PRELIMINARY GEOTECHNICAL REPORT

RIVER PARK CENTER PROJECT
CITY OF YONKERS, NY

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APPENDICES

1. INTRODUCTION

1.1. General

McLaren Engineering Group (MEG) has prepared this Preliminary Geotechnical Report to address the subsurface soil and rock characteristics, and suitability of on-site soils, as well as provide recommendations for foundation construction and earthwork operations. This Report addresses the Phase I River Park Center project, with the exception of the Palisades Pointe development. The area investigated for this Geotechnical Report, described here-in as *the Project Site*, is situated in the downtown area of the City of Yonkers, Westchester County, New York, and is approximately 21 acres in area. The geotechnical field investigation performed by MEG consisted of 22 borings and 4 test pits.

A portion of the Project Site is bounded by Getty Square to the northwest, Palisades Avenue to the north, Elm Street to the northeast, Nepperhan Avenue to the east and south, and City Hall to the west. The Project Site also includes the parking lots and open space bounded by the Cacace Justice Center to the south, Nepperhan Avenue to the north, New Main Street to the east, and South Broadway to the west.

1.2. Locations

For the purpose of the Geotechnical Report the Project Site has been classified into four (4) separate study areas. A description of the study areas is as follows:

- River Park Center - Area bounded by Elm Street, Palisades Avenue, New Main Street, and Nepperhan Avenue. This area includes the Yonkers Fire Department Building, the Henry Herz Parking lot, the Saw Mill River (sometimes referred to as the Nepperhan River) and commercial and residential properties.

- Government Center - Area located at the northwest corner of the intersection of New Main Street and Nepperhan Avenue, abutting City Hall. This area is connected to the Cacace Justice Center parking lot via a pedestrian bridge that spans over Nepperhan Avenue.

- Cacace Center - Area bounded by South Broadway, New Main Street, and Nepperhan Avenue; including existing parking lots and open space north of the Cacace Justice Center.

- Elm Street Center – Area located at the northeast corner of Elm Street and Palisades Avenue. This area includes existing buildings and parking areas adjacent to the Saw Mill River.

1.3. Proposed Development

With the exception of two buildings located adjacent to the intersection of New Main Street and Palisades Avenue, all the existing buildings within the Project Site will be demolished. A general description of the proposed development is as follows:

- River Park Center – This area will be developed into a new mixed-use development comprised of a Multi-level retail and structured parking, two residential towers, and a minor league baseball stadium. Additionally, an office building with lower-level parking is proposed at the corner of Elm Street and Nepperhan Avenue. A portion of the Saw Mill River will be re-diverted through the site to accommodate for this design.

- Government Center – This area will be developed into a new multi-level parking structure in the area currently occupied by the Yonkers City Hall Annex and parking garage. Street level retail and/or similar uses will be included within the structure. The site will be connected to the River Park Center development via a new pedestrian bridge.

- Cacace Center – The existing Cacace Justice Center Parking Lot will be developed to accommodate a new fire station, parking structure, and hotel/office building.

- Elm Street Center – This area will be developed into a multi-story office building with street level retail and parking garage.

1.4. Datum

All existing and proposed on-site grades and elevations are referenced to the NAVD 1929 datum.

1.5. Scope of Report

The scope of the geotechnical investigation performed by MEG included:

i) Performance of soil borings on site to record bedrock depth, bedrock composition, depth of ground water table, and change in soil stratum where possible.

ii) Performance of test pits to record soil composition, changes in stratum, and groundwater level.

iii) The qualification of geotechnical properties of the encountered soils and bedrock.

iv) Discussion of appropriate earthwork operations or considerations consistent with the recommended site and foundation solutions. These include anticipation and management of groundwater, estimated depths of excavation required to remove unsuitable materials, and evaluation of the potential need for removal of bedrock to achieve the site grades.

2. EXISTING CONDITIONS

2.1. Existing Site Surface Conditions

A description of the existing conditions on the project site is as follows:

- River Park Center - The area in which the River Park Center is to be constructed is the largest parcel within the Project Site. It consists of approximately 13 acres bisected by the Saw Mill River. Site elevation ranges from elevation 98 to 56. Grade on site slopes toward the Saw Mill River and steep slopes exist near the eastern bank of the Saw Mill River adjacent to Elm Street.

  Several large retaining walls are located within this parcel. A large stone retaining wall, approximately 20 feet in height, is tied into the Elm Street Bridge and supports Elm Street in the vicinity of the Saw Mill River. There is another stone retaining wall directly south of Elm Street, ranging between 5 to 15 feet in height, which supports the slope between the Saw Mill River and the properties along Nepperhan Avenue. There are also reinforced concrete retaining walls along the southern and eastern portions of the Henry Herz parking lot, supporting Nepperhan Avenue and South Street respectively. These walls range between 4 feet and 12 feet in height.

  The Saw Mill River has been culverted and realigned several times throughout the history of the City. Historic maps of the site indicate that a portion of the river was diverted on-site in the 1800s, effectively creating an island within the area currently occupied by the Henry Herz parking facility (See Appendix B). The current river alignment generally flows in a north-south direction into the northeast portion of the Project Site. The River flows underneath Elm Street at a stone arch bridge and then continues along the east and south sides of the Yonkers Fire Department building. South of the Fire Department, the stream flows into an arch bridge supporting School Street. The stream then continues in a southwest direction into a box culvert under the Henry Herz parking lot and then under a bridge supporting Henry Herz Street. On the western side of Henry Herz Street the river daylights into an open stream. The River then

bends north and flows parallel to Henry Herz Street towards Ann Street where it enters the underground flume structure. Beyond the Project Site the River continues underground through downtown Yonkers and Larkin Plaza. Eventually the flume discharges into the Hudson River.

The existing land usage within the River Park Center area is composed of one to four story commercial and residential buildings, a Fire Station, gas station, asphalt roads and parking areas, and concrete sidewalks. The site is bisected by various above and below ground utilities, including an overhead fiber optic line located along Ann Street between New Main Street and Henry Herz Street. At the northern portion of the project site, south of Palisade Avenue, there is a 1.2 acre open space, which is primarily composed of cut grass, bushes, and several trees. This area was formally occupied by structures that have been demolished. Review of historic maps indicate that the site has been developed for various uses over the past 150^{+} years, and can be assumed to have been disturbed within the upper soil stratum at a minimum.

- Government Center - Rock outcrops are visible along the northern side of Nepperhan Avenue along the Government Center parcel. Additionally, a large reinforced concrete retaining wall is located along the driveway to the parking garage, parallel and approximately 60 feet west of New Main Street. The majority of this portion of the project area is currently occupied by the six-story City Hall Annex building and the five-story Government Center parking garage.

- Cacace Center - Rock outcrops were observed on the south of Nepperhan Avenue and along the western side of New Main Street adjacent to the Cacace Center parking area. The site is approximately 2.2 acres and is terraced, with earth stepping down to the north. The site is linked to the City Hall Annex by a pedestrian bridge which spans north/south, across Nepperhan Avenue. Earth retaining walls are located at the entrance of the Cacace Center parking lot, around the perimeter of the upper parking area, and at the northeastern portion of the study area, adjacent to New Main Street. Prior to the Cacace Justice Center, a portion of the site was occupied by a public high school (Saunders High School). Because this area has a long history of usage, it is assumed that the upper soil stratum within this portion of the project site is classified as disturbed.

- Elm Street Center - The Elm Street Center site is occupied by a three story building and a parking area located adjacent to Elm Street and the Saw Mill River. A large stone retaining wall runs along the southern property line, supporting a portion of Elm Street. Upon review of Historical maps, showing prior site conditions, in conjunction with a Geotechnical investigation from MEG, it has been determined that the upper soil stratum has been disturbed.

2.2. Geology and Subsurface Conditions

The Project Site is located within the Hudson Highlands geologic region, home to some of the most ancient rock formations within the area. Underlying bedrock is composed of metamorphic and igneous rock identified as belonging to the Grenvillian formation, formed during the late Precambrian and early Paleozoic age. This formation is predominantly composed of gneisses (see Appendix B for further information on the geological formation of the area)

A review of the *USDA Natural Resources Conservation Service, National Cooperative Soil Survey* indicates that there is one type of soil present on the project site. The soil classification within the project area is identified as *Urban Land* (Uf). Urban land is described as completely disturbs soils with a base constituency of Charlton Association soil-type.

Table 1.

Map Unit	Area (acres)	Soil Name(s)	Groundwater Depth (ft)	Depth to Bedrock	Hydrologic Group
Uf [1]	Entire Project	Urban Land	5′-20′ [2]	15′ to greater than 70'	D

(USDA Soil Properties)

Source:

1. Natural Resource Conservation Center Web Soil Survey
2. Appendix 1 - Boring Logs and Appendix 7 - Test Pit Field Report

3. GEOTECHNICAL SUBSURFACE INVESTIGATION

3.1. Field Investigation

Struever Fidelco Cappelli, LLC retained the services of Jersey Boring & Drilling Inc. located at 150 Wright Street, Newark, New Jersey to perform 22 boring tests and complete all boring logs. All boring samples were taken between September 22, 2006 and October 12, 2006.

The borings were taken using rotary drilling. Bedrock was cored using 60-inch bedrock casings. The majority of the subsurface within the project site was found to be cobbles and boulders, with borings advancing less than 3 feet prior to obtaining refusal and requiring drilling through the boulders. As a result, split-spoon sampling on site was not possible.

A total of 20 bedrock samples were obtained from 22 boring locations. Boring locations were strategically placed to obtain an understanding of the subsurface

features of the entire Project Site. All soil borings were performed under the supervision of a qualified representative of MEG.

Upon completion of the analysis of the boring data it was determined that test pits were necessary to provide a visual observation of the glacial till and boulders previously encountered by the borings. Struever Fidelco Cappelli, LLC retained the services of ECCO III Enterprises Inc. located at 201 Saw Mill River Road, Yonkers, New York to perform the test pits. Four test pits were completed between December 18th and 19th, 2006 under the supervision of a qualified representative of MEG.

Test pit excavation was accomplished by use of a backhoe. All test pit soil samples were taken and recorded by a qualified representative of MEG. MEG observed and documented the different changes in soil stratum, individual stratum composition, and assessed soils as "fill" or "undisturbed" in origin. Groundwater elevation and depth to bedrock was also recorded, where encountered.

3.2. Subsurface Conditions

The subsurface strata encountered while performing the borings and test pits were primarily composed of:

- Asphalt/Pavement- Most of the borings were performed on areas with paved surfaces. Approximately 6-inches of asphalt pavement was encountered at these locations.

- Prior fill and demolition debris- Throughout much or the Project Site, prior fill consisting of soil, concrete, wood and metal reinforcing was encountered between depths of 1 and 10 feet below existing grade.

- Glacial Till – Heterogeneous mixtures of clay, sand, gravel, boulders, and cobbles, were encountered at depths of up to 85 feet below the existing surface. This material was extremely difficult to penetrate with a drop hammer drill rig. Subsequently, the use of a rotary drill to core-drill was required. Boulder layers ranged between six to forty-eight inches. Subsequent test pits revealed dense to medium dense material consisting of fine to coarse sand, with little to some silt, some fine to coarse gravel, cobbles, and boulders.

- Bedrock- Bedrock was encountered at depths from 3 feet to 85 feet below the existing surface. Rock cores were obtained at 20 of the 22 boring locations.

3.3. Test Borings

Table 2 provides a summary of the boring data, including resultant depth to bedrock, ground water elevation where obtainable, and the Rock Quality Index (RQD). The test boring locations and their corresponding logs are shown in Appendix 1 and Appendix C respectively.

The depths of the boring samples ranged from 8 feet below grade to 90 feet below grade. Groundwater was encountered in most borings ranging between 3 to 19 feet below grade. Within area adjacent to the Saw Mill River, the groundwater table generally corresponded to the bottom of the riverbed.

Table 2
Boring Data Summary

Boring Number	Surface El. (Approx.)	Depth to Bedrock (Fi)	Bedrock Elevation	Bedrock RQD	Comments
4	55	70	-15	0.87	
5	59	25	34	0.71	GW @ El. 53
6	63	28	35	0.62	GW @ El. 53
7	61	44	17	TOP = 0.67, BOT = 0.78	GW @ El. 49, 2 core samples taken
8	52	55	-3	.85	
9	56	30	26	0.66	
10	66	10	56	0.61	GW @ El. 58
11	59	75	-16	0.44	GW @ El. 53
12	63	60	3	TOP = 0.08, BOT = 0.38	GW @ El. 60
14	75	> 55	< 20	-	Drilling discontinued. GW @ El. 56
15	65	22	43	0.56	GW @ El. 58
16A	65	> 20	< 45	-	Drilling discontinued. GW @ El. 63
19	102	85	17	0.34	
22	61	30	31	0.38	GW @ El. 51
23	107	20	87	0.8	GW @ El. 102
24	72	13	59	0.46	GW @ El. 67
25	111	15	96	0.33	
26	118	3	115	TOP = 0.24, BOT = 0.13	GW @ El. 112, 2 core samples taken
27	120	20	100	0.6	GW @ El. 101
28	122	15	107	0.26	
29	112	35	77	0.08	GW @ El. 98
30	131	10	121	0.64	GW @ El. 128

1. RQD = Rock Quality Index Defined as the cumulative length of core pieces longer than 10cm in a run divided by the total length of the core run.
2. GW = Ground Water
3. TOP refers to the first 60" core run. BOT refers to the second 60" core run.

3.4. Test Pits

Generally, the test pits revealed that the upper 7-8 feet of soil is composed of fill material. Fill material varied throughout the site, but overall can be described as sandy material with some clay and silt, some fine to course gravel, cobbles and bounders. Additionally, much of the fill contained construction debris composed of wood, brick, concrete, metal, and building foundation elements.

Fill material encountered in Test Pits 1 through 3 consisted primarily of dense to medium dense material composed of sand with some clay and little silt, with some to and fine to coarse gravel, cobbles, and boulders. Old brick foundations were encountered in the Henry Herz Parking area (Test Pit 1) and the public green space adjacent to Palisades Avenue (Test Pit 2). Timber was also encountered in the Henry Herz parking area.

Test pit 1 was located along the eastern side of the Henry Herz parking lot. This test pit was sited in an attempt to locate the prior turn of the century river diversion in the area formerly known as "Chicken Island". The excavated material from the test pit varied substantially within the excavation from south to north, ranging from mostly sandy fill material described above to predominantly demolition debris in a section approximately 12 to 14 feet wide by approximately 12 feet deep and then to fill material. Undisturbed glacial till material was encountered approximately 12 feet below the surface. Ground water was observed at approximately 14 feet below surface, at the bottom of the excavation. Based on observations, it is highly probable that the former "Chicken Island" river diversion was located in the area of this test pit, and was most likely filled in at the end of its life with the industrial buildings along its banks. MEG anticipates that similar conditions will exist throughout the former river diversion area, stretching between School Street and the existing underground river flume. A strong odor of petroleum was encountered during the excavation of this test pit. MEG recommends that this area be studied further as part of a Remedial Action Work Plan for the site prior to site disturbance.

