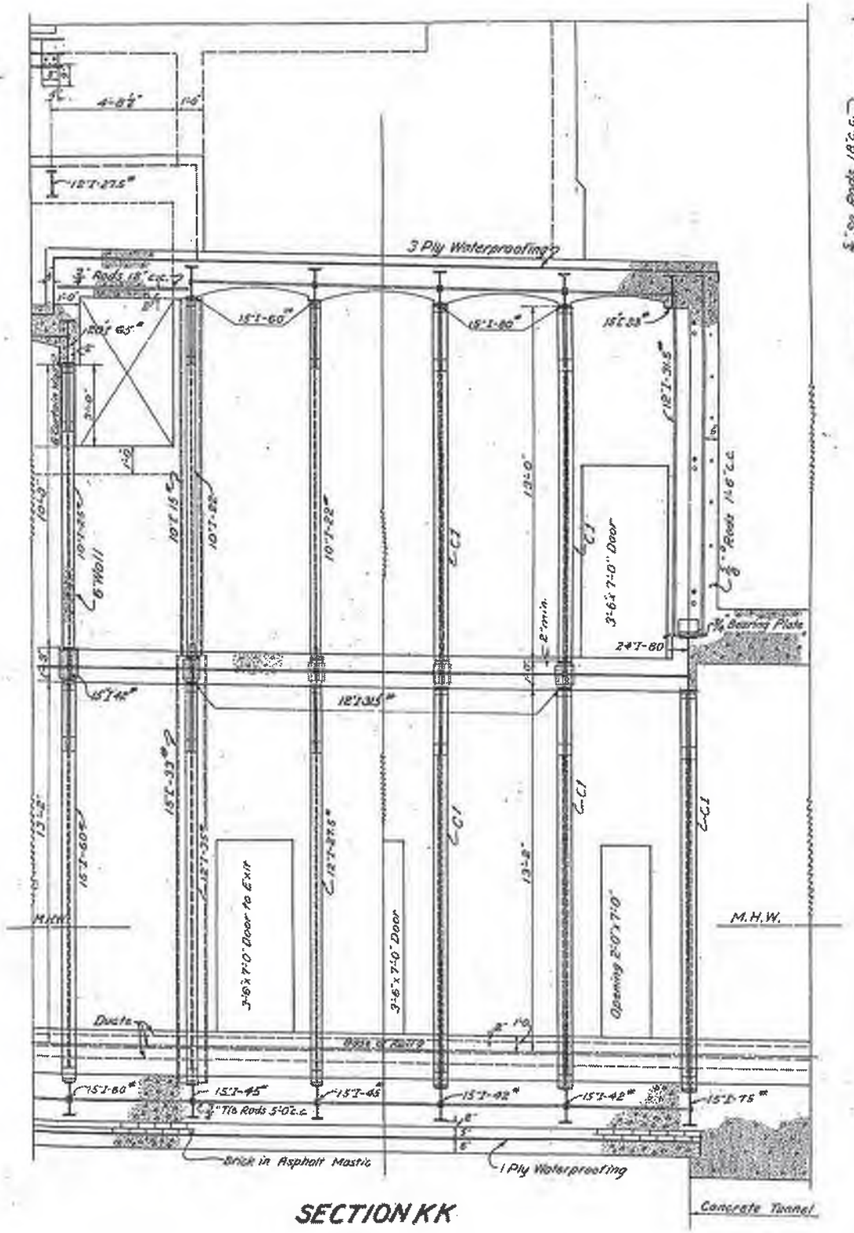
CHIEF ENGINEER

DRAWN BY J.H.
CHECKED BY J.N.O. Nat.
FILE NO. 2701
SHEET NO. 9

SUB SECT. 6



SECTION HH



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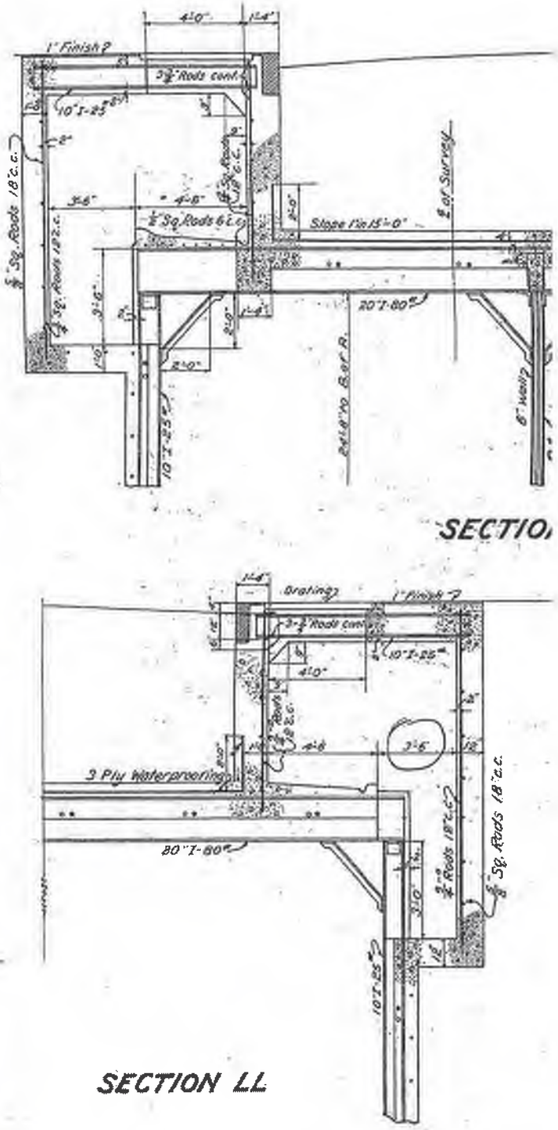
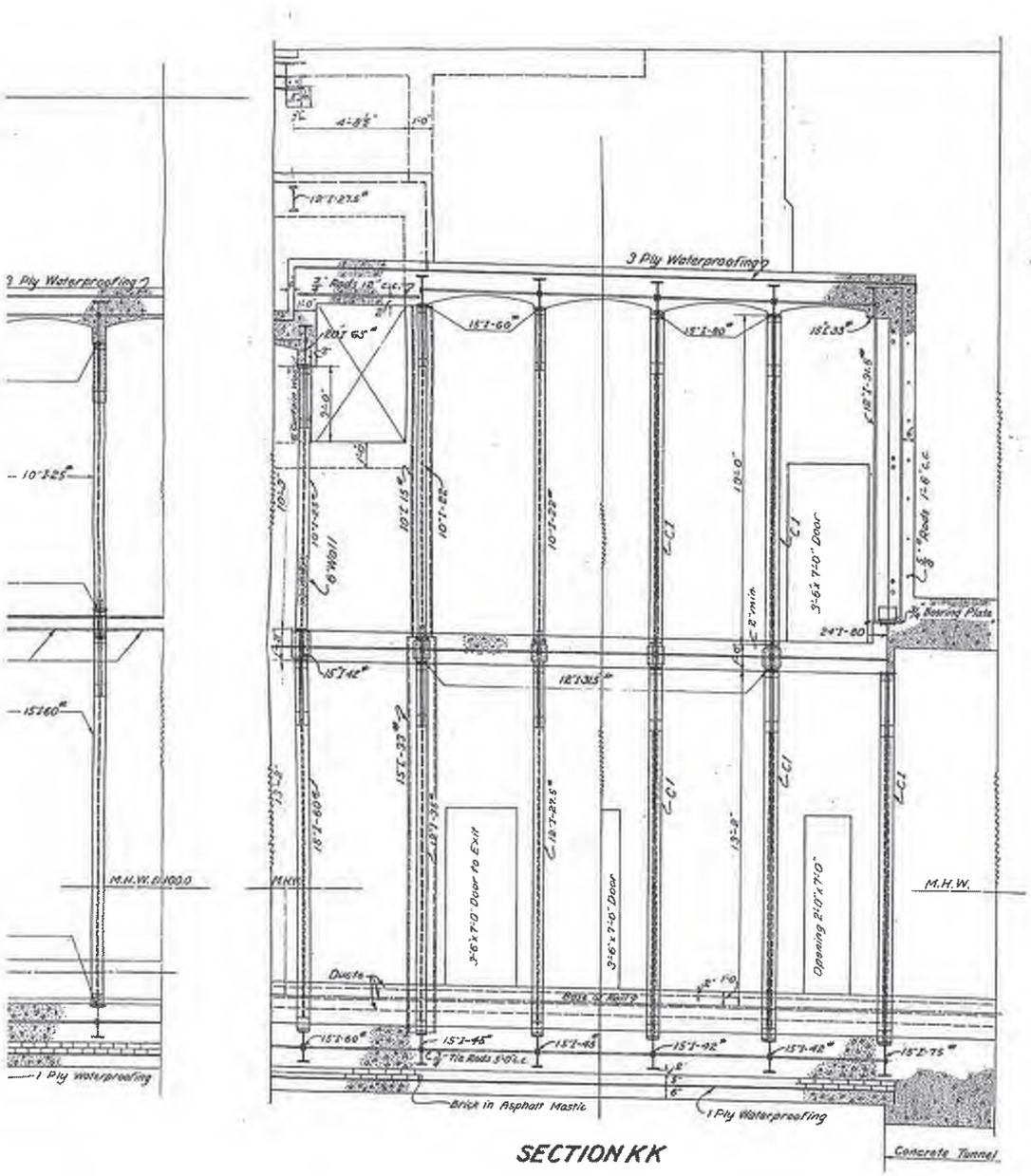


SECTION LL



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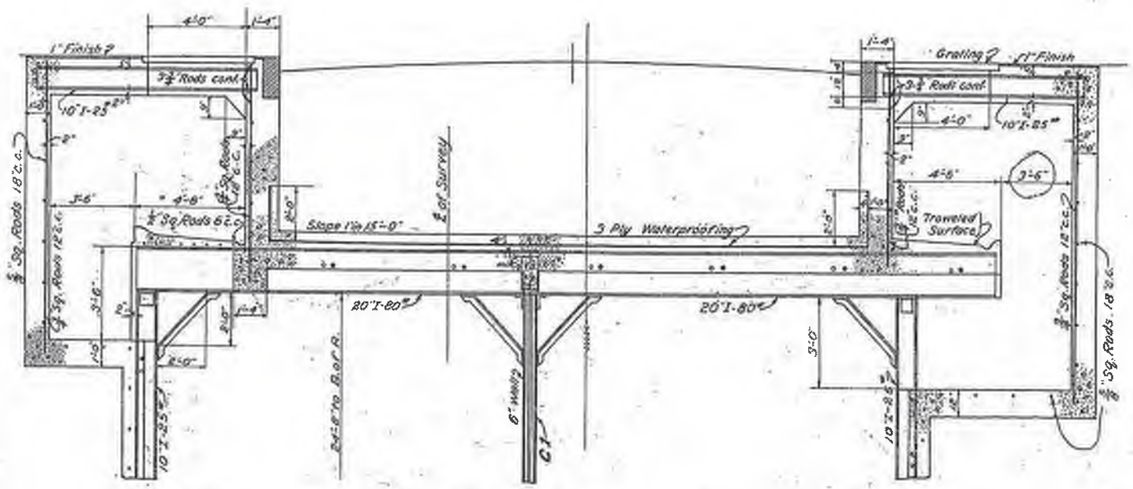
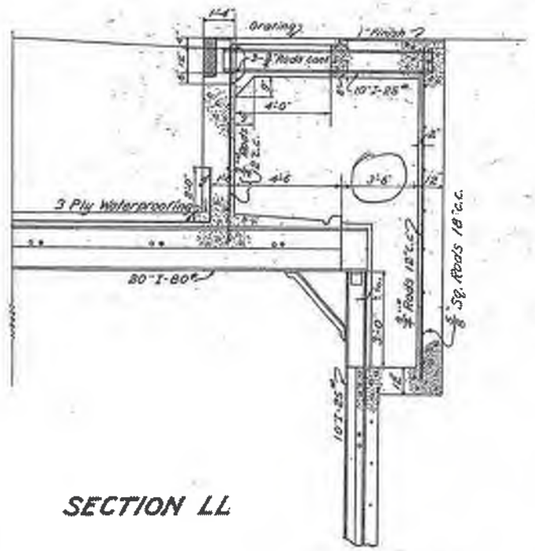


SECTION EE



SECTION LL

REFERENCES

For Alignment & Grade Plans see dwg. "7 File" 2701
For Excavation Plan " " 8 " "
" Roof & Foundation Plans " " 9 " "
" Column Location Plan " " 9 " "

Revised April 1, 1915
C.I in Section HH changed to C2
15'-1-60 in section KK changed to 15'-1-45

Revised Dec. 9, 1915.
Section EE & LL - Ventilation on south side modified.

BOARD OF TRANSPORTATION
RECORDS DEPT.
3
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STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTE NO. 48 - SECTION NO. 1
BEEKMAN STREET
STA. 17+67 TO STA. 19+22
STRUCTURAL PLANS
SECTIONS E-E, H-H, K-K & L-L

SCALE 3/8" = 1'-0"
DATE FEB. 1, 1915

CHIEF ENGINEER

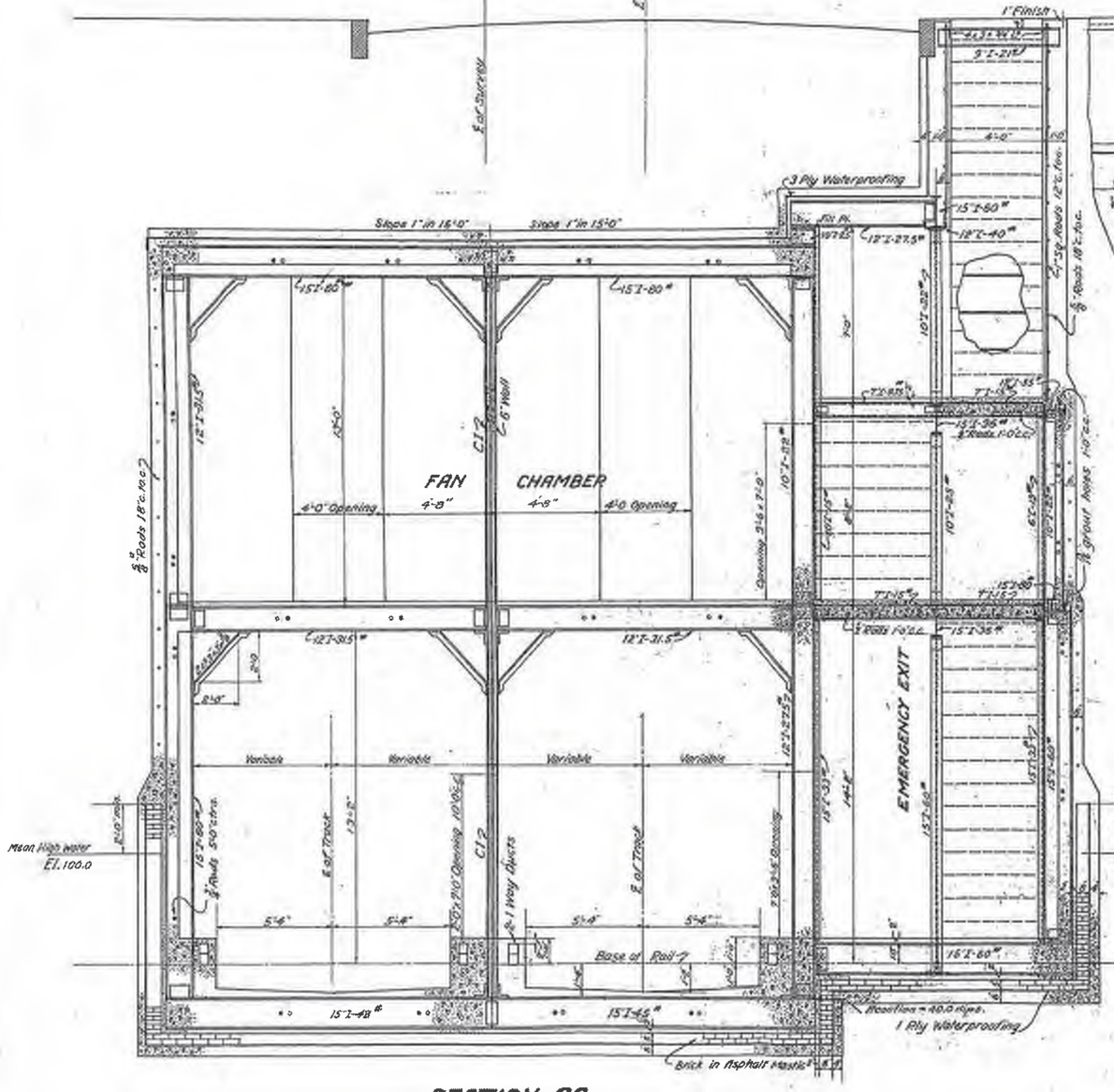
DRAWN BY C.H.
CHECKED BY W.H.O.
FILE NO. 2701
DWG. NO. 10

