

### **3.1 Geology, Soils and Topography**

#### **3.1.1 Existing Conditions**

##### Geology

The site is underlain by Fordham Gneiss, which is made up of garnate-biotite-quartz-plagioclase gneiss, as shown on the Geologic Map of New York Lower Hudson Sheet, Fisher, 1970. This rock is a hard, metamorphic rock commonly found in lower Westchester and New York City. In April 2010, a geotechnical boring investigation was conducted on the subject property. Nine borings were completed on the property at depths ranging from 36 to 51 feet below the ground surface (bgs). Bedrock was not encountered in any of the nine borings completed for this investigation. The entire geotechnical report is attached as Appendix D. No prominent or unique geologic features are found on the Project Site. The Remedial Investigation Report (RIR) attached as Appendix J of this DEIS states that the site is underlain by Manhattan Schist. However, the Geologic Map of New York Lower Hudson Sheet has been reviewed again and it confirms that the Project Site is underlain by Fordham Gneiss. Manhattan Schist underlies portions of Yonkers east of the site.

##### Soils

Soil maps from the Soil Survey of Putnam and Westchester Counties, New York (Soil Conservation Service, September, 1994) classify the soil for the project site as Urban Land (Uf), as shown in Figure 3.1-1. The Urban Land designation extends beyond all edges of the site and applies to soils which have been significantly altered by filling, regrading, and/or construction.

According to the Soil Survey, Urban Land (Uf) soils consist of areas where at least 60 percent of the land surface is covered with buildings or other structures. The areas include parking lots, shopping centers, industrial parks and institutional sites. As per the general Soil Survey description, much of the mapped Uf soils are found in business centers of villages and cities. The soil survey indicates that reclamation is required if Urban Land is converted from its present use.

Since the soils are categorized as Urban Land, specific soil characteristics provided by the Soil and Water Conservation District for this soil unit are unavailable, since the soil mapping unit can consist of fill material from various sources and soil types. In order to determine specific characteristics of soils underlying the Project Site, soil borings were conducted in that area where soils will be disturbed, i.e., below the proposed apartment building complex.

A series of soil borings were completed on the site in April 2010 by General Borings Inc. in conjunction with Sor Testing Laboratories, Inc. as part of a geotechnical investigation. The location of the borings are shown in Figure 3.1-2 and the results of the borings are included in Appendix D. Nine soil borings were completed to depths ranging from 36 to 51 feet bgs. Soil was uniform within each boring and is summarized by depth. Surface materials, such as asphalt, were observed from depths of 0.5 to 1.0 foot bgs. Fill material, such as brick, roots and cinders, was encountered to depths between 2.5 to 12 feet below the ground surface. Sand, brown, grayish brown and white fine to coarse sand containing some silt, was encountered to depths ranging from 25 to 35 feet below the ground surface. Clayey silt, brown clayey silt embedded within the sand layer was observed between 5 to 10 feet thick. Glacial till, red brown

silty/clayey sand and gravel was encountered under the sand and clay in the borings. All borings were terminated in this layer. Groundwater was encountered during these soil borings and was found at depths ranging from 20 to 35 feet below the ground surface.

### *Brownfield Investigation*

As discussed in detail in Chapter 3.11 Hazardous Materials, the subject property is included in the New York State Brownfield Cleanup Program (BCP) as Site C360085. The existing residences located on the west side of Buena Vista Avenue and the residences located on the east side of Buena Vista Avenue that are part of the Project Site are not included in the BCP. Given existing and past use of these properties for residential purposes, it is not anticipated that any hazardous materials would be detected or found.

Six environmental assessments were conducted on the site from 2005 through 2007 in accordance with the requirements of the BCP and with oversight from the New York State Department of Environmental Conservation (NYSDEC). Borings were conducted as part of these assessments, with the collection of soil samples, soil vapor samples, and groundwater samples. These investigations are summarized in detail in Section 3.11 and are further detailed in a RIR in Appendix J.