Test Pit 2 was located within the open space, north of Engine Place, adjacent to Palisades Avenue. The material encountered was composed of a mixture of sandy fill and construction debris to approximately 8 feet below the surface. Undisturbed glacial till material was encountered at a depth of 8 feet to 14 feet below grade.

Test Pit 3 was located at the base of the slope in the industrial area at the east end of John Street. The material encountered contained mostly construction debris to 5 feet below the surface, followed by a 3 foot layer of sandy fill materials, a 6 inch to 1 foot organic layer and then glacial till to the bottom of the excavation at 14 feet blew grade. Ground water was encountered at 3.5 feet below grade, but due

to the material present, we anticipate that this is perched water, and is not representative of the elevation of the ground water table.

While excavating test pit 3, an orange colored material was encountered near the surface which coated the brick the fill material excavated, and permeated the adjacent soils. From the scorch marks on the brick and information obtained from persons in the area, MEG believes that this material is a fire extinguishing agent applied during a building fire, which had been reported to have taken place in this vicinity. We recommend that this area should be studied further as part of a Remedial Action Work plan for the site prior to site disturbance.

Test Pit 4 was located in the Cacase Parking lot. Approximately 7 feet of the upper soil stratum is composed of disturbed sand loam that is similar to undisturbed soils observed with the Project Site area. At a depth of 8 feet, the test pit revealed undisturbed soils composed of dense material composed of fine to coarse sand with little silt, with some medium to coarse gravel, cobbles, and boulders. The soil present in the upper soil stratum, based upon visual inspection, is similar to the "glacial till" material and may be used as backfill or select fill if properly conditioned as specified in this Geotechnical Report.

4. GEOTECHNICAL OBSERVATIONS

4.1. General

The results, as stated in this Report, describe conditions discovered at the boring locations and test pit locations. Borings and test pits were undertaken at strategic locations in attempts to account for all subsurface conditions, subsurface compositions, and subsurface properties. Although all attempts have been made to best classify and define the project site and its subsurface characteristics and properties within this Report, McLaren Engineering Group does not guarantee that this Report presents a full and complete description of the actual conditions on site, nor does McLaren Engineering guarantee all existing soil and subsurface features, characteristics, and properties are exactly as described herein.

MEG developed Soil Profiles which identify the subsurface conditions within the Project Site (see Appendix A). The key geotechnical conditions encountered during the subsurface investigations are discussed below.

4.2. Prior Fills and Demolition Debris

A layer of prior fills and demolition debris overlays a majority of the Project Site at depth of 1 to 10 feet below the existing surface grade. This material varies widely in composition, character, and density. This material composed of construction debris is not suitable for bearing of foundations or slabs in its existing state. In portions of the site, most notably in the Cacase Justice Center parking lot, the fill is

clean and can be used as fill. Other on-site material to be reused for fill will require removal of debris and special conditioning, and must be inspected by a qualified Geotechnical Engineer.

4.3. Glacial Till

Glacial till material was encountered at depths of 8 to 85 feet below existing grade. This material is a very dense mixture of sand, gravel, boulders, and cobbles. This material is suitable as a bearing stratum for foundations and slab-on-grade construction.

4.4. Bedrock

Bedrock was encountered at depths of 10 to 85 feet below existing grade. The material is predominantly gneiss. The core sample RQD's reveal that the rock is largely intact with some surface weathering or fracture, and is a suitable bearing material for deep foundation elements. Portions of the bedrock, most notably in areas of steep slope, do exhibit low RQD numbers and may have been subject to weathering or fracture by glaciation. If deep foundations are considered in these areas, MEG recommends additional borings with deeper rock cores to verify the integrity of the bedrock.

A Bedrock Contour Plan (see Appendix A) was prepared using a limited number of borings. The top of bedrock was interpolated between borings, exact depth of bedrock, between and beyond boring locations, may vary from data shown.

5. FOUNDATION RECOMMENDATIONS

Based on data MEG has obtained of the site, and on the types of structures proposed to be constructed on-site, the following section details the geotechnical recommendations to be used in conjunction with the construction of the anticipated foundation types.

The construction approach to foundations and soil excavation and reuse must be developed in conjunction with the Remedial Action Plan for the site to evaluate all cost implications.

5.1. Shallow Foundations

Proposed foundations bearing on firm, undisturbed glacial till or compacted structural fill may be constructed with a maximum bearing capacity of 8,000 pounds per square foot (psf). Structural fill is defined as a Type 2 or 4 subbase material in accordance with Section 304-202 of the NYSDOT Specifications.

Use of structural fill will require excavation to undisturbed glacial till with excavation and disposal of unsuitable fill materials and placement and compaction of structural fill. At the bottom of excavation, the removal of fill material shall extend a distance of five feet plus one foot for the depth of excavation below the bottom footing elevation.

Prior to placement of foundations on undisturbed glacial till or on structural fill, the contractor should proof-roll the exposed undisturbed glacial till under the supervision of a geotechnical Engineer to confirm soil density and capacity.

Portions of the site may allow for construction of shallow foundation elements directly on bedrock. The rock-bearing foundations should be designed with an allowable bearing capacity of 10 tons per square foot (tsf) for rock with RQD values less than 25 percent. Rock with RQD values greater than 25% can de designed with an allowable bearing capacity of 20 tsf. If additional testing reveals RQD values greater than 50%, the Geotechnical engineer should be consulted to determine allowable loads.

A Geotechnical Egineer should examine the exposed surface of the rock to determine the appropriate method of rock-bearing foundation construction. In areas of the Cacase Center, both soil and rock may be encountered within foundation excavations. When continuous wall footings or closely spaced footings (20 feet or less) bear on dissimilar material, the potential for differential movement exists. Where rock and soil exists in a foundation excavation, the footing must be lowered to bear entirely on rock, or a minimum of one foot of rock below planned footing bottom must be filled with a granular material containing more than 10% and less than 25% passing the No. 200 Sieve. The material shall be placed and compacted to not less than 95% of the maximum modified density.

Cost premiums will involve excavation of unsuitable material and disposal, and placement and compaction of structural fills. This foundation system will be most cost effective in areas above the groundwater table and where unsuitable soils and prior fills form a relatively thin layer.

5.2. Slab-On-Grade Foundations

Foundations for light weigh structures may be constructed on compacted on-site fill soils with a bearing capacity of 4,000 psf. This scheme will require removal of existing fill material to undisturbed glacial till, and the placement and compaction of improved on-site soils. Installation of on-site reused soils must conform to the requirements as stated in this Geotechnical Report. All construction debris and boulders, 6 inches or greater in size, shall be removed from the existing on-site fill material. Cost premiums will be limited to improvement and compaction of soils. The compaction of on-site fill materials shall be performed under the supervision

of a qualified Geotechnical Engineer to observe compaction and confirm bearing capacity.

5.3. Deep foundations

Deep foundations will require end-bearing piles founded on bedrock to depth ranging from 13 to 85 feet below grade. These foundations may include steel mini-piles, pipe piles or H-piles drilled to bedrock or refusal, when conditions permit. Due to the presence of boulders within the glacial till stratum, the cost premiums will include drilling obstructions for installation of any pile or other deep foundation system. Upon determination of the building types and locations, MEG should be consulted to determine feasible pile types.

5.4. Seismic Design Consideration

The new structures shall be designed to resist stress produced by lateral forces in accordance with Section 1615 of the New York State Building Code. The Project Site can be classified as Site Class C, except buildings founded on rock or 10 feet or less of undisturbed glacial till above rock may be classified as Site Class B.

For Site Class C, the following values can be used for the project:

Mapped Spectral Response Acceleration for Short Periods [Fig. 1615(1)*]	S_S = 0.43g
Mapped Spectral Response Acceleration for 1-Second Period [Fig. 1615(2)*]	S_{S1} = 0.094g
Site Coefficient [Table 1615.1.2(1)]	F_a = 1.2
Site Coefficient [Table 1615.1.2(2)]	F_v = 1.7
Max. Considered Earthquake Spectral Response for Short Periods [Eq 16-16]	S_{MS} = 0.52g
Max. Considered Earthquake Spectral Response for 1-Second Period [Eq 16-17]	S_{M1} = 0.16g
Design Spectral Response Acceleration for Short Periods [Eq 16-18]	S_{DS} = 0..340g
Design Spectral Response Acceleration for 1-Second Period [Eq 16-19]	S_{D1} = 0.11g

* Value verified with USGS Probabilistic Hazard Lookup by Zip Code, 1996, for Zip Code 10701

For Site Class B, the following values can be used for the project:

Mapped Spectral Response Acceleration for Short Periods [Fig. 1615(1)*]	S_S = 0.43g
Mapped Spectral Response Acceleration for 1-Second Period [Fig. 1615(2)*]	S_{S1} = 0.094g
Site Coefficient [Table 1615.1.2(1)]	F_a = 1.0
Site Coefficient [Table 1615.1.2(2)]	F_v = 1.0
Max. Considered Earthquake Spectral Response for Short Periods [Eq 16-16]	S_{MS} = 0.43g
Max. Considered Earthquake Spectral Response for 1-Second Period [Eq 16-17]	S_{M1} = 0.094g
Design Spectral Response Acceleration for Short Periods [Eq 16-18]	S_{DS} = 0.29g
Design Spectral Response Acceleration for 1-Second Period [Eq 16-19]	S_{D1} = 0.063g

* Value verified with USGS Probabilistic Hazard Lookup by Zip Code, 1996, for Zip Code 10701

5.5. Retaining Walls and Earth Supporting Structures

For the design and construction of new retaining walls or other earth supporting structures, MEG recommends that the following parameters be applied if supporting on-site soils:

Total Unit Weight = 120 pcf
Angle of Internal Friction = 37^0

It should be noted that all fill material should be free from boulders and stones greater than 6-inch in size, and be free of any type of construction debris.

5.6. Settlement

Settlement will be dependent on load and bearing stratum. For shallow foundations bearing on undisturbed glacial tills, MEG anticipates a maximum settlement of 3/8″ to 1/2″. Based on the soil composition, MEG anticipates that this settlement would be elastic in nature and would occur during construction. MEG does not anticipate any long-term settlement to occur on site.

6. CONSTRUCTION CONSIDERATIONS

6.1. Site Preparation

The initial site preparation should commence with the demolition of all buildings, stripping of organic material, and the removal and disposal offsite of the asphalt, concrete, and loose fills. Minimum depths of 6 to 12 inches should be anticipated, although depths may vary and should be adjusted to remove large root systems, foundations, and loose fill.

The Contractor shall be responsible at all times for conducting all earthwork operations in a safe and prudent manner such that all workmen and the general public will be protected from hazards. The Contractor shall observe all applicable local, State and/or Federal requirements.

6.2. Removal of Existing Fill Material

The Project Site contains existing building to be demolished and former demolished structures. Buried remains of the former structures may be encountered. The debris from demolition and buried remains of former structures must be completely removed from proposed building areas. This shall include complete removal of foundations, walls, floors, utilities, pavement and miscellaneous debris. Where removal extends below planned elevations, the excavation shall be backfilled with fill material as defined in this Report.

Existing utilities within the proposed building area shall be abandoned and completely removed. The removal must include loose fill around the pipe. The resulting trench shall be backfilled with fill material as defined herein.

The Geotechnical Engineer shall make the determination of the extent of existing fill material that must be removed.

6.3. Re-use of Excavated Material

Existing on-site soils that consist of fills and natural soil with traces of clay and construction debris generally will not be suitable for re-use as structural fill. These soils may be used as general fill, provided organic materials, large rocks, and/or construction debris are removed.

Materials for controlled fill under lightweight structures should only utilize the predominately granular soils above the groundwater table, such as the soils within the Cacase Justice Center parking lot, and on-site soils that have been approved by the qualified Geotechnical Engineer. All imported off-site fill material should be approved by the Geotechnical Engineer.

MEG recommends that the following measures be taken during soil movement:

- In general, the site soils are highly susceptible to exposure to adverse weather conditions and heavy construction equipment. Therefore, it is recommended that earthwork operations are performed under favorable weather conditions. Additionally, the Contractor should avoid operating heavy construction equipment directly atop foundation sub-grade soils.

- Stockpiling of soils should be kept to a minimum, due to the possibility that stockpiled soils can be exposed to adverse weather. Exposure to rain will render stockpiled soils unacceptable for reuse.

- Soils which are determined to be unsuitable for immediate reuse as fill due to saturation or moisture content should be removed and disposed offsite.

- If site soils are stockpiled for future use as fill soils, the Geotechnical Engineer should be present onsite to differentiate suitable soils from non-suitable soils.

- Immediately upon exposure of the top layer of soil on which the foundation and subgrade will be constructed on, it is recommended that building construction commence. If construction is not immediately begun, a layer of 3/4″ clean, crushed stone should be overlain on exposed soils to provide a

working mat. Exposure of the undisturbed glacial till to rain will render it unacceptable as a building foundation material.

It is recommended that the Contractor not excavate the entire footprint of the proposed building sub-grade before construction of the foundation. Disturbance should be limited to the minimum area practical.

- When existing fill soils are present at the elevation of the foundation sub-grade, the fill material must be removed. After removing fill soils, Contractor must proof roll the subgrade and place compacted fill material consisting of approved on-site soils and/or structural fill.

- Fill material shall be placed in lifts no greater than 12 inch loose thickness, and compacted as follows:

	PERCENT OF MAXIMUM LABORATORY DENSITY	
LOCATION	ASTM D698	ASTM D1557
Subgrade & Fill Below Structures and Pavement	98	95
Subgrade & Fill in All other Areas	95	92

Contractor must maintain moisture content of not less than 1 percent below and not more than 3 percent above optimum moisture content of fill materials to attain required compaction density. Installation of fill should be performed under the supervision of a qualified Geotechnical Engineer.

6.4. Excavation & Temporary Soil Support

Soil excavation will be primarily in areas of prior fill. Buried construction debris, building remnants, existing utilities, foundation elements and boulders will be encountered. Unsupported open cuts are possible above the water table. However, where groundwater is encountered or soil conditions are not favorable, sheeting will be required.

The contractor should be aware that due to the composition of the ground, driven sheet pilings may not be possible and alternative methods for soil supports should be considered.

6.5. Dewatering

It is anticipated that groundwater will be encountered at depths ranging from 8 to 12 feet below the existing ground surface. Dewatering may be necessary in excavations below these depths. The Contractor is responsible for means and methods for this operation.

6.6. Subsurface Environmental Concerns

Due to the known historic and industrial uses of the site, potential subsurface contamination of soils and/or water may exist. Special methods or handling of soil may be required. The contractor should consult the Remedial Action Workplan for the site, prepared by S&W Redevelopment Corporation, for proper means and method of soil handling.

