

Appendix H

PRELIMINARY GEOTECHNICAL REVIEW



August 7, 2020

Mr. Vladimir Lyubetsky
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**Re: Preliminary Geotechnical Review Services
Proposed Northeast Metropolitan Regional Vocational High School
Wakefield, Massachusetts
LGCI Project No. 2025**

Dear Mr. Lyubetsky:

Lahlaf Geotechnical Consulting, Inc. (LGCI) has performed a site visit and completed a preliminary review of the geotechnical data available for the Northeast Metropolitan Regional Vocational High School in relation to the Proposed Northeast Metropolitan Regional Vocational High School in Wakefield, Massachusetts. Our services were performed in accordance with our proposal No. 20061 dated July 30, 2020. You authorized our services by signing our proposal on July 30, 2020.

This letter includes a summary of our field observations, a summary of the subsurface data we reviewed, our opinion about possible foundation issues during construction, and our recommendations for subsurface explorations.

1. Reviewed Documents

LGCI reviewed the following documents:

- Drawings G-1 titled: “Site Plan, Northeast Metropolitan Regional Vocational Technical School, Wakefield, Massachusetts,” (1969 Site Plan) prepared by Korslund, LeNormand & Quann, Inc., dated June 2, 1969 and provided to us by Drummey Rosane Anderson, Inc. (DRA) on July 30, 2020.
- Drawing S1 titled: “Typical Details and General Notes, Northeast Metropolitan Regional Vocational Technical School,” (1969 Structural Details) prepared by Korslund, LeNormand & Quann, Inc., dated June 2, 1969 and provided to us by Drummey Rosane Anderson, Inc. (DRA) on July 30, 2020.
- Drawing S3 titled: “Foundation and First Floor Plan – Unit A, Northeast Metropolitan Regional Vocational Technical School,” (First Floor Plan – Unit A) prepared by



Korslund, LeNormand & Quann, Inc., dated June 2, 1969 and provided to us by Drummey Rosane Anderson, Inc. (DRA) on July 30, 2020.

- Drawing S5 titled: “Foundation and First Floor Plan – Unit B, Northeast Metropolitan Regional Vocational Technical School,” (First Floor Plan – Unit B) prepared by Korslund, LeNormand & Quann, Inc., dated June 2, 1969 and provided to us by Drummey Rosane Anderson, Inc. (DRA) on July 30, 2020.
- Drawing S7 titled: “Foundation and First Floor Plan – Unit C, Northeast Metropolitan Regional Vocational Technical School,” (First Floor Plan – Unit C) prepared by Korslund, LeNormand & Quann, Inc., dated June 2, 1969 and provided to us by Drummey Rosane Anderson, Inc. (DRA) on July 30, 2020.
- Drawing S9 titled: “Foundation and First Floor Plan – Unit D, Northeast Metropolitan Regional Vocational Technical School,” (First Floor Plan – Unit D) prepared by Korslund, LeNormand & Quann, Inc., dated June 2, 1969 and provided to us by Drummey Rosane Anderson, Inc. (DRA) on July 30, 2020.
- Drawing S12 titled: “Foundation and First Floor Plan – Unit E, Northeast Metropolitan Regional Vocational Technical School,” (First Floor Plan – Unit E) prepared by Korslund, LeNormand & Quann, Inc., dated June 2, 1969 and provided to us by Drummey Rosane Anderson, Inc. (DRA) on July 30, 2020.
- Drawing S14 titled: “Foundation and First Floor Plan – Unit F, Northeast Metropolitan Regional Vocational Technical School,” (First Floor Plan – Unit F) prepared by Korslund, LeNormand & Quann, Inc., dated June 2, 1969 and provided to us by Drummey Rosane Anderson, Inc. (DRA) on July 30, 2020.
- “Custom Soil Resource Report for Essex County, Massachusetts, Southern Part; and Middlesex County, Massachusetts,” (Soil Survey Report) National Cooperative Soil Survey/National Resources Conservation Services, USDA (Map and soil description) printed November 15, 2019 from the following website <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>).
- “Surficial Materials Map of the Boston North, Massachusetts,” prepared by Stone, B.D. and DiGiacomo-Cohen, M.L. for U.S. Geological Survey, 2018, Scientific Investigation Map 3402, Quadrangle 125 – Boston North.
- Document showing proposed schematic options and titled: “Northeast Metro Tech Building Committee,” (Schematic Options) prepared by DRA Architects dated June 25, 2020, and provided to us by DRA via e-mail on July 30, 2020.



2. Site Location and Description

We understand that the site of the existing Northeast Metropolitan Regional Vocational High School is being considered for the proposed construction. The existing Northeast Metropolitan Regional Vocational High School is located at 100 Hemlock Road, Wakefield, Massachusetts, as shown in Figure 1. The site is located north of Hemlock Road. The portion of the site south of Hemlock Road is wooded and vacant.

The site is bordered by the Wakefield High School on the western side, by private properties on the northern side, by a utility easement on the eastern side, and by Farm Street on the southern side.

The existing school consists of several interconnected buildings. The site includes an athletic practice field, and a small paved parking lot on the northern side; a small paved parking lot, a football field and a baseball field on the western side; and a parking lot and a drop off loop on the southern side.

The site is characterized by a variable topography. Based on the 1969 Site Plan, the grade drops from about El. 91 feet at the southwestern corner of the main access driveway to about El. 78 feet near the main entrance to the existing building. The grade continues dropping toward the southeastern corner of the existing building to about El. 75 feet then rises to about El. 90 feet near the northeastern corner of the building. The grade rises slightly to about El. 93 feet within the northern parking lot (toward the northwestern corner of the existing building) before it drops steeply to about El. 80 feet at the northern practice field. The grade across the practice field continues dropping from about El. 80 feet to about El. 50 feet near the northeastern corner of the field and to about El. 75 feet near the northwestern corner of the field. The driveway that loops around the building drops in elevation from about El. 93 feet near the northwestern corner of the site to about El. 80 feet on the southern side before it rises again to El. 85 feet where it joins the main driveway. On the western side, the site is terraced with tennis courts at about El. 102 feet, the football field at about El. 114 feet, and the baseball field at between El. 85 feet and El. 87 feet.

Based on the First Floor Plan (Unit A to F), the existing building is founded on conventional, shallow, spread and continuous footings. Based on the 1969 Structural Details, the existing building footings were designed for allowable bearing capacities of 2 tons per square foot (tsf) for footings bearing on the natural soil on Structural Fill, and 15 tsf for footings bearing on bedrock.

Based on the historical topo maps included in Attachment A, the grades appear to have been cut on the western side of the site in what is currently the football field.

3. Project Description

We understand that the Town of Wakefield is considering the existing high school as the site for the proposed Northeast Metropolitan Regional Vocational High School. We understand that at



this time, the options of either rehabilitating the existing building with providing additions or constructing a new building at a different location are both being considered.

Based on the Schematic Options, five (5) options are being considered as follows:

- Options B.1 and B.2 – These options consist of renovating the existing fields and constructing an additional 3- to 4-story addition
- Options C.1, C.2, and C.3 – These options consist of constructing a new building on the northern, western, or southern side of the existing building, respectively. Under these options, the existing building will be demolished to allow for the construction of new athletic fields.

We understand that at this time, the location, size and layout of the proposed additions or new building have not been established.

4. Field Observations

An LGCI representative visited the site on August 6, 2020. The purpose of our visit was to observe site features such as wet areas, rock outcrops, and other features that may impact construction. Photographs taken during our site visit are included in Attachment B.

The LGCI representative walked around the existing school building and the areas slated for options C.1, C.2 and C.3.

The existing school building is surrounded by paved driveways and parking lots. The condition of the asphalt in the paved areas generally ranges from good to slight disrepair.

The site topography is characterized by sloping grounds, terraces, steep slopes, and rock cuts.

The existing athletic fields are terraced with the northern field at a lower elevation than the existing building and the western tennis courts and football field at higher elevations than the existing building.

Rock outcrops and what appears to be rock cuts are visible on the eastern side, the western side, and the southern of the existing buildings. A few of these outcrops/rock cuts were estimated to be as high as 30 feet.

The area of the existing football and baseball fields on the western side of the existing school building (i.e., area of proposed option C.2) appears to be on rock as evidenced by rock outcrops on the eastern and western sides of the fields.



The area on the southern side of the existing building and main driveway is wooded and higher in elevation than the existing building area. Rock outcrops were observed along the entire extent of proposed option C.3.

Based on the appearance of a few rock faces, it appears that rock blasting took place during construction of the existing building.