### Topography

The entire property involved in the project, 2.04 acres, slopes upward from north to south, with topography varying by approximately 25 feet across the site. Topography in the general vicinity is shown on Figure 3.1-3, Local Topography. In general, existing grades on the Project Site are at an elevation of approximately 51 feet above mean sea level in the southern portion of the property to 25 feet above mean sea level in the northern portion of the property. The existing condition of the site and its topography is shown on Figure 3.1-4, Existing Conditions.

### **3.1.2 Potential Impacts**

#### Grading Activities

The PUR project site is comprised of 1.776 acres of property on the west side of Buena Vista Avenue and 0.264 acres of property on the east side of Buena Vista Avenue. Existing geology, soils, and topography on the project area east of Buena Vista Avenue will not be altered or disturbed. The existing structures will be renovated only. In addition, little disturbance is proposed to the Trolley Barn property (0.566 acres) other than what is required to connect the new apartment building to the building. Actual grading and excavation will occur on the 1.21 acre area to be developed for the apartment building and associated parking structure.

Sheet EW, Site Plan - Earthwork Analysis, of the site plan set accompanying the DEIS, illustrates the amount of cut and fill that will occur on the project site. As shown in the drawing, the entire construction will involve cuts that range from 1 to 40 feet below existing grade. Shallow cuts would occur along the site's boundary with the railroad right-of-way and adjacent to the Trolley Barn. The deepest cuts are found in the southern portion of the site below the portion of the building housing the hydroponic garden - cuts are generally in the 30-40 foot range. Approximately 43,430 cubic yards of material will be removed in order to construct the foundation of the proposed building and the proposed automated garage, therefore no fill is required to be brought in for this project. Of this total amount of cut, it is anticipated that

approximately 10,030 cubic yard would consist of fine sand and fill, 31,790 cubic yards would be coarse and fine sand, and 1,610 cubic yards would be coarse sand and gravel. The number of truck trips associated with this removed material has been calculated to be approximately 2,900 trucks, based on 15 cubic yards per truck. Based on Sheet TR, Site Plan - Proposed Truck Route, of the site plan set accompanying this DEIS, the trucks would travel from Route 9, travel west on Prospect Street, turn right onto Buena Vista Avenue and turn left into the site. As they leave they will head south on Buena Vista, turn left onto Prospect Street and travel back to Route 9.

The soils that would be disturbed and removed, as noted in Chapter 3.11 of this document, Hazardous Materials, must be disposed of in accordance with the regulations and procedures promulgated for the Brownfield Cleanup Program (BCP). The soil removed from this site will need to be handled in accordance with Occupational Safety and Health Administration (OSHA) standards and disposed of in accordance with the BCP and New York State Department of Environmental Conservation requirements. As defined by the NYSDEC "Once Non-Hazardous petroleum-contaminated soil is moved from its original state, it is by definition a solid industrial waste and must be managed in accordance with Part 360 and transported in accordance with Part 365 regulations". These regulations can be found on the NYSDEC website under Chapter IV - Quality Services, Part 360 - Solid Waste Management Facilities and Part 364 - Waste Transporter Permit.

The proposed cuts will not encounter bedrock or ledge, as evidenced by the nine geotechnical borings completed at 36 to 51 feet below the ground surface. Bedrock blasting is not required nor anticipated for the development of the proposed apartment building. Thus, no impacts to existing geologic conditions are anticipated as a result of the construction of the building itself. However, the proposed geothermal wells will be constructed in bedrock. However, due to the depth of the excavation, a temporary earth retaining system will be required. The excavation support will meet OSHA guidelines. The soil encountered on the site is classified by OSHA as Type C and therefore temporary slopes should be no steeper than 1.5 horizontal to 1 vertical. The site development is proposed to extend to the property limits.

The excavation and foundation bracing system, including the possible use of sheet piles, tiebacks or shoring, will be designed by a structural engineer for approval by the city's building department as part of the construction documentation. The design may require temporary or permanent easements that will be sought in conjunction with the building permit. It is anticipated that any required tiebacks will be below the utilities in the street and will be designed to avoid any impact to existing utilities. Excavation side walls will be adequately braced in accordance with a design from the structural engineer to mitigate any potential steep slope issues. Dewatering operations may be periodic during this part of construction but should not be a significant factor, since most of the excavation is above the groundwater observed during the geotechnical investigation. If dewatering is necessary, there will be an on-call person available.

