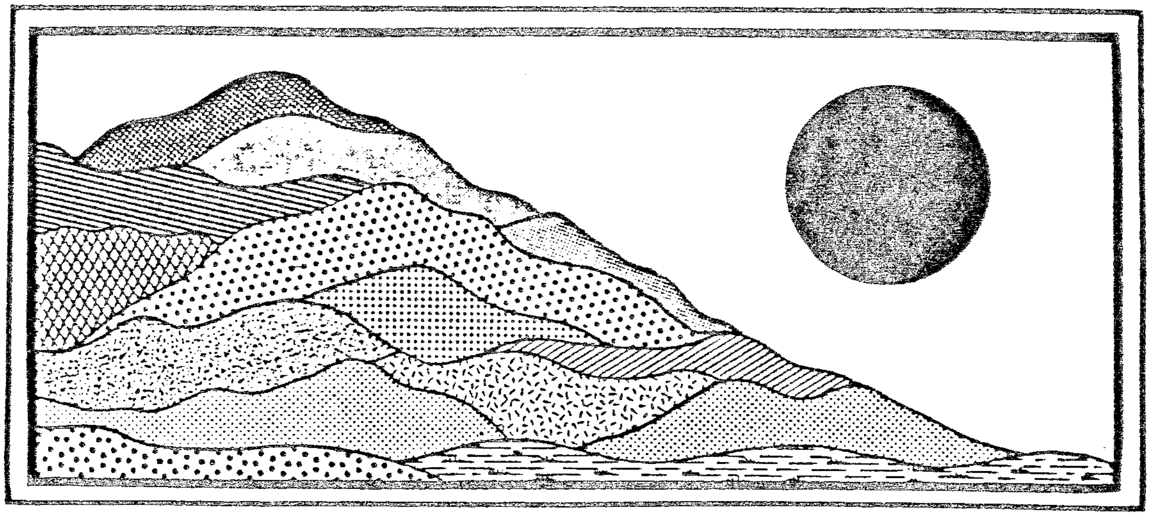
Edgewater Heights Subdivision

Ellington, Connecticut

May 1987



Environmental Review Team Report

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

EDGEWATER HEIGHTS SUBDIVISION

ELLINGTON, CONNECTICUT

Review Date: APRIL 14, 1987

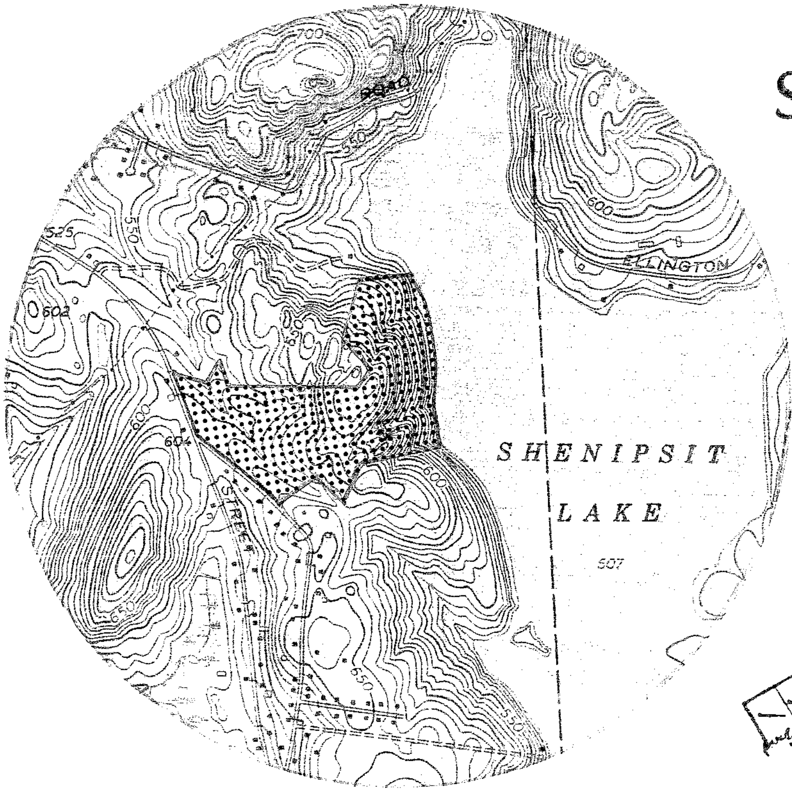
Report Date: MAY 1987

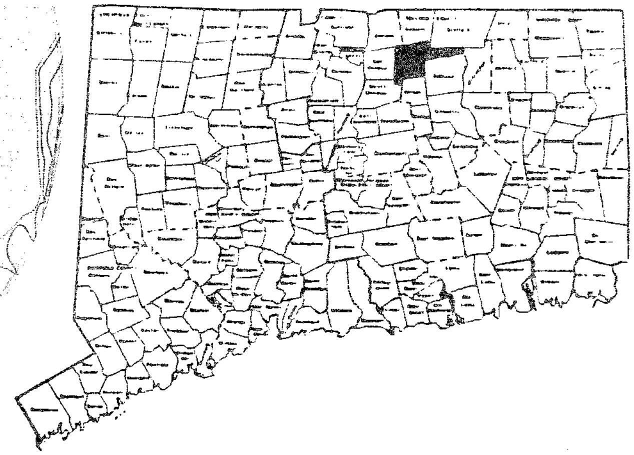
RC&D

ENVIRONMENTAL REVIEW TEAM
PO BOX 198
BROOKLYN, CONNECTICUT 06234

Site Location

EDGEWATER HEIGHTS SUBDIVISION
ELLINGTON, CONNECTICUT





EASTERN CONNECTICUT
RESOURCE CONSERVATION
& DEVELOPMENT AREA

ENVIRONMENTAL REVIEW TEAM REPORT

ON

Ellington, Connecticut

This report is an outgrowth of a request from the Ellington Conservation-Inland Wetlands Commission to the Tolland County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D Area Executive Committee for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The ERT met and field checked the site on Tuesday, April 14, 1987. Team members participating on this review included:

Joyce Purcell	--Soil Conservationist - U.S.D.A., Soil Conservation Service
Dwight Southwick	--Engineering Specialist - U.S.D.A., Soil Conservation Service
Elaine Sych	--ERT Coordinator - Eastern Connecticut RC&D Area
Bill Warzecha	--Geologist - DEP, Natural Resources Center
Chuck Phillips	--Fisheries Biologist - DEP, Eastern District

Prior to the review day, each Team member received a summary of the proposed project, a list of the Town's concerns, a location map, a topographic map, drainage calculations, and a soils map. During the field review the Team members were given subdivision plans, and a hydrogeologic study. The Team met with, and were accompanied by members of the Conservation-Inland Wetlands Commission, the Town Planner, and a representative from the Connecticut Water Company, the developer and his attorney and engineer. Following the review, reports from each Team member were submitted to the ERT Coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site designs or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project--all final decisions and conclusions rest with the Town and landowner. This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the developer and the Town. The results of this Team action are oriented toward the development of better environmental quality and the long-term economics of land use.