5. Summary of Existing Subsurface Data

Soil Survey Report – Based on the Soil Survey Report listed in Section 1, the soils at the site are classified primarily as follows:

- Charlton-Urban Land-Hollis Complex – Charlton soils are defined as well drained drumlin and ground moraines, and Hollis soils are defined as well drained ridges and hillslopes. Based on the Soil Survey Report, the Charlton soils are generally comprised of up to 5 inches of fine sandy loam, overlying up to 17 inches of sandy loam, overlying about up to 43 inches of gravelly sandy loam. The groundwater table is typically deeper than 80 inches. The Hollis soils are generally comprised of up to 14 inches of fine sandy loam, overlying unweathered bedrock. The groundwater table is typically deeper than 80 inches.
- Urban Land – Urban Land is defined as excavated and filled land.
- Rock Outcrop-Hollis Complex – Rock outcrops are defined as granite and gneiss. Hollis soils are defined as well drained, friable, shallow loamy basal till over granite and gneiss. Based on the Soil Survey Report, the Hollis soils are generally comprised of up to 14 inches of fine sandy loam, overlying unweathered bedrock. The groundwater table is typically deeper than 80 inches.
- Charlton-Hollis-Rock Outcrop Complex – Charlton soils are defined as well drained, friable loamy eolian deposits over friable loamy basal till derived from granite and gneiss. Based on the Soil Survey Report, the Charlton soils are generally comprised of up to 5 inches of fine sandy loam, overlying up to 17 inches of sandy loam, overlying about up to 43 inches of gravelly sandy loam. The groundwater table is typically deeper than 80 inches. Hollis soils are defined as well drained, friable, shallow loamy basal till over granite and gneiss. Based on the Soil Survey Report, the Hollis soils are generally comprised of up to 14 inches of fine sandy loam, overlying unweathered bedrock. The groundwater table is typically deeper than 80 inches. Rock outcrops are defined as granite and gneiss.
- Swansea Muck – Swansea Muck are defined in the Soil Survey Report as “highly decomposed organic material over loose sandy and gravelly glaciofluvial deposits.” Based on the Soil Survey Report, the Swansea Muck are generally comprised of up to 34 inches of muck, overlying about up to 45 inches of coarse sand. The groundwater table typically ranges between 0 and 6 inches.



- Ridgebury Fine Sandy Loam – Ridgebury soils are defined as poorly drained depressions, drumlins, drainageways, hills, ground moraines. Based on the Soil Survey Report, the Ridgebury soils are generally comprised of up to 1 inch of moderately decomposed plant material, overlying up to 5 inches of fine sandy loam, overlying about up to 4 inches of sandy loam, overlying about up to 56 inches of gravelly sandy loam. The groundwater table typically ranges between 0 and 6 inches.

A copy of the Soil Survey Report and Map are included in Attachment C.

Surficial Geologic Map – The Surficial Geologic Map (listed in Section 1) indicates that the soils in the general vicinity of the site mostly consist the following

- Thin Till – The thin till is described as non-sorted, non-stratified matrix of sand, some silt, and little clay that contains scattered pebbles, cobbles and boulders. The thin till is generally less than 10 to 15 feet thick.
- Coarse Deposits – The coarse deposits consist of sand, sand and gravel, and gravel deposits. The sand deposits are comprised mostly of fine to coarse sand. Coarser layers may contain up to 25 percent gravel. Finer layers may contain very fine sand, silt and clay. The sand and gravel deposits occur as a mixture of gravel and sand within individual layers and as alternating layers of sand and gravel. The sand and gravel layers range between 25 and 50 percent gravel and 50 to 75 percent sand. The gravel deposits are comprised of at least 50 percent gravel, cobbles, and boulders. Sand occurs within gravel beds and as separate layers within the gravel.
- Bedrock Outcrops – The Surficial Geologic Map indicated the presence of abundant rock outcrops on the western and southern sides of the site.

The Surficial Geologic Map of the site is shown in Figure 2.

6. Preliminary Recommendations

Please note that the review of available information summarized in this letter is not a substitute for a subsurface exploration program. The information gathered as part of this review may be incomplete and the recommendations derived therefrom are at best preliminary in nature and must be confirmed with actual subsurface explorations, laboratory testing, and geotechnical analyses.

Based on our review of the documents listed in Section 1, our understanding of the proposed construction, and our review of the previous explorations at the site, there are a few issues that we would like to highlight for consideration and discussion.



- Rock outcrops are shown on the Surficial Geologic Map. This information is consistent with our observations of rock outcrops and rock faces, evidencing previous rock cuts, on the eastern and western sides of the site.
- Based on our observation of evidence of rock blasting, we anticipate that some of the fill at the site may contain blasted rock. Blasted rock fill is typically susceptible to the formation of sinkholes.
- We believe that the natural soils at the site and rock are suitable to support shallow foundations.
- We believe that the major consideration during construction will be the removal of rock. Depending on where the proposed additions or new building will be located, major rock removal will likely be required. Accordingly, provisions should be made to include a sizeable contingency for rock blasting.
- Where the existing fill consists of blasted rock, the existing fill will have to be entirely removed and replaced with Structural Fill.
- Blasted rock and excavated existing fill containing blasted rock, could be crushed onsite during the earthwork operations to produce materials that can be used as Ordinary and/or Structural Fill.

7. Recommendations for Subsurface Explorations

To explore for the depth to rock and to delineate the limits of existing fill containing blasted rock, if any, additional explorations should be performed during the SD and DD phases of the project. At a minimum, the additional explorations should include at least sixteen (16) to twenty (20) soil borings, and two (2) groundwater observation wells. The geotechnical explorations should also include at least twenty (20) test pits. The test pits should be excavated with a large excavator to be able to penetrate the existing fill containing blasted rock.

The geotechnical explorations should be coordinated with the work of an environmental engineer to pre-characterize the site soils that will be generated during the deep cuts and that will need to be disposed of offsite.

Limitations

Our letter is based on project information provided to us at the time of this letter. If changes to the type, size, and location of the proposed structures or to the site grading are made, the recommendations contained in this letter shall not be considered valid unless the changes are reviewed, and the conclusions and recommendations modified in writing by LGCI. LGCI cannot accept responsibility for designs based solely on these preliminary recommendations.



Preliminary Geotechnical Review

It is not part of our scope to perform a more detailed site history; therefore, we have not explored for or researched the locations of buried utilities or other structures in the area of the proposed construction. Our scope did not include environmental services or services related to moisture, mold, or other biological contaminates in or around the site.

The recommendations in this letter are based in part on the data obtained from the review of existing subsurface data. The recommendations contained in this letter are at best preliminary in nature and must be confirmed with actual subsurface explorations, laboratory testing, and geotechnical analyses.

Our letter has been prepared in accordance with generally accepted engineering practices and in accordance with the terms and conditions set forth in our agreement. No other warranty, expressed or implied, is made. This report has been prepared for the exclusive use of Drummeay Rosane Anderson, Inc. for the specific application to the proposed Northeast Metropolitan Regional Vocational High School in Wakefield, Massachusetts as conceived at this time.

If you have any questions or need further assistance, please contact us at (978) 330-5912.

Very truly yours,

Lahlaf Geotechnical Consulting, Inc.

Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer

Attachments: Figure 1 – Site Location Map
Figure 2 – Surficial Geologic Map
Attachment A – Historical Topo Maps
Attachment B – Photographs
Attachment C – Excerpts of Soil Survey Report

