3.1 Geologic Resources

3.1.1 Existing Conditions

Geology

The project site is located in the eastern section of the New England physiographic province, more specifically the Triassic Lowlands, which is characterized topographically by broad gentle valleys and a moderate pattern of ridges. Local and regional geology has been mapped by the State of New York and is depicted on the Geologic Map of New York Lower Hudson Sheet (reprinted 1995). The bedrock identified on and near the project site is the Brunswick formation, located in the Newark Group. This rock consists of arkose, mudstone and conglomerate rocks.

According to the Surficial Geologic Map of New York, Lower Hudson Sheet (1989), the surficial deposits in the area of the project site consist of glacial tills. Tills are described as variable in texture (e.g. clay, silt-clay, boulder clay), that were deposited adjacent to melting glaciers. Glacial tills and the soils that derive from them predominate in the lower Hudson Valley.

Soils

On-site soils have been mapped and described by the USDA Soil Conservation Service (SCS) in the Soil Survey of Rockland County, New York, issued in 1990. Generally, the site comprises one soil type, Wethersfield gravelly silt loam, with three different classifications due to both slope and urban development. The soil is described as very deep, gently sloping and well drained. These mapped soils mentioned above are not considered hydric soils. Two small areas of wetlands have been delineated on the property, one associated with the stream that traverses the property, and the other in the southeast corner of the site. The soils associated with the wetlands were not mapped on the soil survey due to the small area of the wetlands.

The soil mapping units found on the site, using the soil classifications and descriptions of the USDA SCS, are summarized below and depicted in Figure 3.1-1 as mapped in the Rockland County GIS. A summary of this investigation is described below.

- Wethersfield gravelly silt loam 3 to 8 percent slopes (WeB) This soil unit is located ridgetops and foot slopes of ridges. It consists of very deep well drained soils. Included in the mapped areas of this soil are small areas of Cheshire, Charlton, Wallington and Riverhead soils. The water table is relatively shallow of 1.5 to 2.5 feet in depth between February and April. Bedrock is found at greater than 60 inches. The permeability of this soil type is characterized as moderate in the surface and subsoil, but slow or very slow in the substratum. This soil type is mapped on the majority of the site, primarily in the western portion of the site (see Figure 3.1-1, Soil Map).

- Wethersfield gravelly silt loam 15 to 25 percent slopes (WeD) This soil unit is located on the sides of ridges and hills. It consists of very deep, moderately steep well drained soils. The water table is found more than 60 inches below ground surface. The permeability of this soil type is characterized as moderate in the surface layer and substratum (up to 60 inches), and slow in the substratum. This soil unit is found in the eastern and central portions of the site (see Figure 3.1-1, Soil Map).

- Wethersfield Urban land complex 2 to 8 percent slopes (WuB) This soil unit is mapped on ridgetops and foot slopes on till plains. It consists of very deep, gently sloping, well drained Wethersfield soils and areas covered by buildings streets and other impervious structures. The water table is found 1.5 to 2.5 feet below ground surface February to April. The permeability of this soil type is characterized as moderate in the surface layer and substratum (up to 60 inches), and slow in the substratum. This soil is found in a small area in the southeast corner of the site near South Pascack Road (see Figure 3.1-1, Soils Map).

On-site soils have been formed from glacial deposits. Soils which cover the site are sloping, shallow to bedrock and uniform in drainage class (well drained to somewhat excessively well drained). The water table is primarily found more than 6 feet below ground surface in the Wethersfield gravelly silt loam soils, possibly found in the bedrock.

Suitability of the Soils for Construction

The Soil Survey of Rockland County describes the different soil units and features which may restrict their use for building development. A list of soil characteristics is provided in Table 3.1-1. Development limitations are considered: *slight*, where soil properties are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate*, if soil properties are less favorable for the indicated use, and special planning, design or maintenance may be needed to overcome or minimize the limitations; and *severe*, if soil properties result in the need to implement special design measures to construct a structure.

Table 3.1-1
Soil Characteristics and Limitations

Soil Series	Hydrologic Group[1]	Permeability (in./hr.)	Erosion Factor	Potential Limitations for:			
			K[2]	Local Roads and Streets	Dwellings w/ basements	Dwellings w/o basements	Lawns and Landscaping
Wethersfield gravelly silt loam, hilly (WeB)	C	0.6-2.0 (0-22" deep)	0.20-0.32	Moderate: wetness, frost	Moderate: wetness.	Moderate: wetness.	Moderate: small stones
Wethersfield gravelly silt loam, rolling (WeD)	C	0.6-2.0 (0-22" deep)	0.20-0.32	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wethersfield Urban Land complex (WuB)	C	0.6-2.0 (0-22" deep)	0.20-0.32	Moderate: wetness, frost	Moderate: wetness.	Moderate: wetness.	Moderate: small stones

[1] Hydrologic groups are used to estimate runoff from precipitation; they range from high infiltration (A) to low infiltration (D).
[2] Erosion Factor K indicates susceptibility to sheet and rill erosion by water measured in tons/acre/year. K values range from 0.05 to 0.69. Higher values indicate greater susceptibility
Source: Soil Survey of Rockland County, New York, USDA SCS.