After building locations and elevations are determined, MEG recommends that additional boring and test pits are required in order to more thoroughly delineate the areas of existing soil and rock.

This report has been respectfully submitted in accordance with the request of Struever Fidelco Cappelli, LLC. and is, to the best of our knowledge, accurate and complete. The recommendations in this report are based upon the assumption that the subsurface conditions do not deviate appreciably from those disclosed by the subsurface exploration and that competent monitoring and testing will be conducted during the construction. Any changes in the proposed design of the facilities or variations in the site conditions from those assumed in the Report must be brought to the attention of MEG so that we have the opportunity to review the changes, and if necessary, modify the recommendations to suti the new conditions.

Any questions regarding its content should be addressed to: McLaren Engineering Group, 100 Snake Hill Road, West Nyack, New York 10994.

Respectfully submitted,

The Office of
McLaren Engineering Group
M.G. McLAREN, P.C.

Malcolm G. McLaren, P.E., SECB
President

MGMcL/SLG/EFB/rjk

cc: SLG, EFB, GRP, CMH - Internal
MEG File No. 106100

P:\Proj106\106100\8. Technical (Rpts, Calcs, Specs)\Reports\Geotechnical Report\106100-Geotech report 01.30.07 Final.doc

APPENDIX A

SCALE: 1" = 160'

160' 0 160' FEET

LEGEND

- BORING LOCATION
- TEST PIT LOCATION
- EXISTING GRADE CONTOUR
- SOIL PROFILE STATION LINE (A 0+00 1+00)

B-28 B-30 B-29 B-27 B-26 B-25 TP-4 B-24 B-23 B-22 B-6 B-5 B-7 B-12 TP-1 B-4 B-8 B-11 B-9 B-10 TP-2 B-19 TP-3 B-16A B-14 B-15

HISTORICAL APPROX LOCATION OF RIVER DIVERSION

RIVER FLUME

NEPPERHAN AVENUE · JOHN STREET · JAMES STREET · HENRY HUDSON PARKWAY · PALISADE AVENUE · MAIN STREET · GOVERNMENT CENTER GARAGE · CITY HALL ANNEX · CITY HALL · LARKIN STREET · WAVERLY STREET · SCHOOL STREET · FIRE DEPT · COLUMBUS PLACE · ST. JOHN'S CHURCH

SHEET TITLE	BORING AND TEST PIT LOCATION PLAN
PROJECT NO.	106100
SCALE	AS NOTED
DATE	1/30/07
DRAWN BY	CMH
CHECKED BY	EFB
PHASE	1
	1 OF 6 SHTS

PROJECT

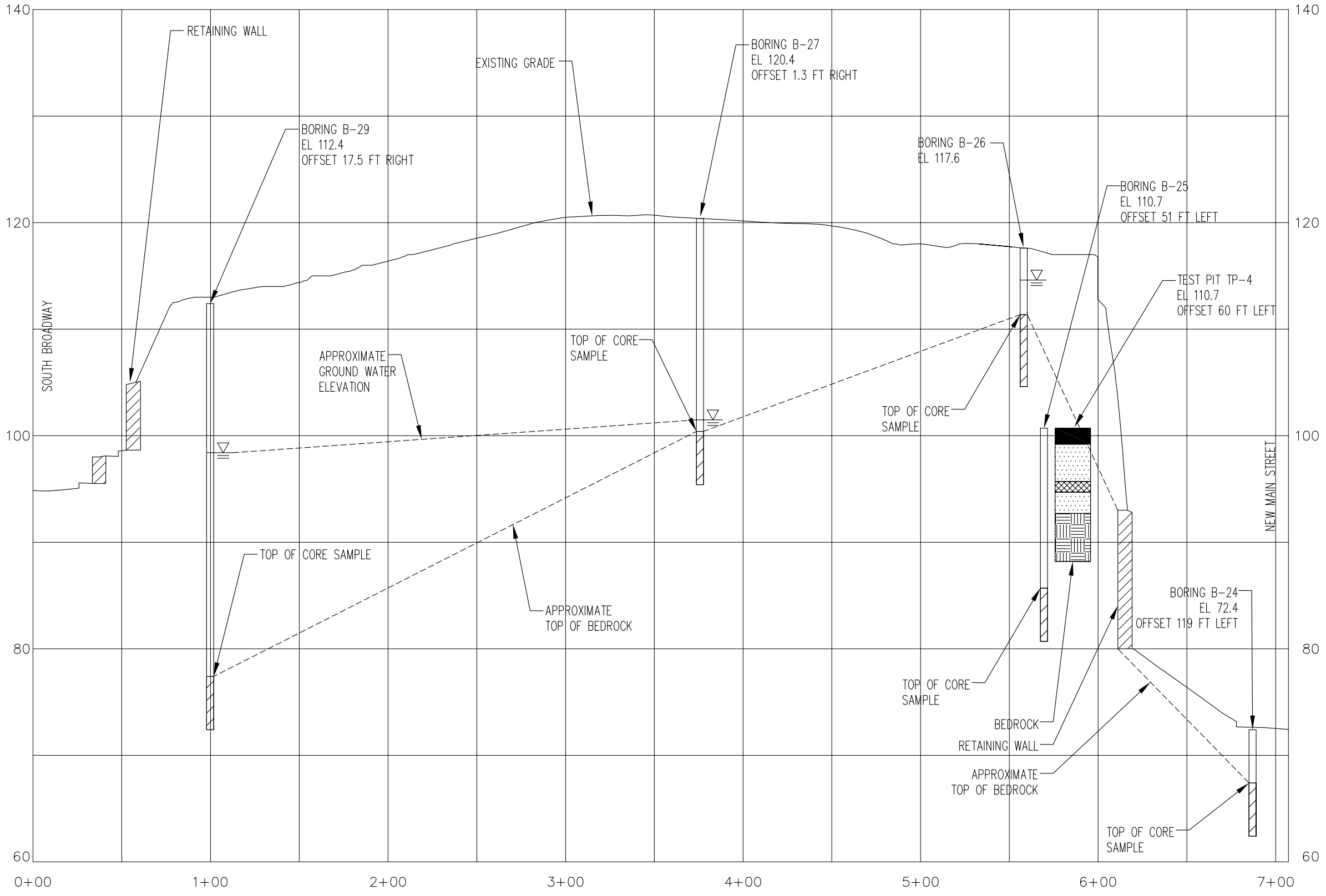
RIVER PARK CENTER

YONKERS NEW YORK

McLaren ENGINEERING GROUP
100 Stanley Hill Rhinebeck, NY 12572
Tel. (845) 353-6400 Fax. (845) 353-6509
E-mail: mgmclaren@mgmclaren.com

NO.	DATE	REVISION	BY

FILE NAME: Q:\Cadd\06\106100\Acad Drawings\Geotech Drawings\ACAD DWGS\Geotech Rpt. Sections 1.05.07.dwg PLOT TIME: Tue, 30 Jan 2007 – 10:08am LAST SAVE: Mon, 29 Jan 2007 – 4:55pm BY: Mcgrane



SECTION A–A

NOTES:

1. PROFILES ARE A LINEAR INTERPOLATION BETWEEN BORING LOCATIONS AND MAY NOT REPRESENT ACTUAL CONDITIONS.
2. ELEVATIONS ARE IN NAVD1929 DATUM.
3. RETAINING WALL FOOTING ELEVATIONS AND BUILDING FOOTING ELEVATIONS ARE UNDETERMINED.

LEGEND

- ROOTS & ORGANIC MATERIAL
- ASPHALT & BASE COARSE
- FILL
- UNDISTURBED SOIL (GLACIAL TILL)
- BEDROCK

30' 15' 0 30' 60' FEET
HORIZONATAL SCALE: 1" = 30'

5' 2.5' 0 5' 10' FEET
VERTICAL SCALE: 1" = 5'

NO.	DATE	REVISION	BY

McLaren ENGINEERING GROUP
E-mail: mgmclaren@mgmclaren.com
100 Snake Hill Road West Nyack, NY 11994
Tel. (845) 353-6400 Fax. (845) 353-6509

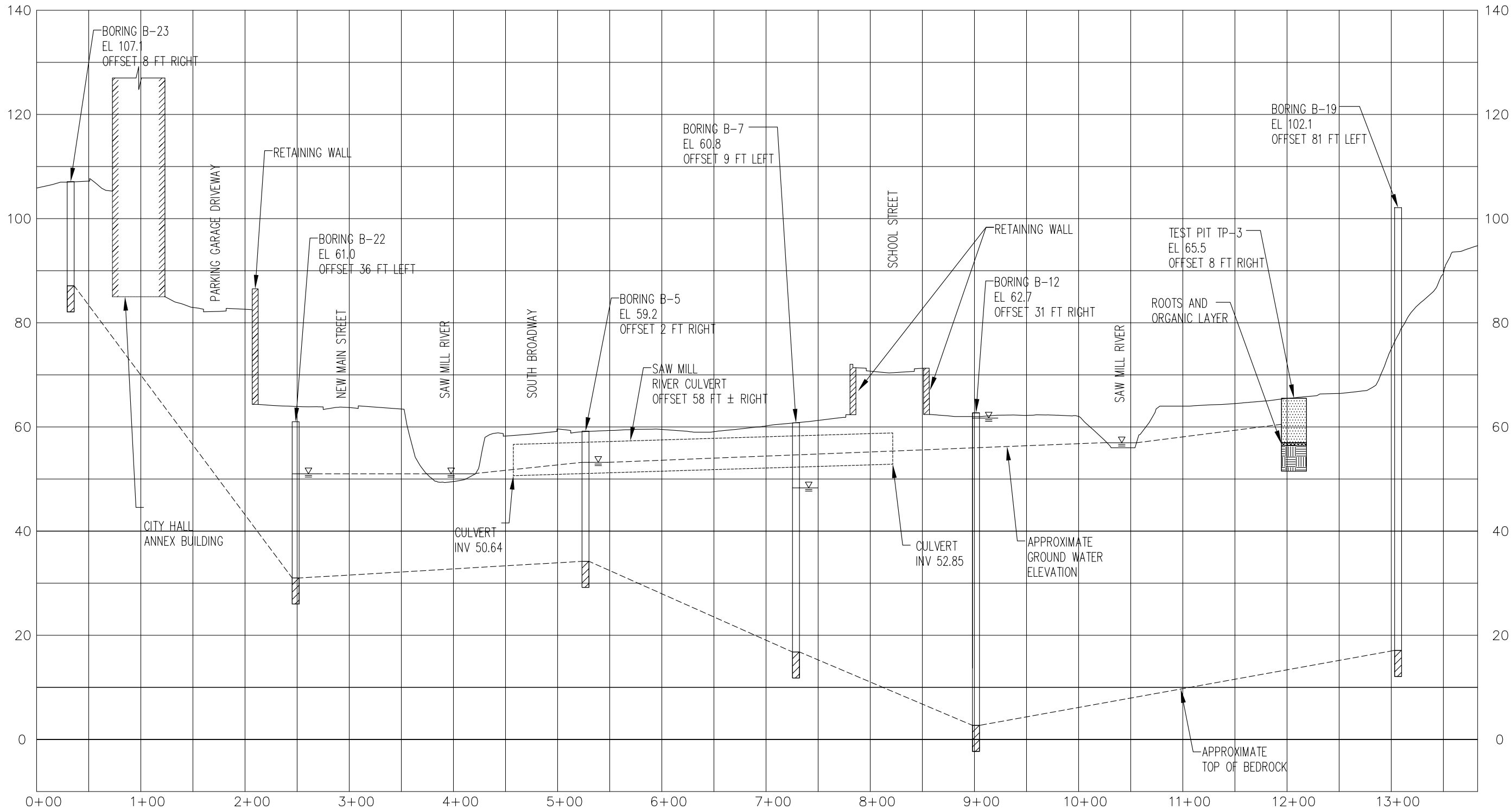
PROJECT
RIVER PARK CENTER
YONKERS
NEW YORK

SHEET TITLE
SOIL PROFILE
SECTION A-A

PROJECT NO.	106100
SCALE	AS NOTED
DATE	1/30/07
DRAWN BY	CMH
CHECKED BY	EFB

FIGURE
2
2 OF 6 SHTS

FILE NAME: Q:\Cadd106\106100\Acad Drawings\Geotech Drawings\ACAD DWGS\Geotech Rpt Sections 1.05.07.dwg PLOT TIME: Tue, 30 Jan 2007 - 10:13am LAST SAVE: Mon, 29 Jan 2007 - 4:55pm BY: Magyewe



SECTION B–B

NOTES:

1. PROFILES ARE A LINEAR INTERPOLATION BETWEEN BORING LOCATIONS AND MAY NOT REPRESENT ACTUAL CONDITIONS.
2. ELEVATIONS ARE IN NAVD1929 DATUM.
3. RETAINING WALL FOOTING ELEVATIONS AND BUILDING FOOTING ELEVATIONS ARE UNDETERMINED.

