# III. EXISTING CONDITIONS, IMPACTS AND MITIGATION

## C. Soils, Topography, Slopes and Geology

# III. Existing Conditions, Potential Impacts, Mitigation

## C. Soils, Topography, Slopes and Geology

### 2. Existing Conditions

The site contains topography that ranges from level to very steep. The site ranges in elevation from about 474 feet in the southeast corner to about 386 feet in the southwest corner. The areas of the property that contain the nursery and the abandoned hotel, roughly the eastern half of the site, are level or are gently sloping to the west. The topography of the site is based on the shape and hardness of the underlying material and the thickness of the surficial material. Slopes on the property range from nearly level to greater than 35%, and are shown on ***Exhibit III.C-1a***, entitled ***"Slope Map."*** According to *Roadside Geology of New York*, the site is located in a geologic area that is part of the Western Highlands of New York. The underlying bedrock is Precambrian, metamorphic gneiss (Van Diver, 1985). Although bedrock outcrops occur, mainly in the western portion of the property, the majority of the site has a surficial layer of glacial till.

Preliminary identification and distribution of the soils on the site were determined by referencing information from on-line and printed sources, Web Soil Survey, and Soil Survey of Putnam and Westchester Counties, New York, referenced at the end of this section. The soils maps from the above-referenced sources are generalized, and are suitable for reviewing large areas and general land uses. The soils on the site were further examined by a Certified Soil Scientist of Evans Associates Environmental Consulting, Inc. (Evans Associates) in order to better clarify the soils information in relation to current on-site conditions. The generalized soils maps were adjusted by Evans Associates based on data collected during on-site soils observations and investigations, including delineation of wetlands, along with soil boring information that was collected by Tectonic Engineers during an investigation in October and November of 2009 and August and September of 2011. Historical and current site uses, topography, and hydrology were also evaluated in order to better describe specific on-site soils conditions. Wetland soil areas were adjusted to fit the actual wetland delineation boundaries and upland soil areas were adjusted according to slope.

The majority of the soils on the property, especially within the proposed area of disturbance, consist predominantly of the altered upland soils Udorthents, smoothed, and Urban land. Four other upland soils are found on the site in lesser amounts, along with two wetland soils. Much of the unaltered soils are located on the western side of the property, outside of the proposed limit of disturbance. The minor soils found in the uplands include mainly Charlton and Sutton loams. Smaller areas of Chatfield and Hollis loams are located on the western side of the site, often complexed with Charlton loam and/or rock outcrops, in areas that are associated with shallower bedrock. Rock outcrops were observed in the western

portion of the property, west of the watercourse and wetland. Sutton loam is found in association with Chatfield loam, but in the lower portions of the landscape, often near wetlands. Urban land is present in the areas directly associated with the hotel, the former gas station, and their associated parking lots. Udorthents, smoothed are located in association with the Urban land, as well as in lawn areas and in the nursery. Leicester loam is the wetland soil that is associated with the forested wetland corridor and intermittent watercourse on the west side of the site. Udorthents, wet substratum are found in the small, gently sloping wetland that is located in the northeast corner of the property. The upland and wetland soils on the property are described below, and locations of the soils on the property are shown on ***Exhibit III.C-1b***, entitled ***"Soil Map."***

Following the soils descriptions, physical and hydrologic properties of the on-site soils are shown on ***Table III. C.1.1***, Soil Seasonal High-Water Table and Hydrologic Soil Group, and ***Table III. C.1.2***, Soil Depth to Bedrock and Saturated Hydraulic Conductivity. Potential development constraints of the soils are discussed and/or shown on ***Table III. C.1.3***, Potential Building Construction Development Limitations, and ***Table III. C.1.4***, Potential Landscape and Road Construction Development Limitations. Because Udorthents and Urban land are variable in their make-up, their properties cannot be accurately assessed and are therefore not evaluated. Soil descriptions and information in the tables are based on data from the Natural Resources Conservation Service (NCRS).


LEGEND

| Color | Range Beg. | Range End | Area |
|---|---|---|---|
| | 0.00 | 10.00 | 10.29 |
| | 10.00 | 20.00 | 5.22 |
| | 20.00 | --- | 3.24 |
| | | TOTAL | 18.75 |

TRC

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7 Skyline Drive
Hawthorne, New York 10532



Exhibit III.C-1a
Slope Map

COSTCO WHOLESALE
Town of Yorktown, New York

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## LEGEND

*Upland Soils*

| | |
|---|---|
| ChC | Charlton loam, 8-15% slopes |
| ChD | Charlton loam, 15-25% slopes |
| ChE | Charlton loam, 25-35% slopes |
| CrC | Charlton-Chatfield complex, 2-15% slopes |
| CsD | Chatfield-Charlton complex, 15-35% slopes |
| SuB | Sutton loam, 3-8% slopes |
| Ub | Udorthents, smoothed |
| Uf | Urban land |

*Wetland Soils*

| | |
|---|---|
| LcA | Leicester loam, 0-3% slopes |
| Uc | Udorthents, wet substratum |

GRAPHIC SCALE

0 150 300 450

Scale: 1 inch = 150 ft.