Preliminary Geotechnical Review

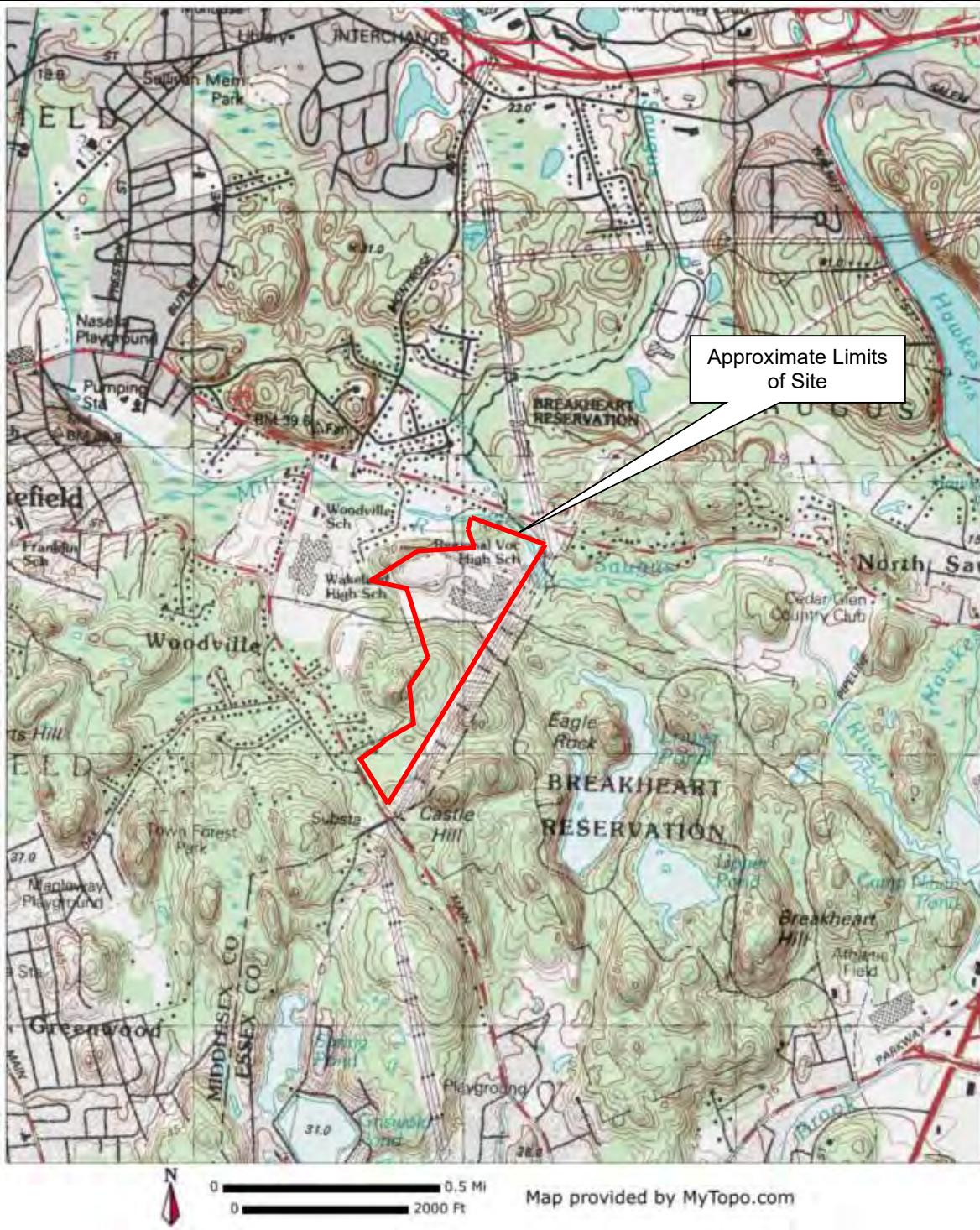
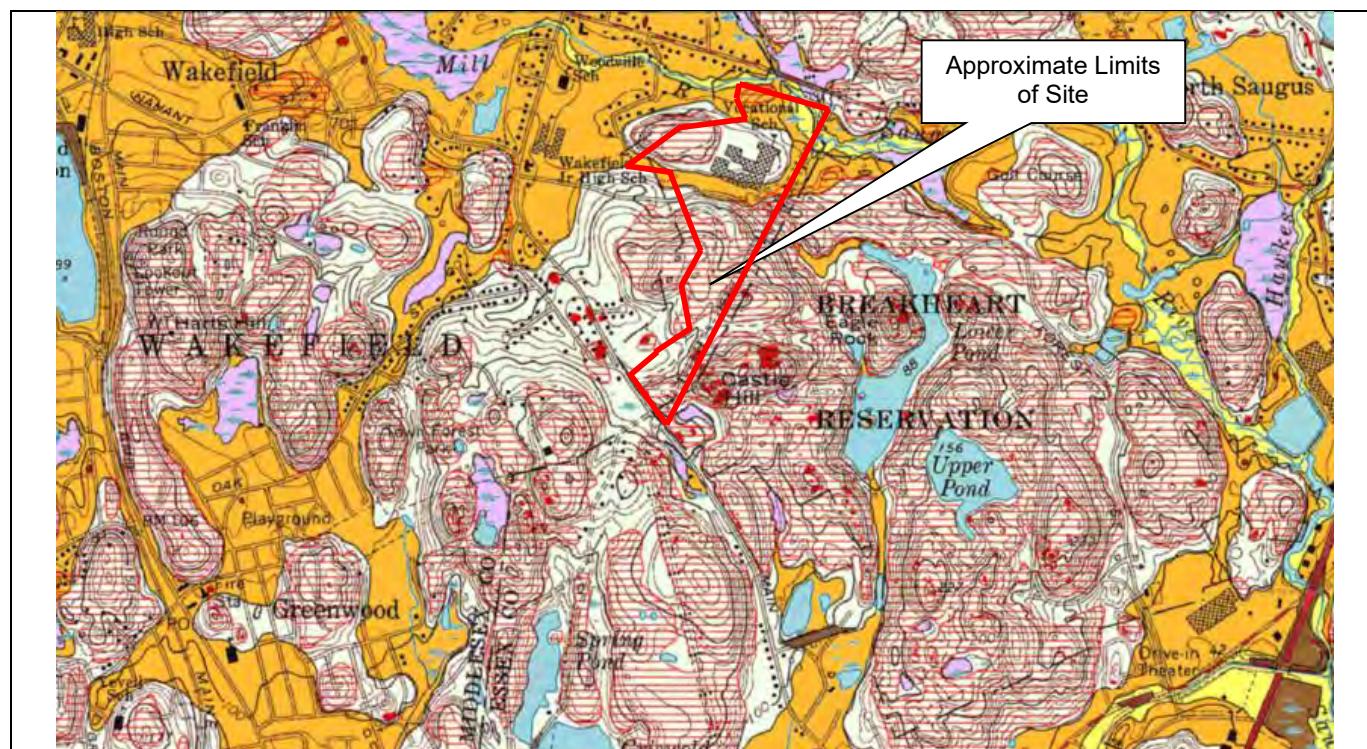


Figure based on USGS topographic map of Wakefield, MA obtained from www.mytopo.com

Client: Drummey Rosane Anderson, Inc.	Project: Proposed Northeast Metropolitan Regional Vocational High School	Figure 1 – Site Location Map	
 LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wakefield, MA	LGCI Project No.: 2025	Date: August 2020

Preliminary Geotechnical Review



Thin till—Nonsorted, nonstratified matrix of sand, some silt, and little clay containing scattered pebble, cobble, and boulder clasts; large surface boulders are common; unit was mapped where till is generally less than 10 to 15 ft thick including areas of shallow bedrock. Predominantly consists of upper till of the last glaciation; loose to moderately compact, generally sandy, commonly stony. Two facies are present in some places: a looser, coarser grained ablation facies, melted out from supraglacial position; and an underlying more compact, finer grained lodgement facies deposited subglacially. In general, both ablation and lodgement facies of upper till derived from fine-grained bedrock are finer grained, more compact, less stony and have fewer surface boulders than upper till derived from coarse-grained crystalline rocks. Across Massachusetts, fine-grained bedrock sources include the red Mesozoic sedimentary rocks of the Connecticut Valley lowland, marble in the western river valleys, and fine-grained schists in upland areas

Coarse deposits consist of **gravel deposits**, **sand and gravel deposits**, and **sand deposits**, not differentiated in this report. **Gravel deposits** are composed of at least 50 percent gravel-size clasts; cobbles and boulders predominate; minor amounts of sand occur within gravel beds, and sand comprises a few separate layers. Gravel layers generally are poorly sorted, and bedding commonly is distorted and faulted due to postdepositional collapse related to melting of ice. **Sand and gravel deposits** occur as mixtures of gravel and sand within individual layers and as layers of sand alternating with layers of gravel. Sand and gravel layers generally range between 25 and 50 percent gravel particles and between 50 and 75 percent sand particles. Layers are well sorted to poorly sorted; bedding may be distorted and faulted due to postdepositional collapse. **Sand deposits** are composed mainly of very coarse to fine sand, commonly in well-sorted layers. Coarser layers may contain up to 25 percent gravel particles, generally granules and pebbles; finer layers may contain some very fine sand, silt, and clay



Bedrock outcrops and areas of abundant outcrop or shallow bedrock—Solid color shows extent of individual bedrock outcrops; horizontal-line pattern indicates areas of shallow bedrock or areas where small outcrops are too numerous to map individually; in areas of shallow bedrock, surficial materials are less than 5 to 10 ft thick. These units were not mapped consistently among all quadrangles; see note at beginning of appendix 1 for information on bedrock outcrop mapping by quadrangle

Figure based on map titled: "Surficial Materials Map of the Boston North, Massachusetts," prepared by Stone, B.D. and DiGiacomo-Cohen, M.L. for U.S. Geological Survey, 2018, Scientific Investigation Map 3402, Quadrangle 125 – Boston North.