The proposed grading plan for the Project Site is shown in Figure 3.1-5 and shows the proposed slope for the Property. The existing on-site slopes will be altered to accommodate the proposed apartment building. It is estimated that 1.21 acres will be altered. Existing buildings and impervious surfaces will be demolished and completely removed. Unsuitable soil will be removed and replaced with suitable fill. On-site elevations will become more level than the existing 25 foot change in elevation. The northern portion of the site will be brought up to an

elevation approximately 46 feet above mean sea level (msl) to match the southern portion elevation change to approximately 47 feet msl.

#### Potential Soil Erosion

As a result of soil disturbance there is an increased potential for siltation to occur in areas downgrade of the site. Soil erosion and sediment control during construction is critical to minimize potential impacts to the Hudson River and the local watershed.

As described above, the site slopes upward from north to south. The project engineer has developed a Soil Erosion and Sediment Control Plan, which is described below. The potential for soil erosion and runoff will be minimized during project construction by adhering to the Soil Erosion and Sediment Control Plan.

#### Geothermal System

A geothermal system will be installed to heat and cool residential and common areas associated with the new apartment building. The system will tap groundwater from a series of wells to be drilled in the City right-of-way. The wells are drilled vertically into bedrock approximately 1,500 feet below ground level. Ten (10) wells will be drilled and spaced 20 feet apart within the City sidewalk in front of the proposed development. The system will operate on an open loop system pumping groundwater at 52 degrees Fahrenheit, using a heat exchanger to either heat or cool the building and then recirculating the water back into the ground at approximately 85-90 degrees Fahrenheit during the summer and 55-77 degrees Fahrenheit during the winter. A full discussion of the geothermal system and associated CHP system and how the two systems work together is provided in Section 3.3 of this DEIS. Based on information provided by the applicant from experiences with the geothermal wells at Main Street Lofts, and discussions with the project engineer, the wells will pump a combined volume of approximately 50 gallons per minute of water for the geothermal system. This amount of water is not expected to cause an impact to the subsurface deep groundwater.

Appropriate agreements will be put into place to allow the applicant to locate the wells within the public street right-of-way to allow for their maintenance and to protect the City from any liability issues associated with the wells. Based on the Applicant's experience with the installation and maintenance of geothermal wells at Main Street Lofts, it is anticipated that the system would require maintenance once per year for approximately two days.

The geothermal wells are not anticipated to adversely impact underlying soils, since steel casing will be used through the overburden material. The exchange of natural groundwater via the geothermal system is not expected to adversely impact the underlying bedrock.

As indicated in Section 3.4, Land Use and Zoning, it is anticipated that agreements comparable to those approved for the geothermal wells that serve the Main Street Lofts project would be established. An encroachment agreement would be entered into between the Applicant and the City of Yonkers Community Development Agency or other City agency. The geothermal wells would be located within the sidewalk and right-of-way subject to Planning Board and City Engineer approvals. The Applicant would be responsible for all costs associated with the maintenance of the encroachment, including maintenance, repair and replacement of any sidewalk within which the wells may be located. The Applicant would obtain and maintain property damage and liability insurance for the Encroachment naming relevant City agencies as

additional insured. The encroachment agreement may be terminated by the City when determined necessary. The City would continue to have rights to allow construction or otherwise improve its right-of-way. The Applicant would indemnify the City and its agencies harmless from any costs and expenses set forth in the Agreement. The agreement would be recorded in the Westchester County Clerk's office. The City Council would be required to pass a special ordinance authorizing the encroachment.

Because the geothermal wells will be located within the City sidewalk and would be installed at the same time the overall building is being constructed, it is not anticipated that installation of the wells would require any street closure.