SOURCES: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at and http://soildatamart.nrcs.usda.gov/, accessed 5/11; United States Department of Agriculture, Soil Conservation Service, in cooperation with Cornell University Agricultural Experiment Station, and Soil Survey of Putnam and Westchester Counties, New York, U.S. Government Printing Office, 1994; and on-site field evaluation by Evans Associates.

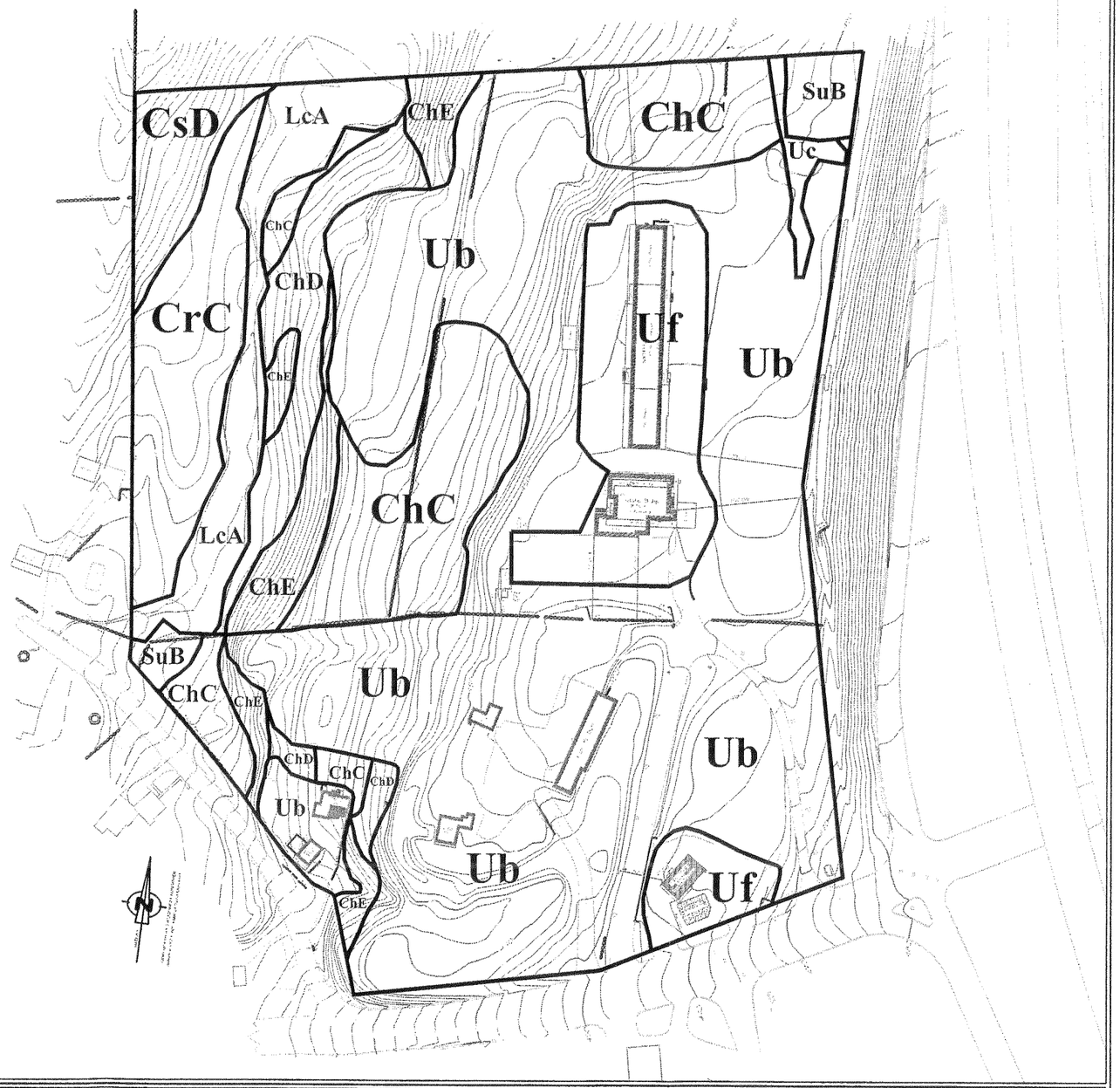


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Exhibit III.C-1b
Soil Map

Source: Evans Associates
Environmental Consulting, Inc.