Client: Drummey Rosane Anderson, Inc.	Project: Proposed Northeast Metropolitan Regional Vocational High School	Figure 2 – Surficial Geologic Map	
 LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wakefield, MA	LGCI Project No.: 2025	Date: August 2020

Attachment A – Historical Topo Maps

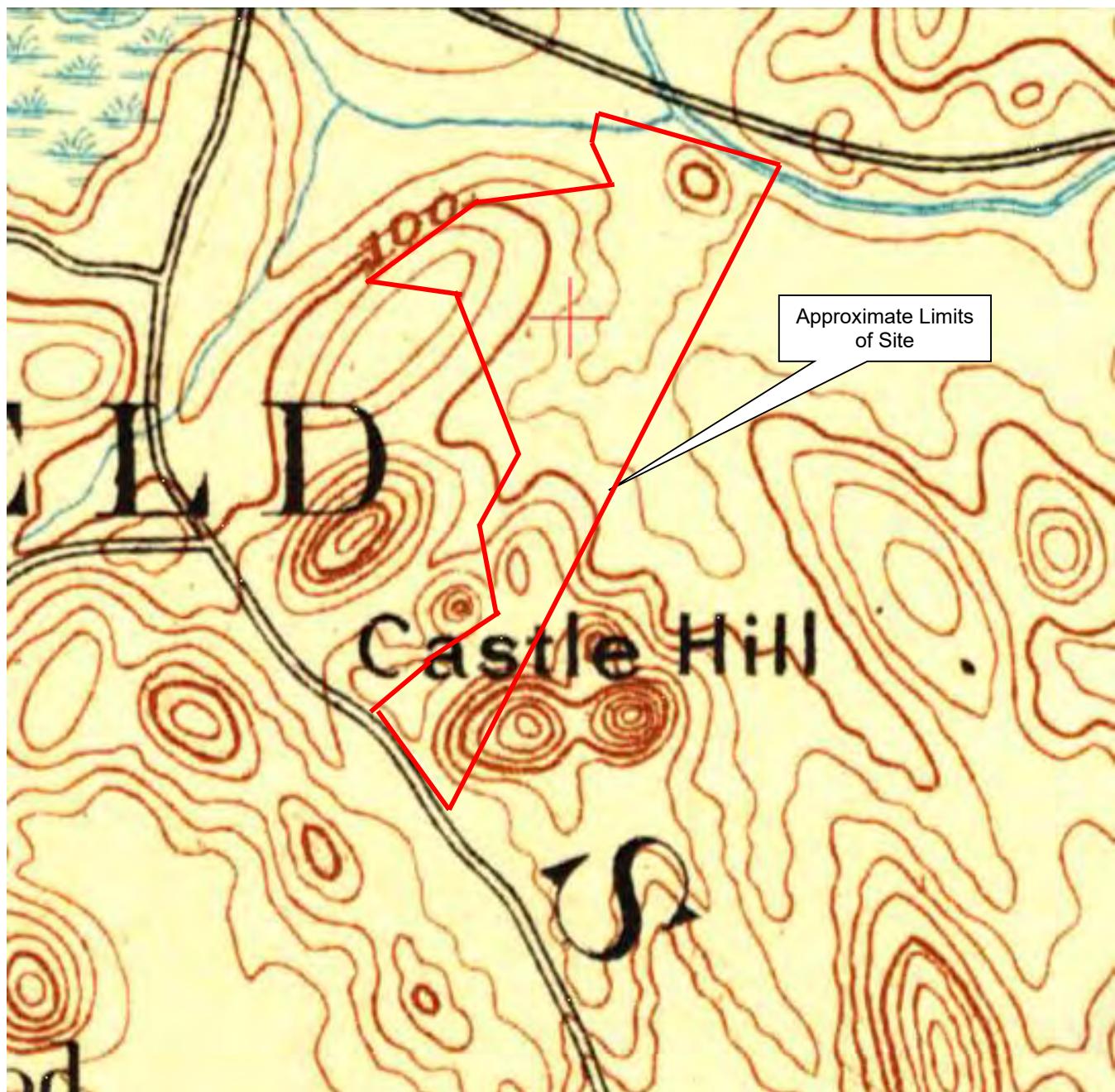


Figure based on USGS topographic map of Wakefield, MA obtained from <https://livingatlas.arcgis.com/topoexplorer/index.html>

Client: Drummey Rosane Anderson, Inc.	Project: Proposed Northeast Metropolitan Regional Vocational High School	Figure A1 – 1893 Historical Topo Map	
 LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wakefield, MA	LGCI Project No.: 2025	Date: August 2020

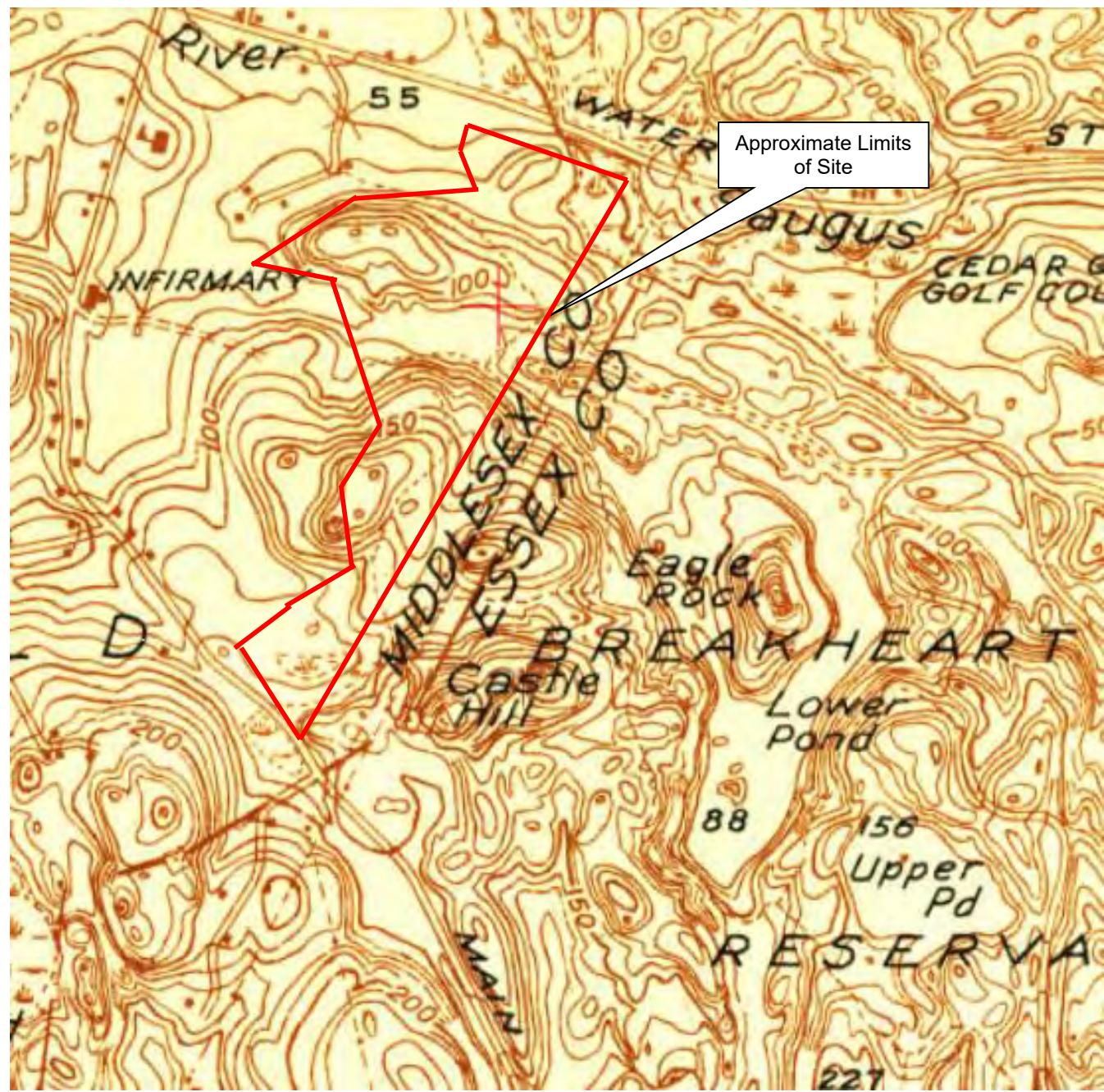


Figure based on USGS topographic map of Wakefield, MA obtained from <https://livingatlas.arcgis.com/topoexplorer/index.html>

Client: Drummey Rosane Anderson, Inc.	Project: Proposed Northeast Metropolitan Regional Vocational High School	Figure A2 – 1943 Historical Topo Map	
 LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wakefield, MA	LGCI Project No.: 2025	Date: August 2020