MICROFILM
RECORD ROOM

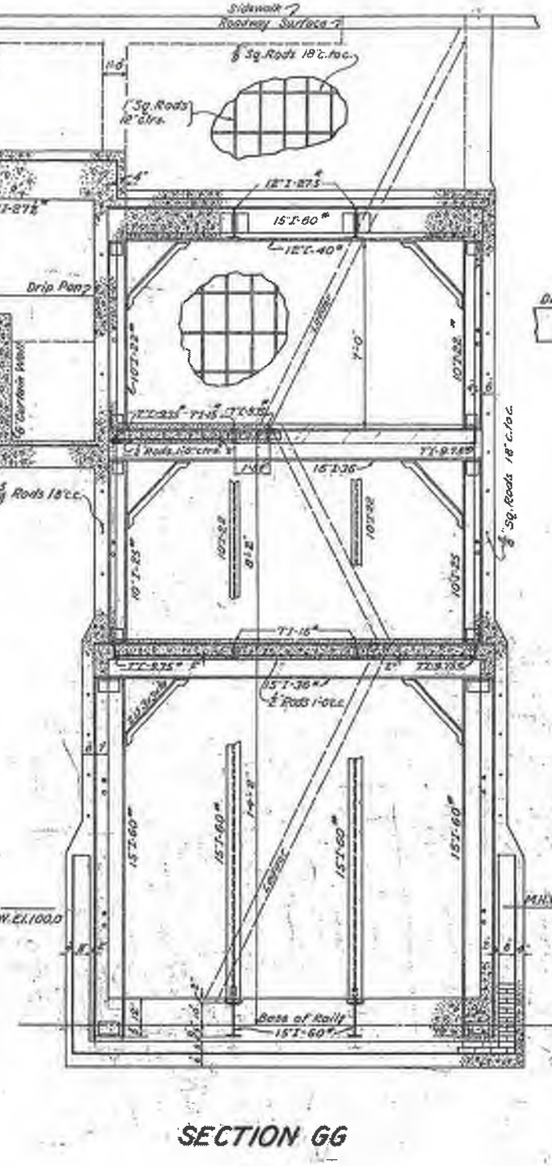
F2

SUB SECT. 6

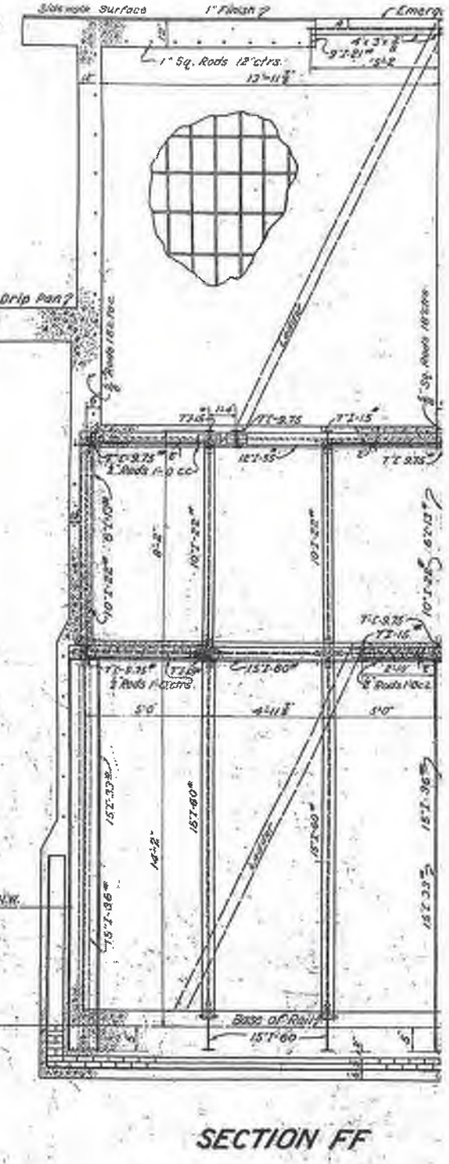
Details of ladder and
cover to be furnished late



SECTION AA



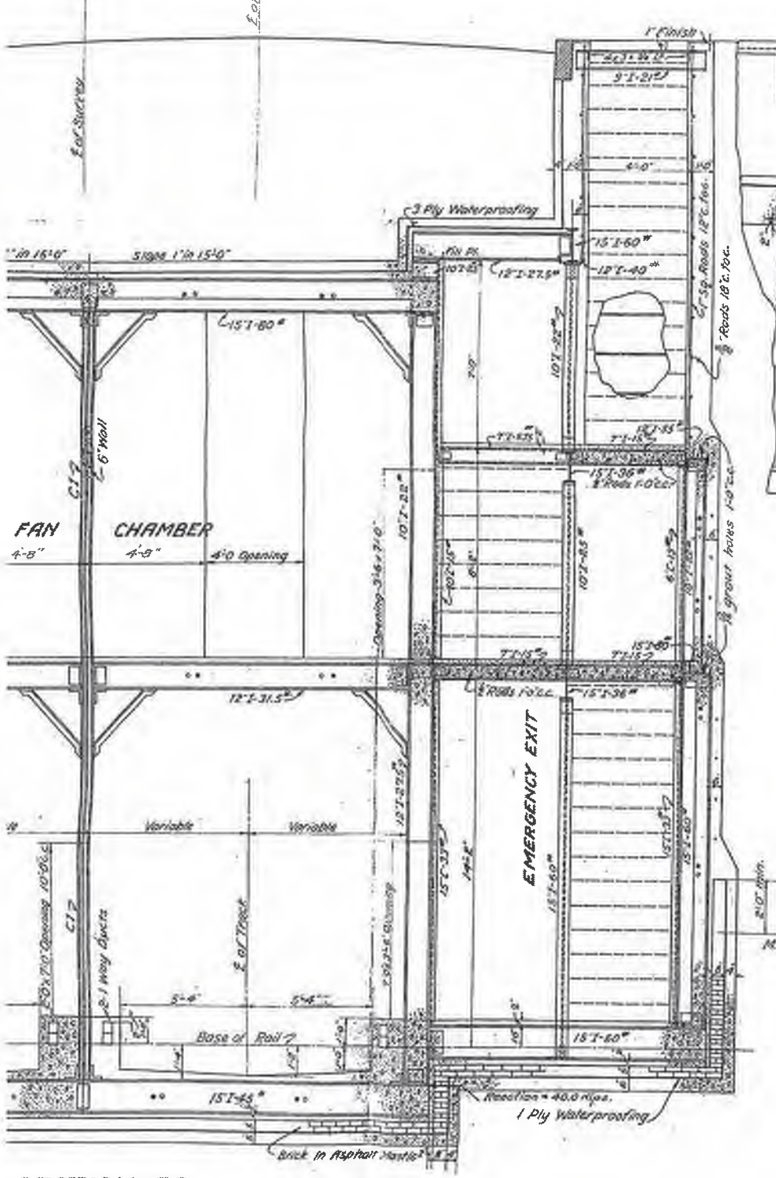
SECTION GG



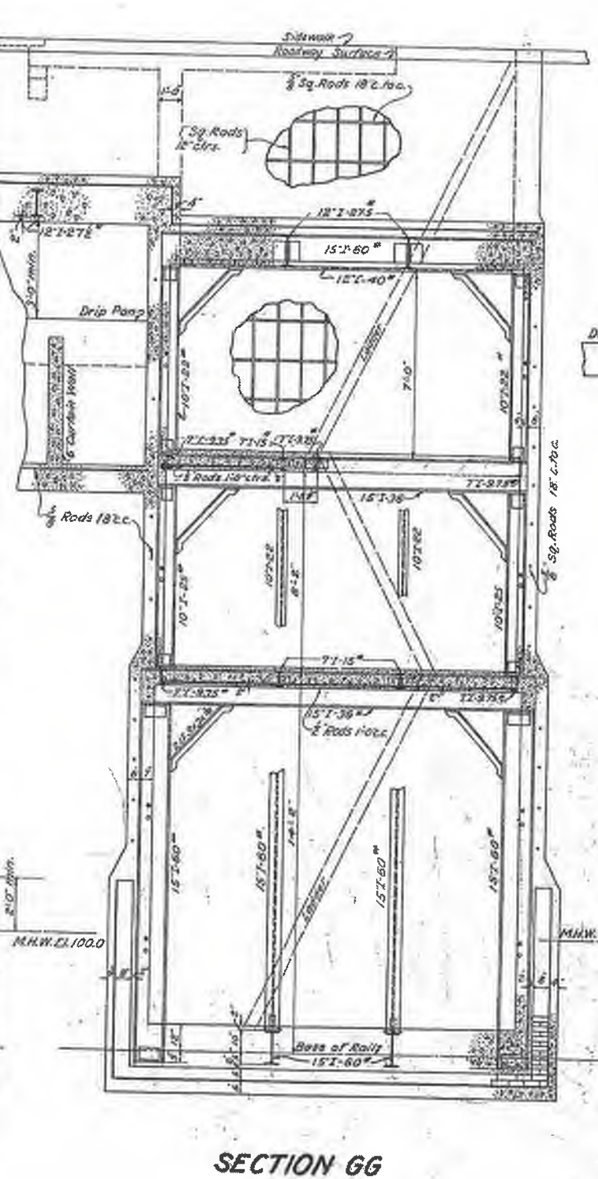
SECTION FF

F1

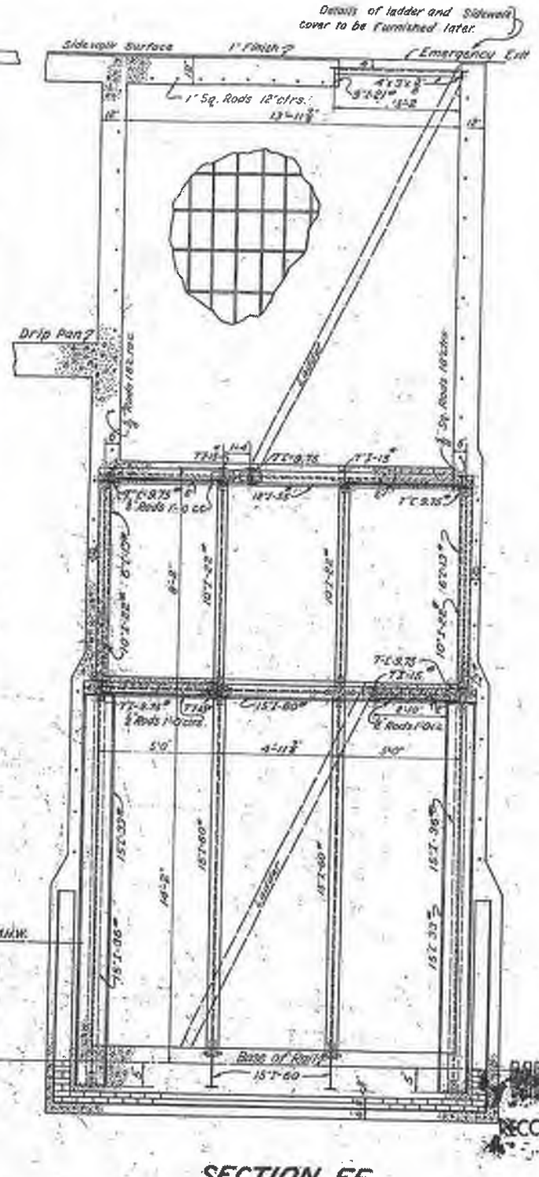
SUB SEC.



SECTION AA



SECTION GG



SECTION FF

Reference Notes
For Alignment & Grades see dwg.# 7 File # 2701
" Excavation Plan " " 8 " 2701
" Roof & Foundation Plan see dwg.# 9 File # 2701
" Column Location Plan " " 9 " 2701

Revised April 4, 1915
Sections changed to agree with plans,
⅝ rods 1'-0" cc. added in Emergency Exit floors.
Grout holes called for in flat beams.

ROUTE NO. 48 - SECTION NO. 1
BEEKMAN STREET
STA. 17+87 TO STA. 19+22
STRUCTURAL PLANS
SECTIONS A-A, F-F & G-G

SCALE ⅜" = 1'-0"
DATE FEB. 1, 1915

Alfred Craven
CHIEF ENGINEER

DRAWN BY J.H.
CHECKED BY J.K.O.
FILE NO. 2701
DWG. NO. 11

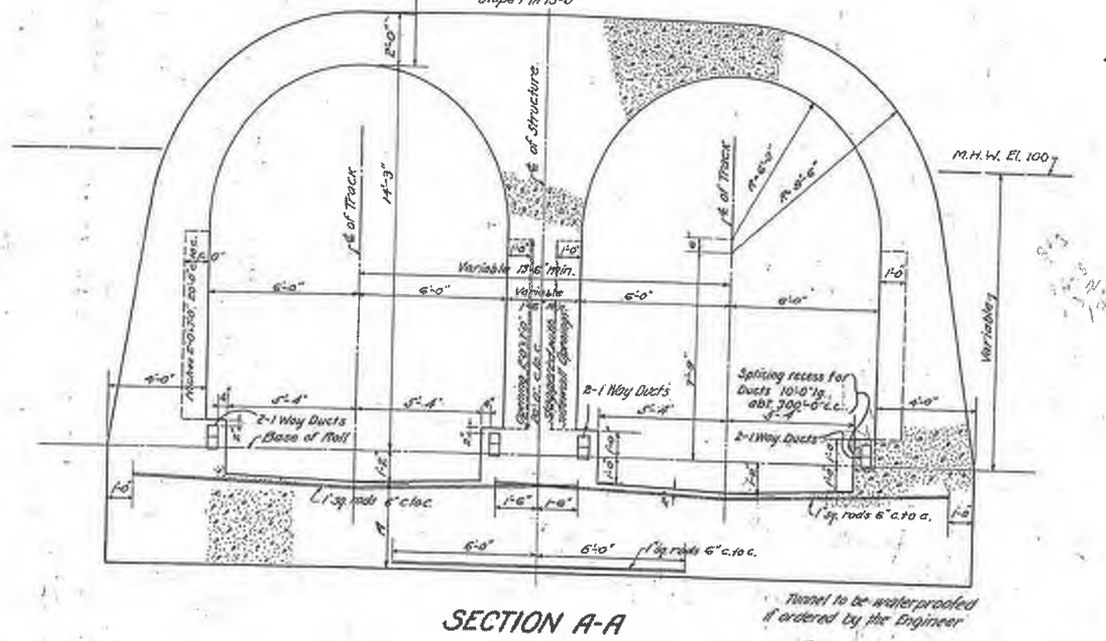
F2

SUB SECT. 6

Sta. to	Sta.	R
17+87 -	17+00	32'
17+00 -	16+00	36'
16+00 -	15+00	38'
15+00 -	13+65	40'

Variable Cover.

Slope 1" in 15'-0"



SECTION A-A

Tunnel to be waterproofed if ordered by the Engineer

REFERENCES
For Plan see Dwg. No 39 File 2701

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION
FOR THE FIRST DISTRICT
ENGINEERING DEPARTMENT

ROUTES NO. 48 SECTION NO. 1
BEEKMAN ST. AT NASSAU ST.
STA. 13+65 TO STA. 17+87
STRUCTURAL PLANS
SECTION A-A

SCALE 3/8"=1'-0"

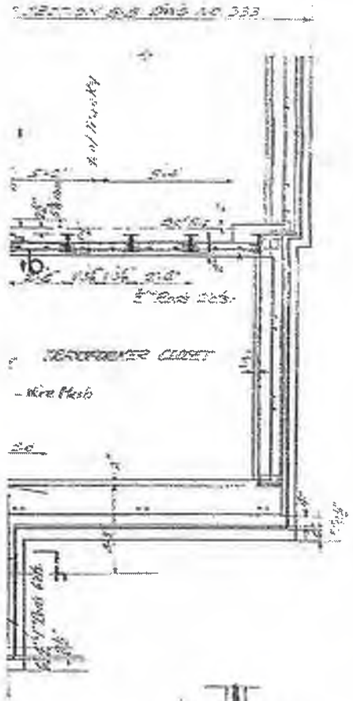
DATE AUG. 26, 1915.