LEGEND

- ROOTS & ORGANIC MATERIAL
- ASPHALT & BASE COARSE
- FILL
- UNDISTURBED SOIL (GLACIAL TILL)
- BEDROCK

50' 25' 0 50' 100' FEET
HORIZONATAL SCALE: 1" = 50'

10' 5' 0 10' 20' FEET
VERTICAL SCALE: 1" = 10'

NO.	DATE	REVISION	BY

McLaren ENGINEERING GROUP
E-mail: mgmclaren@mgmclaren.com
100 Snake Hill Road West Nyack, NY 10994
Tel. (845) 353-6400 Fax. (845) 353-6509

PROJECT

RIVER PARK CENTER
YONKERS NEW YORK

SHEET TITLE

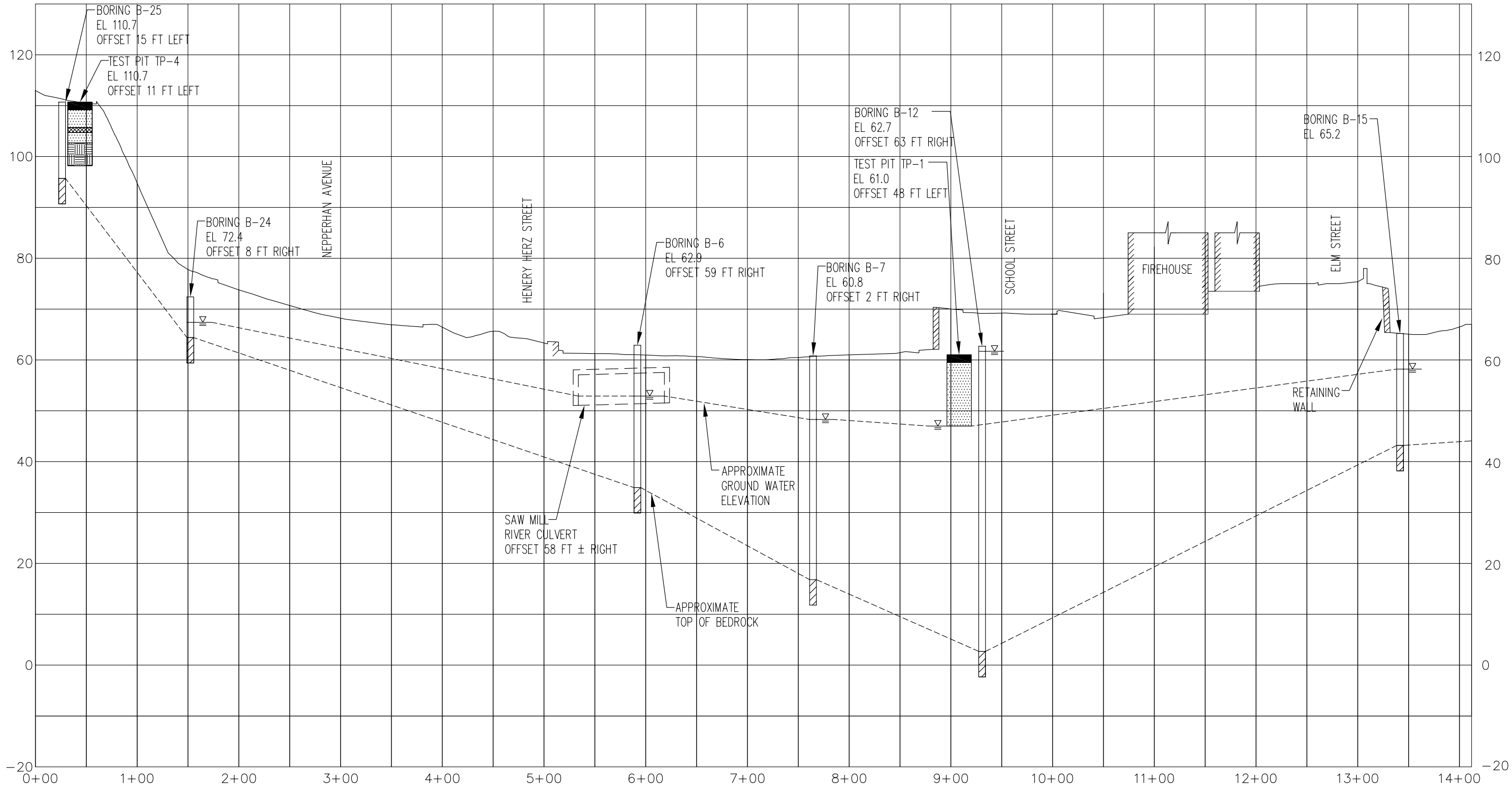
SOIL PROFILE
SECTION B-B

PROJECT NO.	106100
SCALE	AS NOTED
DATE	1/30/07
DRAWN BY	CMH
CHECKED BY	EFB

FIGURE 3

3 OF 6 SHTS

FILE NAME: Q:\Cadd106\106100\Acad Drawings\Geotech Drawings\ACAD DWGS\Geotech Rpt Sections 1.05.07.dwg PLOT TIME: Tue, 30 Jan 2007 - 10:14am LAST SAVE: Mon, 29 Jan 2007 - 4:55pm BY: Magyewe



SECTION C–C

NOTES:

1. PROFILES ARE A LINEAR INTERPOLATION BETWEEN BORING LOCATIONS AND MAY NOT REPRESENT ACTUAL CONDITIONS.
2. ELEVATIONS ARE IN NAVD1929 DATUM.
3. RETAINING WALL FOOTING ELEVATIONS AND BUILDING FOOTING ELEVATIONS ARE UNDETERMINED.

LEGEND

- ROOTS & ORGANIC MATERIAL
- ASPHALT & BASE COARSE
- FILL
- UNDISTURBED SOIL (GLACIAL TILL)
- BEDROCK

50' 25' 0 50' 100' FEET
HORIZONATAL SCALE: 1" = 50'

10' 5' 0 10' 20' FEET
VERTICAL SCALE: 1" = 10'

NO.	DATE	REVISION	BY

McLaren ENGINEERING GROUP
E-mail: mgmclaren@mgmclaren.com
100 Snake Hill Road West Nyack, NY 10994
Tel. (845) 353-6400 Fax. (845) 353-6509

PROJECT

RIVER PARK CENTER
YONKERS NEW YORK

SHEET TITLE

SOIL PROFILE
SECTION C-C

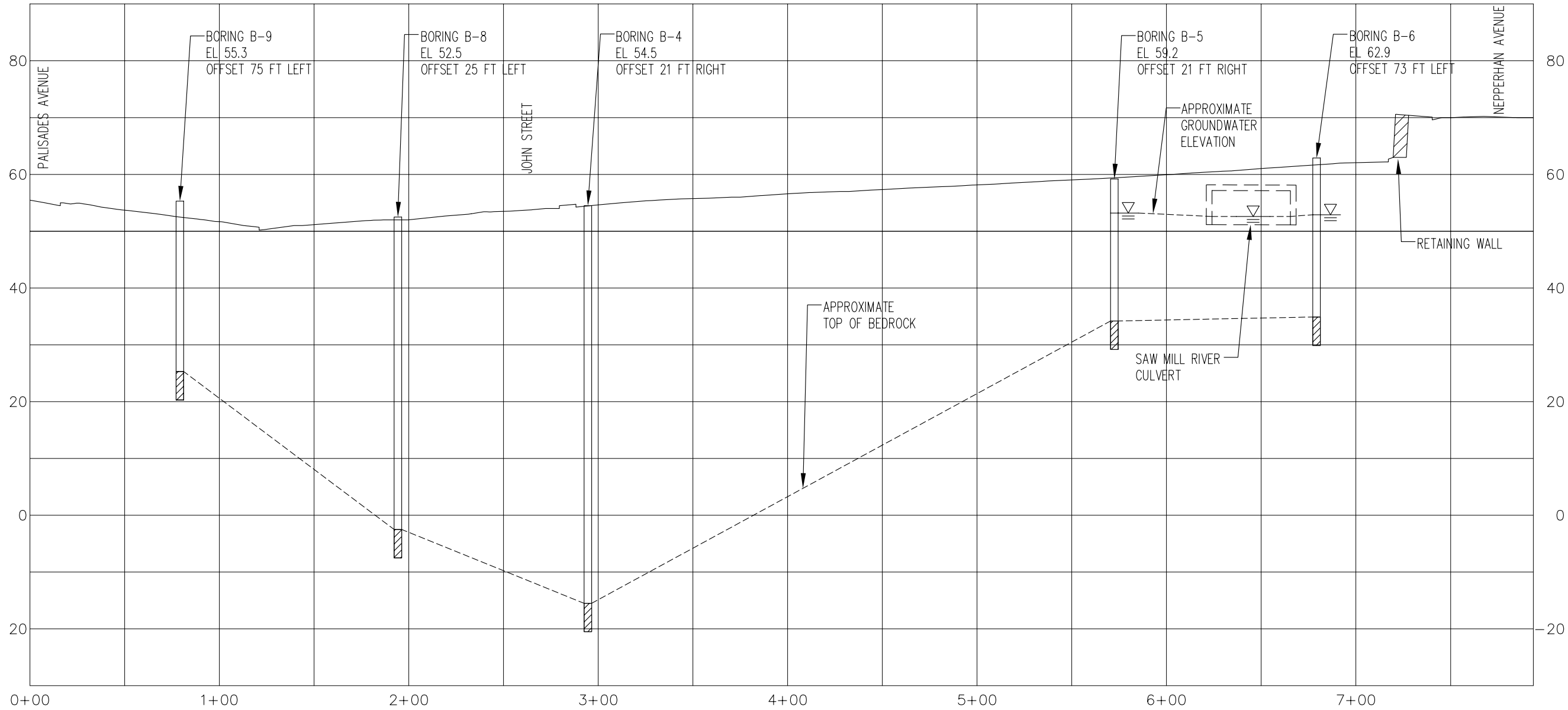
PROJECT NO.	106100
SCALE	AS NOTED
DATE	1/30/07
DRAWN BY	CMH
CHECKED BY	EFB

FIGURE

4

4 OF 6 SHTS

FILE NAME: Q:\Cadd\106\106100\Acad Drawings\Geotech Drawings\ACAD DWGS\Geotech Rpt Sections 1.05.07.dwg PLOT TIME: Tue, 30 Jan 2007 - 10:15am LAST SAVE: Mon, 29 Jan 2007 - 4:55pm BY: Magyewe



SECTION D-D

NOTES:

1. PROFILES ARE A LINEAR INTERPOLATION BETWEEN BORING LOCATIONS AND MAY NOT REPRESENT ACTUAL CONDITIONS.
2. ELEVATIONS ARE IN NAVD1929 DATUM.
3. RETAINING WALL FOOTING ELEVATIONS AND BUILDING FOOTING ELEVATIONS ARE UNDETERMINED.

LEGEND

- ROOTS & ORGANIC MATERIAL
- ASPHALT & BASE COARSE
- FILL
- UNDISTURBED SOIL (GLACIAL TILL)
- BEDROCK

30' 15' 0 30' 60' FEET
HORIZONATAL SCALE: 1" = 30'

5' 2.5' 0 5' 10' FEET
VERTICAL SCALE: 1" = 10'

NO.	DATE	REVISION	BY

McLaren ENGINEERING GROUP
E-mail: mgmclaren@mgmclaren.com
100 Snake Hill Road West Nyack, NY 10994
Tel. (845) 353-6400 Fax. (845) 353-6509

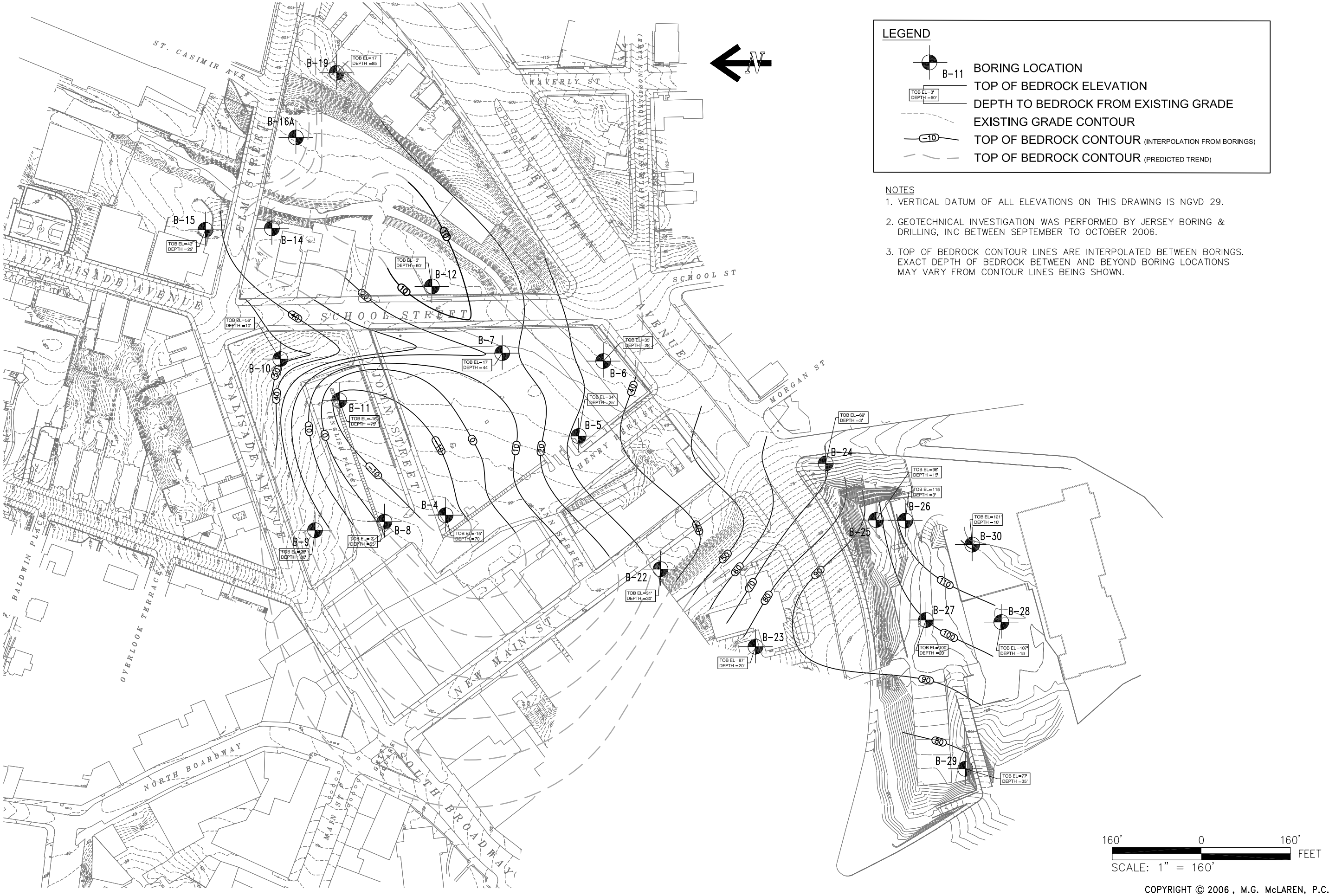
PROJECT
RIVER PARK CENTER
YONKERS NEW YORK

SHEET TITLE
SOIL PROFILE
SECTION D-D

PROJECT NO.	106100
SCALE	AS NOTED
DATE	1/30/07
DRAWN BY	CMH
CHECKED BY	EFB

FIGURE
5
5 OF 6 SHTS

FILE NAME: Q:\Cadd106\106100\Acad Drawings\Geotech Drawings\ACAD DWGS\Geotech Rpt Sections 1.05.07.dwg PLOT TIME: Tue, 30 Jan 2007 - 10:16am LAST SAVE: Mon, 29 Jan 2007 - 4:55pm BY: Magyewe



LEGEND

- B-11 — BORING LOCATION
- TOB EL=3' DEPTH =60' — TOP OF BEDROCK ELEVATION / DEPTH TO BEDROCK FROM EXISTING GRADE
- EXISTING GRADE CONTOUR
- -10 — TOP OF BEDROCK CONTOUR (INTERPOLATION FROM BORINGS)
- TOP OF BEDROCK CONTOUR (PREDICTED TREND)

NOTES

1. VERTICAL DATUM OF ALL ELEVATIONS ON THIS DRAWING IS NGVD 29.
2. GEOTECHNICAL INVESTIGATION WAS PERFORMED BY JERSEY BORING & DRILLING, INC BETWEEN SEPTEMBER TO OCTOBER 2006.
3. TOP OF BEDROCK CONTOUR LINES ARE INTERPOLATED BETWEEN BORINGS. EXACT DEPTH OF BEDROCK BETWEEN AND BEYOND BORING LOCATIONS MAY VARY FROM CONTOUR LINES BEING SHOWN.