The Eastern Connecticut RC&D Executive Committee hopes you will find this report of value and assistance in making your decisions on this proposed subdivision.

If you require any additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P. O. Box 198
Brooklyn, CT 06234
(203) 774-1253

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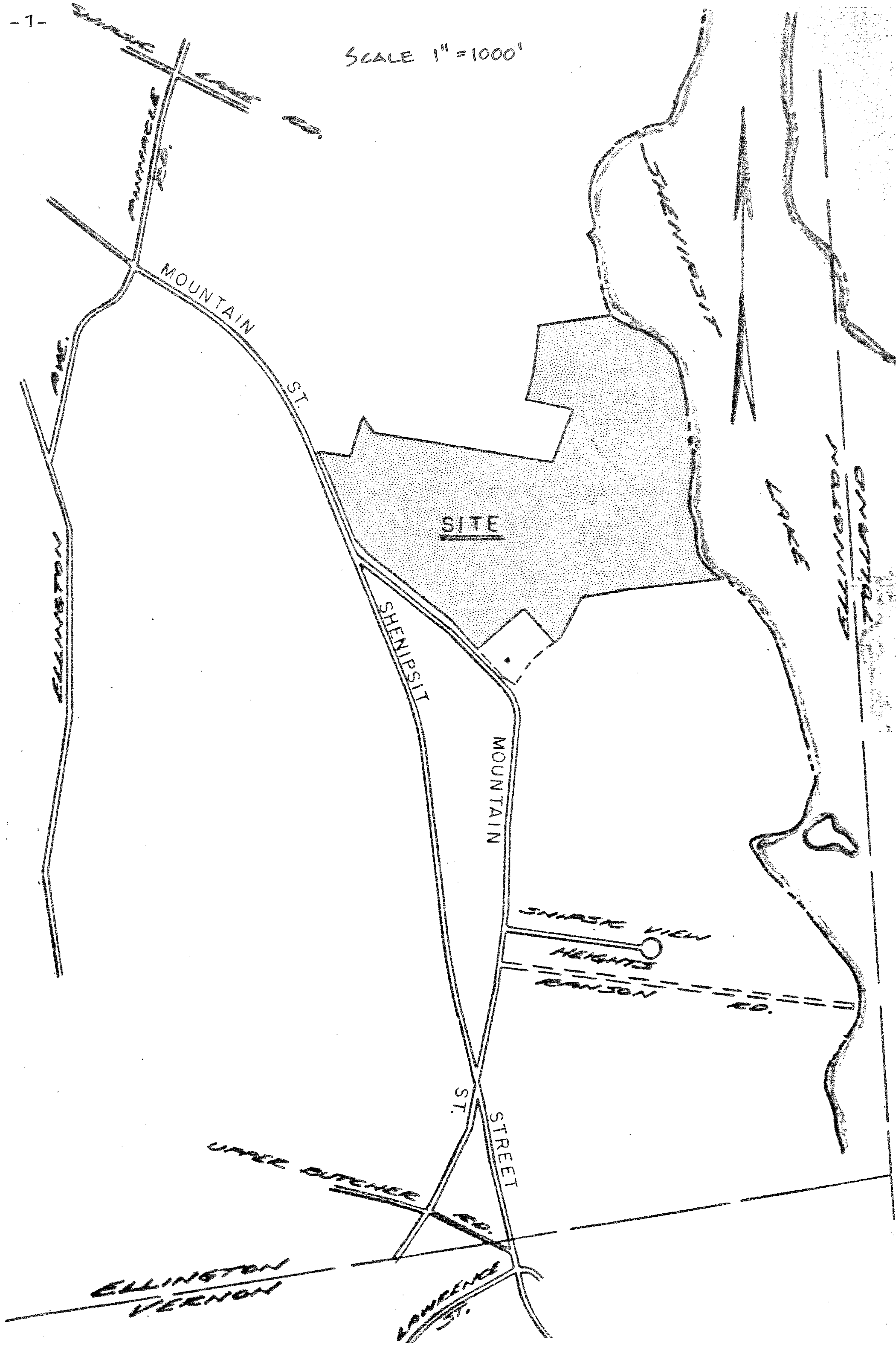
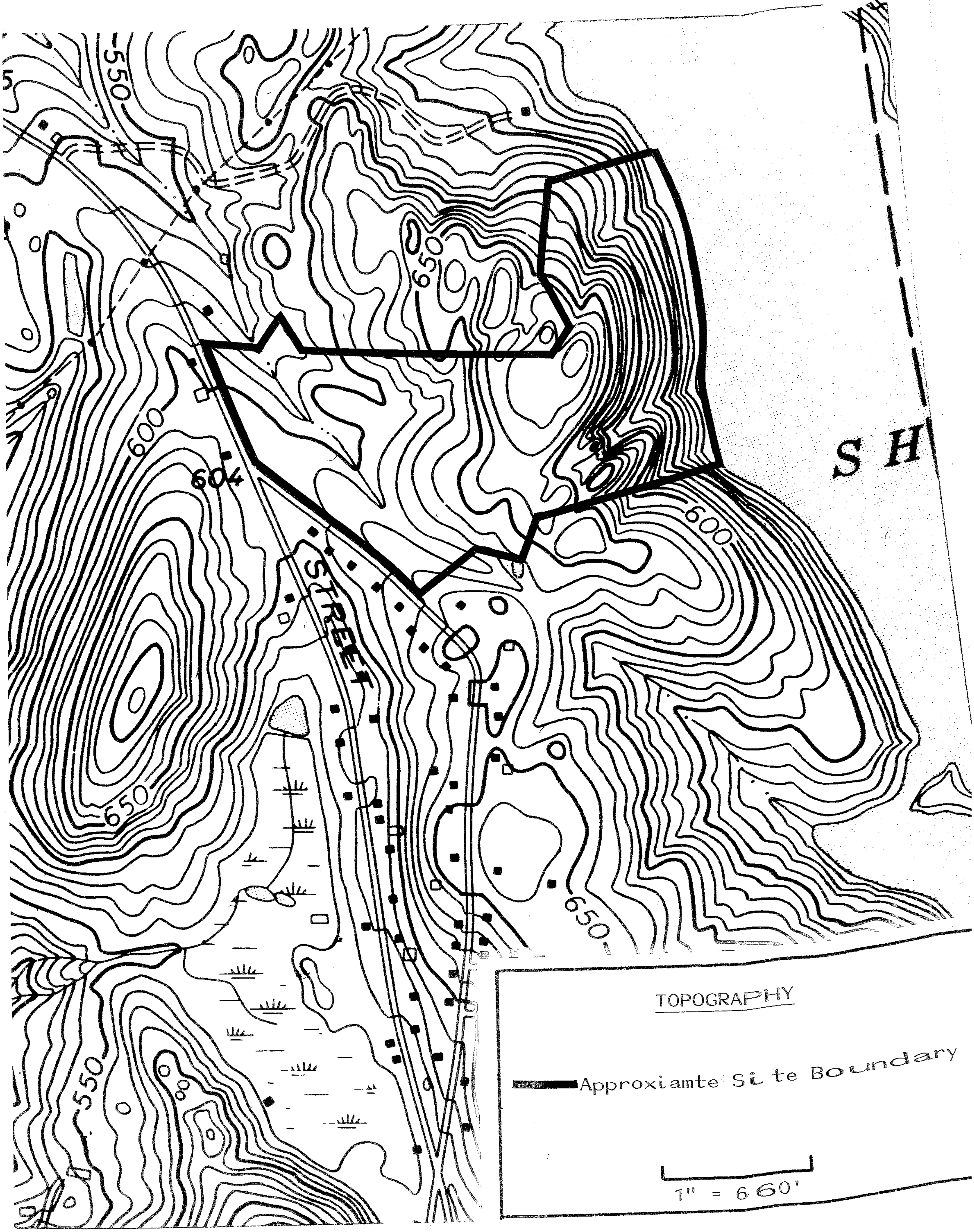
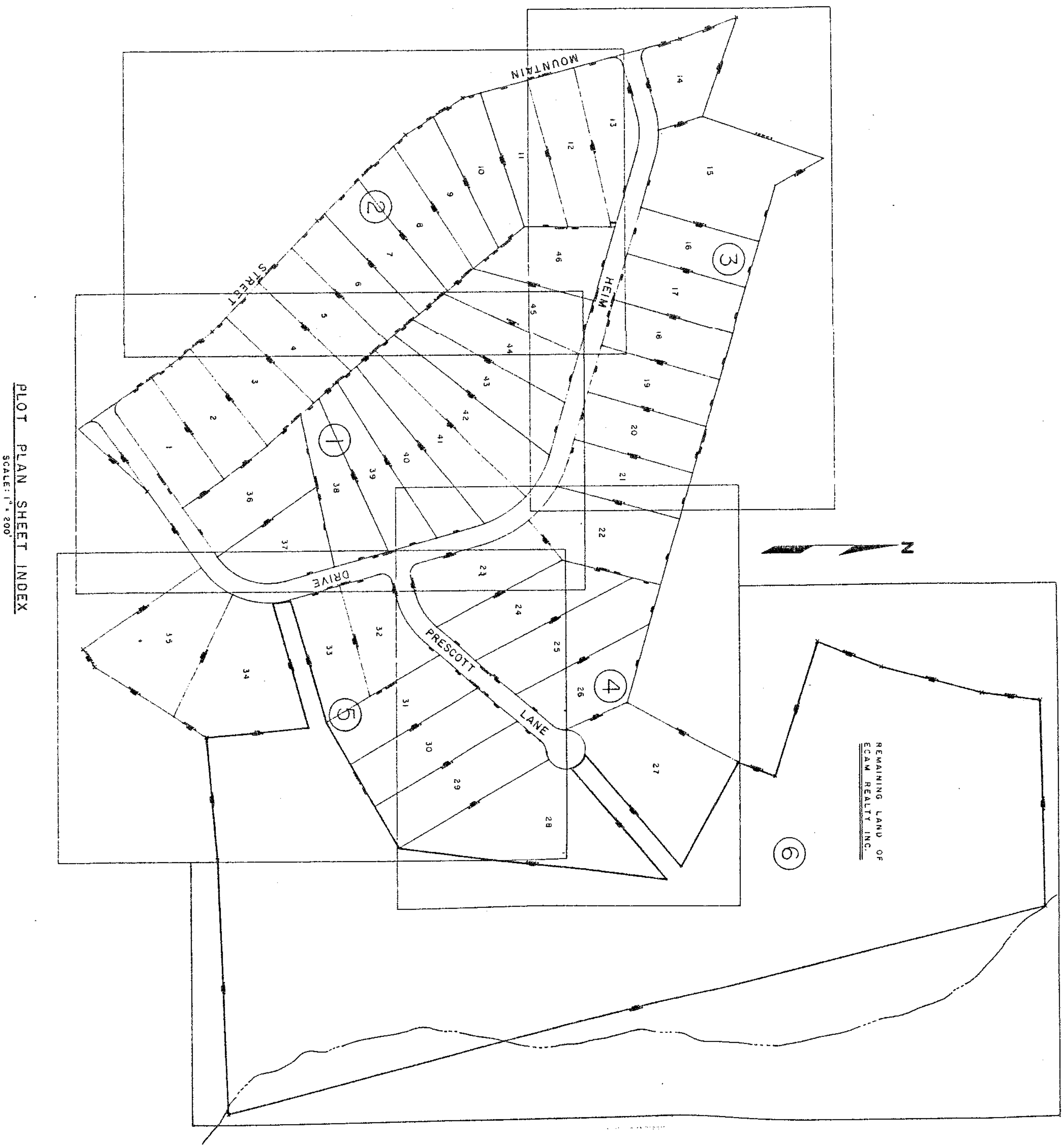