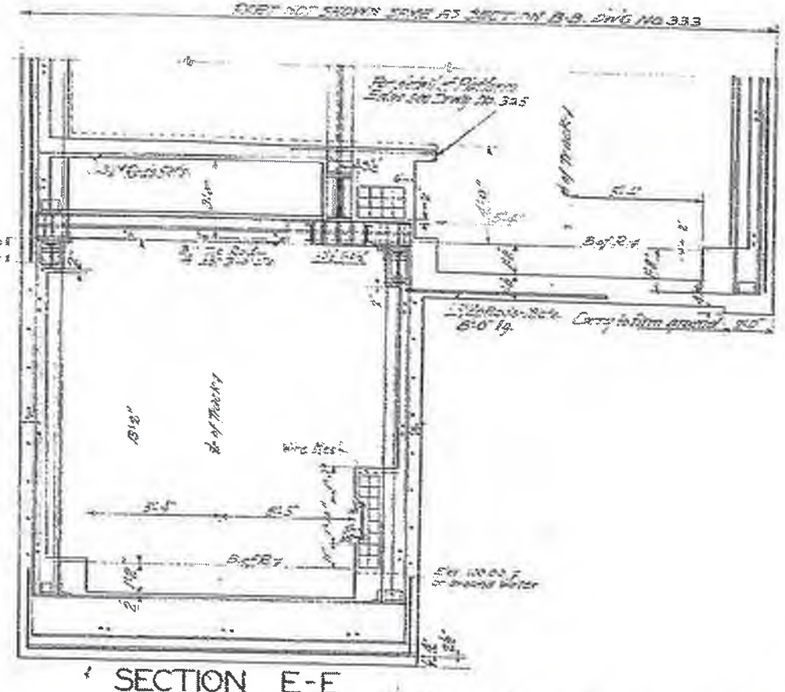
Wm. O. Brann
CHIEF ENGINEER

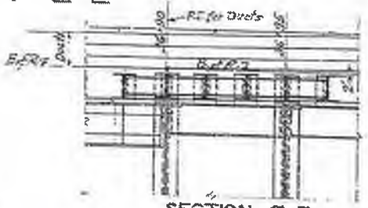
DRAWN BY J.H.
CHECKED BY J.M.D. Hill

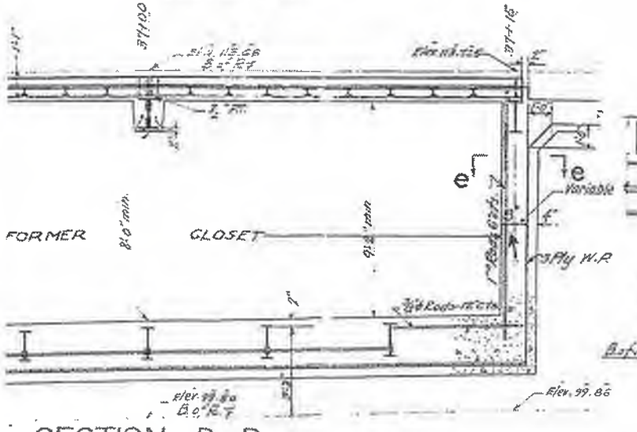
FILE NO. 2701
DWG. NO. 40

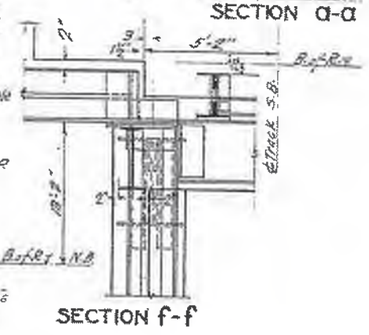
SUB. SEC. 5.

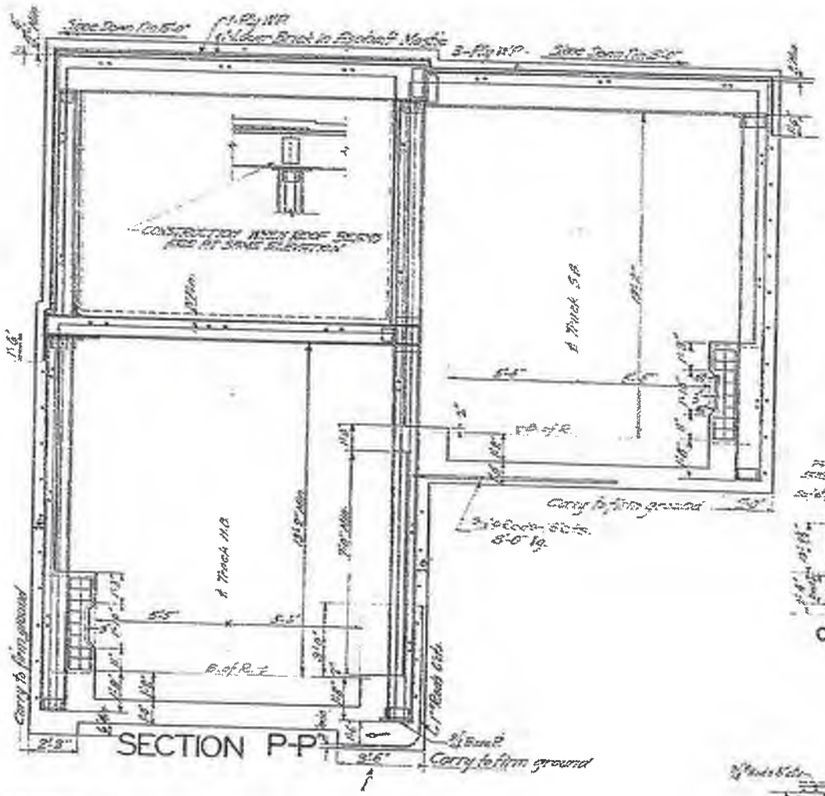


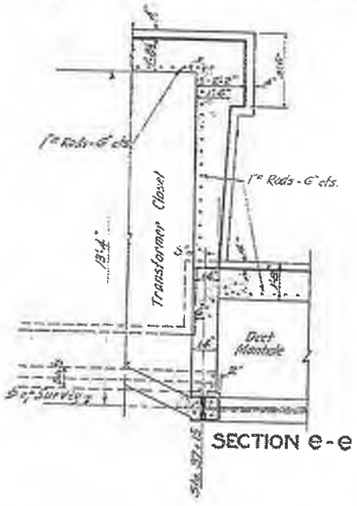


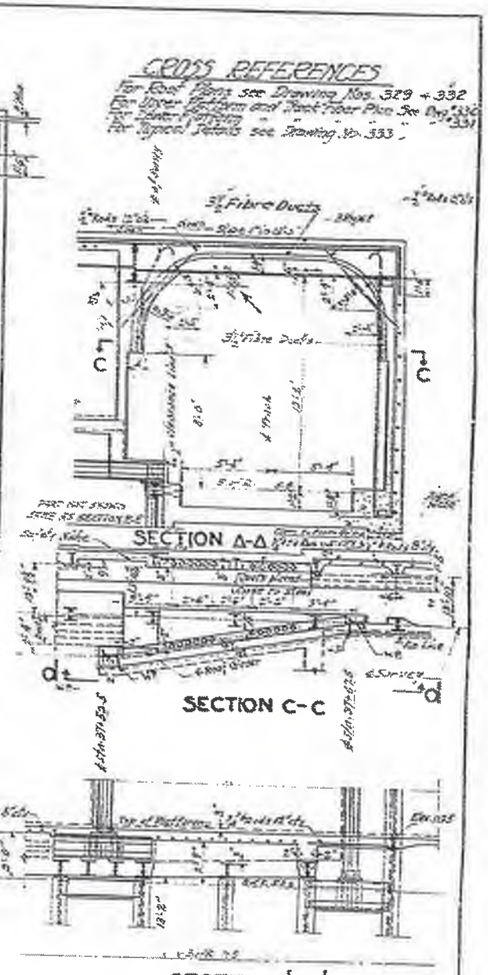












REVISED
Jan. 2, 1929. Rods in Track Floor Slab-Upper Level
Sections E-E & P-P Added.
Section C-C Modified.
Center Column Footing in Section P-P changed

BOARD OF TRANSPORTATION
OF THE CITY OF NEW YORK
ENGINEERING DEPARTMENT
ROUTE 45 SECTION NO. 1
NASSAU ST.
LIBERTY ST. TO PARK ROW
FULTON ST. STATION
STA. 34+65 TO STA. 37+55
STRUCTURAL PLANS
SECTIONS C-C, D-D, E-E, P-P

Scale - 3/8" = 1'-0"
Drawn by H.H.D.
Checked by A.A.K.
Division Engineer
Chief Engineer
Date APRIL 19, 1928
File No. 2501
Dwg. No. 334-A

SUB-SECTION NO. 3

APPENDIX B

BORING AND WELL-CONSTRUCTION LOGS

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Log of Boring **LB-1(OW)** Sheet 1 of 5

Project: 126 Nassau Street	Project No.: 170545701
Location: 126 Nassau Street	Elevation and Datum: Approx.± 24 (NAVD 88)
Drilling Company: Warren George, Inc	Date Started: 3/6/20 — Date Finished: 3/12/20
Drilling Equipment: Electric Protabe Rig	Completion Depth: 95.5 ft — Rock Depth: 81 ft
Size and Type of Bit: 2 15/16"	Number of Samples: Disturbed 26 — Undisturbed 0 — Core 6
Casing Diameter (in): 3 — Casing Depth (ft):	Water Level (ft.): First SEE WELL LOG — Completion SEE WELL LOG — 24 HR. SEE WELL LOG
Casing Hammer: Donut Hammer — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Deon
Sampler: 2-inch diameter split spoon	Field Engineer: Jack Cambeiro
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+24.0	Concrete slab		0						1/2 foot concrete cored
	+23.5	Gray-white medium SAND, some fine sand, trace coarse sand, trace fine gravel, concrete fragments (dry)[FILL] **BC: Class 7**		1	S-1	SS NQ	7 0.5	6 5 3 3	8	S-1 at 0.5ft.
	+21.5	Gray-white medium SAND, some fine sand, trace coarse sand, trace fine gravel, concrete fragments (dry)[FILL] **BC: Class 7**		2 3 4	S-2	SS	7	5 3 2 3	5	S-2 at 2.5ft. Push casing down to 5ft. Wash hole and drill to 5ft. Gray wash.
	+19.5	Gray-Dark gray medium SAND, some fine sand, trace coarse sand, trace fine gravel, concrete fragments (wet)[FILL] **BC: Class 7**		5 6	S-3	SS	4	2 1 2 1	3	Drilled to 5ft.S-3 at 5ft.
	+17.0	Gray-Dark gray medium SAND, some fine sand, trace coarse sand, trace fine gravel, trace silt, plaster fragments, brick fragments (wet)[FILL] **BC: Class 7**		7 8	S-4	SS	11	1 66 8 4	74	S-4 at 7ft.
	+15.0			9						
	+14.4	R-5a (0-7") = Gray-brown medium sand, some fine sand, trace coarse sand, trace fine gravel, trace silt, plaster fragments , brick fragments (moist)[FILL] **BC: Class 7**		10	S-5	SS	10	8 3 2 3	5	S-5 at 9ft. Push casing to 10ft. Wash out hole. Gray wash.
	+13.0	R-5b(7-10") =White-brown coarse SAND, some medium sand, some fine gravel (moist)[FILL] **BC: Class 7**		11	S-6	SS	9	5 4 4 6	8	S-6 at 11ft.
	+11.0	Dark brown medium SAND, some fine sand, trace coarse sand, trace fine gravel (moist) [FILL] **BC: Class 7**		12 13 14 15						
	+7.0	Dark brown medium SAND, some fine sand, trace coarse sand, trace fine gravel (moist) [FILL] **BC: Class 7**		16	S-7	SS	11	5 6 6 6	12	Drill to 15ft. Push casing to 15ft. Gray wash. S-7 at 15ft.
				17 18 19 20						

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Log of Boring **LB-1(OW)** Sheet 2 of 5

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 24 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+4.0	Dark brown medium SAND, some fine sand, some coarse sand, trace fine gravel (moist) [SP] **BC: Class 3b**		20	S-8	SS	10	9 10 8 10	18	Push casing to 20ft, wash hole, dark brown wash, drill to 20ft. S-8 at 20ft.
	+2.0			21						
				22						
				23						
				24						
		Dark brown medium SAND, trace fine sand, trace silt (wet)[SP] **BC: Class 3b**		25	S-9	SS	11.5	7 8 7 11	15	Push casing to 25ft, dark brown wash, drill to 25ft. S-9 at 25ft.
	-3.0			26						
				27						
				28						
				29						
		R10a(0-7")-Dark brown medium SAND, some coarse sand, trace fine sand(wet) [SM]		30	S-10	SS	10	12 14 14 15	28	Push casing to 30ft, dark brown wash, drill to 25ft. S-10 at 30ft. End of day 03/06/2020.
	-7.8			31						
	-8.0	R10b(7-10")-dark brown fine SAND, some medium SAND, trace silt (wet) [SP] **BC: Class 3b**		32						
				33						
				34						
		Dark brown fine SAND, trace silt (moist) [SP-SM] **BC: Class 3b**		35	S-11	SS	17	8 11 9 14	20	Start day 03/09/2020. Drill to 35ft, wash hole,dark brown wash, S-11 at 35ft.
	-13.0	Dark brown fine SAND, trace silt (wet) [SP-SM] **BC: Class 3a**		36						
				37	S-12	SS	20	16 18 16 19	34	Push casing to 35ft, clean out hole, dark brown wash , S-12 at 7ft.
	-15.0	Dark brown SILTY fine SAND (wet) [SM] **BC: Class 3b**		38						
				39	S-13	SS	17.5	6 8 10 12	18	S-13 at 39ft.
	-17.0	Dark brown SILTY fine SAND (wet) [SM] **BC: Class 3b**		40						
				41	S-14	SS	24	15 15 24 15	39	Wash out hole, dark brown wash. S-14 at 41ft.
	-19.0	Dark brown SILTY fine SAND (wet) [SM] **BC: Class 3b**		42						
				43	S-15	SS	19	4 5 12 13	17	S-15 at 43ft.
	-21.0			44						
				45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-1(OW)** Sheet 3 of 5

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 24 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-21.0	R16a (0-8") - Dark brown SILTY fine SAND (wet) [SM]		45				10		Wash hole, dark brown wash.
	-21.7	R16b (8-24") - Olive brown SILT, trace fine SAND (wet) [ML] **BC: Class 3a**		46	S-16	SS	24	16 22 24	38	S-16 at 45ft.
	-23.0	Dark brown SILTY fine SAND (wet) [SM] **BC: Class 3b**		47	S-17	SS	14	3 4 9 14	13	S-17 at 47ft.
	-25.0	Olive brown SILT, trace fine SAND (wet) [ML] **BC: Class 3a**		48 49	S-18	SS	24	10 15 22 34	37	Wash hole, dark brown wash. S-18 at 49ft.
	-27.0	Olive brown SILT, trace fine SAND (wet) [ML] **BC: Class 3b**		50 51	S-19	SS	21	10 10 16 26	26	S-19 at 51ft.
	-29.0	Olive brown SILT, trace fine SAND (wet) [ML] **BC: Class 3a**		52 53	S-20	SS	18	15 24 48 47	72	Wash hole, dark brown wash. S-20 at 53ft.
	-31.0			54 55	S-21	SS	17	28 40 84 100	124	S-21 at 55ft.
	-31.4	R21a (0-5") -Olive brown SILT, trace fine SAND ,trace coarse SAND(wet) [ML]								
	-32.0	R21b (5-12") -Olive fine SAND ,trace silt(moist SP] **BC: Class 3a**		56 57 58 59						
	-36.5	R22a - (0-6")-Dark brown SILT, trace fine sand (moist)[ML]		60	S-22	SS	16	36 46 100/4"	100/4"	Drill to 60 ft, chattering/bouncing , dark brown wash. End of day 3/09/2020. Start of day 3/10/2020. S-22 at 60ft.
		R22B - (6-16") - Very dense dark brown fine SAND, some medium SAND, trace silt (moist)[SP] **BC: Class 3a**		61 62 63 64						
	-38.0	Dark brown SILT, trace fine SAND, trace coarse SAND(wet)) [ML] **BC: Class 3a**		65	S-23	SS	7	45 100/2"	100/2"	S-23 at 65ft.
	-43.0			66 67 68 69 70						