COSTCO WHOLESALE
Town of Yorktown, New York

## SOILS DESCRIPTIONS

### Upland Soils

**Charlton loam (ChC, ChD, and ChE)** is formed in glacial till. This soil is very deep (>6 feet) to bedrock, and is very well drained. Charlton loam is found on glaciated plains, hills, and ridges. Slopes range from 8-15 % for soils designated ChC, from 15-25% for soils designated ChD, and from 25-35% for soils designated ChE.

Charlton loam typically contains a surface layer with a hue of 7.5YR to 10YR, a value of 2-4, and a chroma of 1-4. Textures in this layer are sandy loam, fine sandy loam, or loam, with a weak or moderate granular structure. The surface layer is friable or very friable, with rock fragments comprising 5-35%. The typical subsoil of Charlton loam contains a hue of 7.5YR through 2.5Y, a value of 4-6, and a chroma of 4-6. Textures in this layer are loam, fine sandy loam or sandy loam, with a weak granular or subangular blocky structure, possibly massive. The subsoil is friable or very friable, with rock fragments comprising 5-35%. The typical substratum of Charlton loam contains a hue of 10YR to 5Y, a value of 4-6, and a chroma of 2-6. Textures in the substratum can be loam, fine sandy loam, or sandy loam, with pockets or thin lenses of loamy sand. The structure is massive, or appears to have thin plates. The substratum is friable or very friable, though sometimes firm. Rock fragments comprise 5-35%, with up to 50% below 40 inches.

**Charlton-Chatfield complex (CrC) or Chatfield-Charlton complex (CsD)** consists of mainly Charlton and Chatfield loams, often including areas of Hollis loam and/or rock outcrops. Charlton loam is described above, Chatfield and Hollis loams are described below. Charlton-Chatfield complex is hilly and very rocky. Slopes for this soil type range from approximately 2 to 15% for soils designated CrC, and 15 to 35% for soils designated CsD. Small areas of Sutton loam (described below) may occur within this complex, often near wetlands.

**Chatfield loam** is formed in glacial till. This soil is moderately deep (20-40") to bedrock, and is well drained and somewhat excessively drained. Chatfield loam is found on glaciated plains, hills, and ridges.

Chatfield loam typically contains a surface layer with a hue of 7.5YR through 2.5Y, a value of 2-4, and a chroma of 1-4. Textures in this layer are sandy loam, through loam, with a granular structure. The surface layer is friable or very friable, with rock fragments comprising 5-50%. The typical subsoil of Chatfield loam contains a hue of 7.5YR through 2.5Y, a value of 3-6, and a chroma of 4-6. Textures in this layer range from sandy loam through silt loam, with a granular or subangular blocky structure. The subsoil is friable or very friable, with rock fragments comprising 5-35%. The typical substratum of Chatfield loam, where present, contains a hue of 7.5YR through 5Y, a value of 4-5, and a chroma of 2-4.

Textures in the substratum range from sandy loam to silt loam, and may have pockets or thin lenses of loamy sand. The structure is massive, or appears to have thin plates. The substratum is friable or firm, with rock fragments comprising 5-35%.

**Hollis loam** is formed in glacial till. This soil is shallow (10-20") to bedrock, and is well drained and somewhat excessively drained. Hollis loam is found on bedrock-controlled hills and ridges.

Hollis loam typically contains a surface layer with a hue of 7.5YR or 10YR, a value of 2-4, and a chroma of 1-3. Textures in this layer are sandy loam, fine sandy loam, or loam, with a granular structure. The surface layer is friable or very friable, with rock fragments comprising 5-35%. The typical subsoil of Hollis loam contains a hue 7.5YR through 2.5Y, a value of 4-5, and a chroma of 4-8. Textures in this layer are sandy loam, fine sandy loam, or loam, with a granular or subangular blocky structure. The subsoil is friable or very friable, with rock fragments comprising 5-35%. A thin substratum may occur, with a description similar to the subsoil, but including the color hue of 5Y.

**Sutton loam (SuB)** is formed in glacial till. This soil is very deep (>6 feet) to bedrock, and is moderately well drained. Sutton loam is found on plains, low ridges, and on lower, concave hillside slopes. Slopes range from 3-8%.