SCALE 1" = 1000'
MOUNTAIN ST.
SITE
SHENIPSIT ST.
MOUNTAIN STREET
SHENIPSIT LAKE
SHENIPSIT VIEW HEIGHTS
RANSON RD.
UPPER BUTCHER RD.
ELLINGTON
VERNON
LAWRENCE ST.



TOPOGRAPHY

Approxiamte Site Boundary

1" = 660'


PLOT PLAN SHEET INDEX
SCALE: 1" = 200'
MOUNTAIN
STREET
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DRIVE
PRESCOTT
LANE
N
REMAINING LAND OF ECAM REALTY INC.
1
2
3
4
5
6

1. INTRODUCTION AND TOPOGRAPHY

The Eastern Connecticut Environmental Review Team has been asked by the Ellington Conservation-Inland Wetlands Commission to perform an environmental review of the proposed Edgewater Heights Subdivision. This report contains natural resource information and also highlights areas of concern. Recommendations are given in order to mitigate any negative impacts. The report should be read in its entirety.

The proposed Edgewater Subdivision site is situated between Mountain Street and Shenipsit Lake in eastern Ellington. The applicant wishes to subdivide the ± 87 acre parcel into 50 residential building lots ranging is size from 1 to +2 acres. Each of these lots would be served by on-site wells and a combination of public sewers and septic systems. Immediate access to the site is provided via Mountain Street. Approximately 20 acres of field in the western parts were formerly used for agriculture. The remainder of the land is wooded.

The site is covered by thin soils, especially the central and eastern parts which are festooned with rock outcrops. As such, the central and eastern parts are characterized by slopes which range from steep to precipitous. These east facing slopes afford scenic views of Shenipsit Lake, a public water supply reservoir for the Connecticut Water Company.

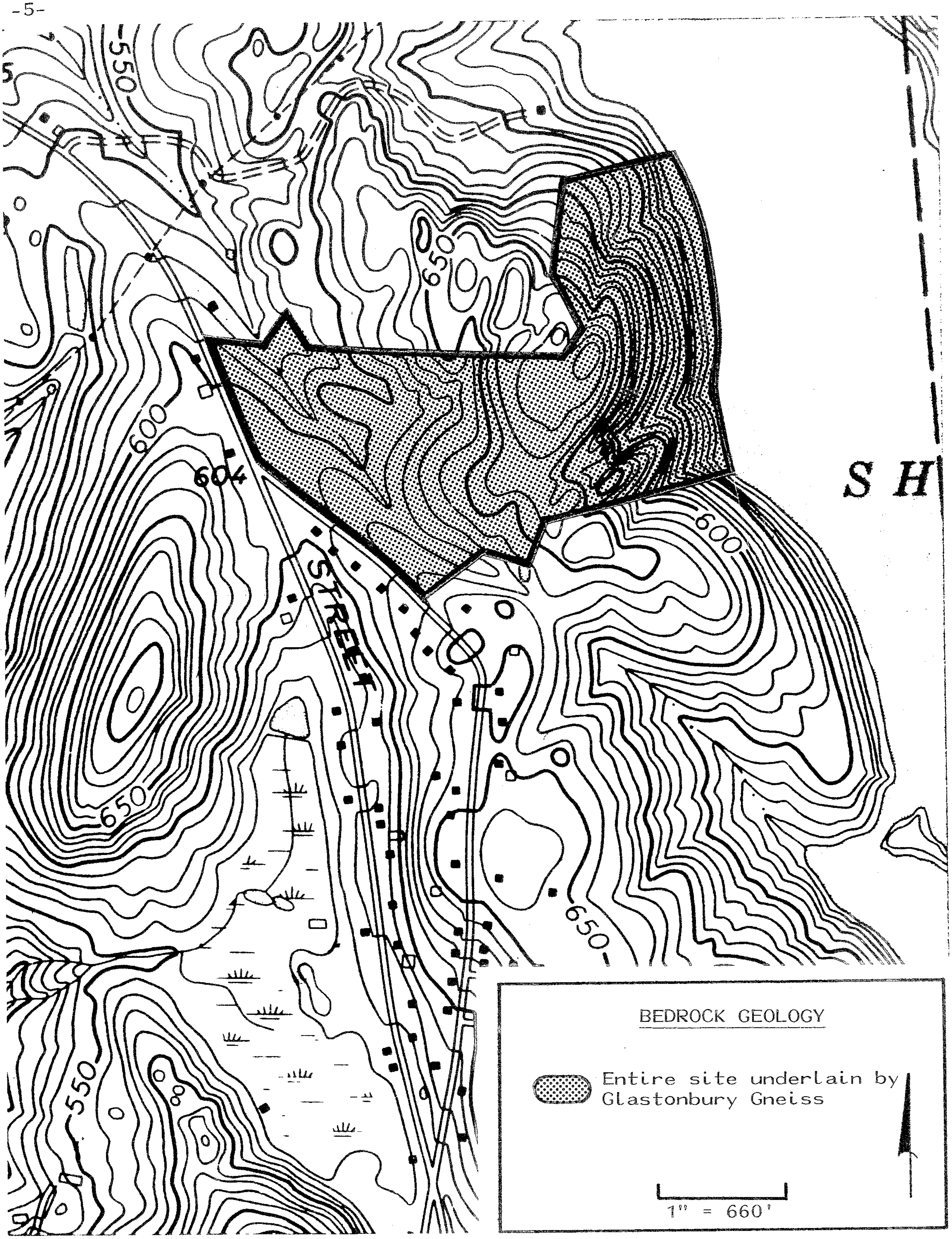
The land surface in the western parts slopes gently to moderately to an unnamed north flowing tributary to Marsh Brook.

The high water mark of Shenipsit Lake along the eastern border, which is about 507 feet above mean sea level, represents the lowest elevation on the site. The highest elevation on the site is about 690 above sea level and is located at the top of the rock-cored hill in the east-central parts. (See TOPOGRAPHIC MAP)

2. GEOLOGY

The proposed 50-lot subdivision is located entirely within the Ellington topographic quadrangle. A bedrock geologic map (QR-4, by G. E. Collins, 1946) and a surficial geologic map (GQ-945, by R. B. Colton, 1972) for the quadrangle has been published by the Connecticut Geological and Natural History Survey and U. S. Geological Survey, respectively.

The bedrock geology of the quadrangle has been well described by Collins in QR-4. He has identified the rock core underlying the site as Glastonbury Gneiss. It consists of a gray, medium