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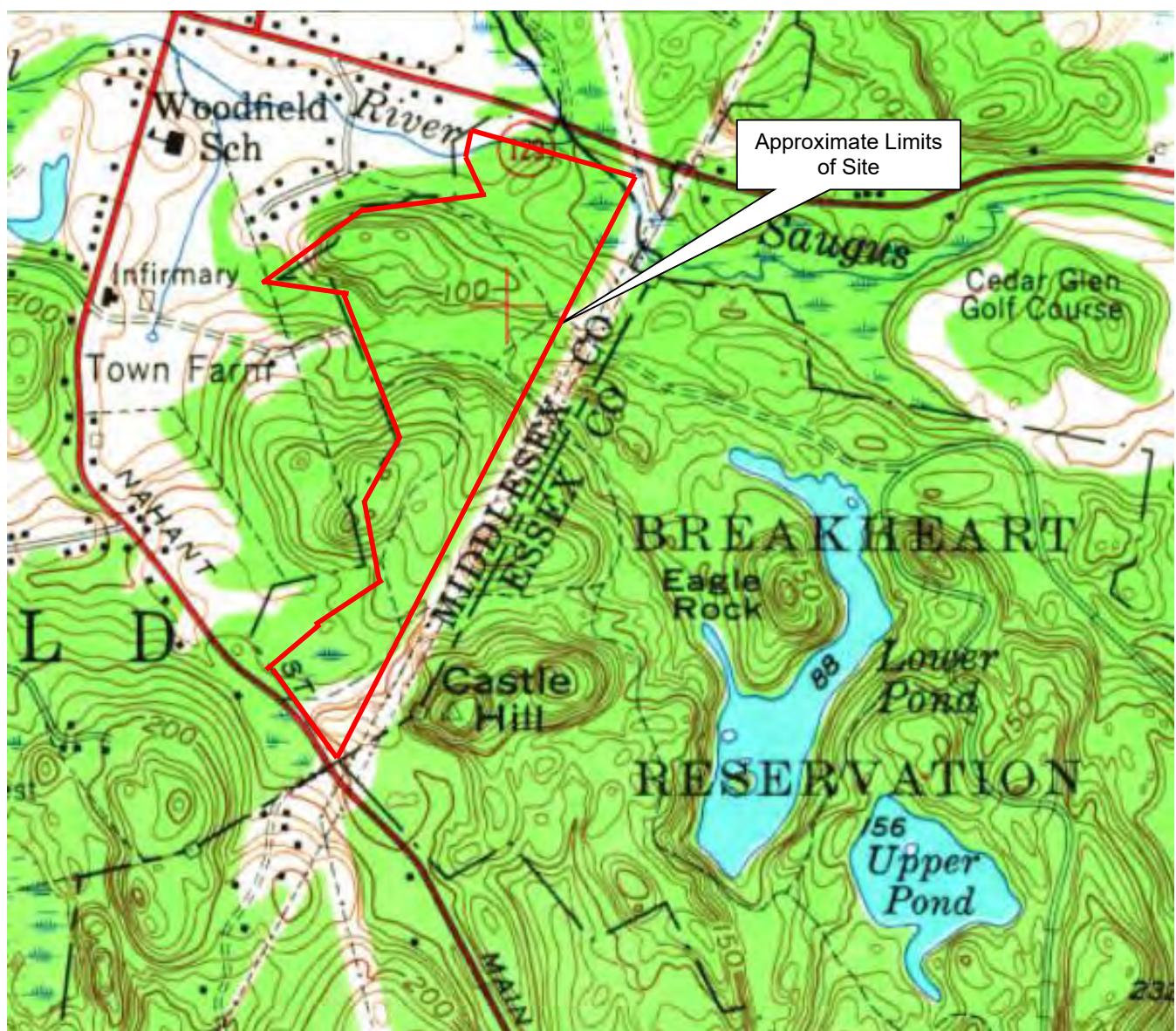


Figure based on USGS topographic map of Wakefield, MA obtained from <https://livingatlas.arcgis.com/topoexplorer/index.html>

Client: Drummey Rosane Anderson, Inc.	Project: Proposed Northeast Metropolitan Regional Vocational High School	Figure A3 – 1956 Historical Topo Map	
 LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wakefield, MA	LGCI Project No.: 2025	Date: August 2020

Preliminary Geotechnical Review



Figure based on USGS topographic map of Wakefield, MA obtained from <https://livingatlas.arcgis.com/topoexplorer/index.html>

Client: Drummey Rosane Anderson, Inc.	Project: Proposed Northeast Metropolitan Regional Vocational High School	Figure A4 – 1971 Historical Topo Map	
 LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wakefield, MA	LGCI Project No.: 2025	Date: August 2020

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Figure based on USGS topographic map of Wakefield, MA obtained from <https://livingatlas.arcgis.com/topoexplorer/index.html>

Client: Drummey Rosane Anderson, Inc.	Project: Proposed Northeast Metropolitan Regional Vocational High School	Figure A5 – 1985 Historical Topo Map	
 LGCI Lahlaf Geotechnical Consulting, Inc.	Project Location: Wakefield, MA	LGCI Project No.: 2025	Date: August 2020

Attachment B – Photographs

Preliminary Geotechnical Review



Preliminary Geotechnical Review



Photo No. 1: Standing on southern side of the building, view facing north showing the existing school building



Photo No. 2: Standing on southern side of the building, panoramic view facing north showing the existing school building

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Photo No. 3: Standing near SE corner of the building, view facing SE showing the rock outcrops

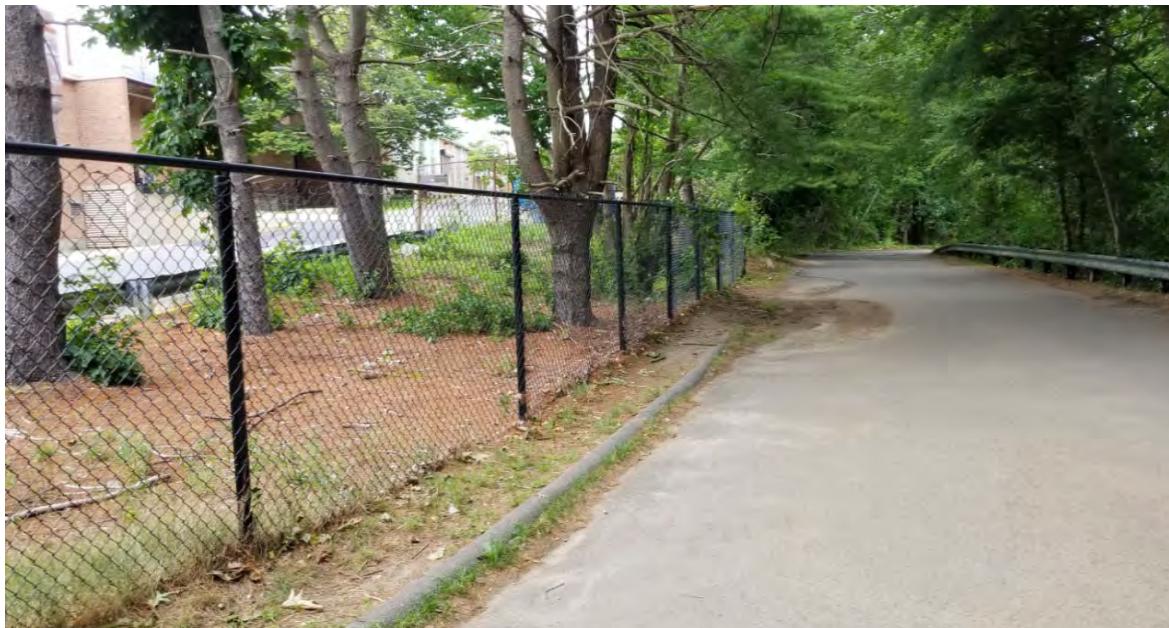


Photo No. 4: Standing on eastern side of the building, view facing north showing the outer loop trail



Photo No. 5: Standing on eastern side of the building, view facing east showing surficial Boulders (field book for scale)



Photo No. 6: Standing near NE corner of the building, view facing NE showing existing wooded area

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Photo No. 7: Standing near NE corner of the building, panoramic view facing NE showing existing wooded area



Photo No. 8: Standing on northern side of the building, view facing north showing the field at a lower elevation



Photo No. 9: Standing on northern side of the building, view facing NW showing the downgradient on the way towards the field



Photo No. 10: Standing on northern side of the building (in the field), view facing south showing the change in elevation

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Photo No. 11: Standing on northern side of the building (in the field), panoramic view facing south showing the change in elevation



Photo No. 12: Standing near NW corner of the building, panoramic view facing east showing the change in elevation

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Photo No. 13: Standing on western side of the building, panoramic view facing west showing the change in elevation



Photo No. 14: Standing on western side of the building, view facing west showing what appears to be rock blasted during the construction of existing building

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Photo No. 15: Standing on western side of the building (near the tracks), view facing west showing the football field



Photo No.16: Standing near SW corner of the building, view facing west showing baseball field

Preliminary Geotechnical Review



Photo No. 17: Standing near SW corner of the building, panoramic view facing west showing baseball field

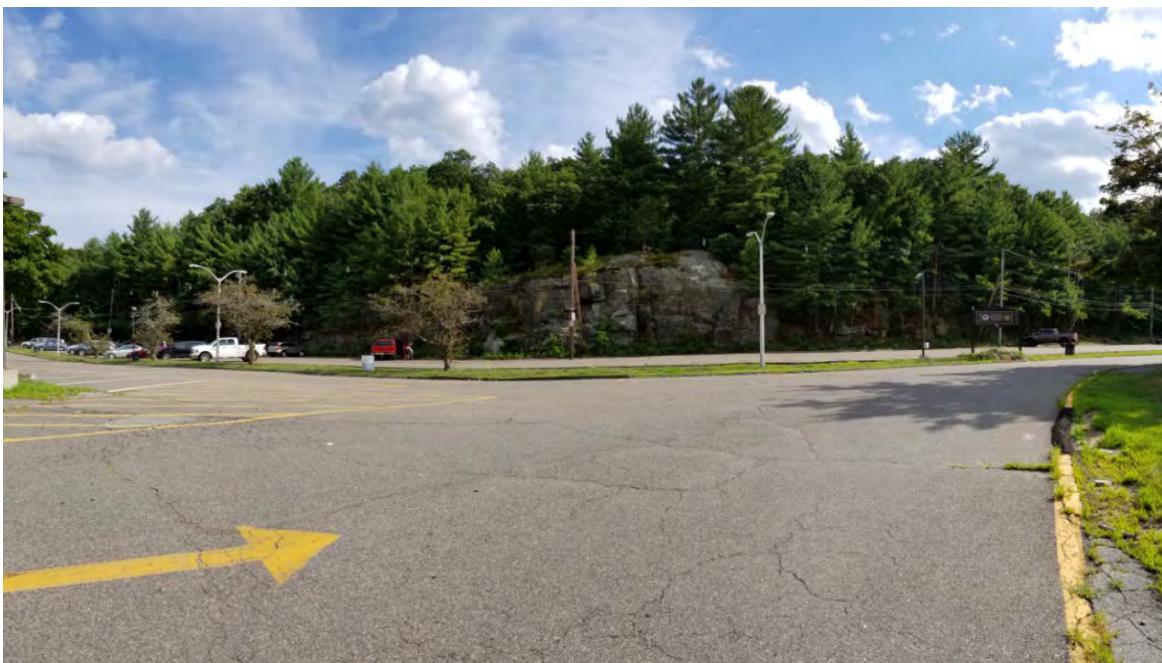


Photo No. 18: Standing on southern side of the building (near the edge of the parking), view facing south showing rocks and wooded areas at higher elevation