Sutton loam typically contains a surface layer with a hue of 10YR to 7.5YR, a value of 2-4, and a chroma of 1-4. Textures in this layer are sandy loam, fine sandy loam, or loam, with a weak or moderate granular structure. The surface layer is friable or very friable, with rock fragments comprising 5-35%. The typical subsoil of Sutton loam contains a hue of 7.5YR to 5Y, a value of 4-6, and a chroma of 4-6, with iron depletions and accumulations within 24 inches. Textures in this layer are sandy loam, fine sandy loam, or loam, with a weak, platy, granular, or subangular blocky structure, or possibly a massive structure. The subsoil is friable or very friable, with rock fragments comprising 5-35%. The typical substratum of Sutton loam contains a hue of 10YR to 5Y, a value of 4-6, and a chroma of 2-4, with redoximorphic features in the upper part. Textures in the substratum range from sandy loam to very fine sandy loam, with potential for pockets or thin lenses of silt loam, loamy sand, or sand. The structure is massive, or it has weak plates. The substratum is friable or very friable, though sometimes firm. Rock fragments comprise 5-35%, with up to 50% below 40 inches.

**Udorthents, smoothed (Ub)** are soils that have been altered in the past by cutting and filling. Properties of these soils are variable and on-site evaluations are required to fully describe this soil as it is represented on the property. Udorthents, smoothed are generally deep to bedrock and moderately well to excessively drained. Most of the Udorthents, smoothed that are located on the property have slopes of 8% or less. Smaller areas with slopes greater than 8% occur on the

property, mainly along the slope that is located to the west of the hotel and parking lot, and to the west of the nursery.

**Urban land (Uf)** consists of areas where at least 60 percent of the land surface is covered with buildings or other structures including parking lots and roadways. Most of the Urban land on the property has a slope of 3% or less.

**Wetland Soils**

**Leicester loam (LcA)** is formed in glacial till. This soil is found in association with the upland Charlton and Sutton loams. This soil is very deep (>6 feet) to bedrock, and is poorly drained. Leicester loam is found on low-lying depressional areas and along drainageways of glaciated hills. Slopes range from 0-3%.

Leicester loam typically contains a surface layer with a hue of 10YR, a value of 2-3, and a chroma of 1-3. Textures in this layer are fine sandy loam, very fine sandy loam, or loam, with a weak or moderate granular structure. The surface layer is friable or very friable, with rock fragments comprising 5-35%. The typical subsoil of Leicester loam contains a hue of 10YR to 5Y, a value of 4-6, and a chroma of 1-4, with distinct or prominent redoximorphic features. Textures in this layer are fine sandy loam, loam, or sandy loam, with a weak granular or subangular blocky structure, or the structure is massive. The subsoil is friable or very friable, with rock fragments comprising 5-35%. The typical substratum of Leicester loam contains a hue of 7.5YR to 5Y, a value of 4-6, and a chroma of 1-4, with redoximorphic features that typically decrease with depth. Textures in the substratum range from fine sandy loam to sandy loam, with potential for pockets or thin lenses of silt loam, loamy sand, or sand. The structure is massive, or it has weak plates. The substratum is friable or very friable, though some lenses may be firm. Rock fragments comprise 5-35%, with up to 50% below 40 inches.

**Udorthents, wet substratum (Uc)** are soils that have been altered, mainly by cutting and filling. Properties of these soils are variable and on-site evaluations are required to fully describe this soil as it is represented on the property. Udorthents, wet substratum are generally deep to bedrock and somewhat poorly drained to very poorly drained. Most of these soils on the property have slopes of 3% or less. Soil-movement within the nursery was considered to be alteration of the soil, however, this alteration may be limited to the surface layers and/or include organic material, such as mulch.

## SOIL PHYSICAL AND HYDROLOGIC PROPERTIES

**Table III. C.1.1**
**Soil Seasonal High-Water Table and Hydrologic Soil Group**

| Soil Type and Symbol | | Seasonal High-Water Table (depth to water in feet) | Hydrologic Soil Group |
|---|---|---|---|
| **Upland Soils** | | | |
| Charlton loam (Ch) | | >6.0 | B |
| | **Soil Portion** | | |
| Charlton-Chatfield complex (CrC, CsD) | Chatfield | >6.0 | B |
| | Hollis | >6.0 | B |
| Sutton loam (Su) | | 1.5 - 2.5, apparent, (Nov. – Apr.) | B |
| Udorthents, smoothed (Ub) | | -- | -- |
| Urban land (Uf) | | >2.0 | -- |
| **Wetland Soils** | | | |
| Leicester loam (Lc) | | 0-1.5, apparent, (Nov. – May) | C |
| Udorthents, wet substratum (Uc) | | -- | -- |