550
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STREET
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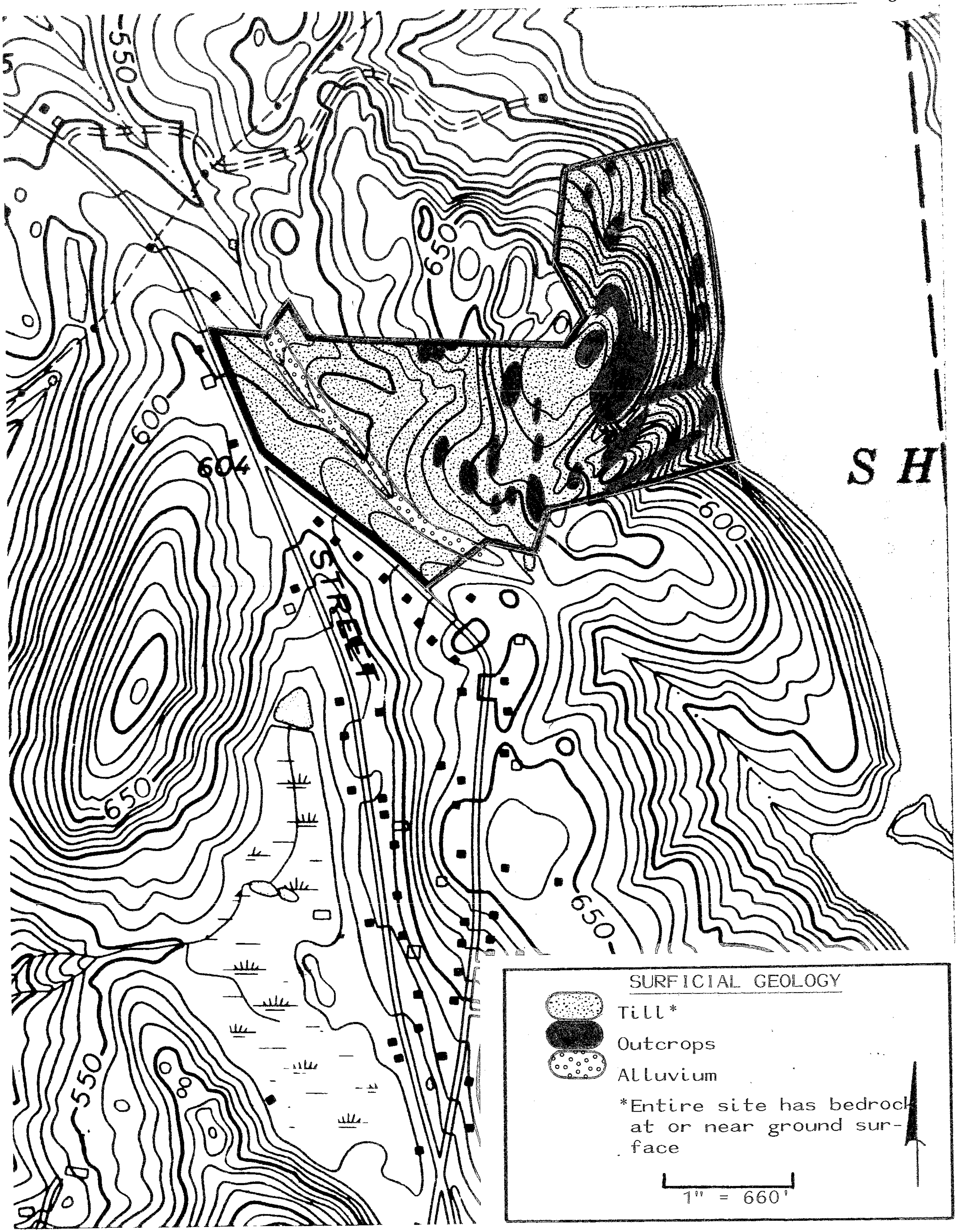
BEDROCK GEOLOGY
Entire site underlain by
Glastonbury Gneiss
1" = 660'


550
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604
STREET
600
650
SH
650
550
SURFICIAL GEOLOGY
Till*
Outcrops
Alluvium
*Entire site has bedrock at or near ground surface
1" = 660'

to coarse grained massive to well-foliated (layered) granitic gneiss. The term "gneiss" refers to a rock that has been subjected to great heat and pressure within the earth's crust. These rocks contain dark, platy or flaky minerals that alternate with thin layers of more rounded minerals which are light colored. This mineral arrangement gives the rock a banded appearance. The adjective "granitic" used above means the rock contains minerals such as quartz, plagioclase feldspar and biotite, all of which are common minerals in granite rock.

The bedrock structure has strongly influenced the shape of the landforms and the drainage patterns on the site. The bedrock underlying the site is the source of water to domestic wells in the area. It is understood that the water supply for each of the 50 lots in the Edgewater subdivision would be derived from drilled wells, that penetrate the underlying bedrock. (See WATER SUPPLY SECTION)

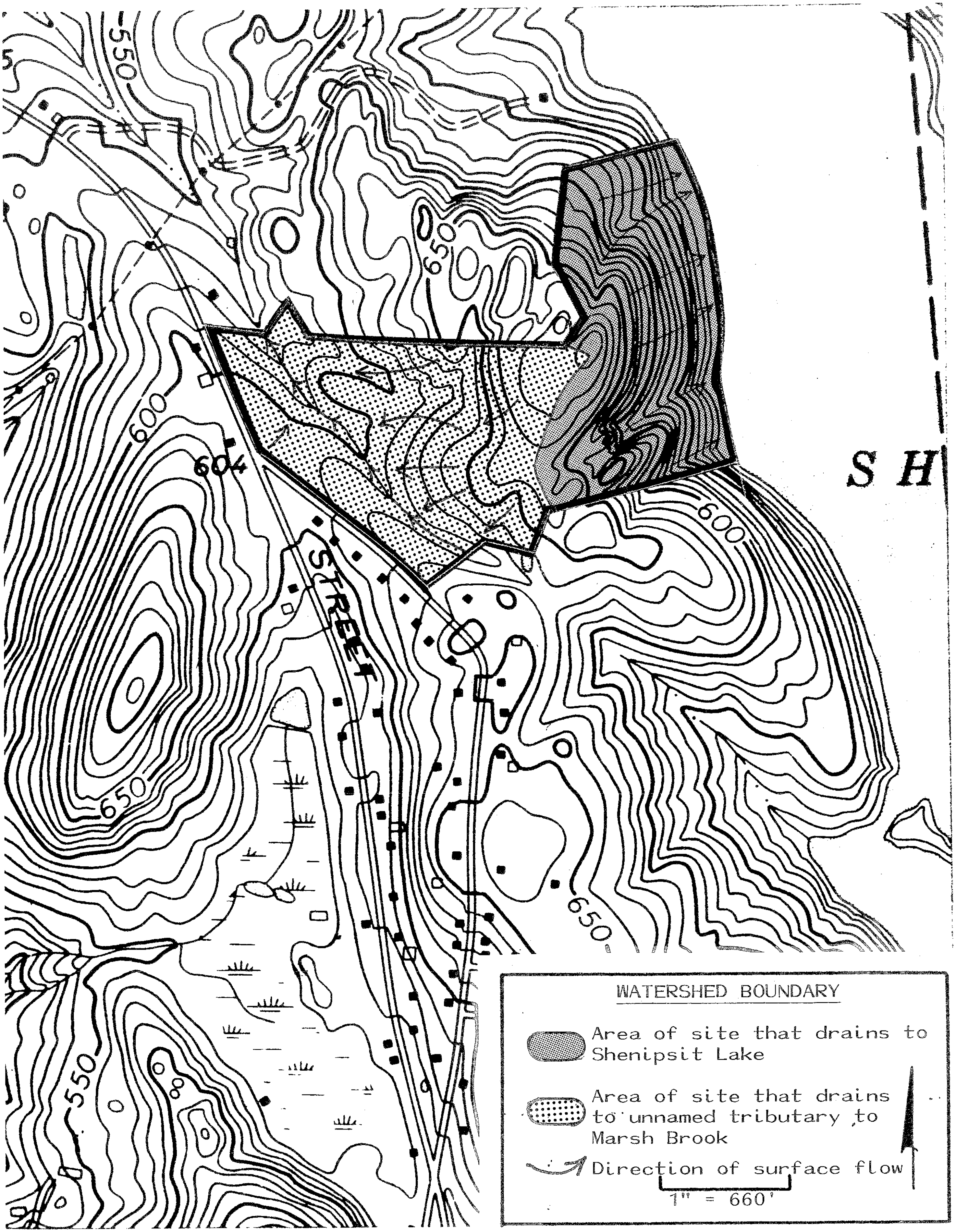
The entire site is covered by a relatively thin layer of glacial sediment called till. These sediments consist of a non-sorted, non-stratified mixture of rock particles of varying shapes and sizes that were deposited directly by glacier ice as it moved across the region from northwest to southeast. It was deposited without substantial re-working by glacial meltwaters. Although the exact thickness of the till on the site is unknown, it probably does not exceed more than 10 feet. The deepest pockets, perhaps 8 to 10 feet thick, may be found in the western parts.