#### Connection to Trolley Barn

As shown on building floor plan A1.4 (Appendix C), the lobby of the new apartment building, at an approximate elevation of 47.5 feet, would be connected via a ramp and stairs to the 3rd floor of the Trolley Barn building which is at an elevation of 51 feet. A cut would be made in the southerly brick wall of the Trolley Barn building to allow the connection. Floor plan A2.2 also shows the connection from the lobby to the 3rd floor of the Trolley Barn building. The proposed connection would be elevated above existing grade.

### **3.1.3 Mitigation Measures**

#### Erosion and Sediment Control

An Erosion and Sediment Control Plan has been prepared to control soil movement from the area of the Project Site that will be disturbed - the Plan is included in the site plan set as Drawings SP-1 and SP-2.

Drawing D1 of the set provides construction details and specifications for erosion control features, such as a stabilized construction entrance, silt fencing, earth dike, water bar, check dams, temporary swales, and stockpile management. Detailed erosion control notes are provided for construction procedures and sequence as they relate to soil erosion control.

Notes provided in the Soil Erosion and Sediment Control Plan indicate that the controls are to be used in conjunction with the Stormwater Pollution Prevention Program document (SWPPP) as required for the NYSDEC General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001). The SWPPP is provided in Appendix E. Erosion and sediment control measures have been devised consistent with the NYSDEC "Guidelines for Urban Erosion and Sediment Control".

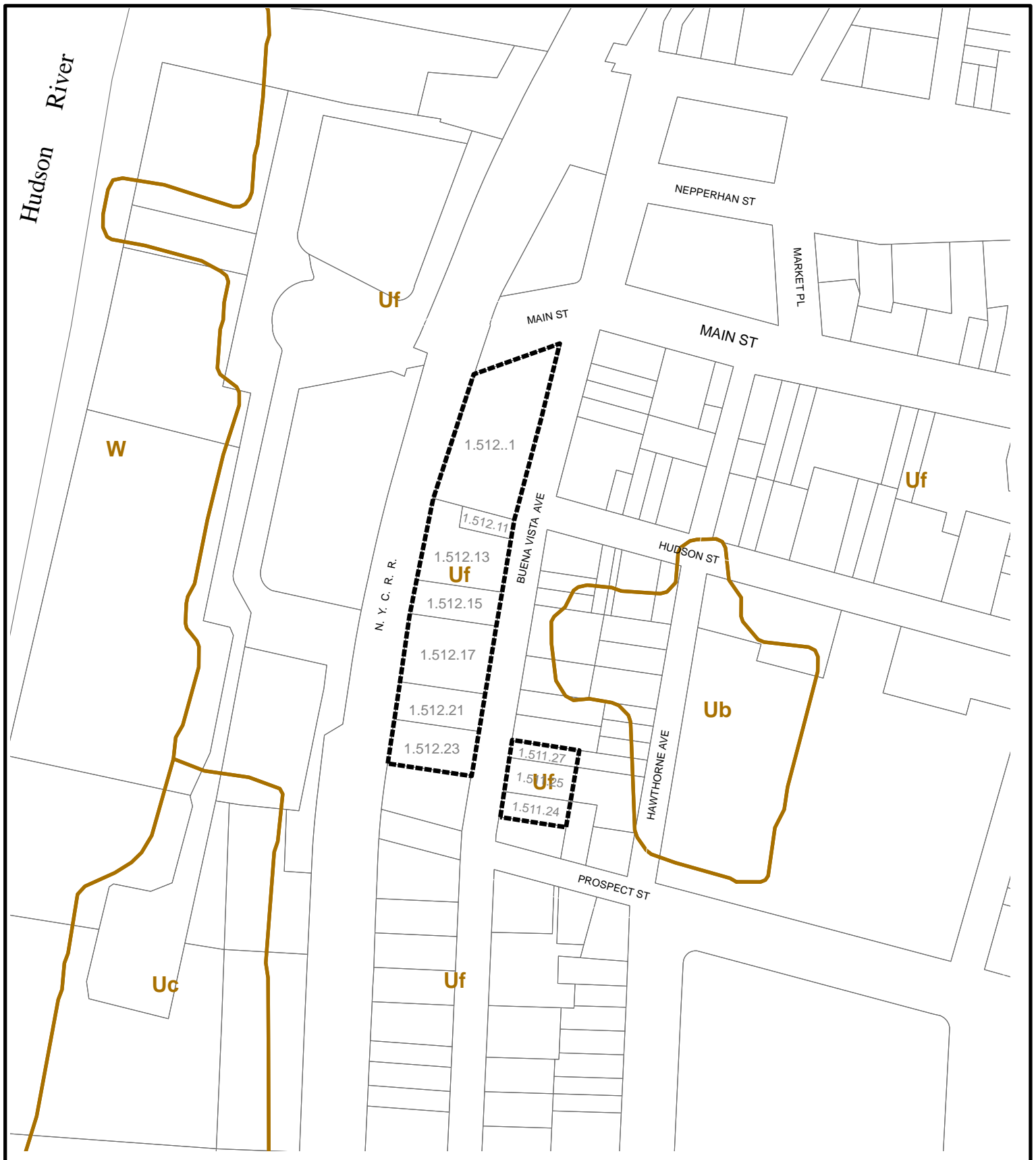
The objectives of the Soil Erosion and Sediment Control Plan are the following:

- Control erosion at its source with temporary control structures;
- Minimize the amount of sediment-laden runoff from areas of disturbance, and control the runoff prior to discharge to off-site areas;
- Deconcentrate and distribute stormwater runoff through structural means before discharge to critical zones such as the Hudson River; and
- Maintain erosion control features in order that they properly function, as designed.

Following construction, soils will be stabilized by the introduction of paved surfaces and vegetation and by the stormwater management devices shown on the site plan. Construction of the permanent stormwater management system will commence as part of the initial earthwork for the project so that the system is functional as early as possible in the construction period.

Brownsfield Cleanup Program



The property is covered presently by buildings that have aided in sealing or trapping soil vapor. The proposed demolition of the building would allow trapped vapor to dissipate. During construction, soils on-site will be removed to up to 20-40 feet bgs. Removing the impacted soil would aid in the elimination of vapors from such soils. A sub-slab vapor ventilation system will be installed during construction that will protect site workers and residents. This is discussed further in Section 3.11 of this document.



**Figure 3.1-1: Soils Map**  
**Buena Vista Teutonia PUR**  
 City of Yonkers, Westchester County, NY  
 Source: Westchester County GIS, 2006 Soil Survey (SSURGO)  
 Scale: As shown

0 100 200 400 Feet

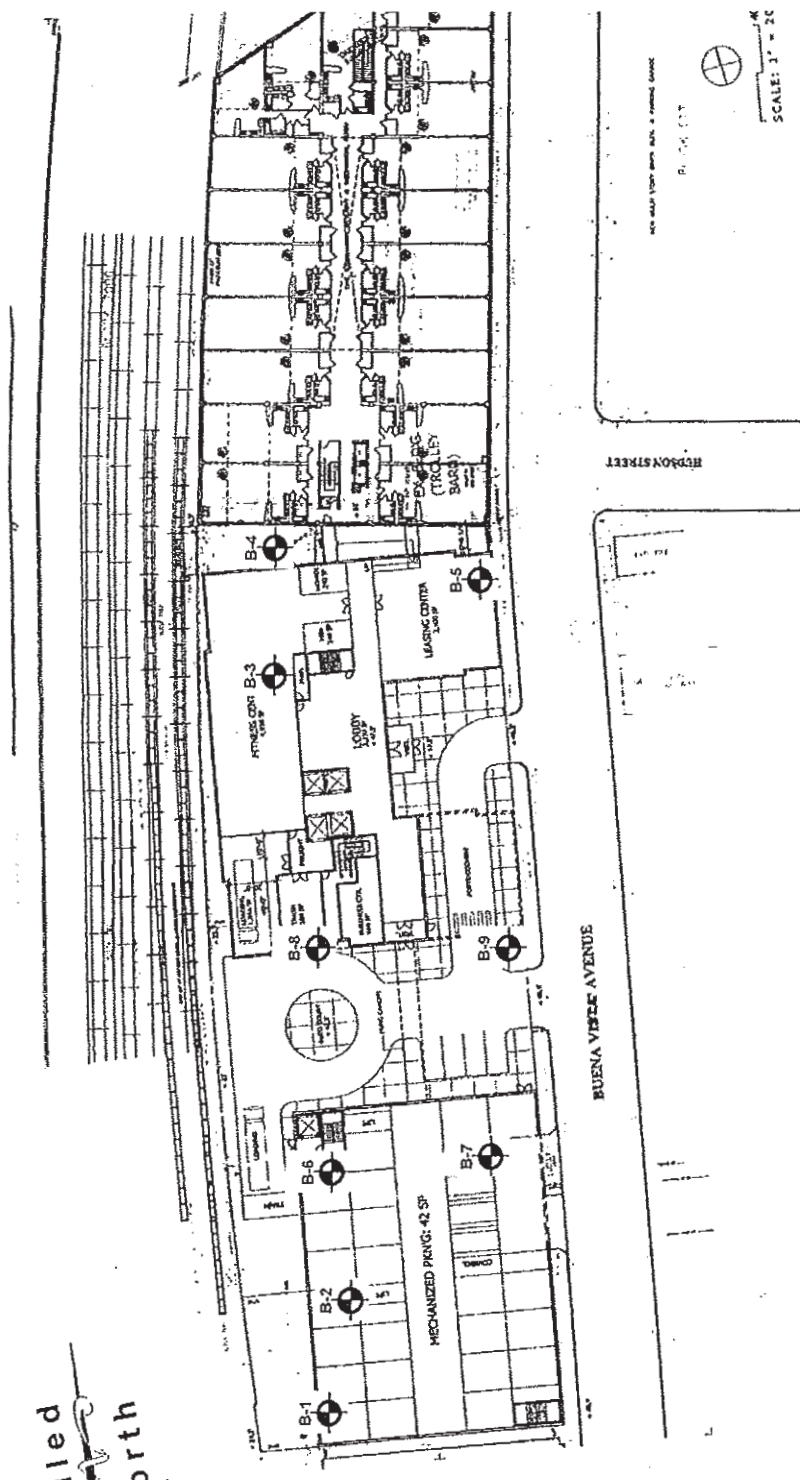
**Legend**

-  Soils Classification Boundary
-  Site Property Boundary

File: 09044 4/20/10  
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Called  
North



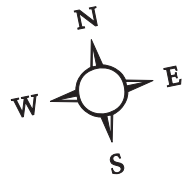
**LEGEND**



B-1 Number and approximate location of test boring performed by STL for this study.

**NOTES**

1. This drawing is part of Sor Testing Laboratories, Inc. Report No. 10-986 and should be read together with the report for complete evaluation.
2. General Layout was obtained from a plan provided by the Client.



**Figure 3.1-2: Geotechnical Boring Location Map**  
 Buena Vista Teutonia PUR  
 City of Yonkers, Westchester County, New York  
 Source: SOR Testing Laboratories, Inc., 05/07/10.  
 Scale: NTS