"Water Table" refers to a saturated zone in the soil, which may be seasonally high during certain months of the year. A saturated zone that lasts for less than a month is not considered a water table. High water table is represented as depth to high ground water in feet below grade, and if the high water table is seasonal, months are listed. All of the natural soils on the property have apparent water tables, meaning that they are all part of the ground water table, and none are perched above an unsaturated zone.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to a group according to the rate of water infiltration when the soils are thoroughly wet, are not frozen, and receive precipitation from long-duration storms. The slope and the kind of plant cover are not considered for this measurement. Drained soils may present different infiltration rates than undrained soils, and the ratings listed represent undrained soils. The four hydrologic soil groups are A, B, C, and D. Hydrologic soil Group A has a high infiltration rate, and a low runoff potential, while Group D has a very slow infiltration rate, and a high runoff potential. Group B and Group C soils fall respectively between Group A and Group D. Group A soils often have soil properties that can increase infiltration rates, such as containing deep to bedrock, excessively drained sand and gravel. Group B soils, which have a moderate infiltration rate, often have moderately deep or deep, moderately well drained, or

well drained soils that have moderately fine to moderately coarse texture. Group C soils, which have a slow infiltration rate, often contain a restriction that impedes the downward movement of water, such as a moderately fine, or fine-textured soil layer. Group D soils also contain restrictions, though they are more severe than in Group C, and they are often located closer to the surface. Restrictions in Group D soils can include a permanent high water table, a clay layer, or shallow depth to bedrock.

Saturated hydraulic conductivity measures the ability of a saturated soil to transmit water. This property is also often referred to as soil permeability. The saturated hydraulic conductivity of the most limiting layer of the soil is shown in the table below. A reading of 14.17 or more inches/hour is very high, 1.417 to 14.17 inches/hour is high, 0.1417 inch to 1.417 inches/hour is moderately high, 0.01417 to 0.1417 is moderately low, 0.001417 to 0.01417 is low, and less than 0.001417 inches/hour is very low.

**Table III. C.1.2**
**Depth to Bedrock and Saturated Hydraulic Conductivity**

| Soil Type and Symbol | | Depth to Bedrock (in inches) | Saturated Hydraulic Conductivity in Limiting Layer (inches/hour)* |
|---|---|---|---|
| **Upland Soils** | **Soil Portion** | | |
| Charlton loam (Ch) | | >60 | 0.57-5.95 moderately high - high |
| Charlton-Chatfield complex (CrC, CsD) | Chatfield | >20-40 | 0.57-5.95 moderately high - high |
| | Hollis | >10-20 | 0.57-5.95 moderately high - high |
| Sutton loam (Su) | | >60 | 0.57-5.95 moderately high - high |
| Udorthents, smoothed (Ub) | | -- | -- |
| Urban land (Uf) | | >10 | -- |
| **Wetland Soils** | | | |
| Leicester loam (Lc) | | >60 | 0.57-5.95 moderately high - high |
| Udorthents, wet substratum (Uc) | | -- | -- |

*applies only to mineral soil layers

**Potential Soil Development Constraints**

Ratings for specific types of site development, along with the main limiting soil feature or features, where applicable, are shown below. While the ratings are for very specific types of development, which may not occur on the property, these ratings present a good estimate of which soils are conducive to development and which are not. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. "Not limited"

indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soils have one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected. The information provided is not site specific, however, and does not eliminate the need for on-site investigation and analysis specific to the proposed project by professionals experienced in engineering.

**Table III. C.1.3**
**Potential Building Construction Development Limitations**

| Soil Type and Symbol | | Site Development | | |
|---|---|---|---|---|
| | | **Dwellings without basements** | **Dwellings with basements** | **Small commercial buildings** |
| **Upland Soils** | **Soil Portion** | | | |
| Charlton loam, 8-15% slopes (ChC) | | *somewhat limited* slope | *somewhat limited* slope | *very limited* slope |
| Charlton loam, 15-35% slopes (ChD, ChE) | | *very limited* too steep | *very limited* too steep | *very limited* slope |
| Charlton-Chatfield complex (CrC) | Charlton | *somewhat limited* slope | *somewhat limited* slope | *very limited* slope |
| | Chatfield | *somewhat limited* DT bedrock slope | *very limited* DT bedrock slope | *very limited* slope DT bedrock |
| | Hollis | *very limited* DT bedrock slope | *very limited* DT bedrock slope | *very limited* DT bedrock slope |
| Chatfield-Charlton complex (CsD) | Chatfield | *very limited* too steep DT bedrock | *very limited* too steep DT bedrock | *very limited* slope DT bedrock |
| | Charlton | *very limited* (too steep) | *very limited* (too steep) | *very limited* (slope) |
| | Hollis | *very limited* too steep DT bedrock | *very limited* too steep DT bedrock | *very limited* slope DT bedrock |
| Sutton loam, 3-8% slopes (SuB) | | *somewhat limited* DT sat. zone | *very limited* DT sat. zone | *somewhat limited* slope DT sat. zone |
| Udorthents, smoothed (Ub) | | varies | varies | varies |
| Urban land (Uf) | | -- | -- | -- |
| **Wetland Soils** | | | | |
| Leicester loam, 0-3% slopes (LcA) | | *very limited* DT sat. zone | *very limited* DT sat. zone | *very limited* DT sat. zone |

| | | | |
|---|---|---|---|
| Udorthents, wet substratum (Uc) | *very limited* DT sat. zone | *very limited* DT sat. zone | *very limited* DT sat. zone |