Based on visual observations made by the Team's Geologist during the field review, there appears to be an area of water-laid (sandy/gravelly) deposits flanking the east side of the streamcourse in the central parts. Some mining activity appears to have taken place in this area.

The final surficial geologic deposit found on the site is alluvium. Alluvium, which consists of stream deposits of silt, sand and gravel was deposited during recent time compared to the till deposits which were deposited probably 10,000 to 12,000 years ago. The alluvial deposits generally parallel the streamcourse in the western parts of the site. These soils are considered to be "regulated" under Chapter 440 of the Connecticut General Statutes. Any proposed activity that impacts regulated areas must be approved by the Ellington Inland Wetlands Commission.

3. HYDROLOGY

Surface drainage within the site may be divided into two areas. Surface runoff emanating from the western and central parts of the site flows downslope to the unnamed watercourse bisecting the western parts. This watercourse is tributary to Marsh Brook. The remaining


550
650
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STREET
SH
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650
550
WATERSHED BOUNDARY
Area of site that drains to Shenipsit Lake
Area of site that drains to unnamed tributary to Marsh Brook
Direction of surface flow
1" = 660'

eastern parts of the site drain quickly downslope to Shenipsit Lake.

Development of the site would be expected to lead to increases in amount of runoff shed from the site. The amount of the increase will ultimately depend upon the extent of development, the amount of impervious surfaces created and the amount of vegetation removed. The added runoff could cause increased overland and stream channel erosion, especially in concentrated areas and it may increase the peak flood flows of streams on the site. These problems can be ameliorated by formulating and following a stormwater management plan for the subdivision.

The major concern in terms of added runoff for the eastern parts of the site which drain to Shenipsit Lake is the chance for erosion.

The potential for erosion due to concentrated runoff from this part of the site may be further increased by the presence of very steep slopes. In order to avoid this potential problem, a comprehensive erosion and sediment control plan will need to be developed for each lot in this area. Strict engineering measures such as silt fencing will also be needed to overcome potential erosion problems. Every effort should be made to keep running water off of steep slopes and provide energy dissapators at storm drain outlets.

The potential for flooding problems in this part is low due to the low density development proposed and its close proximity to Shenipsit Lake. In order to protect Shenipsit Lake, a public water supply reservoir from possible siltation, consideration should be given to the installation of a temporary sediment pool(s) during the construction phase. Also, a conservative buffer (100 feet, but preferably more) should be maintained from the high water mark of Shenipsit Lake and any development activity that takes place on the site.

The major concern for added runoff from the western and central parts is to ensure that peak flows are not increased to the streamcourse on the site so that flooding problems occur to downstream areas. This should be carefully examined since a few downstream residences (at the intersection of Route 83 and the streamcourse) are very close to the streamcourse. Present plans indicate that increased runoff will be detained in the wetland paralleling the streamcourse on the site. Also, it is recommended that all downstream culverts be carefully examined.

4. EROSION AND SEDIMENT CONTROL

The following comments are provided as the result of a field examination of the site and subsequent visits.

1. Wetland boundary information as provided on the plan map was not verified in the field since most of the flags were missing and the numbers were not legible on the few remaining flags. The consulting soil scientist should review the plans and sign them certifying that the wetland boundary information presented is substantially correct. The date(s) when the field work was done should also be included on the plan.

2. The intermittent stream running from the existing pond on lot number 35 and wetlands under the proposed southern entrance of Helm Drive were not surveyed onto the plan map.

3. The steep driveways proposed may present a long term problem with erosion. Driveways over a grade of 8% and others depending on the length usually erode and require either pavement or other special measures to protect them. The eroded material is usually deposited in the road or into the storm drainage system and will end up in the intermittent stream. Methods for controlling driveway erosion should be considered.

4. The plans call for direct discharge of stormwater into the intermittent stream. Sediment control to collect silt, road sand and debris from being discharged into the stream should be addressed.

5. The detention basin should be designed according to the standard found in the <u>Connecticut Guidelines for Soil Erosion and Sediment Control</u> (1985) page 8-43. Dwight Southwick, Engineering Specialist has reviewed the detention basin calculations and has provided comments for review. (See ENGINEERING CONCERNS)

6. An Operation and Maintenace Plan should be developed for the sediment basin and the responsibility of cleaning and maintaining it should be indicated on the plan map.

7. Homes and driveways were not shown on the plan map. Placement should take into account the proximity to wetlands, steep topography and minimum areas of buildable land. Without knowing the exact placement of homes and driveways on each lot, the degree of wetland disturbance to install driveways and to connect laterals to the sewer line is unknown. It appears that driveways on lots 15 and 16 will have to cross the wetlands and that lots 1 through 16 and lots 42 through 46 will have to excavate into the wetlands to connect to the sewer line.

8. The main sewer line will be installed in the wetlands and may significantly disturb the existing wetland conditions.

9. Subsurface exploration for depth to bedrock may be necessary on lots 27, 28, 47, 48, 49 and 50 that will have their own septic systems, and on other lots for underground utilities and sewer lines.

10. Foundation drains to help prevent wet basements will be necessary on lots 8, 9, 10, 11, 12, 13 and 14.

11. The information provided by the Soil Survey of Tolland County appears to be adequate for the site. Soils interpretations have been provided.