As noted in Table 3.1-1, the SCS identifies these soils as possessing potential limitations for development of roads, buildings, excavations, lawns and landscaped areas generally due to

wetness and frost action for much of the site, and slopes on those areas of the site containing steep slopes. The presence of these constraints does not mean the land is undevelopable nor are they a rating of construction potential. The ratings reflect the difficulty and relative costs of corrective measures that may be necessary (e.g. erosion controls, footing drains or other drainage improvements) for development. The limiting characteristics of these soils must be overcome by careful project planning, design and management. Measures to overcome any limitations are described in Section 3.1.2 Potential Impacts.

Topography

Topography in the vicinity of the site consists of rolling topography with no stark topographic features, as can be seen in Figure 3.1-2 Local Topography Map. Local topography reflects the underlying bedrock of the Brunswick formation and local drainage patterns. Topography and steep slopes on the subject site are shown on the Environmental Characteristics Plan (Drawing CA 101), included in the full-size plan set. A stream channel runs in an east-west direction through the northern portion of the site. The terrain on the subject site varies from gently sloping to steeply sloping in the stream channel and in the eastern portion of the site. Previous grading for a parcel in the northwest portion of the site along Red Schoolhouse Road has created short steep slopes along the road.

Elevations above mean sea level range from approximately 400 to 403 feet in the western portion of the property adjacent to Red Schoolhouse Road and along the southern border to the lowest point of approximately 330 in a wetland area in the southeast corner of the property. The topography is generally level in the western area near Red Schoolhouse Road and sloping to lower elevations in the eastern portion of the property. Topography varies approximately 68 feet across the site.

Steep Slopes on the subject site are shown on the Environmental Characteristics Plan (Drawing CA 101). Areas of existing slopes of greater than 25 percent are shown in the drawing. As shown in the drawing, existing steep slopes on the subject property are limited to: the stream corridor, areas of former grading near Red Schoolhouse Road and limited areas in the southeast portion of the site.

3.1.2 Potential Impacts

Soils

The entire site is mapped as having the Wethersfield Gravelly Silt loam soil type. The disturbance for the currently proposed Site Plan is approximately 31.6 acres, all of which will occur in the WeB and WeD soil/slope categories. The total disturbance is approximately 80 percent of the entire site, leaving approximately 8.0 acres, or 20 percent of the site, undisturbed.

Grading is required to construct the internal driveway network, install site utilities, prepare level areas for residential and mixed- use buildings and parking, and to create a stormwater management system. The wetlands identified on the site, including the stream corridor and the wetland in the southeast corner will be avoided.

Based upon preliminary engineering estimates, development of the Site Plan would involve a total of approximately 80,700 cubic yards of cut, 115,700 cubic yards of fill resulting in the need for approximately 35,000 cubic yards of material to be imported into the site. This is a preliminary estimate based upon the preliminary grading plan. As shown in the Overall Grading

Plan (Drawing No. CG 101) included in the full-size plan set, the majority of the earth cuts would be located in the area of the stormwater facilities, and on slopes in the eastern portion of the site. Fill will occur primarily to level building pads and parking areas including the northern mixed use building and in the eastern portion of the property. Excavation (cut) will be required to construct eight stormwater basins located across the subject property to facilitate stormwater management for the development.

Topography

Construction on slopes greater than 25 percent must be carefully considered during residential construction since grading such slopes increases the potential for soil erosion and may impact slope stability. Since the western area of the project site is mostly level or gently sloping, grading in this area will generally not involve steep slopes. Steeper slopes on the north and south sides of the stream corridor will require grading for stormwater management facilities. Steeper slopes in the southeast corner of the site will be disturbed for multifamily residences and the cul-de-sac in that area.

Potential Soil Erosion

As a result of soil disturbance and vegetation removal, there is an increased potential for siltation to occur both on-site affecting watercourses and wetlands and in areas downgradient of the subject site. Areas most susceptible to erosion are areas with slopes 25 percent and greater, primarily near the stream corridor and in the southeast portion of the property. The control of stormwater runoff during construction will be important to minimize construction-related soil erosion and sediment impacts especially downstream of the project site. With proper construction, installation and maintenance, soil erosion control measures will minimize potential on-site and off-site impacts.

The potential for soil erosion and sedimentation will be minimized during the project construction by adhering to an approved Erosion Control Plan, as described below in Section 3.1.3.