DT = depth to; sat. zone = saturated zone; -- = unrated

**Table III. C.1.4**
**Potential Landscape and Road Construction Development Limitations**

| Soil Type and Symbol | | Site Development | | |
|---|---|---|---|---|
| | | Paths and Trails | Local roads and streets | Lawns and landscaping |
| **Upland Soils** | **Soil Portion** | | | |
| Charlton loam, 8-15% slopes (ChC) | | *not limited* | *somewhat limited* slope | *somewhat limited* slope |
| Charlton loam, 15-25% slopes (ChD) | | *somewhat limited* slope | *very limited* too steep | *very limited* too steep |
| Charlton loam, 25-35% slopes (ChE) | | *very limited* slope | *very limited* too steep | *very limited* too steep |
| Charlton-Chatfield complex (CrC) | Charlton | *not limited* | *somewhat limited* slope | *somewhat limited* slope |
| | Chatfield | *not limited* | *somewhat limited* frost action DT bedrock slope | *somewhat limited* DT bedrock droughty slope |
| | Hollis | *not limited* | *very limited* DT bedrock frost action slope | *very limited* DT bedrock droughty slope |
| Chatfield-Charlton complex (CsD) | Chatfield | *very limited* slope | *very limited* too steep frost action DT bedrock | *very limited* too steep DT bedrock droughty |
| | Charlton | *very limited* slope | *very limited* too steep | *very limited* too steep |
| | Hollis | *very limited* slope | *very limited* DT bedrock too steep frost action | *very limited* too steep DT bedrock droughty |
| Sutton loam, 3-8% slopes (SuB) | | *not limited* | *very limited* frost action; DT sat.zone | *somewhat limited* DT sat. zone; large stones |
| Udorthents, smoothed (Ub) | | varies | varies | varies |
| Urban land (Uf) | | -- | -- | -- |
| **Wetland Soils** | | | | |
| Leicester loam, 0-3% slopes (LcA) | | *very limited* (DT sat. zone) | *very limited* (DT sat. zone; frost action) | *very limited* (DT sat. zone) |
| Udorthents, wet substratum (Uc) | | *somewhat limited* (DT sat. zone) | *very limited* (frost action; DT sat.zone) | *somewhat limited* (DT sat. zone; droughty) |

DT = depth to; sat. zone = saturated zone; -- = unrated

## SOIL SUITABILITY FOR DEVELOPMENT

Based on the descriptions, properties, and limitations of the soils, listed above, most of the relatively level, upland portions of the property appear to be suitable for development. This does not take into account any potential hazardous materials ***(see Section 3. Proposed Mitigation and Section III.D. Hazardous Materials)***. Most of the soils that would be disturbed by the proposed project are in areas that already contain alterations and/or development (Udorthents, smoothed, and Urban land). These areas include the buildings, parking lots, and lawn areas, as well as most of the nursery. Areas of Charlton and Sutton soils dominate the remainder of the uplands on the property within areas proposed to be disturbed. Areas of Chatfield and Hollis soils are located mainly in the western portion of the property, outside of the limit of disturbance. In addition, two areas of wetland soils, containing Udorthents, wet substratum, and Leicester loam soils, are also located outside of the limit of disturbance. Wetland soils are generally not suitable for most development activities.

Charlton soils are generally suitable for development, provided that considerations are made for slope, if development occurs in areas with slopes 8% and greater, with special concern for areas with slopes greater than 15%. Sutton loams may be suitable for development provided the effects of the high water table are taken into consideration. Considerations for depth to bedrock will be necessary if moderate or shallow depth to bedrock Chatfield and Hollis soils (as well as rock outcrops) are found within areas to be developed, or in areas of deeper bedrock where cutting and grading will reach those depths. Areas of Udorthents, smoothed, and/or Urban land may consist of a variety of soils and possibly other materials, however because they are already altered or developed, further development is likely feasible, providing any limiting layers, such as organic matter and other fill, are taken into consideration. Overall, the soils on the property in the areas proposed for development will likely be well suited for many development activities, if considerations are made for their limitations. However, all soils in potential construction areas should be evaluated with deep hole and other diagnostic tests by qualified engineers to confirm their suitability for the proposed development. Historical soil data on previously developed areas should also be reviewed, if available.