NO.	DATE	REVISION	BY

McLaren ENGINEERING GROUP
E-mail: mgmclaren@mgmclaren.com
100 Snake Hill Road, West Nyack, NY 10994
Tel. (845) 353-6400 Fax. (845) 353-6509

PROJECT

RIVER PARK CENTER

YONKERS NEW YORK

SHEET TITLE

ROCK CONTOUR PLAN

PROJECT NO.	106100
SCALE	1"=160'
DATE	JAN 29 2007
DRAWN BY	CSL
CHECKED BY	SLG

FIGURE

6

6 OF 6 SHTS

FILE NAME: Q:\Cadd106\106100\Acad Drawings\Geotech Drawings\ACAD DWGS\TOP OF ROCK CONTOUR PLAN.dwg PLOT TIME: Tue, 30 Jan 2007 - 10:19am LAST SAVE: Fri, 26 Jan 2007 - 10:34am BY: Magyowe

APPENDIX B

Yonkers – Circa 1886

USGS

The Highlands Province

The region's most ancient rocks are the foundation of the Highlands region. Metamorphic and igneous rocks of Late Precambrian and Early Paleozoic age crop out in northeast-trending belts of rock forming the core of the Appalachian Mountains in the New York Bight region. The area is a rugged, hilly to mountainous terrain, bearing the characteristic scars of Pleistocene glaciation. The rocky outcrops visible on hillsides, and along stream banks and roadside exposures, consist mostly of gneiss, schist, and marble. The Manhattan skyline owes its existence to the durable character of this bedrock foundation. Some of the most scenic hiking areas in the region are found in the Highlands.

The literature is filled with conflicting definitions as to how the geographic areas surrounding the New York Bight should be subdivided. The rocks of the Highlands Province are a part of the "Crystalline Appalachians." This name refers to the term crystalline rock, a general term for igneous and metamorphic rock (as opposed to sedimentary rock) where the rock consists of minerals in an obviously crystalline state. The Highlands region is equivalent to the ancient, worn-down mountains of the Piedmont and Blue Ridge Provinces in North Carolina and Virginia, and is equivalent to the New England Upland Province to the north. Although the Newark and Connecticut River basins are equivalent to Triassic age basins of the Piedmont to the south, for this discussion, the Highlands Province is limited to exposures of Precambrian and Early Paleozoic metamorphic and igneous rocks throughout portions of northern New Jersey, Southern New York, and most of Connecticut.

The Highlands Province is subdivided into several regions (Figure 10). The Reading Prong extends from southeastern Pennsylvania into the upland areas of northern New Jersey where it is called the New Jersey Highlands. This belt continues into southeastern New York where it is called the Hudson Highlands. Equivalent rocks in western Connecticut are called the Housatonic Highlands. The Manhattan Prong is a smaller belt of ancient rock in southern New York (including Manhattan, the Bronx, and segments of Brooklyn and Staten Island), parts of Westchester County, and upland portions of southwestern Connecticut.

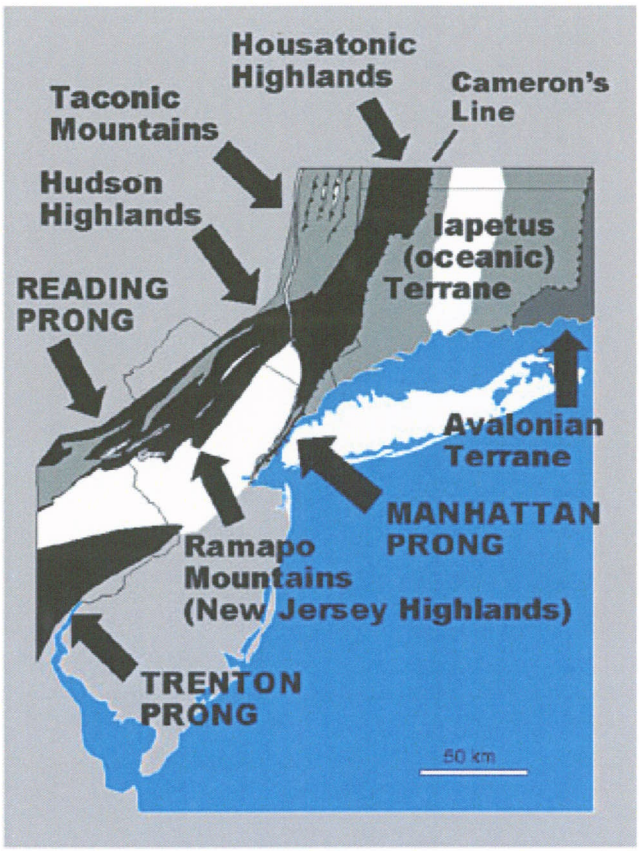


Figure 10. The Highlands Province.

The Manhattan and Reading Prongs are separated by the Newark Basin in the south, but the two features merge at the northern terminus of the Newark Basin in the vicinity of Peekskill, New York. A band of mountains that rise nearly one thousand feet along the northwestern margin of the Newark Basin in New York and New Jersey are called the Ramapo Mountains. Another belt of ancient metamorphic and igneous rock crops out along the southern margin of the Newark Basin south and west of Trenton, New Jersey. In this region the rocks are referred to as part of the Trenton Prong.

The Taconic Mountains consist of complexly folded and faulted Early Paleozoic rocks which, in part, have not been subjected to the high degree of metamorphism as rocks to the south and east. The Iapetus and Avalonian terranes in Connecticut consist of intensely metamorphosed Precambrian and Early Paleozoic rocks, and are defined, in part, by aspects of their geologic history (discussed below).

The geology of the Highlands Province is exceedingly complicated, and many aspects of the region's geologic history are not clearly resolved. Detailed geologic maps of the region show complex patterns of folds, faults, and intrusions. These ancient rocks compose the basement beneath the younger, overlying sedimentary strata of the Valley and Ridge Province, the sedimentary and volcanic rocks of the Newark and Connecticut River Basins, and the poorly consolidated sediments of the Coastal Plain. The rocks have been subjected to several episodes of tectonic deformation, including stages of intense folding and metamorphism associated with the collision of ancient landmasses driven by plate tectonic forces. Following these mountain building episodes of the Paleozoic, this region has endured extensive periods of gradual uplift and erosion lasting throughout Mesozoic and Cenozoic time. As a result, the highest peaks in the Appalachian region generally consist of ancient crystalline rocks that are more resistant to erosion. River valleys generally follow along fractured zones and faults, or along outcrop belts of rocks that

preferentially weather and erode faster.

The Grenville Orogeny

The oldest exposures of Precambrian rock in the New York Bight region are estimated at 1.3 to 1.1 billion years old (Middle Proterozoic). Whether older rocks existed at one time in the region is unknown; they have long since been destroyed by erosion, or have been incorporated deep into the crust or possibly back into the mantle. The majority of these ancient rocks, however, have been subjected to repeated episodes of metamorphism so that their radiogenic dates have been reset to younger ages, mostly around 0.8 billion years ago. The early stages of alteration occurred in an extensive mountain-building episode that affected the entire eastern margin of North America extending as far west as Ohio and Kentucky. This mountain-building episode is collectively known as the Grenville Orogeny which began roughly 1.3 billion years ago (Middle Proterozoic), and ended roughly around 800 million years ago (Late Proterozoic)(Figure 11A). During this period older rocks and sediments deposited along the south and eastern margin of the Canadian Shield underwent deep burial and metamorphic alteration. Many igneous intrusions occurred in the region. Some of these igneous bodies were probably sills or flows preserved within sequences of sedimentary rocks, later to become metamorphosed during subsequent stages of the orogeny. Others large magma chambers cooled slowly deep in the crust, becoming the granitic core of many mountains in the Highlands region (such as Bear Mountain, New York). Through much of their history these rocks were deeply buried, probably many miles beneath the Earth's surface. Their overburden has long been stripped away by erosion.

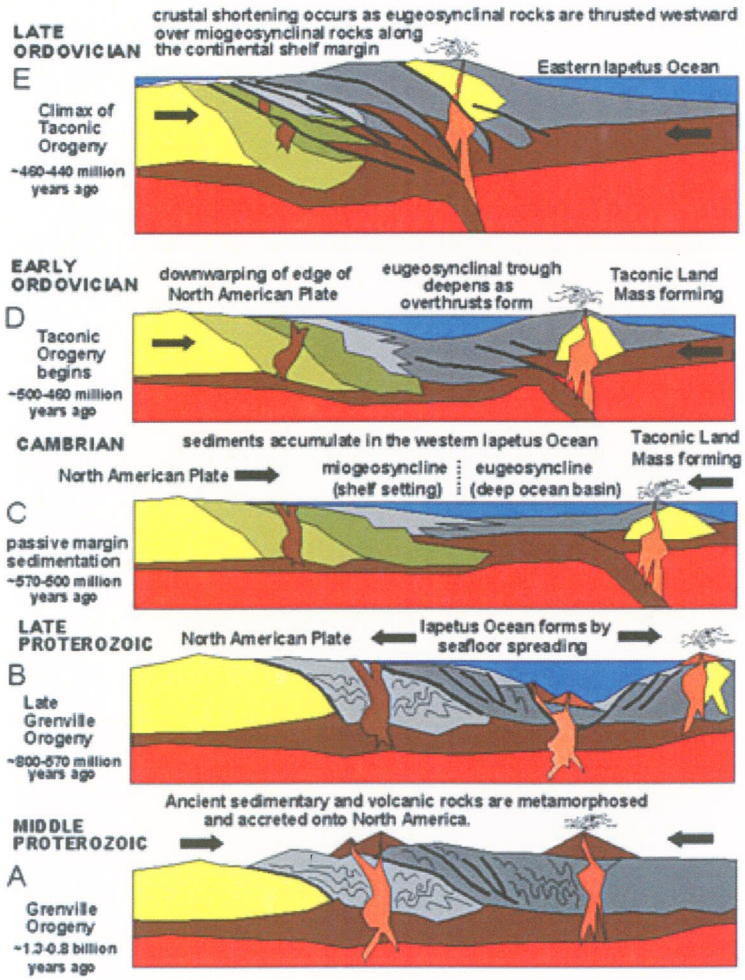


Figure 11. Plate tectonic configuration during Late Precambrian through Early Paleozoic time for the New York City region (not to scale).

A long period of uplift and erosion followed the Grenville Orogeny. Beginning roughly 700 million years ago rifting began along the eastern edge of the North American continent (Figure 11B). This divergence (rifting) led to the formation of the ancient Iapetus Ocean (a waterway that has since vanished by later collisions between continents). According to Greek Mythology, Iapetus was the father of Atlas, the name-sake of the Atlantic Ocean.
Through late Proterozoic into Cambrian time, sediments derived from upland areas to the north and west accumulated along a continental shelf margin and within a deep ocean trough farther offshore. The shallow shelf margin followed a general trend along the southeastern edge of the New Jersey, Hudson , and Housetonic Highlands. On the shallow shelf regions well-sorted quartz sandstone and carbonate rocks (limestone and dolomite) were deposited. This continental shelf sequence accumulated to the thickness of several miles, forming an elongated sedimentary basin referred to as a miogeocline (Figure 11C). To the east, a deep water trough filled with fine-grained sediments (mainly shales) derived from both the continent and from volcanic island arc systems that were emerging far offshore within the Iapetus Ocean basin. This deep water basin sequence is referred to as a eugeocline. To the south and east, this basin was underlain by basaltic crust of the ancient Iapetus Ocean (see Figure 11C). Sedimentation in this basinal trough persisted until Middle Ordovician time.

The Taconic Orogeny

The Taconic Orogeny was a great mountain building period that perhaps had the greatest overall effect on the geologic structure of basement rocks within the New York Bight region. The effects of this orogeny are most apparent throughout New England, but the sediments derived from mountainous areas formed in the northeast can be traced throughout the Appalachian and Midcontinent regions of North America. The following discussion provides a summary of events leading to the culmination of this orogeny.

Beginning in Cambrian time (about 550 million years ago) the Iapetus Ocean began to grow progressively narrower. The weight of accumulating sediments, in addition to compressional forces in the crust, forced the eastern edge of the North American continent to gradually fold downward (Figure 11D). In this manner, shallow carbonate deposition that had persisted on the shelf margin through Late Cambrian into Early Ordovician time, gave way to fine-grained clastic deposition and deeper water conditions during the Middle Ordovician. Sometime during this period a convergent plate boundary developed along the eastern edge of a small island chain. Crustal material beneath the Iapetus Ocean sank into the mantle along a subduction zone with an eastward-dipping-orientation. Partial melting of the down-going plate produced magma that returned to the surface to form the Taconic island arc offshore from the continent. By the Late Ordovician, this island arc had collided with the North American continent. The sedimentary and igneous rock between the land masses were intensely folded and faulted, and were subjected to varying degrees of intense metamorphism (Figure 11E). This was the final episode of the long-lasting mountain-buliding period referred to as the Taconic Orogeny.

When the Taconic Orogeny subsided in the New York Bight region during Late Ordovician time (about 440 million years ago), subduction ended, culminating in the accretion of the Iapetus Terrane onto the eastern margin of the continent. This resulted in the formation of a great mountain range throughout New England and eastern Canada, and perhaps to a lesser degree, southward along the region that is now the Piedmont of eastern North America. The newly expanded continental margin gradually stabilized. Erosion continued to strip away sediments from upland areas. Inland seas covering the Midcontinent gradually expanded eastward into the New York Bight region and became the site of shallow clastic and carbonate deposition. This

tectonically-quiet period persisted until the Late Devonian time (about 360 million years ago) when the next period of mountain-building began, the Acadian Orogeny.

Major Rock Groups

Rock units of Precambrian and Lower Proterozoic Age have been subdivided into numerous formations and members, with different names applied to equivalent-age rock units from one region to the next. More detailed descriptions of local and regional stratigraphy are available in many reports and maps cited in the reference section of this book. The list of rock groups in Figure 12 is both generalized and incomplete; however, it highlights the major rock groups that crop out within the New York Bight region. More detailed discussion of some of these units are incorporated into the following locality descriptions.