N-Value (Blows/ft) scale: 10 20 30 40

LANGAN

Log of Boring **LB-1(OW)** Sheet 4 of 5

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 24 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-46.0	Dark brown SILT, trace fine SAND, trace coarse SAND(wet) [ML] **BC: Class 3a**		70	S-24	SS	9	32 98 100/1"	100/1"	S-24 at 70ft.
	-48.0			71						
				72						
				73						
				74						
	-51.7	Olive brown fine SAND, some medium SAND, some medium SAND, trace fine gravel, trace silt (moist) [SP] **BC: Class 3a**		75	S-25	SS	8	54 100/2"	100/2"	S-25 at 75ft. Start coring rock using 3ft core barrel, No recovery Change to drill bit.
				76						
				77						
				78						
				79						
	-56.3	Olive brown medium SAND, some fine gravel, trace coarse sand, trace silt, flaky mica fragments (wet) [SP] **BC: Class 3a**		80	S-26	SS	9.5	100/3"	100/3"	Start of day 3/11/202. Drill to 80ft, Dark brown wash S-26 at 80ft.
		Gray SCHIST, medum to coarse quatz, plagioclose, muscovite, hornblens, highly weathered ; very close to close fracturing; shallow to steeply dipping, weak to medium weak, very poor rock quality **BC: Class 1d**	20 27 35	81 82 83	C-1	NX CORE	REC=100%	RQD=18%		Core rock using 3 foot core barrel . Jam at 2.75 ft. Light olive wash/drilling fluid.
	-59.8	Gray SCHIST, medum to coarse quatz, plagioclose, muscovite, hornblens, highly weathered ; very close to close fracturing; steeply dipping; weak rock **BC: Class 1d**	36 36	84 85	C-2	NX CORE	REC=37%	RQD=0%		Core rock using 3 foot core barrel . 27 inch to complete 5 foot run, light olive wash End of day 3/11/2020
	-62.0	Gray SCHIST, medum to coarse quatz, plagioclose, muscovite, highly weathered ; very close to close fracturing; steeply dipping; weak rock BC: Class 1d	5 24 28	86 87	C-3	NX CORE	REC=19%	RQD=19%		Start of day 3/12/2020
	-64.0	Gray SCHIST, medum to coarse quatz, plagioclose, muscovite, moderately weathered ; very close to close fracturing; moderate to steeply dipping fractures; medium weak to strong rock **BC: Class 1d**	35 33 9	88 89 90	C-4	NX CORE	REC=93%	RQD=31%		
	-66.5	Gray-tan SCHIST/PEGMATITE; fine to coarse plagioclase; qartz muscovite; slightly weathered; moderate to very close fracture; steeply dipping frctures; strong to very strong rock **BC: Class 1b**	26 36 20	91 92 93	C-5	NX CORE	REC=100%	RQD=78%		
	-69.5	Gray-tan SCHIST/PEGMATITE; fine to coarse plagioclase; qartz muscovite; slightly weathered; close to very close fracture; moderatey dipping frctures; strong to very strong rock	55	94 95	C-6	NX CORE	REC=42%	RQD=25%		

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Log of Boring **LB-1(OW)** Sheet 5 of 5

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 24 (NAVD 88)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-71.0			95						
	-71.5	**BC: Class 1b**	50	96						Combined RQD = (28+6) /(36+24)=34/60 = 56.7% End of boring at 95.5ft. Well LB-1(OW) installed. 3/12/2020.
				97						
				98						
				99						
				100						
				101						
				102						
				103						
				104						
				105						
				106						
				107						
				108						
				109						
				110						
				111						
				112						
				113						
				114						
				115						
				116						
				117						
				118						
				119						
				120						

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Log of Boring **LB-2** Sheet 1 of 3

Project: 126 Nassau Street	Project No.: 170545701
Location: 126 Nassau Street	Elevation and Datum: Approx.± 24 (NAVD 88)
Drilling Company: Warren George, Inc	Date Started: 3/6/20 — Date Finished: 3/10/20
Drilling Equipment: Electric Protabe Rig	Completion Depth: 55 ft — Rock Depth:
Size and Type of Bit: 2 15/16"	Number of Samples: Disturbed 23, Undisturbed, Core
Casing Diameter (in): 3 — Casing Depth (ft):	Water Level (ft.): First ▽, Completion ▼, 24 HR. ▼
Casing Hammer: Donut Hammer — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Cyrell
Sampler: 2-inch diameter split spoon	Field Engineer: Jack Cambeiro
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+24.0	Concrete Slab/brick	0						Concrete slab/ brick
	+23.0	Brown medium SAND, some fine gravel,trace coarse sand, brick fragments (dry)[FILL] **BC: Class 7**	1	S-1	SS	7	6, 8, 10, 11	18	
	+21.0	Light brown to brown medium SAND, some fine sand,trace coarse sand, trace fine gravel, brick fragments (dry)[FILL] **BC: Class 7**	3	S-2	SS	10	4, 9, 6, 5	15	
	+19.0	Brown medium SAND, some fine sand,trace coarse sand,trace fine gravel, brick fragments (dry)[FILL] **BC: Class 7**	5	S-3	SS	8	6, 75		Second 6" refusal after 75 blows, bouncin of spoon/rod Push casing down to 5ft. clean/wash out hole
	+17.0	Brown medium SAND, some fine sand,trace coarse sand,trace fine gravel, trace silt, metal fragments (dry)[FILL] **BC: Class 7**	7	S-4	SS	7	11, 71, 6, 1	77	
	+15.0	Light brown to dark brown medium SAND, trace fine sand,trace silt, trace fine gravel, brick fragments (dry)[FILL] **BC: Class 7**	9	S-5	SS	12	3, 2, 1, 2	3	Push casing to 10ft. clean/wash out hole
	+13.0	Dark brown medium SAND, trace fine sand,trace silt, trace fine gravel (dry)[FILL] **BC: Class 7**	11	S-6	SS	13	3, 2, 2, 3	4	
	+11.0		13						
		Dark brown medium SAND, some fine sand,trace silt (wet)[FILL] **BC: Class 7**	15	S-7	SS	6	5, 4, 4, 7	8	Drill to 15ft, dark brown wash. Push casing to 15ft. clean/wash out hole, light brown wash. Start 03/09/2020
	+7.0		17						
			19						
			20						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-2** Sheet 2 of 3

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 24 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+4.0	Dark brown medium SAND, some fine sand,trace coarse sand, trace silt (dry)[FILL] **BC: Class 7**	20	S-8	SS	7	5 7 8 7	15	Drill to 20ft, dark brown wash.
	+2.0		21						
			22						
			23						
			24						
		Dark brown fine SAND, trace silt (wet)[SP] **BC: Class 3b**	25	S-9	SS	17	5 4 6 5	10	Drill to 20ft, dark brown wash.
	-3.0	Dark brown fine SAND, trace silt (wet)[SP] **BC: Class 3b**	26						
			27	S-10	SS	16	7 9 11 7	20	wash out hole; dark brown wash.
	-5.0	Dark brown fine SAND, trace silt (wet)[SP-SM] **BC: Class 3b**	28						
			29	S-11	SS	20	10 8 8 11	16	
	-7.0	Dark brown fine SAND, trace silt (wet)[SP-SM] **BC: Class 3b**	30						wash out hole; dark brown wash.
			31	S-12	SS	23	10 10 13 10	23	
	-9.0	Dark brown fine SAND, trace silt (wet)[SP-SM] fine sand varied with silt **BC: Class 3b**	32						
			33	S-13	SS	16	6 7 10 8	17	
	-11.0	Olive brown SILTY fine SAND, (wet)[SM] fine sand varied with silt **BC: Class 3b**	34						wash out hole; dark brown wash.
			35	S-14	SS	23	8 8 12 17	20	
	-13.0	Dark brown SILTY fine SAND, (wet)[SM] **BC: Class 3b**	36						
			37	S-15	SS	14.5	5 4 7 16	11	
	-15.0	R16a -(0-7")- Dark brown SILTY fine SAND(moist) [SM]	38						
	-15.6	R16B -(7-16")- Olive brown SILT, trace fine SAND(moist) [SM] **BC: Class 3a**	39	S-16	SS	16	11 17 20 22	37	wash out hole; dark brown wash.
	-17.0	Dark brown SILTY fine SAND, (wet)[SM] **BC: Class 3b**	40						
			41	S-17	SS	16	8 9 13 16	22	
	-19.0	Dark brown SILT, trace fine SAND, (wet)[ML] **BC: Class 3a**	42						End of day 03/09/2020
			43	S-18	SS	24	9 15 20 17	35	
	-21.0		44						
			45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-2** Sheet 3 of 3

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 24 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-21.0	Dark brown SILT, trace fine SAND, (wet)[ML] **BC: Class 3b**	45	S-19	SS	18	10 12 18 24	30	Start of day 03/10/2020
	-23.0	Olive brown SILT, trace fine SAND, (wet)[ML] **BC: Class 3a**	47	S-20	SS	24	16 26 28 25	54	
	-25.0	Dark brown SILTY fine SAND, (moist)[SM] **BC: Class 3a**	49	S-21	SS	14.5	22 26 32 42	58	
	-27.0	Dark brown medium SAND, some fine SAND (moist)[SP] **BC: Class 3a**	51	S-22	SS	24	20 31 36 31	67	wash out hole; dark brown wash.
	-29.0	Dark brown medium SAND, some fine SAND, trace silt (moist)[SP] **BC: Class 3a**	53	S-23	SS	15	15 22 30 44	52	
	-31.0		55						End of boring 03/10/2020 at 55ft.
			70						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-3** Sheet 1 of 4

Project: 126 Nassau Street	Project No.: 170545701
Location: 126 Nassau Street	Elevation and Datum: Approx.± 24 (NAVD 88)
Drilling Company: Warren George, Inc	Date Started: 2/27/20 — Date Finished: 3/5/20
Drilling Equipment: Electric Protabe Rig	Completion Depth: 93 ft — Rock Depth: 87 ft
Size and Type of Bit: 2 15/16"	Number of Samples: Disturbed 31 — Undisturbed — Core 3
Casing Diameter (in): 3 — Casing Depth (ft)	Water Level (ft.): First ▽ — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut Hammer — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Deon
Sampler: 2-inch diameter split spoon	Field Engineer: Jack Cambeiro
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+24.0		0						0.5 ft Concrete slab
	+23.5	Reddish brown medium SAND, trace fine gravel, trace fine SAND, brick fragments (dry)[FILL] **BC: Class 7**	1	S-1	SS	5	5 4 4 3	8	
	+21.5	Brown medium SAND, trace fine gravel, trace coarse sand, trace fine sand, brick fragments (dry)[FILL] **BC: Class 7**	3	S-2	SS	5.5	5 2 4 13	6	
	+19.5	Reddish brown fine GRAVEL, some fine sand, trace coarse sand, brick fragments (dry)[FILL] **BC: Class 7**	5	S-3	SS	4	19 8 20 7	28	Push casing to 5ft.
	+17.5	Reddish brown medium GRAVEL, some medium sand, brick fragments, wood fragments (dry)[FILL] **BC: Class 7**	7	S-4	SS	2	3 5 5 28	10	Drill to 7ft. Last 6in only went down 1" then stopped going down (refusal)-Wood End of day 2/27/2020
	+15.0	Olive fine GRAVEL, trace coarse sand (wet)[FILL] **BC: Class 7**	9	S-5	SS	2	4 0 0 1	0	Start of day 2/28/2020 Push casing to 7ft. blows then rod sank about a foot, 1 blow last 6inch concrete?
	+13.0	No recovery	11	S-6	SS	0	1 0 0 0	0	1 blow, spoon dropped full 2' (weight of hammer)
	+11.0	Dark brown medium SAND, trace fine sand, trace fine gravel, wood fragments (moist)[FILL] **BC: Class 7**	13	S-7	SS	3	1 0 1 2	1	
	+9.0	Dark brown medium SAND, trace fine sand, trace fine gravel, wood fragments ,brick fragments (moist)[FILL] **BC: Class 7**	15	S-8	SS	4	18 14 7 7	21	Drill casing to 17ft. Wash hole , brown wash
	+7.0	Dark brown medium SAND, some fine sand (moist)[FILL] **BC: Class 7**	17	S-9	SS	7.5	7 5 6 7	11	
	+5.0	Dark brown medium SAND, some fine sand, trace coarse sand(moist)[FILL]	19	S-10	SS	12	6 8	19	
			20						

N-Value (Blows/ft) scale: 10 20 30 40

Casing blws/ ft — Coring (min)

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Log of Boring **LB-3** Sheet 2 of 4

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 24 (NAVD 88)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+4.0	**BC: Class 7**	20	S-10	SS	12	11 12	19	
	+3.0	Dark brown medium SAND, some fine sand, trace fine gravel(moist)[FILL] **BC: Class 7**	21						
			22	S-11	SS	15	10 8 10 9	18	Drill casing to 22ft.
	+1.0		23						Wash hole to 23ft , Dark brown wash
			24						
		Dark brown medium SAND, some fine sand, trace coarse sand, trace fine gravel, plaster fragments(moist)[FILL] **BC: Class 7**	25						Drill to 25ft and wash hole, dark brown wash
			26	S-12	SS	8	16 18 24 22	42	
	-3.0		27						
			28						
			29						
		Dark brown fine SAND, trace medium sand, trace silt (wet)[SP-SM] **BC: Class 3a**	30						Drill to 30ft and wash hole, dark brown wash, chattering End of day 2/28/2020
			31	S-13	SS	1	12 15 16 20	31	
	-8.0		32						
		R14a - (0-8") -Dark brown medium SAND, trace fine sand (moist)[SP] R14b - (8-10") -Dark brown fine SAND (moist)[SP] **BC: Class 3a**	33	S-14	SS	10	19 15 16 18	31	Start day 3/2/2020. Push casing to 32ft. Rerill to 32 ft, wash hole, dark brown wash.
	-10.0	Dark brown SILTY fine SAND (moist)[SM] **BC: Class 3a**	34						
			35	S-15	SS	13	15 16 18 20	34	
	-12.0	Dark brown fine SAND , trace silt (moist)[SM] **BC: Class 3a**	36						Wash hole to 36ft. Dark brown wash.
			37	S-16	SS	12	9 15 17 15	32	Pus casing to37ft. wash hole, dark brown wash
	-14.0	Dark brown SILTY fine SAND (moist)[SM] **BC: Class 3a**	38						
			39	S-17	SS	24	11 9 14 16	23	
	-16.0	Dark brown SILTY fine SAND (wet)[SM] **BC: Class 3a**	40						
			41	S-18	SS	24	14 18 21 28	39	
	-18.0	Olive brown SILTY fine SAND (wet)[SM] **BC: Class 3b**	42						Wash hole to 42ft, dark brown wash
			43	S-19	SS	17	6 8 14 20	22	
	-20.0	Olive brown SILTY fine SAND (moist)[SM] **BC: Class 3a**	44						
			45	S-20	SS	24	11 16	34	

N-Value (Blows/ft) scale: 10 20 30 40

Casng blws/ ft
Coring (min)

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Log of Boring **LB-3** Sheet 3 of 4

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 24 (NAVD 88)

Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
-21.0		45	S-20	SS	24	18 25	34	
-22.0	Olive brown SILTY fine SAND (moist)[SM] **BC: Class 3b**	46						Wash hole to 46ft, dark brown wash
		47	S-21	SS	17.5	7 11 16 16	27	
-24.0	Dark brown SILT, trace fine sand (wet)[SM] **BC: Class 3a**	48	S-22	SS	24	16 24 32 55	56	
-26.0	Olive brown SILT, trace fine sand (wet)[ML] **BC: Class 3a**	50	S-23	SS	18	11 14 21 94	35	Wash hole to 50ft, dark brown wash
-28.0	Very dense dark brown medium SAND, some fine sand, trace fine gravel, trace silt (wet)[SP-SM] **BC: Class 3a**	52	S-24	SS	14	64 66 88 68	154	Last 6in not recovere (fellout) End of day 3/2/2020
-30.0		54						
-33.0	Brown medium SAND, some fine sand, trace fine gravel, trace silt (moist)[SP-SM] **BC: Class 3a**	55 56 57	S-25	SS	14.5	62 88 51 41	139	Start of ady 3/3/2020 Drill to 55ft, wash hole, dark brown wash , chattering
-38.0	Very dense dark brown medium SAND, some fine sand, trace fine gravel, trace silt (wet)[SP-SM] **BC: Class 3a**	60 61 62	S-26	SS	4	100/4"	100/4"	Drill to 60ft, chattering often, wash hole, dark brown wash Went down only 4-inch after 100 blows
-43.0	Very dense redish brown medium SAND, some fine sand, some fine gravel, trace silt (wet)[SP-SM] **BC: Class 3a**	65 66 67	S-27	SS	4.5	108 100/3"	100/3"	Drill to 65ft. heavy chattering, slow drilling, dark brown wash Second 6" only went down 3" after 100 blows
		70						