3.1.3 Proposed Mitigation Measures

The greatest potential impact associated with this project relative to site construction operations would be from erosion and sedimentation during construction. A preliminary Stormwater Pollution Prevention Plan (SWPPP) has been prepared by Langan Engineering and is attached as Appendix D. The SWPPP will be finalized prior to the final site plan approval. The SWPPP and accompanying project plans identify erosion and sediment control measures to be implemented during and after construction to minimize potential sediment and erosion impacts.

The primary objective of the plan is to reduce soil erosion from areas exposed during construction and prevent silt from reaching off-site water bodies and areas downstream. All soil erosion and sediment control practices would be designed and installed in accordance with "best management practices" or "BMPs" recommended by the New York State Department of Environmental Conservation and integrated into the SWPPP.

Prior to the disturbance of soils, erosion and sediment control measures would be installed in accordance with the specifications of the SWPPP. The construction contractor will be required to install all sediment and erosion control measures prior to ground disturbance and maintain them throughout the entire construction process. The project will be constructed in phases to limit disturbance on site to no more than 5 acres at a time.

Proper erosion control measures will be subject to the conditions of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001), as described in this section. The Village of Chestnut Ridge does not have stormwater management regulations in their Code.

The proposed plan minimizes the areal extent of soil exposure to the greatest extent practicable in accordance with the applicable Erosion and Sediment Control Guidelines of the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001). Erosion and sedimentation will be controlled during the construction period by temporary devices according to the SWPPP developed specifically for this project.

The construction of the stormwater management facilities will be undertaken as part of the overall road construction and grading for building pads so that these systems are functional as early as possible in the construction period. Temporary construction sediment traps will be converted to permanent stormwater management facilities.

Erosion control measures provided in the SWPPP include:

1. **Stabilized Construction Access** Prior to construction, the stabilized construction entrance will be installed at Red Schoolhouse Road, as shown on the plans. The entrance will be inspected and maintained to avoid tracking material onto nearby roadways. Any material dropped or tracked onto Red Schoolhouse Road will be removed immediately.

2. **Silt fencing** will be installed along the perimeter of all areas to be disturbed, upgradient of water courses and off-site properties. Fencing will be installed prior to construction activity. Silt fencing will be inspected on a daily basis and maintained as needed.

3. **Temporary seeding** shall be applied to disturbed areas that are to be left bare for 14 days unless construction begins. If construction is suspended or completed, areas will be seeded or mulched immediately.

4. **Temporary Sediment Basins and Traps** will be constructed to intercept sediment laden run-off and reduce the sediment affecting downgradient locations. As shown in the Overall Erosion Control Plan, the majority of future stormwater management basins will first be constructed as temporary sediment basins. These basins will be inspected at a minimum weekly basis and maintained to maintain design capacity.

5. **Check dams** will be installed in any drainage ditches leading to temporary sediment basins and traps to reduce the velocity of stormwater run-off and reduce any off-site sediment transport. The check dams will be inspected and maintained on a regular basis, according to the inspection requirements in the SWPPP.

Following construction, soil erosion will be prevented through the establishment of permanent vegetation and by the stormwater management facilities shown on the plan, including a permanent detention pond and a grass swale.

Construction Sequence

The following describes the general sequence of activities that would occur to construct the project.

1. Install temporary erosion controls
2. Remove trees and stumps
3. Strip and stockpile topsoil
4. Rough grading
5. Install utilities and stormwater facilities
6. Stabilize disturbed areas with paving or permanent erosion control measures
7. Construct residences/commercial space as detailed below.

Steps 1 through 6 involve construction of the roads and stormwater management facilities and would be completed prior to construction of the residences/commercial space.

The following list is construction phasing as it is currently envisioned. This may be subject to change subject to site conditions or unforeseen circumstances.

- Road Improvements along Red School House Road
- Internal Road Grading near apartments
- Construct Building A
- Internal Road grading near some portion of the Townhouses
- Construct 10 to 15 Townhouse buildings
- Construct Community Building
- Road grading near all Senior Housing
- Construct 1st senior Building.
- Install walkways as necessary
- Construct Building B
- Internal Road grading near next portion of the Townhouses
- Construct 10 to 21 Townhouse buildings
- Construct 2nd senior Building.
- Install Landscaping & Finishing site wide.

The project will be constructed in phases to limit disturbance on the site to no more than 5 acres at any one time. Refer to Figure 2-7 Construction Sequencing, which demonstrates general compliance with NYS DEC regulations for disturbance limits of 5 acres or less at any one time. An Erosion Control Plan will be prepared prior to site plan approval to provide for temporary and permanent stabilization of disturbed areas in accordance with New York State Department of Environmental Conservation best management practices ("BMPs").

As required by the Village subdivision regulations, the applicant will post a bond or other monetary guarantee to ensure the satisfactory completion of all required improvements.