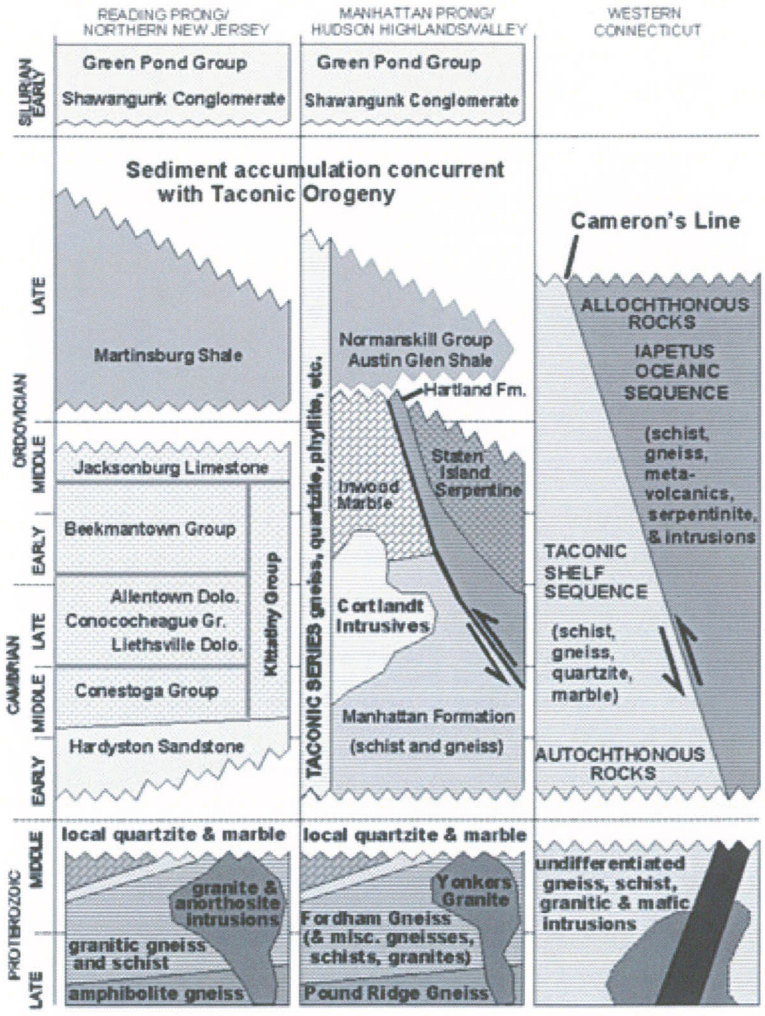


Figure 12. Generalized Precambrian and Lower Paleozoic stratigraphy for the New York City region (modified after American Association of Petroleum Geologists COSUNA Charts (1983, 1986), Drake and others (1986), Fisher and others (1995), and Rodgers (1985).

When traveling across the region from the north and west toward the south and east the rocks of lower Paleozoic age display increasing stages of metamorphism. This is because this region was subjected to higher degree of deformation associated with the Taconic Orogeny. For instance, the

Late Cambrian and Early Ordovician limestones and dolomite of the Kittatiny Group in northwestern New Jersey are equivalent to the Inwood Marble in the Manhattan Prong region. Likewise, the Late Ordovician Martinsburg and Normanskill shales are equivalent to the Manhattan Schist. All rocks in the region formed prior to or during the Taconic Orogeny were also subjected to additional deformation episodes during the Acadian and Alleghenian Orogenies later in the Paleozoic.

Mountains Without "Roots"

During the process of continental collision and accretion, rocks in the crust are subjected to great forces of pressure. They eventually yield to this pressure by bending or fracturing. If the rock is confined under great pressure they will flow gradually like plastic, resulting in the formation of folds (anticlines and synclines [Figure 13]). Such evidence of plastic deformation can be observed on the scale of a small hand specimen or traced to a series of folds on a scale of tens or even hundreds of miles. If the pressure is applied too rapidly the rocks will behave in a more brittle manner forming fractures (joints and faults). A joint differs from a small fault in that a fault displays evidence of visible offset. In many cases faults are only observed on the surface as a relative change in lithology from one surface outcropping to the next.

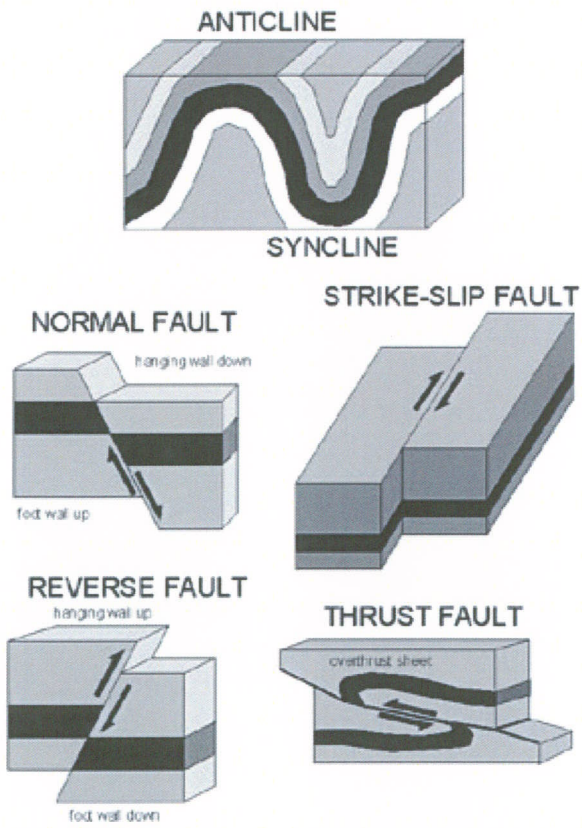


Figure 13. Types of faults and folds.

Though time, rocks respond to crustal pressure by folding or moving passively past one another along faults. Earth movement is typically an extremely slow, gradual process. However, when pressure builds beyond the point to which rocks can gradually yield they may suddenly break and move, causing an earthquake. Earthquakes are measured by different levels of intensity (see additional discussion in the Human Impacts chapter). Most earthquakes are imperceptible to humans; only great quakes are capable of causing damage and creating visible changes on the Earth's surface. Earth displacements measured following the greatest earthquakes in modern times

are only measured in the order of several dozens of feet.

During the mountain-building episodes during the Paleozoic, great piles of thrust sheets piled one on another, built up into mountain ranges along the eastern margin of North America. As mountain building proceeded, certain faults may have been active for a time, then motion may have ceased as active displacement occurred along new fault systems or along other older fracture zones. In many fault systems relative motion is of strike-slip displacement, where one rock mass to move horizontally past another, in some cases for great distances. Over the course of geologic time, fault systems may become reactivated with relative motion changing from one episode to the next. Several major thrust fault systems are known throughout the New York Bight region; some display a large degree of strike-slip offset.
Perhaps the greatest fault system in the New York Bight region is known as Cameron's Line, named after Eugene N. Cameron, a U.S. Geological Survey geologist who first recognized its significance as a great suture between rocks of widely different origins. Cameron's Line winds southward out of New England into Western Connecticut and passes through southern New York across the Bronx, following the general trend of the East River. It extends beneath sedimentary cover on Staten Island and southward beneath the Coastal Plain of New Jersey. In general, basement rocks to the west of Cameron's Line are regarded as autochthonous, meaning that they have not been significantly displaced by tectonic processes. The rocks to the west of Cameron's Line include metamorphosed sedimentary material originally comprising ancient continental slope, rise, and shelf deposits, collectively described as a miogeocline (see Figure 11C and Figure 12). The rocks to the east of Cameron's Line are allochthonous, which means they have been shoved westward over autochthonous basement rocks on the order of many tens or even hundreds of kilometers. These rocks were originally deposited as sediments in a deep water basin called a eugeocline. Cameron's Line may represent the trace of a subduction zone that ceased when the smaller Taconic Landmass, a small terrane consisting of oceanic crust and a complex island arc system, collided with, and became accreted onto, the eastern margin of North America during the Taconic Orogeny. Much of the rocks east of Cameron's Line were once part of the floor of the Iapetus Ocean (the Iapetus Terrane).

Rocks to the west of Cameron's Line have also been displaced along great thrust faults. These faults generally dip steeply near the surface, but decrease to shallow angles in the subsurface. As with most thrust faults in the region, older metamorphic rocks have been shoved westward over younger sedimentary rocks of Cambrian and Ordovician age. In many areas there are numerous thrust sheets. The term, imbrication, is used to describe great massifs of rock in which sequences of stratigraphic intervals are repeated in stacked vertical succession. This is particulary evident in the Taconic Mountains, throughout the Hudson Valley, and in portions of the New Jersey Highlands. In several locations of the Highlands region the upland areas are underlain by Precambrian gneisses whereas the exposures along the stream valleys consist of Cambrian and Ordovician shales and limestones. The Precambrian gneisses have been shoved north and west over the younger sedimentary rocks along great thrust faults. The occurrence of older, more resistant crystalline rocks forming the core of a mountain, with an adjacent valley underlain by softer sedimentary rocks gives the impression of "mountains without roots."

APPENDIX C

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-4
PROJECT:Yonkers Redevelopment		SHT. NO. 1 of 3
CLIENT: McLaren Engineering		JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY		ELEVATION
GROUND WATER		PERMIT NO.
DATE: 9/22/2006	TIME:	DEPTH: 12
CASING: 64	TYPE: DIA.	CAS.: HW 4"
SAMP.: SS 24"	CORE: NX	TUBE:
	WT.	300 140
	FALL	24" 30"
		DATE START 9/26/06
		DATE FINISH 9/28/06
		DRILLER L.Ramos
		INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1	3" spin				0-6" Black top 6"-1' Soil	
2					1-3' Roller bit 6" concrete & Rebar	BOREHOLE GROUTED YES___X__ NO_____
3						
4					3-4' Roller bit boulder	
5					4-7' soil	Samples received in field by Client's Rep. YES_____ NO__X__
6						
7						If YES, sign & print name
8						
9					7-10' Roller bit boulders	Signature
10						
11					10-11' soil	Print name
12					11-14' Roller bit boulder	
13						
14						Materials used on Boring
15					14-16' soil	Benseal __2__ Quick Gel ___2___ Hole Plug __2___ Revert _____ Well gravel _____ Concrete _____ Asphalt _____ Spoons _____ Traps _____
16						
17					16-18' roller bit boulder	
18						
19					18-19' soil	
20					19-21' Roller bit boulder	Bits Tri Cone 2/2 15/16 Diamond _
21						
22						Misc. material/equipment
23					21-26' soil	
24						
25						
26						
27						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-4
PROJECT: Yonkers Redevelopment		SHT. NO. 2 of 3
CLIENT:McLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28	3"				26-28' Roller bit boulder	
29					28-30' soil	
30						
31					30-33' Roller bit boulder	
32						
33						
34					33-34' soil	
35					34-35' Roller bit boulders	
36					35-36' soil	
37					36-38' 6" Roller bit boulder	
38						
39					38-40' soil	
40						
41					40-42' Roller bit boulder	
42						
43					42-47' soil	
44						
45						
46						
47						
48					47-49' Roller bit boulder	
49						
50					49-54' soil	
51						
52						
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-4
PROJECT: Elm street - Yonkers Redevelopment		SHT. NO. 3 of 3
CLIENT: McLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
54						
55					54-58' Boulder	
56						
57						
58						
59					58-64' soil	
60						
61						
62						
63						
64						
65					64-65' Roller bit boulder	
66					65-66' soil	
67					66-70' Roller bit into rock	
68						
69						
70						
71		1st run			70-75' 1st run Rec: 59"	
72						
73						
74						
75						
76					EOB at 75'	
77						
78						
79						
80						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-5

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Enginnering
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
9/26/2006		7'	25'	DIA.	4"	SS	NX	
				WT.	300			
				FALL	24"			

SHT. NO. 1 of 2
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 9/25/06
DATE FINISH 9/26/06
DRILLER L. Ramos
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1	3" spin				0-6" Blacktop Roller bit 6"-3'6" soil
2					
3					
4					3'6" - 4'6" Roller bit boulder
5					4'6" - 10' soil w. misc. fill, brick
6					
7					
8					
9					
10					
11					10-12' roller bit boulder
12					
13					12-14' soil
14					
15					14-17' roller bit boulder
16					
17					
18					17-18' soil
19					18-21' roller bit boulder
20					
21					
22					21-22'6" soil
23					22'6"-25' roller bit into rock
24					
25					
26		1st run			25-30' Core 1st run REC: 54"
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal __1__
Quick Gel __2____
Hole Plug ___1__
Revert _____
Well gravel _____
Concrete _____
Asphalt _____
Spoons _____
Traps _____
Bits
Tri Cone 3 7/8 2 15/16
Diamond _

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-5
PROJECT: Yonkers Redevelopment		SHT. NO. 2 of 2
CLIENT: M cLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28		1st run			Core 1st run REC: 54"	
29						
30						
31					EOB at 30'	
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-6

PROJECT:Yonkers Redevelopment | SHT. NO. 1 of 2
CLIENT: McLaren Enginnering | JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY | ELEVATION
GROUND WATER | PERMIT NO.

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
9/25/2006		10'		DIA.	4"			
				WT.	300			
				FALL	24"			

DATE START 9/22/06
DATE FINISH 9/22/06
DRILLER J. Cruz
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1	4" spin				0-6" blacktop
2					6"-2' misc. fill
3					2-3' Roller bit boulder
4					3-8' soil
5					
6					
7					
8					
9					8-9' Roller bit boulder
10					9-15' soil
11					
12					
13					
14					
15					
16	▼				15-16' Roller bit boulder
17					16-22' soil
18					
19					
20					
21					
22					
23					22-25' Roller bit boulder
24					
25					
26					25-28' soil
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal __1__
Quick Gel __1____
Hole Plug ___1__
Revert _____
Well gravel _____
Concrete _____
Asphalt _____
Spoons _____
Traps _____
Bits
Tri Cone
Diamond _

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-6
PROJECT: Yonkers Redevelopment		SHT. NO. 2 of 2
CLIENT: M cLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28						
29		1st run			28-33' Core 1st run REC: 46"	
30						
31						
32						
33						
34					EOB at 33'	
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-7

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Engineering
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
10/3/2006		12'6"		DIA.	4"			
				WT.	300			
				FALL	24"			

SHT. NO. 1 of 2
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 9/27/06
DATE FINISH 10/3/06
DRILLER J. santiago
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1	3" spin				0-6" blacktop 6"-5' soil
2					
3					
4					
5					
6					5-7' roller bit boulder
7					
8					7-8' soil
9					8-9' Roller bit boulder
10					9-10' soil
11					10-15' Roller bit boulder
12					
13					
14					
15					
16					15-18' Roller bit Cobbles
17					
18					
19					18-20' soil
20					
21					20-25' Roller bit boulders
22					
23					
24					
25					
26					25-27' soil
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal __2_
Quick Gel ___2___
Hole Plug __1___
Revert _____
Well gravel _____
Concrete _____
Asphalt _____
Spoons _____
Traps _____

Bits
Tri Cone 2/2 15/16
Diamond 1

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-7
PROJECT: Elm Street - Yonkers Redevelopment		SHT. NO. 2 of 2
CLIENT: M cLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28	3"				27-29' 6" Roller bit boulder	
29						
30					29' 6" - 30' soil	
31					30-35' cored boulders & roller bit	
32						
33						
34						
35						
36					35-38' soil	
37						
38						
39					38-40' Roller bit boulders	
40						
41					40-43' soil	
42						
43						
44					43-44' Roller bit boulders	
45					44-49' 2nd run core rock REC: 51"	
46						
47						
48						
49						
50					EOB at 49'	
51						
52						
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-8

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Engineering
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
10/2/2006		10'	45'	DIA.	4"		NX	
				WT.	300			
				FALL	24"			