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Log of Boring **LB-3** Sheet 4 of 4

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 24 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks
	-46.0	Very dense dark brown fine SAND, trace medium sand, trace silt (wet)[SP-SM] **BC: Class 3a**	70	S-28	SS	11.5	58 100/4"	100/4"	Drill to 70ft. wash hole , dark brown wash Second 6" onyl went down 4" with 100 blows
	-48.0		71						
			72						
			73						
			74						
		Dark brown and olive SILT, trace fine sand(moist)[ML] **BC: Class 3a**	75	S-29	SS	12	62 83 100/2"	100/2"	Drill to 75ft, wash out hole, dark brown wash Third 6" only went down 2" with 100 blows End of day 3/3/2020 Start of day 3/4/2020
	-53.0		76						
			77						
			78						
			79						
		Olive brown fine SAND, some silt (moist)[SM] **BC: Class 3a**	80	S-30	SS	15.5	26 56 54 74	110	Drill to 80ft. wash hole , dark brown wash
	-58.0		81						
			82						
			83						
			84						
		Olive brown medium SAND, some fine sand, trace fine gravel (moist)[SP] **BC: Class 3a**	85	S-31	SS	12	45 103 100/1"	100/1"	Drill to 85ft. wash hole , dark brown wash Third 6" only went 1" for 100 blows Decomposed rock?
	-63.0	Gray to tan SCHIST, medium coarse graained quartz, biotite-muscovite slightly weathered close fracture spacing, nearly vertical to steeply dipping, medium to strong rock **BC: Class 1d**	86	C-1	NX CORE	REC=100%	RQD=29%		Core 2ft of rock End of day 03/04/2020 Start of day 03/05/2020
	-65.0	Gray to tan SCHIST, medium to coarse grained quartz, biotite-muscovite-amphibolite; slightly weathered ;close to moderate fracture spacing; modedrately to steeply dipping; medium to strong rock **BC: Class 1b**	87						
	-67.0	Gray to tan SCHIST, medium to coarse grained quartz, plagioclase-muscovite-amphibolite; slightly weathered ;close to moderate fracture spacing; modedrately to steeply dipping fracture **BC: Class 1b**	88	C-2	NX CORE	REC=100%	RQD=54%		
	-69.0		89						
			90						
			91						
			92	C-3	NX CORE	REC=94%	RQD=69%		
			93						End of boring at 93ft. 03/05/2020
			94						
			95						

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Log of Boring **LB-4** Sheet 1 of 3

Project: 126 Nassau Street	Project No.: 170545701
Location: 126 Nassau Street	Elevation and Datum: Approx.± 12 (NAVD 88)
Drilling Company: Warren George, Inc	Date Started: 2/25/20 — Date Finished: 2/26/20
Drilling Equipment: Electric Protabe Rig	Completion Depth: 52 ft — Rock Depth:
Size and Type of Bit: 2 15/16"	Number of Samples: Disturbed 24 — Undisturbed — Core
Casing Diameter (in): 3 — Casing Depth (ft)	Water Level (ft.): First ▽ — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut Hammer — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Deon
Sampler: 2-inch diameter split spoon	Field Engineer: Jack Cambeiro
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+12.0	Concrete slab, cinder black	0						
	+11.0	Black medium SAND, some fine sand, trace silt, trace fine gravel (dry)[FILL] Tannish cinder concrete **BC: Class 7**	1	S-1	SS	8	3		6" with blow count of 3 and then refusal.
	+9.0	1' of concrete	3						
	+8.0	Dark brown medium SAND, some fine sand, trace silt, brick fragment (dry)[FILL] **BC: Class 7**	4	S-2	SS	1	10 7 10 7	17	
	+6.0	Brown medium SAND, some fine sand, trace silt (dry)[FILL] **BC: Class 7**	6	S-3	SS	18	12 13 13 15	26	
	+4.0	Brown fine SAND, some medium sand, trace silt (dry)[FILL] **BC: Class 7**	8	S-4	SS	14	20 12 14 12	26	
	+2.0	Dark brown medium SAND, trace fine sand, trace silt, brick fragment (moist)[FILL] **BC: Class 7**	10	S-5	SS	11	7 10 14 16	24	Push casing to 10ft. Washed out hole to 10ft, dark brown wash
	0.0	Dark brown medium SAND, some fine sand, trace silt (moist)[FILL] **BC: Class 7**	12	S-6	SS	7	12 12 11 11	23	
	-2.0	Dark brown medium SAND, trace fine sand, trace silt, brick fragment (moist)[FILL] **BC: Class 7**	14	S-7	SS	9	10 12 13 14	25	Washed out hole to 14ft, dark brown wash
	-4.0	R8a(0-11")-Brown medium SAND, some fine sand, trace silt(moist)[SP]	16	S-8	SS	20	13 13 13 12	26	
	-5.3	R8b(11-20")-Brown fine SAND, some silt(moist)[SP] **BC: Class 3b**							
	-6.0	Dark brown SILTY fine SAND(moist)[SM] **BC: Class 3b**	18	S-9	SS	17	7 8 9 12	17	Washed out hole to 18ft, dark brown wash
	-8.0		20						

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Log of Boring **LB-4** Sheet 2 of 3

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 12 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-8.0	Dark brown SILTY fine SAND(moist)[SM] **BC: Class 3b**	20	S-10	SS	15	14 12 14 15	26	
	-10.0	Dark brown SILTY fine SAND(moist)[SM] **BC: Class 3b**	22	S-11	SS	14	7 10 14 15	24	Washed out hole to 22ft, dark brown wash
	-12.0	Dark brown SILTY fine SAND(moist)[SM] **BC: Class 3b**	24	S-12	SS	16	17 14 15 17	29	
	-14.0	Dark brown SILTY fine SAND(moist)[SM] **BC: Class 3b**	26	S-13	SS	15	9 10 8 15	18	Washed out hole to 26ft, dark brown wash
	-16.0	Dark brown SILTY fine SAND(moist)[SM] **BC: Class 3b**	28	S-14	SS	24	8 9 15 14	24	
	-18.0	Dark brown SILTY fine SAND(wet)[SM] **BC: Class 3b**	30	S-15	SS	17	5 6 8 15	14	Washed out hole to 30ft, dark brown wash Start 2/26/2020
	-20.0	R16a (0-12"- Dark brown SILTY fine SAND(wet) [SP-SM]	32	S-16	SS	24	11 14 21 32	35	
	-21.0	R16B (12-24"- Dark brown SILT, trace fine sand(wet) [SP-SM] **BC: Class 3a**	33						
	-22.0	Dark brown SILT, trace fine sand (wet) **BC: Class 3b**	34	S-17	SS	20	5 7 10 16	17	Washed out hole to 34ft, dark brown wash
	-24.0	Dark brown SILT, trace fine sand (wet) **BC: Class 3a**	36	S-18	SS	23	12 24 30 23	54	
	-26.0	Dark brown SILT, trace fine sand (wet) **BC: Class 3a**	38	S-19	SS	18	13 14 19 24	33	Washed out hole to 38ft, dark brown wash
	-28.0	R20a(0-8") -Dark brown medium dense SILT (wet) R20b(8-2")-Dark brown very dense SILT (wet) **BC: Class 3a**	40	S-20	SS	24	14 23 34 63	57	
	-30.0	Olive dark brown SILT, ttrace fine sand, trace fine gravel (wet) **BC: Class 3a**	42	S-21	SS	13.5	13 62 42 37	104	Washed out hole to 42ft, dark brown wash
	-32.0	Olive to dark brown SILT, trace fine sand (wet)[SM] **BC: Class 3a**	44	S-22	SS	18	42 105		
			45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-4** Sheet 3 of 3

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 12 (NAVD 88)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-33.0		45				-		
	-34.0	Olive gray fine very dense SAND,some silt, trace coase sand, trace fine gravel (moist)[SP-SM] **BC: Class 3a**	46	S-23	SS	10	100/4"	100/4"	Washed out hole to 46ft, dark brown wash Only went down 4" in 100 blows
			47				-		
			48				-		
			49						
	-38.0	Dark brown medium SAND, some fine sand (wet)[SP] **BC: Class 3a**	50	S-24	SS	18	27		
			51				35	78	
							43		
	-40.0		52				60		End of boring at 52ft. 2/26/2020 (15:27)
			53						
			54						
			55						
			56						
			57						
			58						
			59						
			60						
			61						
			62						
			63						
			64						
			65						
			66						
			67						
			68						
			69						
			70						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-5(OW)** Sheet 1 of 3

Project: 126 Nassau Street	Project No.: 170545701
Location: 126 Nassau Street	Elevation and Datum: Approx.± 12 (NAVD 88)
Drilling Company: Warren George, Inc	Date Started: 2/21/20 — Date Finished: 2/24/20
Drilling Equipment: Electric Protabe Rig	Completion Depth: 52 ft — Rock Depth:
Size and Type of Bit: 2 15/16"	Number of Samples: Disturbed 30 — Undisturbed — Core 4
Casing Diameter (in): 4 — Casing Depth (ft):	Water Level (ft.): First ▽ — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut Hammer — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Deon Dewar
Sampler: 2-inch diameter split spoon	Field Engineer: Andrea Herrera/Sergio Chong Sosa
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+12.0	6 inch concrete slab	0						Cored Slab
	+11.5	6 inch void							6-inch void
	+11.0	11 inch rock	1						Cored rock
	+10.0	Dark gray to brown very coarse to medium SAND, trace fine gravel (moist)[FILL] **BC: Class 7**	2	S-1	SS	9	2 3 3 1	6	Took S-1
	+8.0	Dark gray to brown very coarse to medium SAND, trace fine gravel (moist)[FILL] **BC: Class 7**	4	S-2	SS	13	3 2 2 3	4	Took S-2
	+6.0	Dark gray to brown very coarse to medium SAND, trace medium to fine gravel (wet)[FILL] **BC: Class 7**	6	S-3	SS	14	4 5 8 8	13	Installed casing to 5ft. Drilled to 6ft, Brown wash, add mud Took S-3
	+4.0	Dark gray to brown very coarse to medium SAND, some medium to fine gravel (wet)[FILL] **BC: Class 7**	8	S-4	SS	22	7 6 8 8	14	Took S-4
	+2.7	Brown fine SILTY SAND, mica flakes (8")(moist)[SM] **BC: Class 3b**	9						
	+2.0	Brown fine SILTY SAND, mica flakes (moist)[SM] **BC: Class 3b**	10	S-5	SS	14	6 6 8 8	14	Took S-5
	0.0		11						
		Brown fine SILTY SAND, mica flakes (moist)[SM] **BC: Class 3b**	12						
			13						
			14	S-6	SS	18	6 5 6 6	11	Drilled to 14ft Took S-6
	-4.0	Brown meium to fine SAND, some silt, mica flakes (moist)[SP] **BC: Class 3b**	15						
			16						Took S-7
			17	S-7	SS	24	8 8 12 10	20	
	-6.0	Brown meium to fine SAND, trace silt, mica flakes (moist)[SP] **BC: Class 3b**	18						Took S-8
			19	S-8	SS	13	8 11 14 12	25	
	-8.0		20						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-5(OW)** Sheet 2 of 3

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 12 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-8.0	Brown meium to fine SILTY SAND, mica flakes (moist)[SM] **BC: Class 3b**	20	S-9	SS		8 10 10 12	20	Took S-9
	-10.0	Brown silt, trace mica flakes (moist) [SM] **BC: Class 3b**	22	S-10	SS		5 7 5 7	12	Took S-10
	-12.0	Brown silt, trace mica flakes (moist) [SM] **BC: Class 3b**	24	S-11	SS		7 10 14 14	24	Took S-11
	-14.0	Brown silt, mica flakes (moist) [SM] **BC: Class 3b**	26	S-12	SS		5 6 12 14	18	Took S-12
	-16.0	Brown silt, mica flakes (moist) [SM] **BC: Class 3b**	28	S-13	SS		9 14 14 14	28	Took S-13
	-18.0	Brown silt, mica flakes (moist) [SM] **BC: Class 3b**	30	S-14	SS		6 7 11 18	18	Took S-14 End of day 2/21/2020 Start 2/24/2020
	-20.0	Brown olive silt, trace medium gravel, mica flakes (moist) [SM] **BC: Class 3a**	32	S-15	SS	24	10 16 18 20	34	Took S-15
	-22.0	Brown to dark gray very coarse to coarse SAND, some medium to fine gravel(moist) [SP]	34	S-16	SS	15	10 11 9 22	20	Wash out hole Took S16A Took S16B
	-23.0	Brown SILT, trace fine gravel (moist) [SM] **BC: Class 3b**	35						
	-24.0	Brown coarse to fine SAND, trace silt (wet)[SP] **BC: Class 3a**	36	S-17	SS	24	19 23 21 21	44	Took S-17
	-28.0	Brown very coarse to medium SAND, trace fine gravel, trace silt(wet) [SP] **BC: Class 3a**	40	S-18	SS	14	14 17 11 18	28	Drilled o 40fft, light brown wash, rig chatter Took S-18
	-30.0		42						
			45						

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Log of Boring **LB-5(OW)** Sheet 3 of 3

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 12 (NAVD 88)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-33.0		45					10 20 30 40	
		Brown very coarse to medium SAND, trace fine gravel, (moist) [SP] **BC: Class 3a**	46	S-19	SS	19	34 50 45 55	95	Drilled to 45ft, brown wash Took S-19
	-35.0		47						
			48						
			49						
		Brown coarse to fine SAND, trace silt(moist) [SP] **BC: Class 3a**	50	S-20	SS	21	45 57 60 96	117	Took S-20
	-40.0		51						
			52						End of boring at 52ft. Installed well(10ft screen and 0ft riser) 2/24/2020
			53						
			54						
			55						
			56						
			57						
			58						
			59						
			60						
			61						
			62						
			63						
			64						
			65						
			66						
			67						
			68						
			69						
			70						

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Log of Boring **LB-6** Sheet 1 of 5

Project: 126 Nassau Street	Project No.: 170545701
Location: 126 Nassau Street	Elevation and Datum: Approx.± 12 (NAVD 88)
Drilling Company: Warren George, Inc	Date Started: 2/21/20 — Date Finished: 3/4/20
Drilling Equipment: Electric Protabe Rig	Completion Depth: 104.5 ft — Rock Depth: 95.5 ft
Size and Type of Bit: 2 15/16"	Number of Samples: Disturbed 30 — Undisturbed — Core 4
Casing Diameter (in): 2-7/8" — Casing Depth (ft)	Water Level (ft.): First ▽ — Completion ▼ — 24 HR. ▼
Casing Hammer: Donut Hammer — Weight (lbs): 140 — Drop (in): 30	Drilling Foreman: Cyrell
Sampler: 2-inch diameter split spoon	Field Engineer: Andrea Herrara/Jack Cambeiro
Sampler Hammer: Donut — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+12.0	Dark brown fine SAND, trace coarse sand, trace silt (Suspension test)(moist)[FILL] **BC: Class 7**		0	S-1	SS	6	3, 2, 1, WOR	3	Stat drilling at 11AM. 2/21/2020
	+9.5	Dark brown fine SAND, some coarse sand, trace silt (moist)[FILL] **BC: Class 7**		3	S-2	SS	6	2, 4, 7, 4	11	
	+7.5	Dark brown coarse SAND, some fine sand (moist)[FILL] **BC: Class 7**		5	S-3	SS	11	2, 5, 7, 10	12	Push casing ti 5ft, clean hole, brown wash (using mud)
	+5.0	Dark brown coarse SAND, some fine sand (moist)[FILL] **BC: Class 7**		7	S-4	SS	14	8, 12, 14, 11	26	
	+3.7	Dark brown fine SAND, some medium sand, trace silt (moist)[FILL] **BC: Class 7**								
	+3.0	Dark brown silty coarse SAND, some fine sand (moist)[FILL] **BC: Class 3b**		9	S-5	SS	15	11, 12, 11, 10	23	Push casing to 10ft, clean hole, chattery around 7ft.
	+1.0	Dark brown SILTY fine SAND, trace mica (moist)[SP-SM] **BC: Class 3b**		11	S-6	SS	19	6, 10, 8, 11	18	
	-1.0	Dark brown SILTY fine SAND, trace mica [SP-SM] **BC: Class 3b**		13	S-7	SS	14	12, 16, 13, 13	29	
	-3.0	Dark brown SILTY fine SAND, trace mica (moist)[SP-SM] **BC: Class 3b**		15	S-8	SS	16	8, 8, 8, 8	16	Cleaning hole to 15ft, dark brown wash
	-5.0	Dark brown SILTY fine SAND, trace mica (moist)[SP-SM] **BC: Class 3b**		17	S-9	SS	16	10, 13, 13, 12	26	
	-7.0	Dark brown SILTY fine SAND, trace mica (wet)[SP-SM]		19	S-10	SS	17	8, 10	18	Cleaning hole to 19ft, dark brown wash
				20						