With the above measures in place, potential soil erosion will be minimized to the maximum extent practicable.

Slope Mitigation

Potential impacts to slopes will also be mitigated through implementation of the erosion control measures detailed in the project SWPPP. The installation and maintenance of erosion control measures, such as silt fencing, check dams and temporary sediment basins and traps will be especially important in areas of steep slope in the vicinity of the stream corridor through the northern portion of the site. The development will be constructed in phases to limit disturbance on site to no more than 5 acres at a time.

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Figure 3.1-1: Soil Map
Equestrian Estates
Village of Chestnut Ridge, Rockland County, NY
Approximate Scale: 1 in. = 290 ft.
Source: USDA Natural Resources Conservation Services

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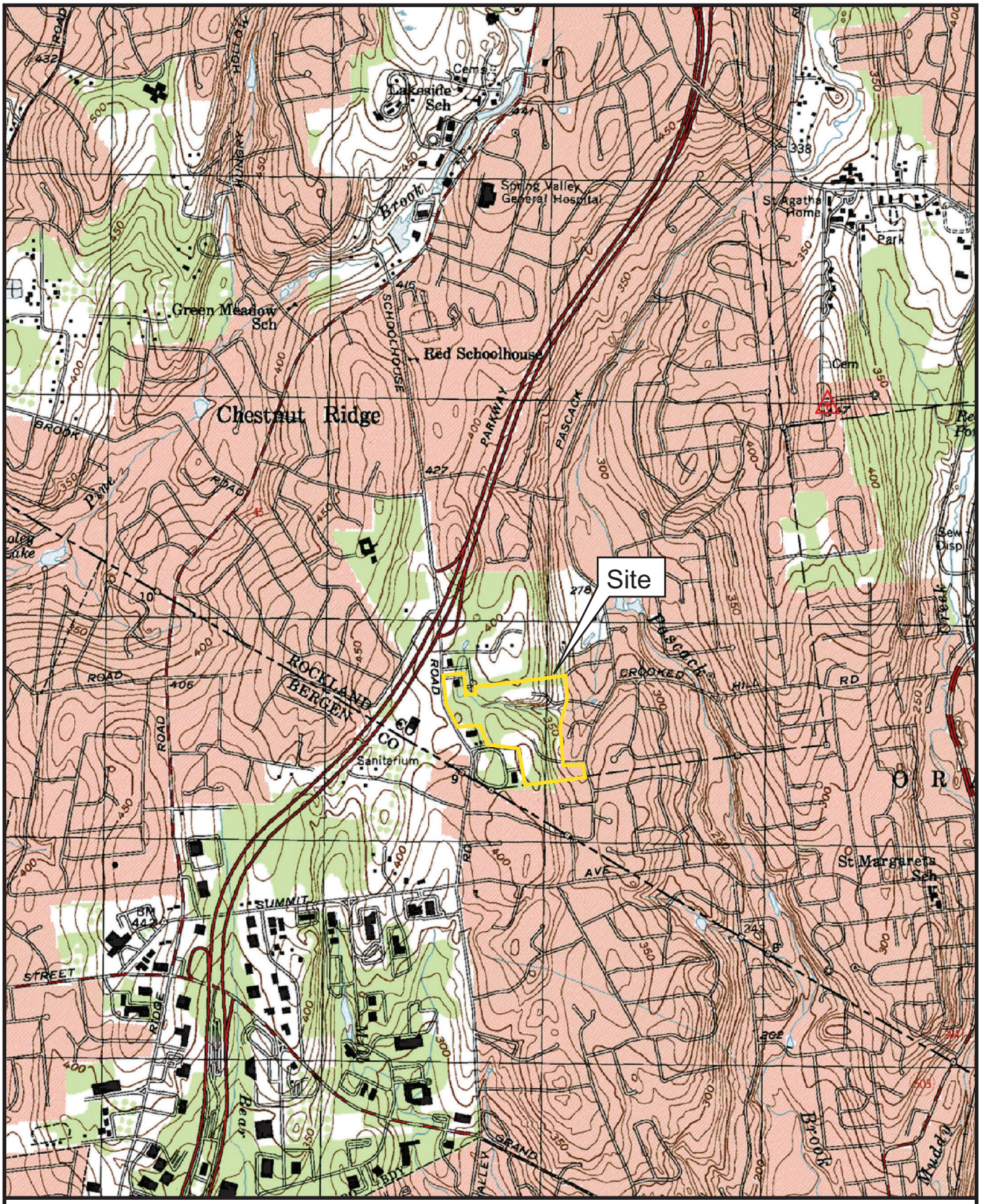

Figure 3.1-2: Local Topography
Equestrian Estates
Village of Chestnut Ridge, Rockland County, New York
Base Map: USGS Topographic Map
Approx. Scale: 1 in. = 2000 ft.

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