Please see the report (located in Appendix M) entitled "Geotechnical Engineering Report for Proposed Costco Wholesale Store Crompond Road & Taconic Parkway Yorktown Heights, New York," prepared by Tectonic Engineering & Surveying Consultants P.C. ("Tectonic") on October 3, 2011 for more details on the specific geotechnical constraints and abilities of the property , and specific information on the soil borings taken in October and November 2009, as well as in August and September 2011.

## REFERENCES

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/

United States Department of Agriculture, Soil Conservation Service, in cooperation with Cornell University Agricultural Experiment Station. *Soil Survey of Putnam and Westchester Counties, New York.* U.S. Government Printing Office, 1994.

Van Diver, Bradford B. Roadside Geology of New York. Missoula: Mountain Press Publishing Company, 1985.

3. **Potential Impacts**

Erosion is the wearing away of the land surface by water, wind, ice, or other agents. Surface runoff is the water that flows off of the surface of the land, without infiltrating the soil. Erosion and surface runoff are often associated with each other. Soil properties that can affect both are soil texture, soil structure, and soil hydraulic conductivity. The slope of a soil is also a critical factor, as is the type of, or lack of, vegetative cover.

Soil disturbance and exposure resulting from construction activities, specifically earth moving operations, creates the potential for soil erosion and sedimentation to occur, thereby impacting stormwater runoff quality. Soil eroding from the construction site could result in sedimentation within downstream low-lying areas, including the onsite wetlands and watercourse. Furthermore, precipitation runoff onto and down exposed, unprotected surfaces of existing and proposed embankments can result in significantly greater erosion and sedimentation impacts and cause future slope stability issues.

Sediment deposition into the onsite watercourse could result in further impacts to downstream, offsite water resources by transporting sediment offsite during larger storm events. In addition to filling in low-lying depressions, water turbidity could result from transporting even fine suspended solids to offsite water resources. Offsite resources that could be impacted include the Crompond Wetland, located west of the site and south of Old Crompond Road. Downstream facilities and resources including the enclosed NYSDOT storm pipe system for Route 202/35 and the Hunter Brook could be negatively impacted.

In general, cut and fill operations will consist of stripping and stockpiling topsoil for later use in final landscaping and permanent vegetative stabilization. Excess topsoil will be sold and removed from the site. Based on earthwork computations performed by the project engineer, construction of the Project will require approximately 109,200 cubic yards of material excavation, which includes approximately 6,700 cubic yards of rock excavation, and approximately 132,500

- Removal of Organic fill on Nursery Site?
- Remediation - remark of hazardous waste?

cubic yards of fill material placement. Since all excavated earth and rock materials will be placed and compacted in fill areas, prolonged stockpiling of these materials will not be required. In order to provide balanced cuts and fills, approximately 23,300 cubic yards of earth fill material will need to be imported to the site. In accordance with Tectonic's recommendations, the imported material should totally consist of "engineered" or "structural" fill that will needed for placement under the foundations and slabs for the proposed building and gas station; for placement under and behind fill areas supported by proposed retaining walls; and to replace excavated material deemed unsuitable for use as fill material for reasons further discussed below.

According to the findings in Tectonic's geotechnical report, a summary of the evaluations made with respect to the onsite reuse or offsite disposal of excavated soils is presented below (see report in Appendix M for more details):

- The use the native soils as fill is discouraged as it is highly moisture sensitive due to its high silt content. Their use can result in construction delays if their water content is not suitable for compaction. The soils will readily soften and the bearing capabilities of these soils will be greatly reduced if exposed to construction traffic, wet weather or perched groundwater.
- If used, the onsite soils can be placed as general fill outside the building area. Although discouraged, onsite materials can also be reused as fill under pavement areas provided the fill material has a maximum particle size of four (4) inches and is free of trash, debris, roots, vegetation, peat and other deleterious materials.
- Existing fill materials within the motel complex should be completely removed from the proposed building footprints and zones of influence of foundations. It may remain in-place within landscape and parking areas provided that there are trace (or less) organic materials present and the fill appears to be in a dense condition at the time of construction.
- The fill found within the nursery property which generally consists of mulch and other organic materials that are soft and compressible, should be completely removed.

Construction is anticipated to take approximately 14 months beginning in October 2012, with completion by November 2013. Because of the sensitivity of the site soils to moisture, freeze/thaw cycles during the winter months could also impact the moisture content of the site soils and effect the ability to use them as fill material for the reasons discussed above.

Based on soil borings performed throughout the site by Tectonic, depth to rock was determined and ranges from four to twenty-four feet below the surface. Depths of proposed cuts generally range from zero to around 20 feet. Therefore, rock may be encountered within the areas of proposed excavation. Based on the subsurface investigation, the bedrock consists of variably weathered and fractured

gneiss. Only the upper zones of the bedrock should be considered rippable. Rock not able to be removed by ripping should be assumed to require the use of excavator mounted hydraulic hammers for removal. The use of blasting as a means of rock removal may be a feasible alternative. (See Section III.O for additional discussion.)