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Photo No. 19: Standing on southern side of the building (at the parking), view facing south showing rocks and wooded areas at higher elevation



Photo No. 20: Standing near SW corner of the building, view facing north showing change in elevation

Preliminary Geotechnical Review



Photo No. 21: Standing on southern side of the building (in the woods), view facing south showing rock outcrops and change in elevation

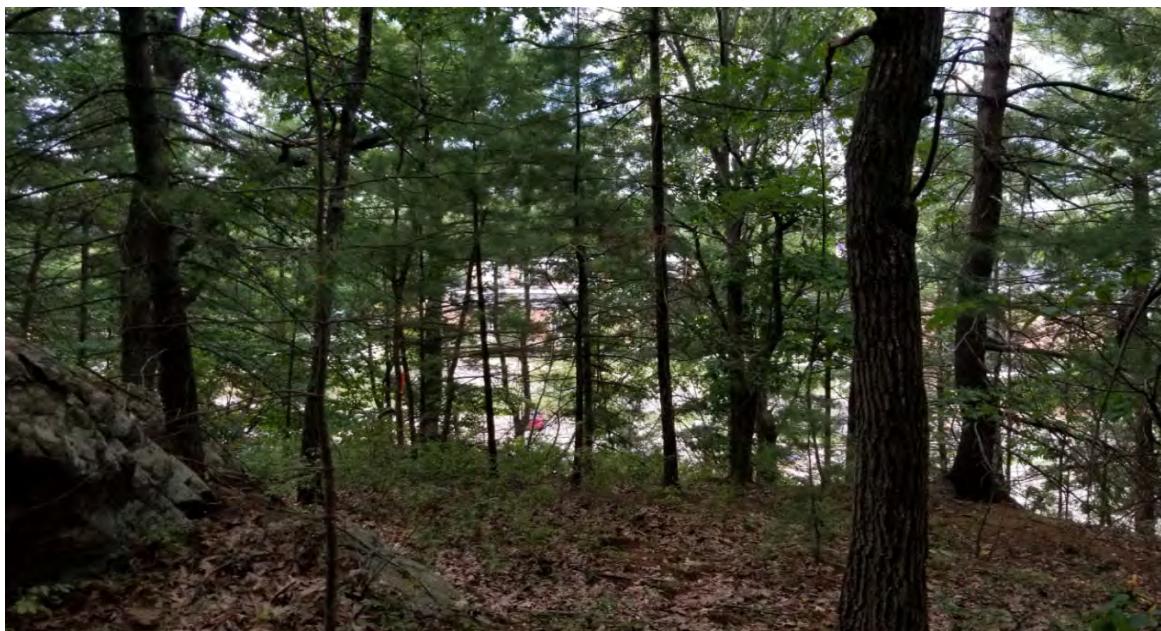


Photo No. 22: Standing on southern side of the building (in the woods), view facing north showing rock outcrops and the existing school building at a lower elevation



Photo No. 23: Standing on southern side of the building (in the woods), view facing south showing rock outcrops and change in elevation

Preliminary Geotechnical Review

Attachment C – Excerpts of Soil Survey Report



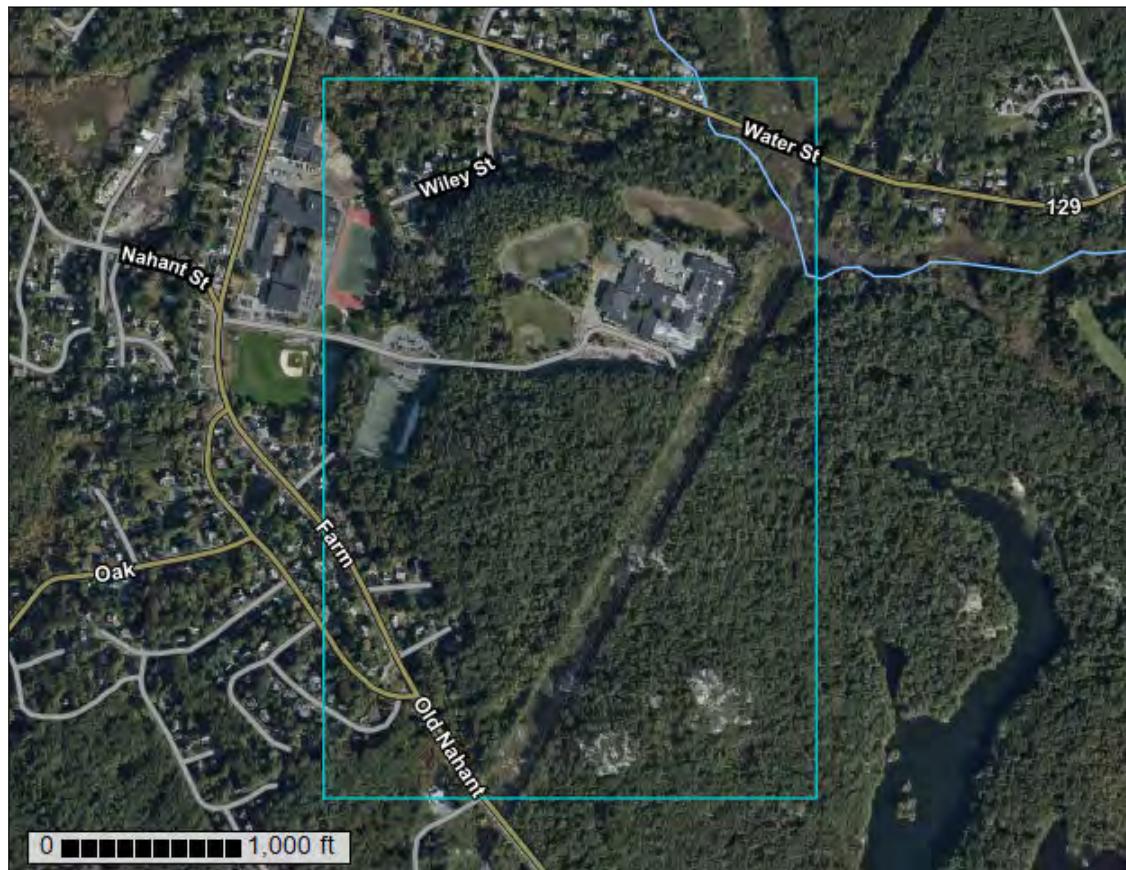
United States
Department of
Agriculture



Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Essex County, Massachusetts, Southern Part; and Middlesex County, Massachusetts



August 3, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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MAP LEGEND

Area of Interest (AOI)		Area of Interest (AOI)
Soils		Soil Map Unit Polygons Soil Map Unit Lines Soil Map Unit Points
Special Point Features		Blowout Borrow Pit Clay Spot Closed Depression Gravel Pit Gravelly Spot Landfill Lava Flow Marsh or swamp Mine or Quarry Miscellaneous Water Perennial Water Rock Outcrop Saline Spot Sandy Spot Severely Eroded Spot Sinkhole Slide or Slip Sodic Spot
		Spoil Area Stony Spot Very Stony Spot Wet Spot Other Special Line Features
		Streams and Canals
		Transportation Rails Interstate Highways US Routes Major Roads Local Roads
		Aerial Photography
		Background

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Essex County, Massachusetts, Southern Part
 Survey Area Data: Version 17, Jun 9, 2020

Soil Survey Area: Middlesex County, Massachusetts
 Survey Area Data: Version 20, Jun 9, 2020