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Log of Boring **LB-6** Sheet 2 of 5

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 12 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-8.0	**BC: Class 3b**		20	S-10	SS	17	8 10	18	
	-9.0			21	S-11	SS	20	13 12 12 11	24	
		Dark brown SILTY fine SAND, trace mica (moist)[SP-SM] **BC: Class 3b**		22 23	S-12	SS	18.5	7 11 13 16	24	02/24/2020 Took S-12
	-13.0	Dark brown SILTY fine SAND, trace mica (moist)[SP-SM] **BC: Class 3b**		24 25	S-13	SS	19	10 11 17 17	28	Took S-13
	-15.0	Dark brown SILTY fine SAND, trace mica (wet)[SP-SM] **BC: Class 3b**		26 27	S-14	SS	21	10 11 16 20	27	Took S-14
	-17.0	Dark brown SILTY fine SAND, trace mica (moist)[SP-SM] **BC: Class 3b**		28 29	S-15	SS	22	10 12 18 16	30	Clean hole to 31ft, dark brown wash Took S-15
	-19.0	Dark brown SILTY fine SAND, trace mica (moist)[SP-SM] **BC: Class 3b**		30 31	S-16	SS	23	8 12 14 14	26	Took S-16
	-21.0	R17a - (0.8")-Dark brown SILTY fine SAND(wet) R17b - (8-24")- Olve SILTY fine SAND (wet) **BC: Class 3a**		32 33	S-17	SS	24	14 22 27 47	49	Took S-17
	-23.0	Olve brown medium SAND, some fine sand, trace silt (wet)[SP] **BC: Class 3a**		34 35	S-18	SS	18	16 25 15 14	40	Clean hole to 35ft. Took S-18
	-25.0			36 37						
				38 39						
		R19a (0-9")- Brown medium SAND, some fine sand, trace silt (wet)[SP] R19b (9-17") - Brown coarse SAND, some fine gravel, trace silt (wet) [SP] **BC: Class 3a**		40 41	S-19	SS	17	26 33 37 27	70	Drill to 40ft. Clean ole o 40ft. Took S-19a Took S-19b-fine gravel green color
	-30.0			42 43 44 45						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-6** Sheet 3 of 5

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 12 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-33.0	Brown medium SAND, trace fine sand, trace coarse sand (wet)[SP] **BC: Class 3a**		45	S-20	SS	19	48 54 45 69	99	Drill to 45ft, clean hole to 45ft.
	-35.0			46						Refusal, drilling not successful, Going to core Start 2/25/20202
				47						
				48						
				49						
		Brown coarse SAND, some medium sand, some fine gravel (wet)[SP] **BC: Class 3a**		50	S-21	SS		26 100		Cored to 50ft. Took S-21. Didnot reach 6" in 100 blows
	-40.0			51						
				52						
				53						
				54						
		Brown fine SAND, trace medium sand, trace silt (moist)[SP] **BC: Class 3a**		55	S-22	SS	19	38 44 47 49	91	Drill to 55ft, wash hole Took S-22
	-45.0			56						
				57						
				58						
				59						
		Brown hard SILT, trace fine sand, trace clay (moist)[ML] **BC: Class 5a**		60	S-23	SS	15	40 74 100	174	Drill to 60ft, wash hole Took S-23 Push casing down to 60ft
	-50.0			61						
				62						
				63						
				64						
		Dark brown to olive fine SAND, some silt (moist)[SP] **BC: Class 3a**		65	S-24	SS	16	23 39 46 57	85	Drill to 65ft., wash hole Start 2/26/2020 Took S-24
	-55.0			66						
				67						
				68						
				69						
				70						

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Log of Boring **LB-6** Sheet 4 of 5

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 12 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-58.0	Dark brown medium SAND, some coarse sand, trace silt (moist)[SP] **BC: Class 3a**		70	S-25	SS	16	10 17 19 35	36	Drill to 70ft and wash hole, dark brown wash Took S-25
	-60.0			71						
				72						
				73						
				74						
		R26a (0-14")- Dark brown medium SAND, some coarse sand, trace fine sand (wet)[SP] R26b (12-24") - Dark brown fine SAND, trace silt (moist) [SP] **BC: Class 3a**		75	S-26	SS	24	38 88 95 100	183	Drill to 75ft and wash hole, dark brown wash Took S-26 Didn't reach last 6" in 100 blows
	-65.0			76						
				77						
				78						
				79						
		Very dense olive brown fine SAND, trace silt (moist) [SP] **BC: Class 3a**		80	S-27	SS	18	40 55 62 66	117	Took S-27
	-70.0			81						
				82						
				83						
				84						
		Very dense olive brown fine SAND, trace silt , fibrous filament (moist) [SP] **BC: Class 3a**		85	S-28	SS	14	28 52 96 100	148	Drill to 85ft and wash hole, dark brown wash Took S-28 Last count didn't reach 6" in 100 blows End of day 2/28/2020
	-75.0			86						
				87						
				88						
				89						
		Very dense olive brown fine SAND, trace silt (moist) [SP] **BC: Class 3a**		90	S-29	SS	14	42 63 92 98	155	Drill to 90ft. Start day 2/28/2020 Took S-29
				91						
				92						
				93						
				94						
				95						

N-Value (Blows/ft) scale: 10 20 30 40

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Log of Boring **LB-6** Sheet 5 of 5

Project	Project No.
126 Nassau Street	170545701
Location	**Elevation and Datum**
126 Nassau Street	Approx.± 12 (NAVD 88)

Material Symbol	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	-83.0			95						Drill to 95ft and wash hole, dark brown wash
	-83.5	Olive brown medium SAND, trace fine sand, trace silt, trace fine gravel (wet) [SP] **BC: Class 3a**	17		S-30	SS	7.5	122		Took S-30
		Gray SCHIST, close fracture spacing, moderately dipping **BC: Class 1d**	40	96	C-1	SS	22	- -		Did not go more than 6" after 122 lows, decomposed rock?
			42	97						End of day 2/28/2020
	-86.0			98						Start day 3/2/2020
		Gray SCHIST, very close fracture spacing, steeply dipping **BC: Class 1d**	17		C-2	SS	11			Push casing down to 60ft. Going to core rock
	-87.0			99						End day 3/2/2020
		Gray SCHIST, very close fracture spacing, steeply dipping **BC: Class 1d**	18		C-3	SS	17			Start 3/3/2020 5ft run attempt but core barrel clogged.
			10	100						Push casing to 82ft, re-drill to 99ft.
	-88.5									End day 3/3/2020
		Gray SCHIST, medium to coarse grained muscovite-quartz-plagioclase-amphibolite, slightly weathered, close to moderate fracture spacing, moderate dipping **BC: Class 1b**	21	101						Stat day 3/4/2020 Coring from 99.5ft
			15	102	C-4	SS	48			Jammed at 100.5ft
			12	103						
			6	104						
	-92.5			105						End of boring 3/4/2020 at 104.5ft.
				106						
				107						
				108						
				109						
				110						
				111						
				112						
				113						
				114						
				115						
				116						
				117						
				118						
				119						
				120						

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WELL CONSTRUCTION SUMMARY

Well No. LB-1(OW)

PROJECT 126 Nassau Street	**PROJECT NO.** 170545701
LOCATION Manhattan, NY	**ELEVATION AND DATUM** el ± 25.5 (NAVD 88)
DRILLING AGENCY Warren George, Inc.	**DATE STARTED** 2/21/2020 **DATE FINISHED** 2/24/2020
DRILLING EQUIPMENT Interior Portable Drill Rig	**FOREMAN** Deon Dewar
SIZE AND TYPE OF BIT 2-15/16" Drill Bit	**INSPECTORS** Jack Cambeiro

METHOD OF INSTALLATION

The boring was advanced to 95.5 feet below the existing cellar slab using mud rotary drilling techniques. The well was installed to 60 feet below the cellar slab. The well is made of 10 feet screen and 50 feet riser.

METHOD OF WELL DEVELOPMENT

The bore hole was developed using a bailer. Approximately 20 gallons were bailed from the well. The well

TYPE OF CASING PVC **DIAMETER** 2 inch	**TYPE OF BACKFILL MATERIAL** Soil Cuttings
TYPE OF SCREEN PVC **DIAMETER** 2 inch	**TYPE OF SEAL MATERIAL** Bentonite
BOREHOLE DIAMETER 3 inch	**TYPE OF FILTER MATERIAL** Silica Sand

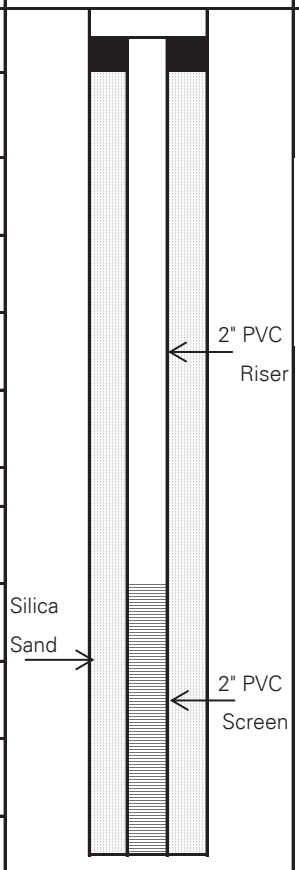
	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	25.5	0.0
TOP OF SEAL	25.5	0.0
TOP OF FILTER	25.0	0.5
TOP OF SCREEN	-24.5	50.0
BOTTOM OF SCREEN	-34.5	60.0
SCREEN LENGTH		LENGTH (ft) 10.0

SLOT SIZE
0.025 inch

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
16.3	3/13/2020	9.2
-25.1	3/13/2020	50.6
25.5		
25.5		
25.5		

WELL DETAILS



SUMMARY SOIL CLASSIFICATION [1], NOTES

Refer to boring LB-1(OW) for soil details.

DEPTH (FT) [2]

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21 Penn Plaza, 360 West 31st Street, 8th Floor, Manhattan, New York 10001

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ENGINEERING & ENVIRONMENTAL SERVICES

WELL CONSTRUCTION SUMMARY

Well No. LB-5(OW)

PROJECT 126 Nassau Street	**PROJECT NO.** 170545701
LOCATION Manhattan, NY	**ELEVATION AND DATUM** el ± (NAVD 88)
DRILLING AGENCY Warren George, Inc.	**DATE STARTED** 2/21/2020 **DATE FINISHED** 2/24/2020
DRILLING EQUIPMENT Interior Portable Drill Rig	**FOREMAN** Deon Dewar
SIZE AND TYPE OF BIT 3 7/8" Tricone Roller Bit	**INSPECTORS** Sergio Chong Sosa

METHOD OF INSTALLATION

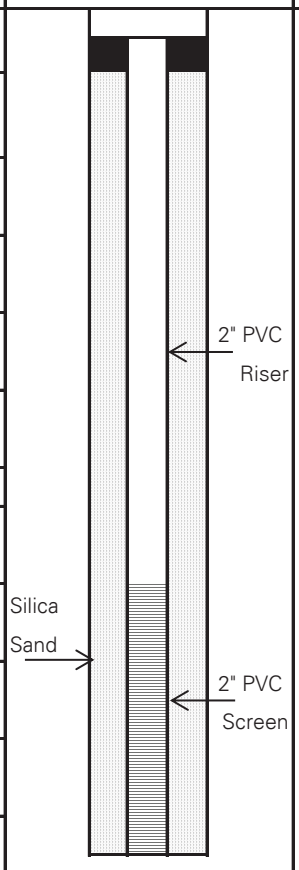
The boring was advanced to 52 feet below the existing subcellar slab using mud rotary drilling techniques. The well was installed to 50 feet below the slab. The well is made of 10 feet screen and 40 feet of riser.

METHOD OF WELL DEVELOPMENT

The bore hole was developed using a pump and sealed with bentonite.

TYPE OF CASING PVC	**DIAMETER** 2 inch	**TYPE OF BACKFILL MATERIAL** Soil Cuttings	
TYPE OF SCREEN PVC	**DIAMETER** 2 inch	**TYPE OF SEAL MATERIAL** Bentonite	
BOREHOLE DIAMETER 4 inch		**TYPE OF FILTER MATERIAL** Silica Sand	

TOP OF CASING	**ELEVATION (ft) [3]** 56.6	**DEPTH (ft)** 0.0	**WELL DETAILS**	**SUMMARY SOIL CLASSIFICATION [1], NOTES** / **DEPTH (FT) [2]**
TOP OF SEAL	**ELEVATION (ft) [3]** 0.0	**DEPTH (ft)** 0.0		
TOP OF FILTER	**ELEVATION (ft) [3]** -1.0	**DEPTH (ft)** 1.0		
TOP OF SCREEN	**ELEVATION (ft) [3]** -15.0	**DEPTH (ft)** 15.0		Refer to boring LB-5
BOTTOM OF SCREEN	**ELEVATION (ft) [3]** -25.0	**DEPTH (ft)** 25.0		
SCREEN LENGTH		**LENGTH (ft)** 10.0		
SLOT SIZE 0.025 inch				



GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
0.0		0.0
0.0		0.0
0.0		
0.0		
0.0		

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor, Manhattan, New York 10001

APPENDIX C

TEST-PIT SKETCHES AND PHOTOGRAPHS

Photo 1: General view of the test pit TP-4

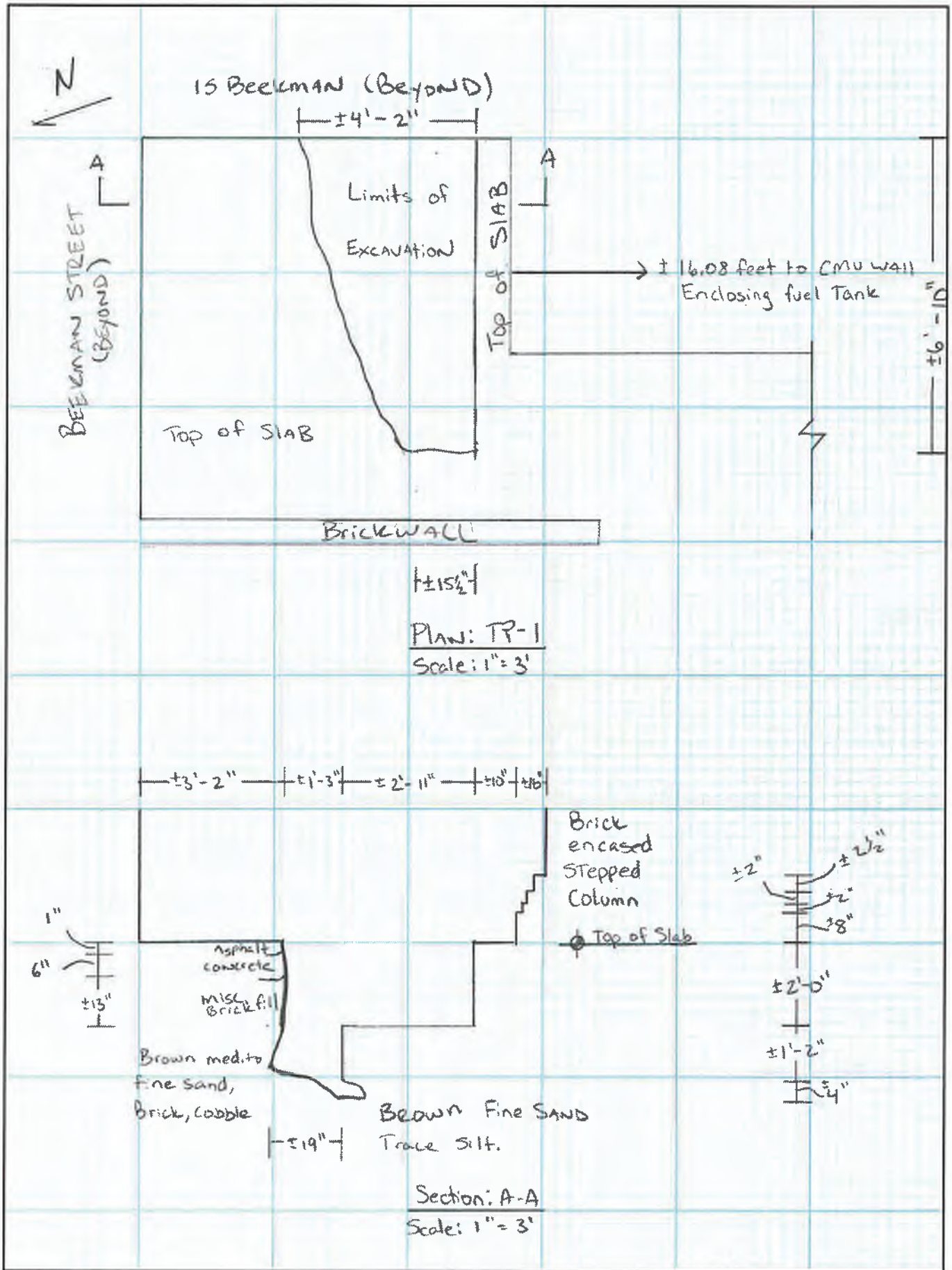
Photo 2: Close-up view of the test pit TP-3