Should significant amounts of rock be encountered, rock crushing operations will likely be performed onsite. The crushed rock will be used as fill, with coarser rock utilized to raise the majority of the proposed fill height within parking and landscape areas of the site.

4. **Proposed Mitigation**

Erosion and Sediment Control - Potential for soil erosion and sediment-laden stormwater to leave the site will be managed in accordance with the detailed Erosion and Sediment Control Plans and the Stormwater Pollution Prevention Plan (SWPPP). Both Plans are prepared in accordance with the Chapter 248, Stormwater Management and Erosion and Sediment Control, of the Yorktown Code. The Erosion Control Plans are prepared in accordance with the *New York Standards and Specifications for Erosion and Sediment Control*. The SWPPP (see Appendix D) is prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit for Stormwater Discharges from Construction Activity.

Performing site construction in accordance with the soil erosion and sediment control plan will minimize the downstream erosion hazard by proactively controlling erosion and runoff at its source. Erosion control measures shall include but not be limited to the following: stabilized reinforcement mat, hydromulch, hydroseeding, dust control and establishment of permanent vegetation. In areas where soil disturbance activity has been temporarily or permanently ceased, temporary and/or permanent soil stabilization measures shall be installed and/or implemented within seven (7) days from the date the soil disturbance activity ceased.

Stability at the surface of the slopes must include measures to prevent erosion of the slope. Surface water resulting from precipitation that can be intercepted at the top of the slope and diverted to the stormwater management system should be maximized if possible to reduce the volume of water flowing onto and down the slopes. Surface stabilization can be achieved using one of several alternatives including rip-rap, permanent erosion control fabric or matting which promotes vegetative growth, or others.

Sediment control measures shall include but not be limited to the following: silt fence, stabilized construction entrance, soil stockpiling, water bars, sediment traps, and inlet protection. During construction, dewatering methods in conformance with the *New York Standards and Specifications for Erosion and*

*Sediment Control* (August 2005) will be implemented to help control the moisture content of the site soils to the greatest extent practicable.

Throughout construction, regular site assessment and inspections in accordance with the requirements of the SPDES General Permit for Stormwater Discharges from Construction Activity, Town of Yorktown and as incorporated in the SWPPP will be performed. Inspections will be performed by the Operator's Qualified Professional. See Section III.O for additional discussion.

The purpose of the inspections shall be to confirm that proper erosion and sediment control practices are installed, maintained and to ensure their integrity and effectiveness. Required corrective actions shall be identified. Inspection reports shall be completed, issued to the appropriate agents and maintained at the project site. The objectives of the erosion and sediment control plan will be achieved through the management of stormwater runoff through erosion and sediment control practices applied during construction.

Earthwork Operations - The Recommendations in Section 9.0 and the Earthwork Construction Criteria in Section 10.0 of the Tectonic geotechnical report (see Appendix M) will be also be implemented during construction to mitigate soil impacts and manage earthwork operations. As for mitigation from potential freeze/thaw impacts, the proposed construction schedule and sequence in Section III.O has been set up so that mass earthwork and grading operations occur outside the winter months.

Blasting - Where rock is encountered, the preferred method of removal shall be by mechanical methods. Where mass excavations with conventional heavy construction equipment fitted with rippers, hammers, hydraulic rock splitters and other rock removal features cannot be performed effectively below the refusal depths, jack-hammering and/or blasting will be necessary.

Rock blasting shall be performed in compliance with all applicable Federal, State, County and local codes and regulations including Chapter 124, Blasting and Explosives, of the Town of Yorktown Code. The blasting plan will include such mitigation measures as performing a pre-blasting surveillance of nearby structures. Blasting will be conducted so that the resulting vibrations at the nearest structure do not exceed the maximum particle velocity stipulated in the applicable regulations. Vibration and noise levels will be measured and recorded in accordance with applicable regulations and industry standards. Blasting will be limited to days and times as permitted by code and as stipulated in the approved blasting plan. Use and transportation of explosives will be limited in accordance with applicable regulations.

The blasting plan will address other protective requirements such as scheduling and coordination with local officials, pre-notification of anticipated blasts, securing and delineating the blasting site, use of protective mats, protection of

pedestrian and vehicular traffic and implementation of all protective measures to ensure the safety, health and welfare of the community.

Hazardous Material Removal – Mitigation measures implemented for the removal of hazardous material are discussed in detail in Section III.D.3. Safety and monitoring procedures to be employed during the removal and disposal of hazardous materials are discussed in detail in the EHASP/CAMP presented in Appendix B2 of this DEIS.