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

MAP LEGEND

MAP INFORMATION

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 13, 2019—Oct 5, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	13.4	5.3%
102E	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	1.2	0.5%
105D	Rock outcrop-Hollis complex, 3 to 25 percent slopes	39.7	15.7%
242B	Hinckley gravelly fine sandy loam, 3 to 8 percent slopes	1.7	0.7%
616A	Fluvaquents, frequently flooded, 0 to 3 percent slopes	4.7	1.8%
Subtotals for Soil Survey Area		60.6	24.0%
Totals for Area of Interest		252.2	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
51A	Swansea muck, 0 to 1 percent slopes	4.6	1.8%
52A	Freetown muck, 0 to 1 percent slopes	10.0	4.0%
53A	Freetown muck, ponded, 0 to 1 percent slopes	3.8	1.5%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	6.8	2.7%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	8.3	3.3%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	3.0	1.2%
104C	Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes	4.6	1.8%
104D	Hollis-Rock outcrop-Charlton complex, 15 to 25 percent slopes	6.4	2.6%
105E	Rock outcrop-Hollis complex, 3 to 35 percent slopes	58.2	23.1%
253B	Hinckley loamy sand, 3 to 8 percent slopes	2.9	1.2%
602	Urban land	11.7	4.6%
631C	Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky	39.8	15.8%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
655	Udorthents, wet substratum	15.7	6.2%
656	Udorthents-Urban land complex	15.7	6.2%
Subtotals for Soil Survey Area		191.6	76.0%
Totals for Area of Interest		252.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Essex County, Massachusetts, Southern Part

102C—Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w69g
Elevation: 0 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Chatfield, extremely stony, and similar soils: 39 percent
Hollis, extremely stony, and similar soils: 26 percent
Rock outcrop: 17 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Extremely Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands

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Hydric soil rating: No

Description of Hollis, Extremely Stony

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Nose slope, crest, side slope

Down-slope shape: Convex

Across-slope shape: Linear, convex

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

A - 2 to 7 inches: gravelly fine sandy loam

Bw - 7 to 16 inches: gravelly fine sandy loam

2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 8 to 23 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Description of Rock Outcrop

Setting

Parent material: Igneous and metamorphic rock

Properties and qualities

Slope: 0 to 15 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: No

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Minor Components

Charlton, extremely stony

Percent of map unit: 12 percent

Landform: Hills, ridges

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Linear, convex

Across-slope shape: Convex

Hydric soil rating: No

Sutton, extremely stony

Percent of map unit: 3 percent

Landform: Ground moraines, hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Paxton, extremely stony

Percent of map unit: 2 percent

Landform: Drumlins, hills, ground moraines

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Hydric soil rating: No

Leicester, extremely stony

Percent of map unit: 1 percent

Landform: Depressions, drainageways, hills, ground moraines

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave

Hydric soil rating: Yes

102E—Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2w69h

Elevation: 0 to 1,540 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

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Map Unit Composition

Chatfield, extremely stony, and similar soils: 35 percent

Hollis, extremely stony, and similar soils: 30 percent

Rock outcrop: 20 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Extremely Stony

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex, linear

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 2 inches: fine sandy loam

Bw - 2 to 30 inches: gravelly fine sandy loam

2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 20 to 41 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Hollis, Extremely Stony

Setting

Landform: Hills, ridges

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Side slope, nose slope, crest

Down-slope shape: Convex

Across-slope shape: Linear, convex

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

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Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills, ridges
Parent material: Igneous and metamorphic rock

Typical profile

R - 0 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water capacity: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Charlton, extremely stony

Percent of map unit: 7 percent
Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

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Down-slope shape: Linear, convex

Across-slope shape: Convex

Hydric soil rating: No

Leicester, extremely stony

Percent of map unit: 4 percent

Landform: Depressions, drainageways, hills, ground moraines

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave

Hydric soil rating: Yes

Sutton, extremely stony

Percent of map unit: 2 percent

Landform: Hills, ground moraines

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Paxton, extremely stony

Percent of map unit: 2 percent

Landform: Hills, ground moraines, drumlins

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Hydric soil rating: No

105D—Rock outcrop-Hollis complex, 3 to 25 percent slopes

Map Unit Setting

National map unit symbol: vkcq

Elevation: 0 to 280 feet

Mean annual precipitation: 45 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 65 percent

Hollis and similar soils: 20 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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Description of Rock Outcrop

Setting

Parent material: Granite

Properties and qualities

Slope: 25 to 35 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Description of Hollis

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Friable, shallow loamy basal till derived from granite and gneiss over granite

Typical profile

O - 0 to 2 inches: muck

H2 - 2 to 4 inches: fine sandy loam

H3 - 4 to 17 inches: gravelly fine sandy loam

H4 - 17 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 35 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Minor Components

Chatfield

Percent of map unit: 15 percent

Hydric soil rating: No

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242B—Hinckley gravelly fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: vk5l

Elevation: 0 to 1,000 feet

Mean annual precipitation: 45 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 145 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Hinckley and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Flood plains

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Friable sandy and gravelly glaciofluvial deposits derived from granite and gneiss

Typical profile

H1 - 0 to 8 inches: gravelly fine sandy loam

H2 - 8 to 17 inches: gravelly loamy sand

H3 - 17 to 60 inches: stratified cobbly coarse sand to very gravelly loamy fine sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

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Minor Components

Windsor

Percent of map unit: 10 percent
Hydric soil rating: No

Sudbury

Percent of map unit: 3 percent
Hydric soil rating: No

Wareham

Percent of map unit: 1 percent
Landform: Terraces
Hydric soil rating: Yes

Swansea

Percent of map unit: 1 percent
Landform: Bogs
Hydric soil rating: Yes

616A—Fluvaquents, frequently flooded, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: vk56
Elevation: 0 to 100 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents

Setting

Landform: Alluvial flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Friable loamy alluvium over friable sandy eolian deposits

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Depth to water table: About 0 to 12 inches
Frequency of flooding: NoneFrequent

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Frequency of ponding: None

Minor Components

Swansea

Percent of map unit: 10 percent

Landform: Bogs

Hydric soil rating: Yes

Unnamed soils

Percent of map unit: 5 percent

Hydric soil rating: No

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Middlesex County, Massachusetts

51A—Swansea muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2trl2
Elevation: 0 to 1,140 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Swansea and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swansea

Setting

Landform: Swamps, bogs
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material over loose sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 34 inches: muck
Cg - 34 to 79 inches: coarse sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water capacity: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Freetown

Percent of map unit: 10 percent
Landform: Bogs, swamps

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Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent

Landform: Depressions, drainageways

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent

Landform: Drainageways, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope, tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

52A—Freetown muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2t2q9

Elevation: 0 to 1,110 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Freetown and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Freetown

Setting

Landform: Depressions, depressions, bogs, marshes, kettles, swamps

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 2 inches: mucky peat

Oa - 2 to 79 inches: muck

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Properties and qualities

Slope: 0 to 1 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water capacity: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Swansea

Percent of map unit: 5 percent
Landform: Kettles, depressions, depressions, marshes, swamps, bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

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53A—Freetown muck, ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2t2qc
Elevation: 0 to 1,140 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Freetown, ponded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Freetown, Ponded

Setting

Landform: Marshes, kettles, swamps, bogs, depressions, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 2 inches: mucky peat
Oa - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water capacity: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

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Minor Components

Whitman, ponded

Percent of map unit: 5 percent
Landform: Depressions on ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea, ponded

Percent of map unit: 5 percent
Landform: Kettles, depressions, depressions, marshes, swamps, bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

71B—Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w69c
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Depressions, drumlins, drainageways, hills, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope

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Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 6 inches: fine sandy loam

Bw - 6 to 10 inches: sandy loam

Bg - 10 to 19 inches: gravelly sandy loam

Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 15 to 35 inches to densic material

Drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F144AY009CT - Wet Till Depressions

Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 10 percent

Landform: Drumlins, hills, ground moraines

Landform position (two-dimensional): Foothslope, summit, backslope

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Whitman, extremely stony

Percent of map unit: 8 percent

Landform: Depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Paxton, extremely stony

Percent of map unit: 2 percent

Landform: Drumlins, hills, ground moraines

Landform position (two-dimensional): Shoulder, summit, backslope

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Linear, convex

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Across-slope shape: Convex, linear
Hydric soil rating: No

103B—Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 98yc
Elevation: 0 to 1,490 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 110 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 50 percent
Hollis and similar soils: 25 percent
Rock outcrop: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Ground moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable loamy eolian deposits over friable loamy basal till derived from granite and gneiss

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 22 inches: sandy loam
H3 - 22 to 65 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

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Hydrologic Soil Group: A

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Hollis

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Crest

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Friable, shallow loamy basal till over granite and gneiss

Typical profile

H1 - 0 to 2 inches: fine sandy loam

H2 - 2 to 14 inches: fine sandy loam

H3 - 14 to 18 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 8 to 20 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ledges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Head slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Granite and gneiss

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

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Minor Components

Canton

Percent of map unit: 2 percent

Landform: Hills

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Head slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Woodbridge

Percent of map unit: 2 percent

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, toeslope, summit

Landform position (three-dimensional): Head slope, base slope, nose slope

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

Scituate

Percent of map unit: 2 percent

Landform: Hillslopes, depressions

Landform position (two-dimensional): Toeslope, summit

Landform position (three-dimensional): Head slope, base slope

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

Narragansett

Percent of map unit: 2 percent

Landform: Ridges, hills

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent

Montauk

Percent of map unit: 1 percent

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Head slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