Photo 3: Close-up view of the test pit TP-3(facing North)

Photo 4: General view of the test pit TP-1(facing East)

Photo 5: Close-up view of the test pit TP-1

Photo 6: Close-up view of the test pit TP-2 (facing South)



126 NASSAU STREET	BY SCS DATE 3/10/20	PROJ. NO. 1705457O1
TESTPIT SKETCHES - TP-1	CKD. LEF DATE	SHEET 1 OF

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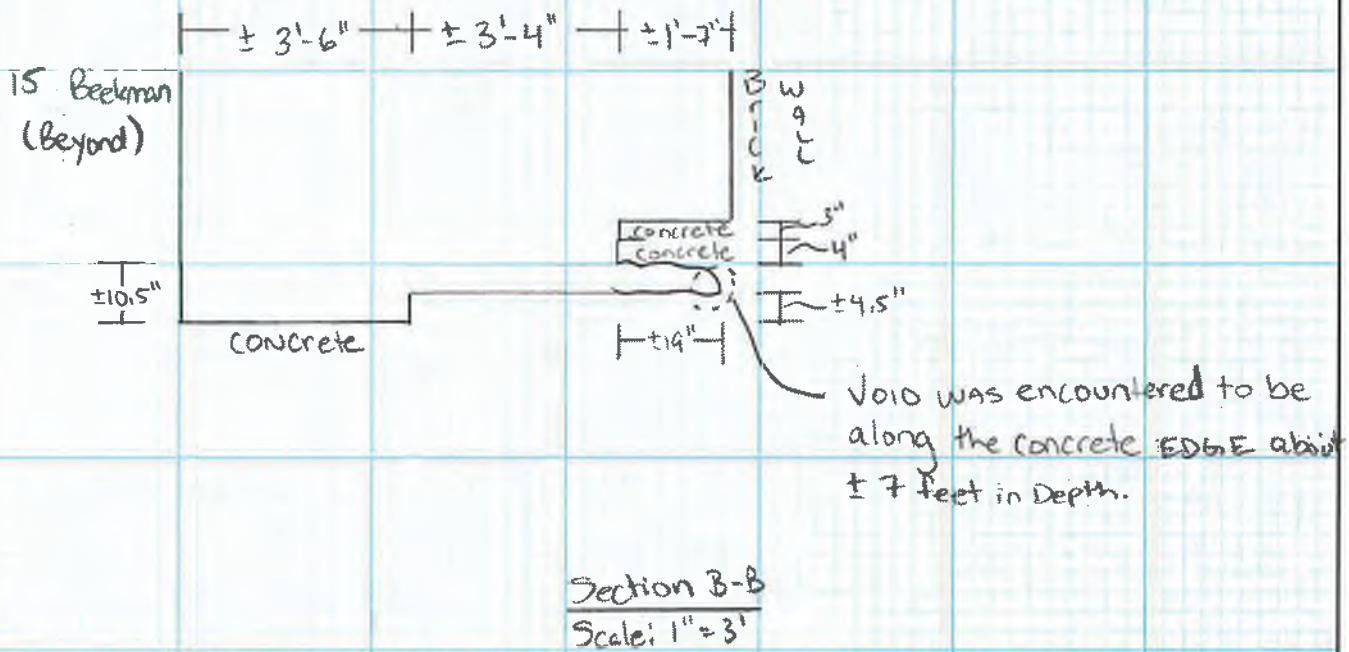

Section B-B
Scale: 1" = 3'

126 NASSAU STREET	BY SCS DATE 3/10/20	PROJ. NO. 170545701
Test Pit Sketches - TP-1	CKD. ____ DATE ____	SHEET 2 OF ____

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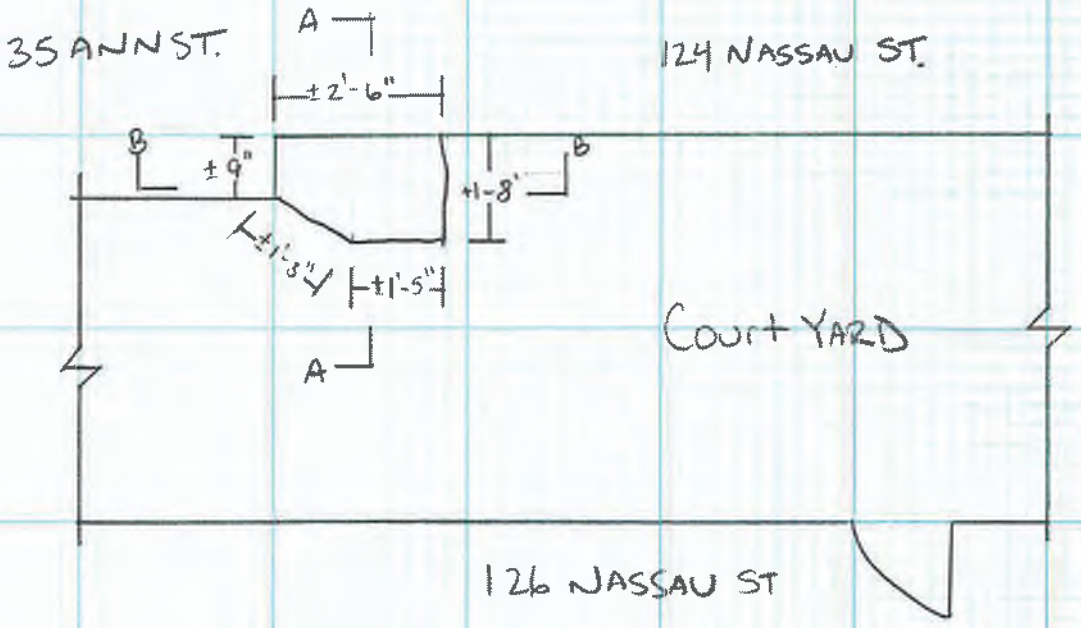
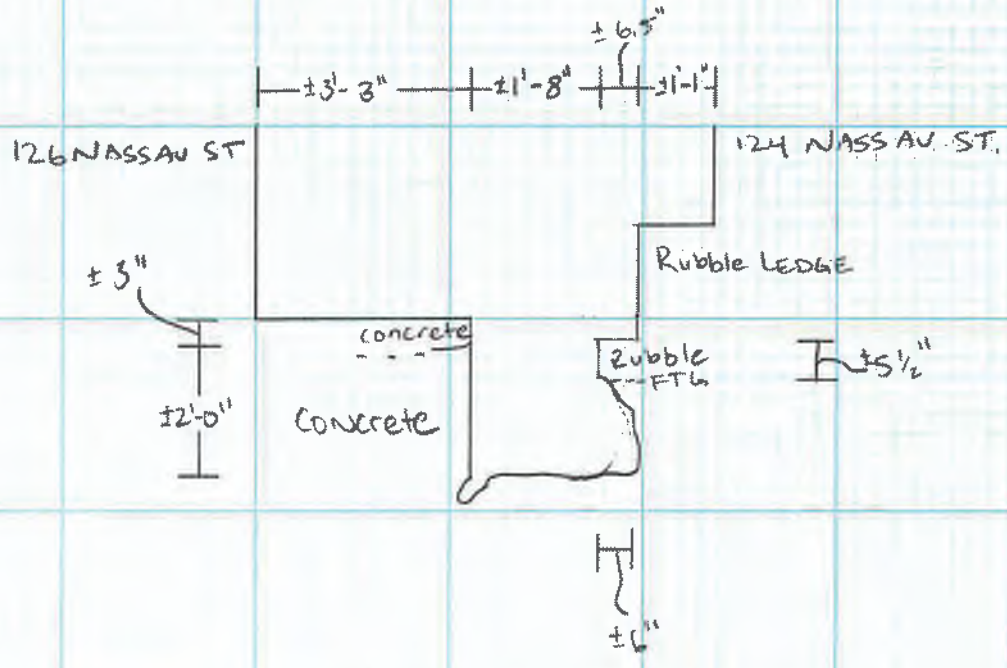


Plan: TP-2
Scale: 1"=3'



Section: A-A
Scale: 1"=3'

126 NASSAU STREET Test Pit Sketches - TP-2	BY SCS DATE 3/10/20 CKD. ____ DATE ____	PROJ. NO. 170545701 SHEET 3 OF ____

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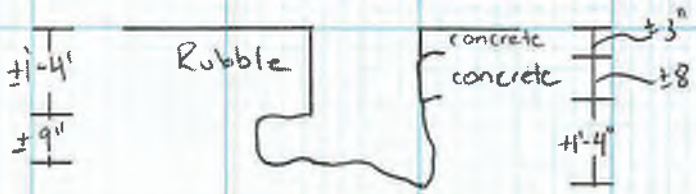
126 NASSAU STREET COURTYARD



126 NASSAU STREET	BY SCS DATE 3/10/20	PROJ. NO. 17054570
TEST Pit Sketches - TP-2	CKD. LEF DATE	SHEET 4 OF

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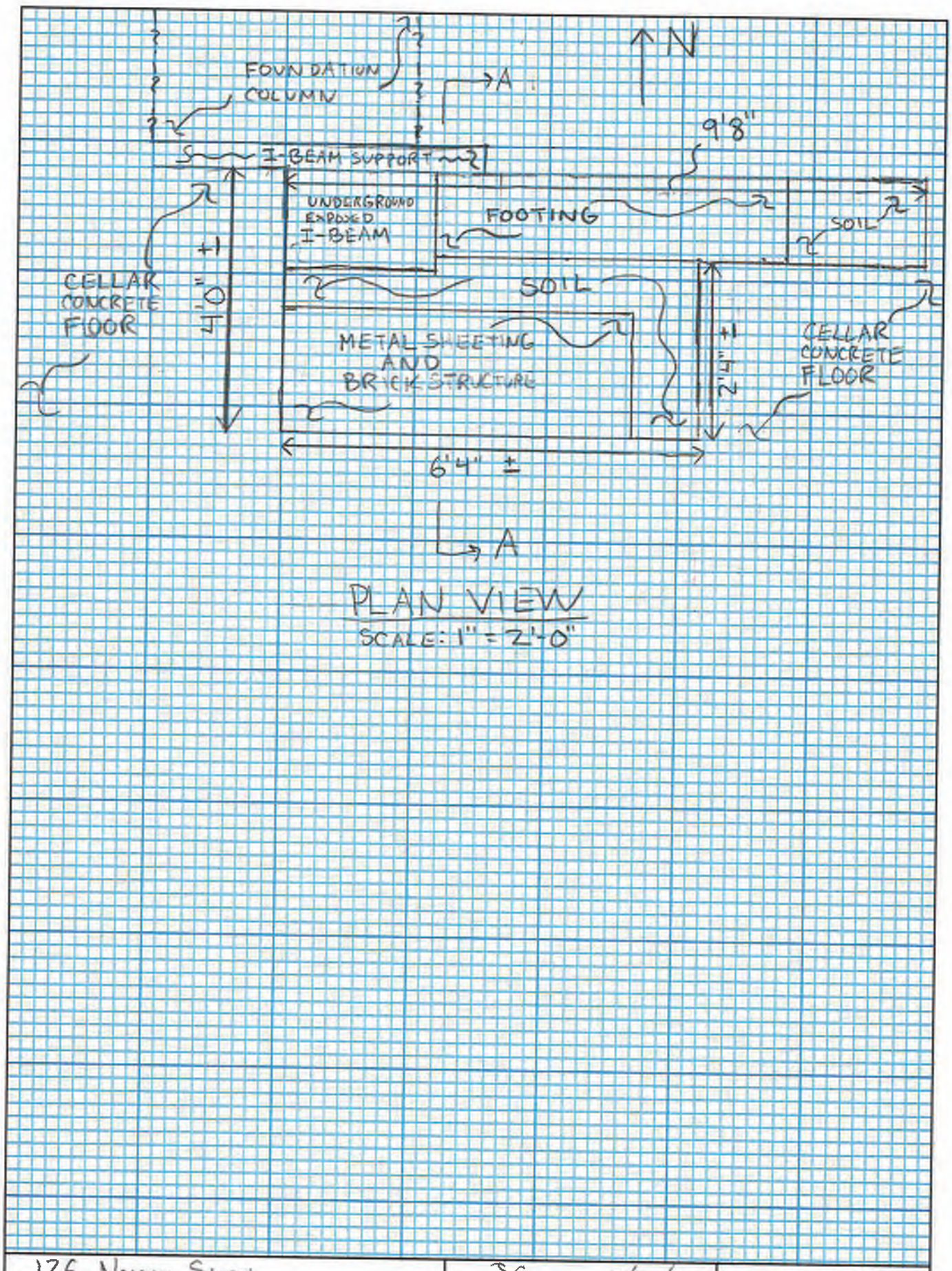