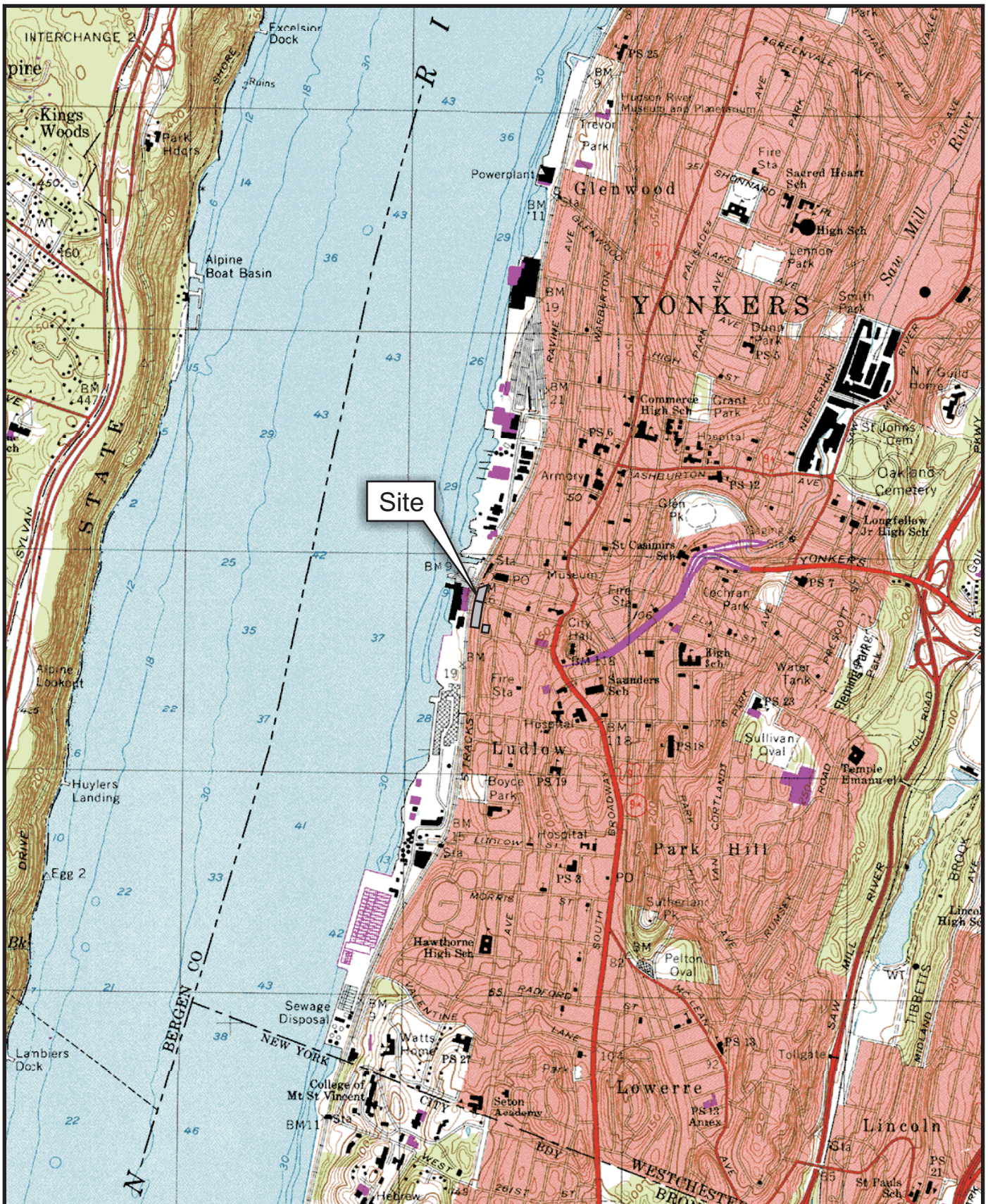


Figure 3.1-3: Local Topography Map  
 Buena Vista Teutonia PUR  
 City of Yonkers, Westchester County, New York  
 Base: USGS 7.5-minute Topographic Map, Yonkers Quad  
 Scale: 1"= 2,000'

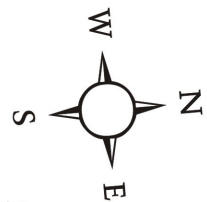


Figure 3.1-4: Existing Conditions Map  
 Buena Vista Teutonia PUR  
 City of Yonkers, Westchester County, New York  
 Source: Milone & MacBroom, 7/7/10, revised 9/10/10  
 Scale: 1" = 65'