SHT. NO. 1 of 3
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 9-29-06
DATE FINISH 10-2-06
DRILLER P. Lynch
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
	4" spin				
1					0-6" blacktop
2					6"-3' soil
3					
4					3-6'
5					Concrete rebar
6					
7					6-8'
8					Roller bit boulders
9					8-9'6" soil
10					9'6" - 10' cobbles
					10 - 10' 6" soil
11					10' 6 - 11' cobbles roller bit
12					11'-20' soil
13					
14					
15					
16					
17					
18					
19					
20					
21					20-21' cobbles & gravel
22					21-25' soil
23					
24					
25					
26					25-26' soil
27					26-27'6" cobbles

REMARKS

BOREHOLE GROUTED
YES___X__ NO_____

Samples received in field by Client's Rep.
YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal	__2_
Quick Gel	____2__
Hole Plug	___1__
Revert	_____
Well gravel	_____
Concrete	_____
Asphalt	_____
Spoons	_____
Traps	_____
	Bits
Tri Cone	2 - 2 15/16
Diamond	1

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-8
PROJECT: Yonkers Redevelopment		SHT. NO. 2 of 3
CLIENT: M cLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28	3"				27'6" - 30' soil	
29						
30						
31					30-43' soil	
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44					43-46' roller bit cobbles	
45						
46						
47					46-47' soil	
48					47-49' roller bit cobbles	
49						
50					49-49'6" soil 49'6" - 50' roller bit cobbles	
51					50-51' soil	
52					51-53' Roller bit cobbles	
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-8
PROJECT: Elm street - Yonkers Redevelopment		SHT. NO. 3 of 3
CLIENT: McLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
54					53-55'	
55					Roller bit into rock	
56						
57					Core 1st run	
58		1st run			REC: 51"	
59						
60						
61					EOB at 60'	
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						
76						
77						
78						
79						
80						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-9

PROJECT: Yonkers Redevelopment | SHT. NO. 1 of 2
CLIENT: McLaren Enginnering | JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY | ELEVATION

GROUND WATER					CAS.	SAMP.	CORE	TUBE	PERMIT NO.
DATE	TIME	DEPTH	CASING	TYPE	HW	SS	NX		DATE START 10/3/06
10/3/2006		6'	25'	DIA.	4"				DATE FINISH 10/3/06
				WT.	300				DRILLER P. Lynch
				FALL	24"				INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1–3					0-3' soil	BOREHOLE GROUTED YES___X__ NO_____
4–18					3-18' cobbles	Samples received in field by Client's Rep. YES_____ NO__X__ If YES, sign & print name
19–27					18-27' soil	Signature Print name Materials used on Boring Benseal __2__ Quick Gel __1____ Hole Plug ___1__ Revert _____ Well gravel _____ Concrete _____ Asphalt _____ Spoons _____ Traps _____ Bits Tri Cone Diamond _ Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-9
PROJECT: Yonkers Redevelopment		SHT. NO. 2 of 2
CLIENT: M cLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28					27-30'	
29					Roller bit into rock	
30						
31						
32					Core 1st run	
33		1st run			REC: 40"	
34						
35						
36					EOB at 35'	
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-10

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Engineering
LOCATION: Elm Street, Yonkers, NY
SHT. NO. 1 of 1
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 10/2/06
DATE FINISH 10/3/06
DRILLER P. Lynch
INSPECTOR

GROUND WATER

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
10/3/2006		5'		DIA.	4"	SS	NX	
				WT.	300			
				FALL	24"			

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1	4" casing				0-3' soil	BOREHOLE GROUTED YES___X__ NO_____
2						
3						
4					3 - 10' Roller bit boulders	Samples received in field by Client's Rep. YES_____ NO__X__ If YES, sign & print name
5						
6						
7						
8						
9						Signature
10						
11					10-15' 1st run Rec: 37"	Print name
12						
13		1st run				
14						Materials used on Boring
15						
16						Benseal __1__ Quick Gel __1____ Hole Plug _____ Revert _____ Well gravel _____ Concrete _____ Asphalt _____ Spoons _____ Traps _____ Bits Tri Cone Diamond _
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						Misc. material/equipment
27						NOTES:

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-11

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Engineering
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
10/4/2006		12	40	DIA.	4"	SS	NX	
				WT.	300			
				FALL	24"			

SHT. NO. 1 of 3
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 10/2/07
DATE FINISH 10/4/07
DRILLER L.Ramos
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
	4" spin				0-6" Black top
1					6"-2' Soil
2					
3					2-3' Roller bit boulders
4					3-5' Soil
5					
6					5-6'6" Roller bit cobbles
7					6' 6" - 7' 6" Roller bit boulders
8					7' 6" - 9' 6" Roller bit
9					Concrete & Rebar
10					9' 6" -10' Soil
11					10' - 13'
12					Roller Bit
13					Boulder
14					13-14'
					C gravel
15					14-17"
16					Roller Bit
17					boulder
18					17-18'
					Roller Bit boulder
19					18-18' 6" Soil
					18' 6"- 19' Roller bit cobbles
20					19'-19' 6" Soil
					19' 6" - 20' cobbles
21					20-25'
22					Roller bit
23					cobbles
24					
25					
26					25-27' roller bit
27					Gravel

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal __2__
Quick Gel ___3___
Hole Plug __2___
Revert _____
Well gravel _____
Concrete _____
Asphalt __1/4_____
Spoons _____
Traps _____
Bits
Tri Cone
Diamond _

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-11
PROJECT: Yonkers Redevelopment		SHT. NO. 2 of 3
CLIENT: Elm Street - Yonkers Redevelopment		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28	3"				27-30' Roller bit Boulder	
29						
30						
31					30-32' soil	
32						
33					32-40' Roller bit boulders	
34						
35						
36						
37						
38						
39						
40						
41					40-45' cobbles	
42						
43						
44						
45						
46					45-49' Roller bit boulders	
47						
48						
49						
50					49-51' soil	
51						
52					51-52' 6" Roller bit boulders	
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-11
PROJECT: Elm street - Yonkers Redevelopment		SHT. NO. 3 of 3
CLIENT: McLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
54					52' 6" -56' Roller bit cobbles	
55						
56						
57					56-59' soil	
58						
59						
60					59-60' Roller bit boulder	
61					60-65' cobbles	
62						
63						
64						
65						
66					65-70' cobbles	
67						
68						
69						
70						
71					70-73' soil	
72						
73						
74					73-75' Roller bit into rock	
75						
76					Rec: 46"	
77						
78		1st run				
79						
80					EOB at 80'	

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-12

PROJECT: Yonkers Redevelopment | SHT. NO. 1 of 3
CLIENT: McLaren Engineering | JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY | ELEVATION

GROUND WATER					CAS.	SAMP.	CORE	TUBE	PERMIT NO.
DATE	TIME	DEPTH	CASING	TYPE	HW	SS	NX		DATE START 10/5/06
10/9/2006		8'		DIA.	4"				DATE FINISH 10/9/06
				WT.	300				DRILLER P. Lynch
				FALL	24"				INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1	4" spin				0-6" Black top 6"-2' soil	BOREHOLE GROUTED YES___X__ NO_____
2						
3					2-4' soil	
4						Samples received in field by Client's Rep. YES_____ NO__X__
5					4-6' concrete & rebar	
6						If YES, sign & print name
7						
8						
9					6-20' Roller bit boulders	Signature
10						
11						Print name
12						
13						Materials used on Boring
14						
15						Benseal ___ Quick Gel _____
16						Hole Plug ___ Revert _____
17						Well gravel _____ Concrete _____
18						Asphalt _____ Spoons _____
19						Traps _____ Bits
20						Tri Cone Diamond _
21						
22					20-27' Roller bit boulders	Misc. material/equipment
23						
24						
25						
26						
27						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-12
PROJECT: McLaren Engineering		SHT. NO. 2 of 3
CLIENT: Elm Street - Yonkers Redevelopment		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28–35					27-35' Roller bit boulders	
36–40					35-40' C gravel	
41–47					40-47' soil	
48–49					47-49' Roller bit boulders	
50–53					49-60' Roller bit boulders	

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-12
PROJECT: Elm street - Yonkers Redevelopment		SHT. NO. 3 of 3
CLIENT: McLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
54						
55						
56						
57						
58						
59						
60						
61		1st run			60-65' Core 1st run Rec: 20" rock	
62						
63						
64						
65						
66		2nd run			65-70' Core 2nd run Rec: 36"	
67						
68						
69						
70						
71					EOB at 70'	
72						
73						
74						
75						
76						
77						
78						
79						
80						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-14

PROJECT: Yonkers Redevelopment | SHT. NO. 1 of 3
CLIENT: McLaren Engineering | JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY | ELEVATION

GROUND WATER					CAS.	SAMP.	CORE	TUBE	PERMIT NO.
DATE	TIME	DEPTH	CASING	TYPE	HW		NX		DATE START 10-4-06
10/5/2006		10'	45'	DIA.	4"				DATE FINISH 10-5-06
				WT.	300				DRILLER J. santiago
				FALL	24"				INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1	4" spin				0-6" blacktop 6"-3' soil	BOREHOLE GROUTED YES___X__ NO_____
2						
3						
4					3-10' Roller bit boulders	Samples received in field by Client's Rep. YES_____ NO__X__ If YES, sign & print name
5						
6						
7						
8						
9						Signature
10						
11					10-13' soil	Print name
12						
13						
14					13-14' boulders	Materials used on Boring
15					14-18' soil	Benseal __ Quick Gel ____ Hole Plug ___ Revert _____ Well gravel _____ Concrete _____ Asphalt _____ Spoons _____ Traps _____ Bits Tri Cone Diamond
16						
17						
18						
19					18-19' Roller bit boulders	
20					19-21' soil	
21						
22					21-22' Roller bit boulders	Misc. material/equipment
23					22-26' soil	
24						
25						
26						
27	↓					

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-14
PROJECT: Yonkers Redevelopment		SHT. NO. 2 of 3
CLIENT: M cLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28	3"				26-31' boulders	
29						
30						
31						
32					31-38' Gravel	
33						
34						
35						
36						
37						
38						
39					38-48' boulders	
40						
41						
42						
43						
44						
45						Benseal ___ Quick Gel ___ Hole Plug ___
46						
47						
48						
49					48-50' cobbles	
50						Tri Cone Diamond
51					50-55' Roller bit boulders	
52						
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-14
PROJECT: Elm street - Yonkers Redevelopment		SHT. NO. 3 of 3
CLIENT: McLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
54						
55						
56					EOB at 55'	
57						
58						
59						
60						
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						Benseal ___
72						Quick Gel ___
73						Hole Plug ___
74						
75						
76						Tri Cone
77						Diamond
78						
79						
80						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-15
PROJECT: Yonkers Redevelopment		SHT. NO. 1 of 1
CLIENT: McLaren Engineering		JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY		ELEVATION

GROUND WATER					CAS.	SAMP.	CORE	TUBE	PERMIT NO.
DATE	TIME	DEPTH	CASING	TYPE	HW	SS	NX		DATE START 10/3/06
10/4/2006		12	64	DIA.	4"				DATE FINISH 10/4/06
				WT.	300				DRILLER L.Ramos
				FALL	24"				INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1	4" spin				0-6" Black top	
2					6"-4' soil	BOREHOLE GROUTED
3						YES___X__ NO_____
4						Samples received in field by Client's Rep.
5					4-5' Roller bit boulder	YES_____ NO__X__
6					5-8' soil	If YES, sign & print name
7						
8						
9					8-10' 6" Roller bit boulder	Signature
10						
11					10' 6" - 13' soil	Print name
12						
13						
14					13-14' cobbles	Materials used on Boring
15					14-22' roller bit boulders	Benseal __1__
16						Quick Gel ___1___
17						Hole Plug _____
18						Revert _____
19						Well gravel _____
20						Concrete _____
21						Asphalt __1/4_____
22						Spoons _____
23		1st run			22-27' 1st run REC: 47"	Traps _____
24						Bits
25						Tri Cone
26						Diamond _
27					EOB at 27'	Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-16
PROJECT: Yonkers Redevelopment		SHT. NO. 1 of 1
CLIENT: McLaren Engineering		JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY		ELEVATION

GROUND WATER					CAS.	SAMP.	CORE	TUBE	PERMIT NO.
DATE	TIME	DEPTH	CASING	TYPE	HW	SS	NX		DATE START 10/3/06
		No		DIA.	4"				DATE FINISH 10/4/06
		water		WT.	300				DRILLER P. Lynch
				FALL	24"				INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1–4					0-4' Concrete & Rebar	BOREHOLE GROUTED YES___X__ NO_____ Samples received in field by Client's Rep. YES_____ NO__X__ If YES, sign & print name
5–15					4-15' Roller bit boulders	Signature Print name
16–27					EOB at 15'	Materials used on Boring Benseal ____ Quick Gel _____ Hole Plug ___2__ Revert _____ Well gravel _____ Concrete _____ Asphalt _____ Spoons _____ Traps _____ Bits Tri Cone 6" roller bit Diamond _ Misc. material/equipment NOTES: broke wheel off 6" roller bit had to move.

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-16A

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Redevelopment
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING
10/4/2006		7'	

	CAS.	SAMP.	CORE	TUBE
TYPE	HW	SS	NX	
DIA.	4"			
WT.	300			
FALL	24"			

SHT. NO. 1 of 1
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 10/4/06
DATE FINISH 10/4/06
DRILLER P. Lynch
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1					0-2' soil
2					
3					2' -18' 6" Roller bit boulders
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					18' 6" - 20' soil
20					EOB at 20'
21					
22					
23					
24					
25					
26					
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal __2__
Quick Gel _____
Hole Plug __1___
Revert _____
Well gravel _____
Concrete _____
Asphalt _____
Spoons _____
Traps _____
Bits
Tri Cone
Diamond _

Misc. material/equipment

NOTES:

Obstruction in way would lock up rods & break all wrenches, pull off hole.