12. Lots that will have their own septic systems, and areas that may be disturbed on lots along the perimeter of Shenipsit Lake need to be carefully designed and installed properly. Protection of the lake should be of highest priority.

13. The Erosion and Sediment Control Plan that was submitted is not adequate. The plans should show the measures listed in the narrative and details shown. Maintenance of Erosion and Sediment control measures should be listed as necessary. The seeding dates are incorrect and should be April 15 through June 15 and August 15 through September 15. A more detailed plan should be developed. The District would appreciate the opportunity to review revised plans for Erosion and Sediment Control for adequacy prior to final approval.

5. ENGINEERING CONCERNS

The calculations from A. R. Lombardi Associates, Inc. have been reviewed and comments are:

1. Sheet 3 shows soil Hxc = Hrc to be hydrologic soil group A. These soils are Hollis very rocky and Hollis extremely rocky and should be hydrolic soil group D. Scarboro (Sf) is also hydrologic soil group D.

2. Sheet 6. There is about 15 acres of "D" soil that has not been accounted for in the future development. The soils map indicate that there are no "A" soils in the drainage area and the consultant uses about 16 acres. Both the before and after RCN's (runoff curve numbers) are low.

3. Sheet 15-17 Flood Routings. A spot check of the 50 year frequency storm routing shows that the method the consultant used gives about 58% less storage than required by the approximate method given in the Sediment and Erosion Control Guidelines.

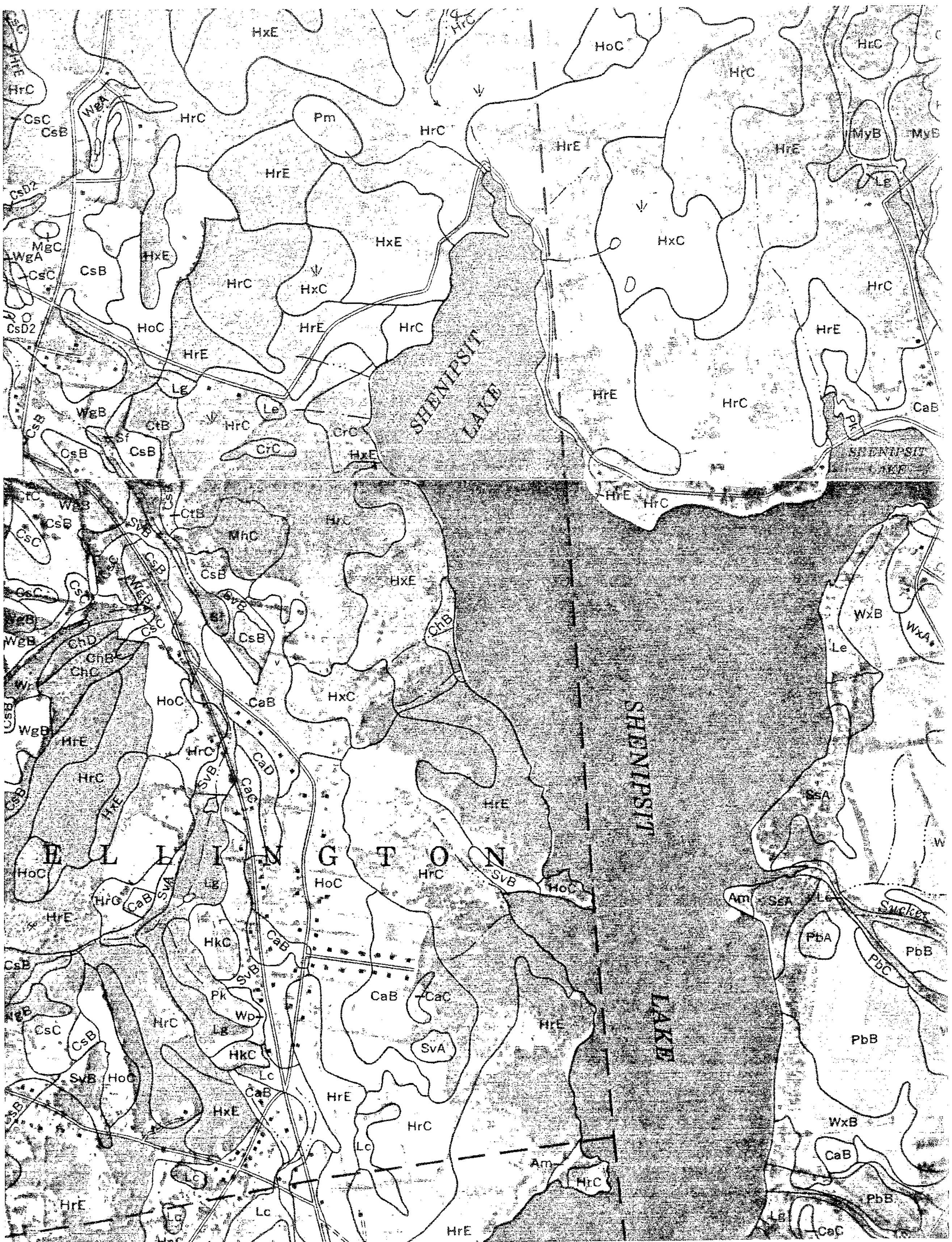
United States Department of Agriculture

Soil Conservation Service

Tolland County USDA-SCS
24 Hyde Avenue
Rockville, CT 06066
875-3881

Scale 1"=1320'

Soil Survey Sheets #20, #24



6. SOILS DESCRIPTIONS

CaA -- CaB

Canton and Charlton soils, 3 to 8 percent slopes - This unit consists of gently sloping, deep well drained soils on ridges, hills, and side slopes of glacial till uplands. The areas are mostly rectangular or irregular in shape. Slopes are generally smooth and convex and 200 to 400 feet long. About 45 percent of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. Some areas of this unit consist almost entirely of Canton soils, some almost entirely of Charlton soils, and some of both. The soils were mapped together because they have no significant differences in use and management.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly loamy sand to a depth of 60 inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils. Also included are a few large, nearly level areas and a few areas that have a compact substratum at a depth of 40 to 50 inches.

The water table in these Canton and Charlton soils is commonly at a depth of more than 6 feet. The permeability of the Canton soils is moderately rapid in the surface layer and subsoil and rapid in the substratum. The permeability of the Charlton soils is moderate or moderately rapid. Both soils have medium to rapid runoff, have moderate available water capacity.

Instability of some excavations in the Canton soils is the main limitation of these soils for community development.