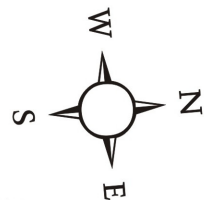
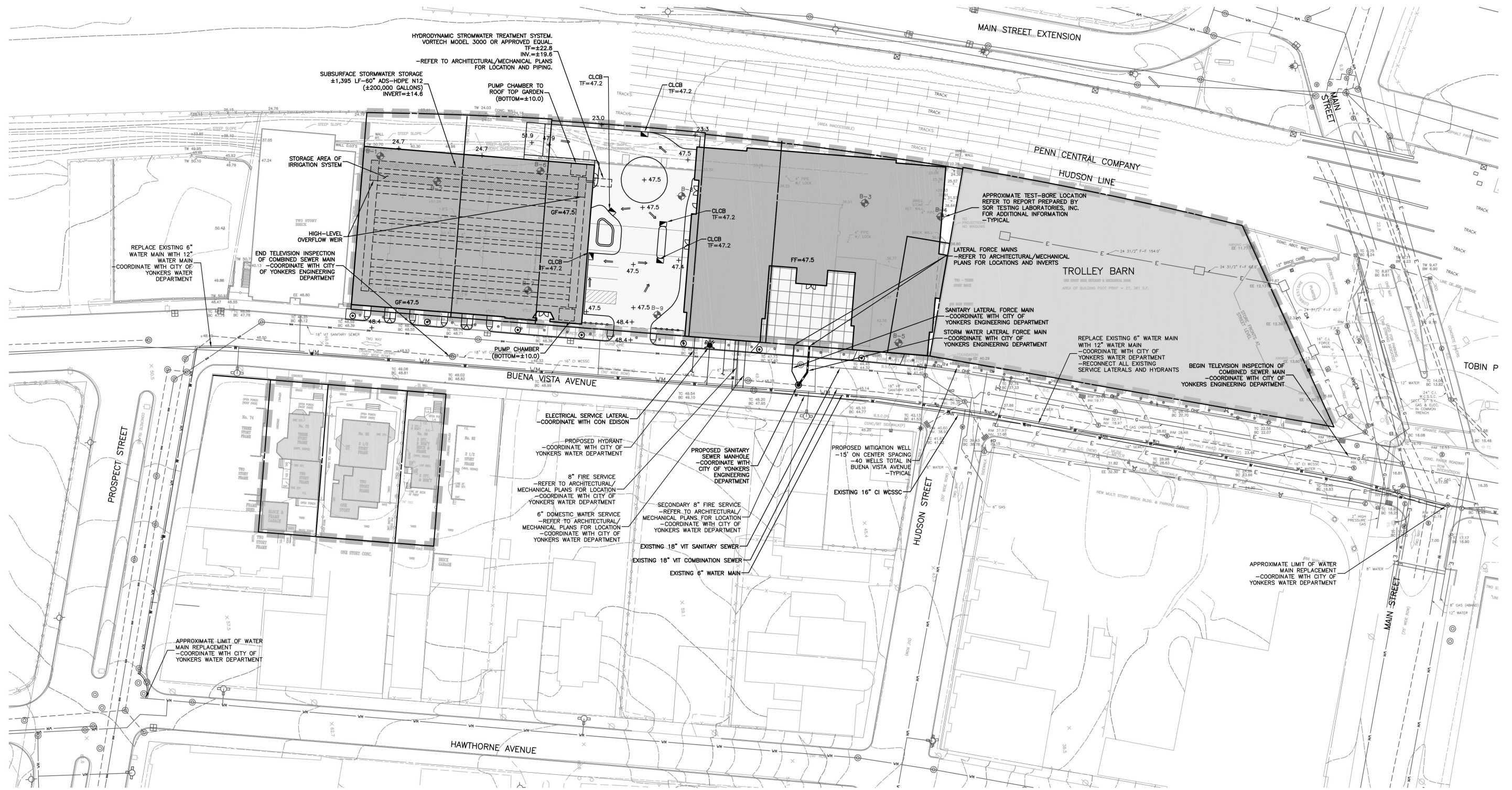


Figure 3.1-5: Proposed Grading Plan  
 Buena Vista Teutonia PUR  
 City of Yonkers, Westchester County, New York  
 Source: Milone & MacBroom, 7/7/10, revised 9/10/10  
 Scale: 1" = 65'