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-19

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Engineering
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
10/6/2006		11'		DIA.	4"			
				WT.	300			
				FALL	24"			

SHT. NO. 1 of 4
JOB NO.: 06-219
ELEVATION
PERMIT NO.
DATE START 10/4/06
DATE FINISH 10/6/06
DRILLER L.Ramos
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1	4" spin				0-5' soil
2					
3					
4					
5					
6					5-10' cobbles
7					
8					
9					
10					
11					10-13' 6" roller bit boulder
12					
13					
14					13' 6" - 15' roller bit boulder
15					
16					15-20' roller bit boulder
17					
18					
19					
20					
21	3"				20-45' roller bit boulders
22					
23					
24					
25					
26					
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal ____
Quick Gel _____
Hole Plug _____
Revert _____
Well gravel _____
Concrete _____
Asphalt _____
Spoons _____
Traps _____
Bits
Tri Cone
Diamond _

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-19
PROJECT: Yonkers Redevelopment		SHT. NO. 2 of 4
CLIENT: McLaren Engineering		JOB NO. 06-219

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28	3"					
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46					45-50' Roller bit boulders	
47						
48						
49						
50						
51					50-53' soil	
52						
53	▼					

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-19
PROJECT: Yonkers Redevelopment		SHT. NO. 3 of 4
CLIENT: McLaren Engineering		JOB NO. 06-219

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
54					53-54' Roller bit Boulder	
55					54-65' Roller bit cobbles & gravel	
56						
57						
58						
59						
60						
61						
62						
63						
64						
65						
66					65-67' Roller bit Boulder	
67						
68					67-70' soil	
69						
70						
71					70-73' Roller bit cobbles	
72						
73						
74					73-74' soil	
75					74-77' Roller bit Cobbles	
76						
77						
78					77-78' Roller bit boulder	
79					78-80' Soil	
80						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-19
PROJECT: Yonkers Redevelopment		SHT. NO. 4 of 4
CLIENT: McLaren Engineering		JOB NO.06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
80					80-84' 6" Roller bit cobbles	
81						
82						
83						
84						
85					84' 6" - 85' boulder	
86		1st run			85'-90' 1st run core REC: 52"	
87						
88						
89						
90						
91					EOB at 90'	
92						
93						
94						
95						
96						
97						
98						
99						
100						
101						
102						
103						
104						
105						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-22

PROJECT:Yonkers Redevelopment
CLIENT: McLaren Enginnering
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING
10/10/2006		10'	

	CAS.	SAMP.	CORE	TUBE
TYPE	HW	SS	NX	
DIA.	4"			
WT.	300			
FALL	24"			

SHT. NO. 1 of 2
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 10/9/06
DATE FINISH 10/10/06
DRILLER P. Lynch
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1–4					0-4' Roller bit boulders	BOREHOLE GROUTED YES___X__ NO_____ Samples received in field by Client's Rep. YES_____ NO__X__ If YES, sign & print name
5–25					4-25' Roller bit boulders & cobbles	Signature Print name
26–27						Materials used on Boring Benseal __2__ Quick Gel __1____ Hole Plug ___1__ Revert _____ Well gravel _____ Concrete _____ Asphalt _____ Spoons _____ Traps _____ Bits Tri Cone Diamond _ Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-22
PROJECT: Yonkers Redevelopment		SHT. NO. 2 of 2
CLIENT: M cLaren Engineering		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28					25-30' Decomposed rock	
29						
30						
31		1st run			Core 1st run REC: 42"	
32						
33						
34						
35						
36					EOB at 35'	
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-23

PROJECT: Yonkers Redevelopment | SHT. NO. 1 of 1
CLIENT: McLaren Engineering | JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY | ELEVATION

GROUND WATER					CAS.	SAMP.	CORE	TUBE	PERMIT NO.
DATE	TIME	DEPTH	CASING	TYPE	HW	SS	NX		DATE START 10/10/06
10/10/2006		5'		DIA.	4"				DATE FINISH 10/10/06
				WT.	300				DRILLER P. Lynch
				FALL	24"				INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1	4" spin				0-6" Black top	
2					6"- 4' soil	BOREHOLE GROUTED YES___X__ NO_____
3						
4						Samples received in field by Client's Rep. YES_____ NO__X__
5					4-6' Roller bit boulder	
6						If YES, sign & print name
7						
8						
9					6-20' soil	Signature
10						
11						Print name
12						
13						Materials used on Boring
14						
15						Benseal ____
16						Quick Gel _____
17						Hole Plug _____
18						Revert _____
19						Well gravel _____
20						Concrete _____
21						Asphalt _____
22					1st run core REC: 60"	Spoons _____
23		1st run				Traps _____
24						Bits
25						Tri Cone
26					EOB at 25'	Diamond _
27						Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-24

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Engineering
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING
10/6/2006		5'	

	CAS.	SAMP.	CORE	TUBE
TYPE	HW	SS	NX	
DIA.	4"			
WT.	300			
FALL	24"			

SHT. NO. 1 of 1
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 10/6/06
DATE FINISH 10/6/06
DRILLER L. Ramos
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1					0-1' soil
2					1-2' timber/wood
3					2-3' brick
4					3-5' Roller bit
5					boulder
6					5-8'
7					Roller bit into rock
8					
9					8-13'
10					Core 1st run
11		1st run			Rec: 40"
12					
13					
14					EOB at 13'
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal ____
Quick Gel _____
Hole Plug _____
Revert _____
Well gravel _____
Concrete _____
Asphalt _____
Spoons _____
Traps _____
Bits
Tri Cone
Diamond _

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-25

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Engineering
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING
10/9/2006		10'	

	CAS.	SAMP.	CORE	TUBE
TYPE	HW	SS	NX	
DIA.	4"			
WT.	300			
FALL	24"			

SHT. NO. 1 of 1
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 10/9/06
DATE FINISH 10/9/06
DRILLER L. Ramos
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1	4" spin				0-6" Black top
2					
3					6" - 6' cobbles
4					
5					
6					
7					6-7' Roller bit boulders
8					7-8' soil
9					8-10' cobbles
10					
11					10-11' Roller bit boulder
12					11-12' cobbles
13					12-13' Roller bit boulder
14					13-14' cobbles
15					14-15' Roller bit into rock
16		1st run			1st run REC: 48"
17					
18					
19					
20					
21					EOB at 20'
22					
23					
24					
25					
26					
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal ____
Quick Gel _____
Hole Plug _____
Revert _____
Well gravel _____
Concrete _____
Asphalt _____
Spoons _____
Traps _____
Bits
Tri Cone
Diamond _

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-26

PROJECT: Yonkers Redevelopment | SHT. NO. 1 of 1
CLIENT: McLaren Engineering | JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY | ELEVATION
GROUND WATER | PERMIT NO.

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
10/11/2006		6' 3"		DIA.	4"			
				WT.	300			
				FALL	24"			

DATE START 10/11/06
DATE FINISH 10/11/06
DRILLER Jose Santiago
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1	4" casing				0-6" Blacktop 6"-3' brick & gravel (misc. fill)
2					
3					
4					3-8' Core 1st run Rec: 19"
5					
6		1st run			
7					
8					
9					8-13' Core 2nd run Rec: 16"
10					
11		2nd run			
12					
13					
14					EOB at 13'
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal ____
Quick Gel _____
Hole Plug _____
Revert _____
Well gravel _____
Concrete _____
Asphalt _____
Spoons _____
Traps _____
Bits
Tri Cone
Diamond _

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-27

PROJECT: Yonkers Redevelopment | SHT. NO. 1 of 1
CLIENT: McIAren Engineering | JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY | ELEVATION
GROUND WATER | PERMIT NO.

DATE	TIME	DEPTH	CASING	TYPE	CAS. HW	SAMP. SS	CORE NX	TUBE
10/10/2006		18' 11"	64	DIA.	4"			
				WT.	300			
				FALL	24"			

DATE START 10/10/06
DATE FINISH 10/10/06
DRILLER J. Santiago
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1	4" spin				0-6" Black top
2					6"-2' roller bit boulder
3					2-3' Wood
4					3-8' roller bit boulder
5					
6					
7					
8					
9					8-9' soil
10					9-10' Roller bit - boulder
11					10-13' soil
12					
13					
14					13-16' Roller bit boulder
15					
16					
17					16-18' soil
18					
19					18-19' Roller bit boulder
20					19-20" Roller bit boulder
21					20-25' Core 1st run REC: 41"
22					
23		1st run			
24					
25					
26					EOB at 25'
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal __1__
Quick Gel ___1___
Hole Plug ___1__
Revert _____
Well gravel _____
Concrete _____
Asphalt __1/4_____
Spoons _____
Traps _____
Bits
Tri Cone
Diamond _

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-28
PROJECT: Yonkers Redevelopment		SHT. NO. 1 of 1
CLIENT: McLaren Engineering		JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY		ELEVATION
GROUND WATER		PERMIT NO.

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
				DIA.	4"			
				WT.	300			
				FALL	24"			

DATE START 10/10/06
DATE FINISH 10/11/06
DRILLER L. Ramos
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION
1	3" spin				0-6" Black top
2					
3					6"-5' cobbles
4					
5					
6					5-10' Roller bit boulders
7					
8					
9					
10					
11					10-15' Roller bit boulders
12					
13					
14					
15					
16		1st run			1st run REC: 35"
17					
18					
19					
20					
21					EOB at 20'
22					
23					
24					
25					
26					
27					

REMARKS

BOREHOLE GROUTED

YES___X__ NO_____

Samples received in field by Client's Rep.

YES_____ NO__X__

If YES, sign & print name

Signature

Print name

Materials used on Boring

Benseal ____
Quick Gel _____
Hole Plug ____
Revert _____
Well gravel _____
Concrete ____
Asphalt _____
Spoons _____
Traps _____

Bits

Tri Cone
Diamond _

Misc. material/equipment

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-29
PROJECT: Yonkers Redevelopment		SHT. NO. 1 of 2
CLIENT: McLaren Engineering		JOB NO.: 06-209
LOCATION: Elm Street, Yonkers, NY		ELEVATION

GROUND WATER					CAS.	SAMP.	CORE	TUBE	PERMIT NO.
DATE	TIME	DEPTH	CASING	TYPE	HW	SS	NX		DATE START 10/9/06
10/10/2006		14'		DIA.	4"				DATE FINISH 10/10/06
				WT.	300				DRILLER L.Ramos
				FALL	24"				INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1	4" spin				0-6" blacktop 6"-5' Cobbles	BOREHOLE GROUTED YES___X__ NO_____ Samples received in field by Client's Rep. YES_____ NO__X__ If YES, sign & print name
6					5-7' roller bit boulder	
8					7-8' soil	
9					8-10' Roller bit boulder	Signature
11					10-11' cobbles	Print name
12					11-12' soil	
13					12-15' Roller bit boulders	Materials used on Boring
16					15-20' Roller bit boulders	Benseal ___ Quick Gel _____ Hole Plug _____ Revert _____ Well gravel _____ Concrete _____ Asphalt _____ Spoons _____ Traps _____ Bits Tri Cone Diamond _
21					20-25' Roller bit boulders	Misc. material/equipment
26					25-35' Roller bit decomposed rock	
27	▼					

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-29
PROJECT: McLaren Engineering		SHT. NO. 2 of 2
CLIENT: Elm Street - Yonkers Redevelopment		JOB NO. 06-209

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
28	4"					
29						
30						
31					25-35' Roller bit Decomposed rock	
32						
33						
34						
35						
36						
37					Core 1st run Rec: 38"	
38		1st run				
39						
40						
41					EOB at 40'	
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						

JERSEY BORING & DRILLING CO., INC.	TEST BORING LOGS	BORING NO. B-30

PROJECT: Yonkers Redevelopment
CLIENT: McLaren Engineering
LOCATION: Elm Street, Yonkers, NY
GROUND WATER

DATE	TIME	DEPTH	CASING	TYPE	CAS.	SAMP.	CORE	TUBE
10/11/2006		3'	4	DIA.	4"			
				WT.	300			
				FALL	24"			

SHT. NO. 1 of 1
JOB NO.: 06-209
ELEVATION
PERMIT NO.
DATE START 10/11/06
DATE FINISH 10/11/06
DRILLER P. Lynch
INSPECTOR

DEPTH FEET	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	SAMPLE RECOVERY	IDENTIFICATION	REMARKS
1	4"				0-6" blacktop	BOREHOLE GROUTED
2						YES___X__ NO_____
3					6"-10' soil	
4						Samples received in field by Client's Rep.
5						YES_____ NO__X__
6						If YES, sign & print name
7						
8						
9						Signature
10						
11					1st run	Print name
12					REC: 52"	
13		1st run				Materials used on Boring
14						
15						Benseal ____
16					EOB at 15'	Quick Gel _____
17						Hole Plug _____
18						Revert _____
19						Well gravel _____
20						Concrete _____
21						Asphalt _____
22						Spoons _____
23						Traps _____
24						Bits
25						Tri Cone
26						Diamond _
27						Misc. material/equipment

NOTES:

broke wheel off 6" roller bit ha to move.

APPENDIX D

McLaren ENGINEERING GROUP

bridge, highway & rail engineering
entertainment engineering
subaqueous investigation
civil & site engineering
structural design
marine facilities
geotechnics
surveying
forensics

TEST PIT FIELD NOTES

Job No: 106100
Location: Yonkers, NY
Project Title: River Park Center Project
Client: SFC, L.L.C.
Performed by: Chris Humphries
Dates: 12/18/06 – 12/19/06
Weather: Partly cloudy, 50-55 F

TEST PIT No.1

0′ – 1.5′	Asphalt and gravel base coarse
1.5′ – 14′	Fill - Dense to medium dense material, consisting of fine to coarse sand with little silt, some to and fine coarse gravel, cobbles, and boulders. Brick foundation present between 1.5′-6′. Timber present between 5′-6′ Ash present between 11.5′-12′.

Groundwater present at 14.′ Groundwater appears contaminated, possibly by crude oil.
Test pit appears to be original location of river bottom.

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On the web: www.mgmclaren.com

TEST PIT No.2

0′ – 1′	Roots and organic material.
1′ – 7.5′	Fill - Dense to medium dense material consisting of fine to coarse sand with some clay, little silt. Some to and coarse gravel, cobbles, and boulders. Brick foundation present between 3′-5′.
7.5′-14′	Undisturbed, dense to medium dense material consisting of fine to coarse sand, with little to some silt. Some to and fine coarse gravel, cobbles, and boulders.

No water present.

TEST PIT No.3

0′ – 2′	Decomposed asphalt and base coarse
2′ – 5′	Orange/brown sand and clay. Traces of fire extinguishing materials at 3′-4′. Some coarse gravel.
5′– 6′	Fill – Dense to medium dense dark brown sand with some clay, with little silt. Some coarse gravel.
6′-7′	Fill – Dense to medium dense orange/brown sand with some clay, with little silt. Some coarse gravel.
7′-7.5′	Fill - Dense to medium dense light brown sand with some clay, with little silt. Some coarse gravel.
7.5′-8′	Organic layer with dense to medium dense fine to coarse sand.
8′-14′	Undisturbed dense to medium dense material consisting of fine to coarse sand, with little to some silt, some to and fine coarse gravel, cobbles, and boulders.

Water present at 3.5′

TEST PIT No.4

0′ – 1.5′	Asphalt and base coarse
1.5′ – 5′	Fill – Dense to medium dense material consisting of fine to coarse sand, with little silt, some to and fine coarse gravel, cobbles, and boulders.
5′ – 6′	Organic layer with dense to medium dense fine to coarse sand.
6′-8′	Fill – Dense to medium dense material consisting of fine to coarse sand, with little silt, some to and fine coarse gravel, cobbles, and boulders.
8′-12.5′	Undisturbed, dense to medium dense material consisting of fine to coarse sand, with little silt, some to and fine coarse gravel, cobbles, and boulders.

No water present.
Bedrock encountered at 12.5′.