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103C—Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2wzp1
Elevation: 0 to 1,390 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, extremely stony, and similar soils: 50 percent
Hollis, extremely stony, and similar soils: 20 percent
Rock outcrop: 10 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Extremely Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 8.7 inches)

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Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Hollis, Extremely Stony

Setting

Landform: Hills, ridges

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Linear, convex

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

A - 2 to 7 inches: gravelly fine sandy loam

Bw - 7 to 16 inches: gravelly fine sandy loam

2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 8 to 23 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills, ridges

Parent material: Igneous and metamorphic rock

Typical profile

R - 0 to 79 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 0 inches to lithic bedrock

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Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Available water capacity: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Woodbridge, extremely stony

Percent of map unit: 8 percent

Landform: Drumlins, hills, ground moraines

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Canton, extremely stony

Percent of map unit: 5 percent

Landform: Moraines, ridges, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Chatfield, extremely stony

Percent of map unit: 5 percent

Landform: Hills, ridges

Landform position (two-dimensional): Summit, backslope, shoulder

Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Linear, convex

Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 2 percent

Landform: Hills, ground moraines, depressions, drumlins, drainageways

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Base slope, head slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

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104C—Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w69p
Elevation: 0 to 1,270 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis, extremely stony, and similar soils: 35 percent
Charlton, extremely stony, and similar soils: 25 percent
Rock outcrop: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis, Extremely Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Very low (about 2.7 inches)

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Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Description of Charlton, Extremely Stony

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Summit, backslope, shoulder

Landform position (three-dimensional): Crest, side slope

Down-slope shape: Linear, convex

Across-slope shape: Convex

Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material

A - 2 to 4 inches: fine sandy loam

Bw - 4 to 27 inches: gravelly fine sandy loam

C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 15 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills, ridges

Parent material: Igneous and metamorphic rock

Typical profile

R - 0 to 79 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent

Depth to restrictive feature: 0 inches to lithic bedrock

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Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Available water capacity: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Canton, extremely stony

Percent of map unit: 7 percent

Landform: Hills, moraines, ridges

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Chatfield, extremely stony

Percent of map unit: 6 percent

Landform: Hills, ridges

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Crest, side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Linear, convex

Hydric soil rating: No

Montauk, extremely stony

Percent of map unit: 1 percent

Landform: Recessional moraines, hills, drumlins, ground moraines

Landform position (two-dimensional): Summit, backslope, shoulder

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Linear, convex

Across-slope shape: Convex

Hydric soil rating: No

Scituate, extremely stony

Percent of map unit: 1 percent

Landform: Drumlins, hills, ground moraines

Landform position (two-dimensional): Footslope, backslope, summit

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Linear, convex

Across-slope shape: Convex

Hydric soil rating: No

Preliminary Geotechnical Review

Custom Soil Resource Report

104D—Hollis-Rock outcrop-Charlton complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 98yh
Elevation: 0 to 1,530 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 110 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hollis and similar soils: 35 percent
Rock outcrop: 30 percent
Charlton and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Crest, head slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Friable, shallow loamy basal till over granite and gneiss

Typical profile

H1 - 0 to 2 inches: fine sandy loam
H2 - 2 to 14 inches: fine sandy loam
H3 - 14 to 18 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Preliminary Geotechnical Review

Custom Soil Resource Report

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Description of Rock Outcrop

Setting

Parent material: Granite and gneiss

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Description of Charlton

Setting

Landform: Hills

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Friable loamy eolian deposits over friable loamy basal till derived from granite and gneiss

Typical profile

H1 - 0 to 5 inches: fine sandy loam

H2 - 5 to 22 inches: sandy loam

H3 - 22 to 65 inches: gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Minor Components

Canton

Percent of map unit: 10 percent

Landform: Hills

Landform position (two-dimensional): Shoulder, summit

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Landform position (three-dimensional): Head slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Montauk

Percent of map unit: 3 percent

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Nose slope, head slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Unnamed

Percent of map unit: 2 percent

105E—Rock outcrop-Hollis complex, 3 to 35 percent slopes

Map Unit Setting

National map unit symbol: 98yj

Elevation: 0 to 2,100 feet

Mean annual precipitation: 32 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 110 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 50 percent

Hollis and similar soils: 45 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Setting

Landform: Ledges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Head slope

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Granite and gneiss

Properties and qualities

Slope: 5 to 20 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified

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Land capability classification (nonirrigated): 8s

Description of Hollis

Setting

Landform: Ridges, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Friable, shallow loamy basal till over granite and gneiss

Typical profile

H1 - 0 to 2 inches: fine sandy loam

H2 - 2 to 14 inches: fine sandy loam

H3 - 14 to 18 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 35 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent

Depth to restrictive feature: 8 to 20 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Minor Components

Whitman

Percent of map unit: 3 percent

Landform: Depressions, drainageways

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Swansea

Percent of map unit: 1 percent

Landform: Bogs, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Unnamed

Percent of map unit: 1 percent

253B—Hinckley loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svm8

Elevation: 0 to 1,430 feet

Mean annual precipitation: 36 to 53 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Hinckley and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash terraces, outwash deltas, outwash plains, eskers, moraines, kame terraces, kames

Landform position (two-dimensional): Summit, shoulder, backslope, footslope

Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 8 inches: loamy sand

Bw1 - 8 to 11 inches: gravelly loamy sand

Bw2 - 11 to 16 inches: gravelly loamy sand

BC - 16 to 19 inches: very gravelly loamy sand

C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Very low (about 3.0 inches)

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Custom Soil Resource Report

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 8 percent

Landform: Moraines, outwash terraces, outwash deltas, kame terraces, outwash plains, kames, eskers

Landform position (two-dimensional): Summit, shoulder, backslope, footslope

Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent

Landform: Kame terraces, outwash plains, moraines, outwash terraces, outwash deltas

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope, base slope, head slope, tread

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: No

Agawam

Percent of map unit: 2 percent

Landform: Outwash deltas, kame terraces, outwash plains, kames, eskers, moraines, outwash terraces

Landform position (two-dimensional): Summit, shoulder, backslope, footslope

Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

602—Urban land

Map Unit Setting

National map unit symbol: 9950

Elevation: 0 to 3,000 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 110 to 200 days

Farmland classification: Not prime farmland

Preliminary Geotechnical Review

Custom Soil Resource Report

Map Unit Composition

Urban land: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Excavated and filled land

Minor Components

Rock outcrop

Percent of map unit: 5 percent

Landform: Ledges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Head slope

Down-slope shape: Concave

Across-slope shape: Concave

Udorthents, wet substratum

Percent of map unit: 5 percent

Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 5 percent

Hydric soil rating: No

631C—Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky

Map Unit Setting

National map unit symbol: vr1g

Elevation: 0 to 1,000 feet

Mean annual precipitation: 32 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 110 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 45 percent

Urban land: 35 percent

Hollis and similar soils: 10 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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Custom Soil Resource Report

Description of Charlton

Setting

Landform: Drumlins, ground moraines

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Friable loamy eolian deposits over friable loamy basal till derived from granite and gneiss

Typical profile

H1 - 0 to 5 inches: fine sandy loam

H2 - 5 to 22 inches: sandy loam

H3 - 22 to 65 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: A

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Excavated and filled land

Description of Hollis

Setting

Landform: Ridges, hillslopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Friable, shallow loamy basal till over granite and gneiss

Typical profile

H1 - 0 to 2 inches: fine sandy loam

H2 - 2 to 14 inches: fine sandy loam

H3 - 14 to 18 inches: unweathered bedrock

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Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Canton

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 2 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Landform: Ledges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Scituate

Percent of map unit: 1 percent
Landform: Depressions, hillslopes
Landform position (two-dimensional): Toeslope, summit
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Montauk

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Nose slope, head slope
Down-slope shape: Convex

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Across-slope shape: Convex
Hydric soil rating: No

655—Udorthents, wet substratum

Map Unit Setting

National map unit symbol: vr1n
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 110 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, wet substratum, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Wet Substratum

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Minor Components

Urban land

Percent of map unit: 8 percent
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear

Freetown

Percent of map unit: 4 percent
Landform: Depressions, bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

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Hydric soil rating: Yes

Swansea

Percent of map unit: 3 percent

Landform: Bogs, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

656—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 995k

Elevation: 0 to 3,000 feet

Mean annual precipitation: 32 to 54 inches

Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 110 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 45 percent

Urban land: 35 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Slope: 0 to 15 percent

Depth to restrictive feature: More than 80 inches

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Excavated and filled land

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Minor Components

Canton

Percent of map unit: 10 percent

Landform: Hills

Landform position (two-dimensional): Backslope, toeslope

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent

Landform: Plains, terraces

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Tread, rise

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Paxton

Percent of map unit: 5 percent

Landform: Hillslopes

Landform position (two-dimensional): Backslope, summit

Landform position (three-dimensional): Head slope, side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

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