126 Nassau Street Test Pit 4 (TP-4) - Plan	BY SC DATE 2/25/2010 CKD. ____ DATE ____	PROJ. NO. 17054570! SHEET 1 OF 2

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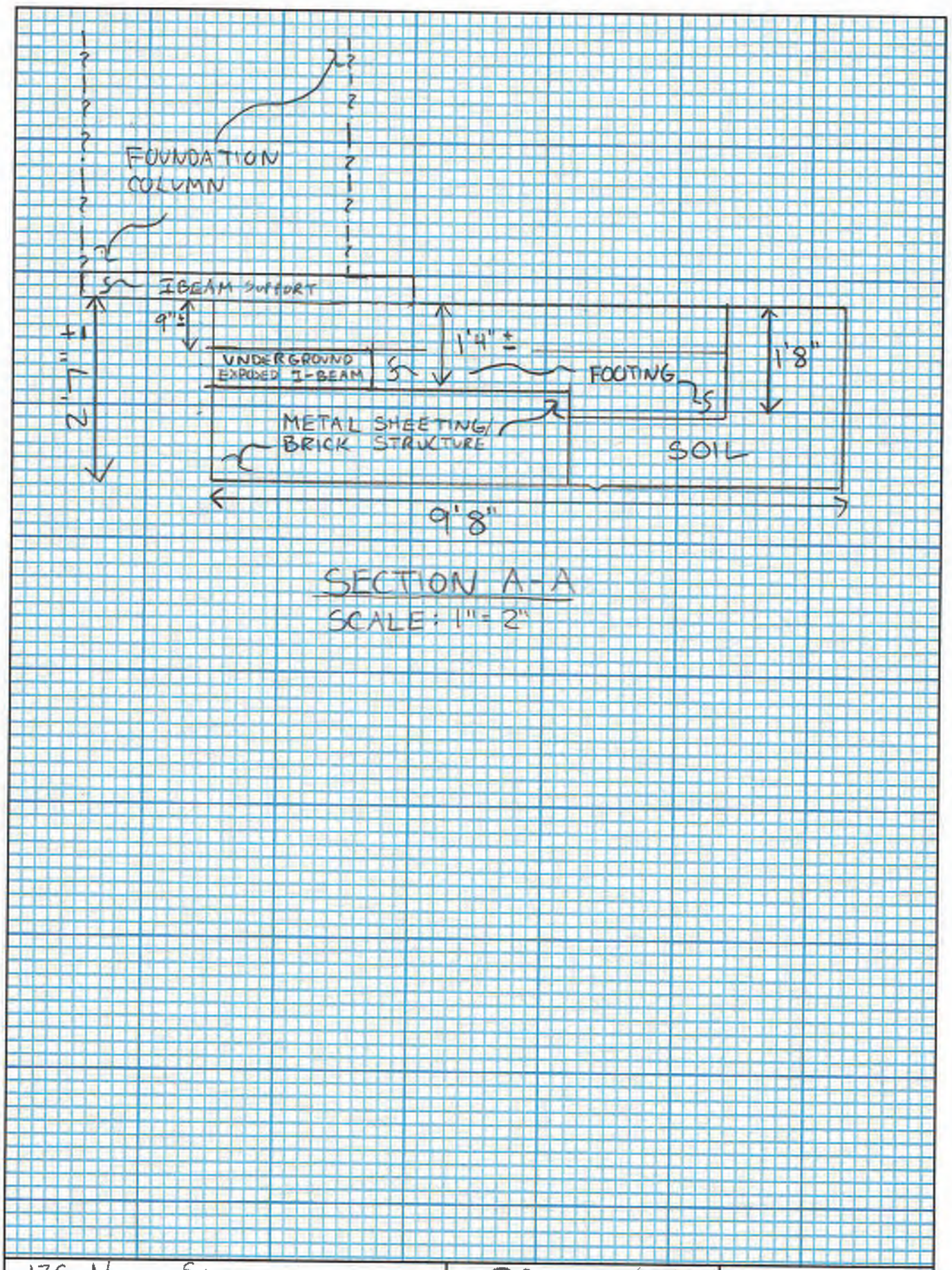
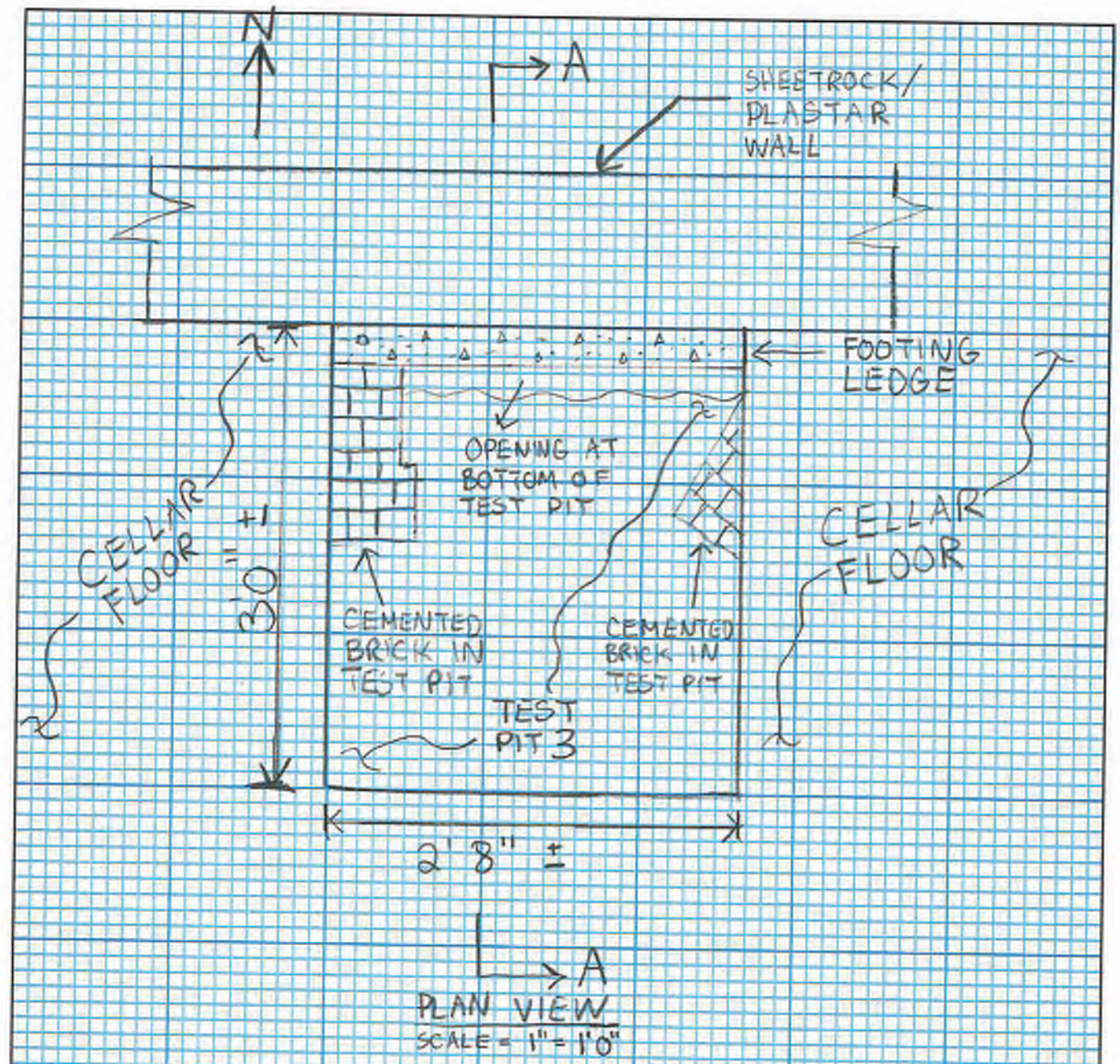


SECTION A-A

SCALE: 1" = 2"

126 Nassau Street Test Pit 4 (TP-4) - Section	BY SC DATE 2/25/2020 CKD. ____ DATE ____	PROJ. NO. 170545701 SHEET 2 OF 2

LANGAN



126 Nassau Street	BY SC DATE 3/13/2020	PROJ. NO. 170545701
Test Pit 3 (TP-3) - Plan	CKD. ..... DATE	SHEET 1 OF 2

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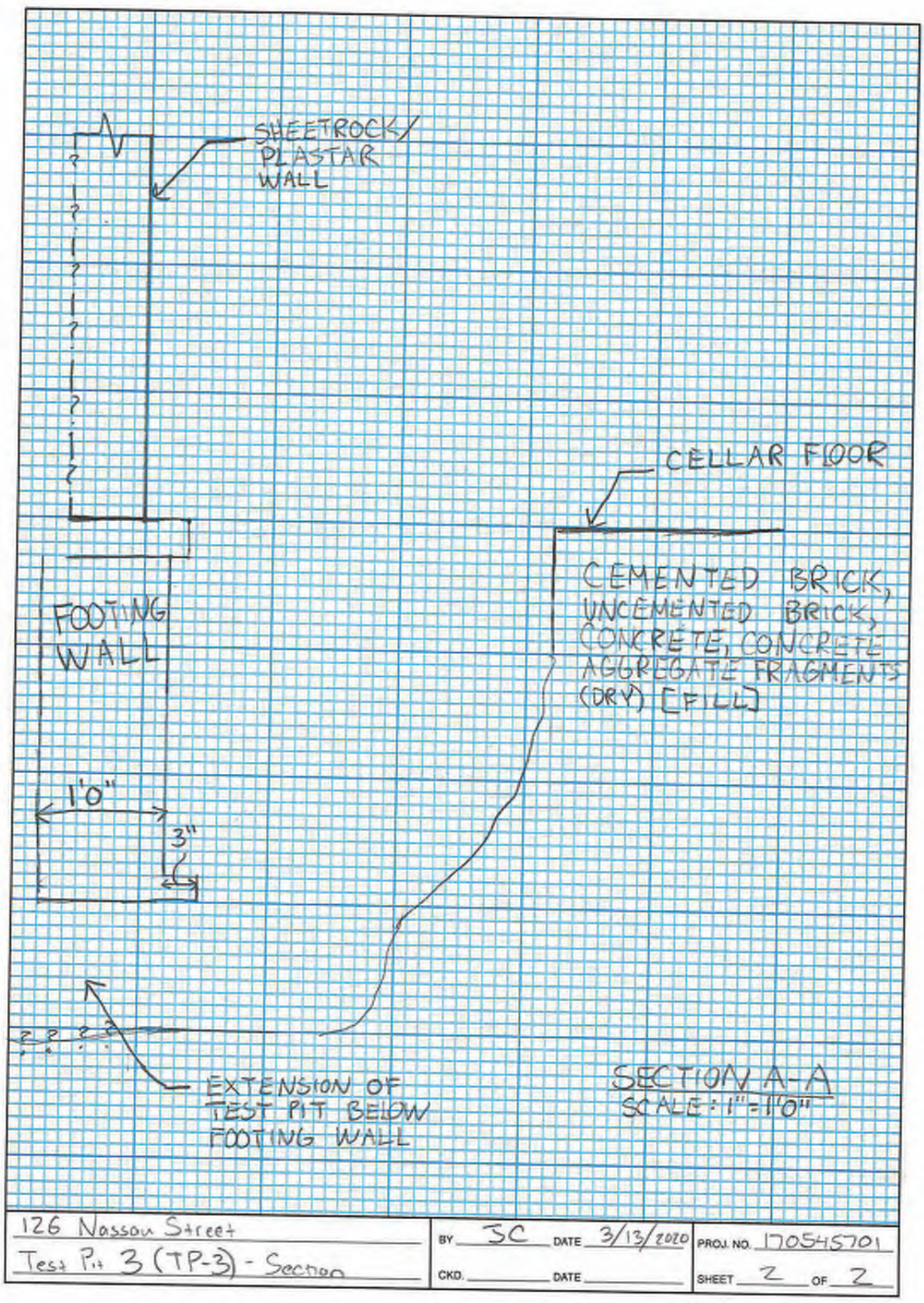

126 Nassau Street	BY SC DATE 3/13/2020	PROJ. NO. 170545701
Test Pit 3 (TP-3) - Section	CKD. ____ DATE ____	SHEET 2 OF 2

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APPENDIX D
ROCK-CORE PHOTOGRAPHS

Rock Cores for LB-1:

Rock Core	Depth	Recovery	RQD
C-1	86ft-88ft	33%	18%
C-2	88ft -90.5ft	93%	31%
C-3	90.5ft -93.5ft	100%	78%
C-4	93.5ft-95.5ft	42%	25%

Rock Cores for LB-7:

Rock Core	Depth	Recovery	RQD
C-1	95.5ft-98ft	73%	18%
C-2	98ft -99ft	92%	33%
C-3	99ft -100.5ft	94%	28%
C-4	100.5ft-104.5ft	100%	75%

Rock Cores for LB-3:

Rock Core	Depth	Recovery	RQD
C-1	87ft-89ft	100%	29%
C-2	89ft -91ft	100%	54%
C-3	91ft -93ft	94%	69%

APPENDIX E

Landmark Technical Policy and Procedure Notice #10/88

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The City of New York

DEPARTMENT OF BUILDINGS

EXECUTIVE OFFICES
60 HUDSON STREET, NEW YORK, NY 10013

CHARLES M. SMITH, Jr., R.A., Commissioner
312-8100

Issuance #109

TECHNICAL
POLICY AND PROCEDURE NOTICE # 10/88

TO: Borough Superintendents

FROM: Irving Polsky, P.E., Executive Engineer

DATE: June 6, 1988

SUBJECT: Procedures for the Avoidance of Damage to Historic Structures Resulting from Adjacent Construction When Subject to Controlled Inspection by Section 27-724 and for Any Existing Structure Designated by the Commissioner.

BACKGROUND: Approval of the Landmarks Preservation Commission is required before any changes may be made to protected features of any individually designated landmark or properties within historic districts. A listing of these was furnished to each Borough. Building Code Section 27-166 (C26-112.4) serves to protect historic structures by requiring that all lots, buildings and service facilities adjacent to foundation and earthwork areas shall be protected and supported in accordance with the requirements of Building Construction Subchapter 7 (Article) and Building Code Subchapters 11 and 19 (Article). The intent of these procedures is to supplement the latter and require a monitoring program to reduce the likelihood of construction damages to adjacent historic structures and to detect at an early stage the beginnings of damage so that construction procedures can be changed.

It is also intended that these procedures shall be used to safeguard any existing structure in accordance with Section 27-127 (C26-105.1) if deemed necessary by the Commissioner.

DEFINITION: ADJACENT HISTORIC STRUCTURE. A structure which is a designated New York City Landmark or located within an historic district, or listed on the National Register of Historic Places and is contiguous to or within a lateral distance of ninety feet from a lot under development or alteration.

SUPPLEMENTARY PROCEDURES: The architect or engineer designated for Controlled Inspection of Construction Required for or Affecting the Support of Adjacent Properties or Buildings required by Section 27-724 (C26-1112.6) shall institute a monitoring program for adjacent historic structures and for any existing structure designated by the Commissioner. The following supplementary procedures shall be considered and adhered to:

1.0. Subsurface conditions and effects that might influence performance of structures.

Subsurface Conditions		Effect that Might Influence Performance of Structures
1.1.	Large obstructions in the fill	Vibrations during excavating and pile driving operations
1.2.	Shallow water table	Drawdown of water table and loss of ground during excavation operations
1.3.	Previous layers within and under the hardpan stratum	Loss of ground during excavation operations
1.4.	Dense nature of hardpan	Vibrations during excavating and pile driving operations
1.5.	Boulders	Vibrations during pile driving and/or blasting operations
1.6.	Bedrock	Vibrations during pile driving and/or blasting operations

2.0. Construction vehicular traffic and construction equipment movement which might increase existent vibration levels.

3.0. Establishment of a peak particle velocity design criteria during the driving of sheeting or blasting operations.

3.1. The maximum permissible peak particle velocity shall be 0.5 in./sec. (13mm/sec.) with no distance criterion.

3.2. The maximum permissible peak velocity shall be reduced if movements or cracking is detected.

3.3. Maintaining accurate records, including the location of the blast, total explosive weight in the blast, maximum explosive weight per delay (or the explosive weight in each blast hole and the designation of the delay cap used in each hole).

4.0. Establishment of criteria for any temporary retaining wall structure.

4.1. The maximum permissible horizontal and vertical movement of the temporary retaining wall system shall be designed in accordance with generally accepted engineering practice.

5.0. Establishment of movement criteria for the historic building.

5.1. The maximum permissible vertical and horizontal movement shall be ½in. (6mm.).

6.0. Establishment of criteria for ground water.

6.1. The lowest water level shall be determined by periodic ground water monitoring at observation wells, seasonably adjusted and designated as the "low datum" prior to the start of excavation operations.

6.2. Limitation on water drawdown shall be considered in the criteria for the retaining system.

7.0. Establishment of a monitoring program.

8.1. A licensed surveyor shall be retained to monitor movements and tilting of the historic buildings and the temporary retaining system.

8.1.1. Settlements of the street and of selected points on the ground are to be monitored.

8.1.2. Survey measurements shall be made a minimum of two times per week.

8.1.3. Optical survey readings shall be taken to an accuracy of ±0.01 ft. (3mm.).

8.2. "Telltales" shall be installed across existing cracks and in other sensitive areas to permit changes in crack width to be measured.

8.2.1. A micrometer sensitive to 0.001 in. (0.003mm.) shall be used to monitor crack widths at least once a day.

8.3. Water levels in observation wells are to be monitored at least twice a day for the period that active dewatering is in progress.

8.4. Requirements for seismographic test data. -

8.4.1. Obtain seismographic test data showing the vibration transmission characteristics of the area around the blasting site.

8.4.2. Vibrations from the driving of sheet piles, from excavating and blasting, shall be monitored with a portable seismograph placed adjacent to or within the historic structure closest to the vibration source.

8.5. Requirements for photographs. -

8.5.1. Photographs of the affected historic buildings of sufficient clarity to view the "telltales" shall be taken weekly during construction.

8.5.2. The photographs shall be identified on the back with the building address, direction, date, time and photographer.

9.0. Controlled Inspection Report. -

9.1. Records of the monitoring program shall be retained.

9.2. Controlled inspection reports as to the monitoring program shall be submitted to the department per amendment on B Form 10E within thirty days of completion of the excavation.

9.2.1. The report shall include a set of photographs taken pursuant to Item 8.8.

REFERENCES: "The Avoidance of Damage to Historic Structures Resulting from Adjacent Construction", Melvin I. Esrig and Andrew J. Ciancia, American Society of Civil Engineers, Preprint 81-052; "Effects of Blasting Vibrations on Buildings and People", John F. Wiss, P.E., Civil Engineering-ASCE - July 1968.

IP/gt
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