ChB -- <u>Canton and Charlton soils, 3 to 8 percent slopes, very stony.</u> This mapping unit consists of gently sloping well drained soils on ridges, hills, and side slopes of glacial till uplands. The areas are mostly rectangular or irregular in shape. Slopes are generally smooth and convex and less than 200 feet long. About 45 percent of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. In some areas, this unit will consist almost entirely of Canton soils or almost entirely of Charlton soils. The soils were mapped together because they have no significant differences in use and management. Stones cover 1 to 8 percent of the soil surface.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly sand loam 21 inches thick. The substratum is pale brown gravelly loamy sand to a depth of 60 inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils; well drained Paxton soils; and moderately well drained Sutton soils. Also included are a few areas that have a compact substratum at a depth of 40 to 50 inches.

The water table in these soils is commonly at a depth of more than six feet. The permeability of the Canton soils is moderately rapid in the surface layer and subsoil and rapid in the substratum. The permeability of the Charlton soils is moderate or moderately rapid. Both soils have medium to rapid runoff, and have moderate available water capacity.

Instability of some excavations in the Canton soils is the main limitation for community development.

HrC -- <u>Charlton-Hollis complex, 3 to 15 percent slopes, very rocky</u> - This complex consists of gently sloping to sloping, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. The areas of this unit are mostly irregular in shape. Slopes are mostly complex and are 100 to 200 feet long. Stones cover 1 to 8 percent of the surface.

This unit is about 55 percent Charlton soils, 20 percent Hollis soils, 15 percent other soils, and 10 percent exposed bedrock. The Charlton and Hollis soils are in such a complex pattern that it was not practical to map them separately.

Typically, the Charlton soils have a thick, fine sandy loam topsoil and subsoil over a sandy loam substratum. The soils are commonly deeper than 60 inches.

The Hollis soils have fine sandy loam topsoil and subsoil from 10 to 20 inches thick over hard, unweathered schist bedrock.

Included with these soils in mapping are small areas of well drained Canton and Paxton soils; moderately well drained Sutton and Woodbridge soils; and poorly drained Leicester soils. Also included are small areas with bedrock at a depth of 20 to 40 inches.

The water table of these soils is commonly at a depth of more than 6 feet. The available water capacity is moderate in the Charlton soils and very low or low in the Hollis soils. Both soils have moderate or moderately rapid permeability and medium to rapid runoff.

The areas of exposed rock and the depth to bedrock in the Hollis soils limit the use of these areas for community development, especially as a building site or as a site for onsite septic systems. The stones on the surface restrict landscaping.

HxC -- **Hollis-Charlton-Rock outcrop complex, 3 to 15 percent slopes**

HxE

This unit consists of gently sloping to sloping, somewhat excessively drained and well drained soils and areas of exposed bedrock. The unit is on hills and ridges of glacial till uplands in long and narrow or irregularly shaped areas. Slopes are mostly convex and 100 to 200 feet long. Stones cover 8 to 25 percent of the surface, which is marked by narrow, intermittent drainageways and a few small, wet depressions. The unit is about 35 percent Hollis soils, 30 percent Charlton soils, 15 percent exposed bedrock, and 20 percent other soils. The Hollis and Charlton soils and exposed rock are in such a complex pattern that it was not practical to map them separately.

Typically, the Hollis soils have a surface layer of dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown gravelly fine sandy loam 12 inches thick. Hard, unweathered schist bedrock is at a depth of 14 inches.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Included with this unit in mapping are small areas of somewhat excessively drained Gloucester soils, well drained Canton and Charlton soils, moderately well drained Sutton soils, and poorly drained Leicester soils.

The water table in this unit is commonly below a depth of six feet. The available water capacity is very low or low in the Hollis soils, and moderate in the Charlton soils. Both soils have moderate or moderately rapid permeability and medium to rapid runoff.

Most areas of this unit are in woodland. A few small areas are in pasture.

This unit is too stony for cultivation. The stones on the surface, the areas of exposed rock, and the depth to bedrock in the Hollis soils make the unit poorly suited to woodland and are the major limitations for community development. Droughtiness in the Hollis soils causes a high rate of seedling mortality, and trees on the Hollis soils are subject to uprooting because of the depth to bedrock.

Sf -- Scarboro Series -- This unit consists of deep, very poorly drained soils on terraces and outwash plains. They formed thick sand deposits.

Typically, these soils may have a three inch black mucky peat layer over a six inch very dark brown mucky sandy loam layer. The subsurface layer from six to thirteen inches is gray loamy sand. The substratum from three to sixty inches is olive gray, grayish brown and light yellowish brown loamy sand, loamy fine sand and coarse sand. The substratum may be stratified.

These soils have severe limitations for septic tank leaching fields due to the high water table. The limitations are very difficult to overcome and are considered as least suitable for this type of use. They have good potential for pond construction.

SvB -- <u>Sutton fine sandy loam, 3 to 8 percent slopes</u> - This gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Areas are dominantly irregular in shape.

Typically, this Sutton soil has a very dark grayish brown, fine sandy loam surface layer 9 inches thick. The subsoil is yellowish brown, dark yellowish brown, and dark brown, mottled fine sandy loam and sandy loam 24 inches thick. The substratum is olive brown, mottled sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Canton and Charlton soils; moderately well drained Woodbridge soils; and poorly drained Leicester soils. Included areas make up about 10 percent of this map unit.

The Sutton soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate or moderately rapid. The available water capacity is moderate. Runoff is medium. Sutton soil warms up and dries out slowly in the spring.

The major limiting factor for community development is the seasonal high water table. Onsite septic systems need special design and installation to prevent effluent from seeping to the surface. Foundation drains help to prevent wet basements. Lawns are wet and soggy in the fall and spring. Quickly establishing a plant cover and using mulch, temporary diversions and sediment basins help to control erosion during construction.

7. GEOLOGIC DEVELOPMENT CONCERNS

The major geologic limitations on the site with respect to the proposed subdivision include: (1) areas where bedrock is at or near the surface of the ground, which is vertually the entire site; (2) areas of steeply sloping land, most of which prevails in the eastern parts; and (3) the wetland corridor in the western parts.

Team members were informed on the review day that the subdivision will be served by a public sewer line, some on-site sewage disposal and on-site wells.

The availability of sewer lines to this property will eliminate the need for all the lots to have individual on-site septic systems. Based on visual observations and the aforementioned geologic limitations, most of the site would have very low potential for on-site disposal.

It should be pointed out that there was some discussion on the review day about serving a few large size lots in the eastern parts with on-site septic systems. This is mainly due to shallow soil conditions and the inability to gravity feed into the municipal sewer line. If this is considered, detailed soil testing in conjunction with the local health district would be most important especially since effluent would drain eastward towards Shenipsit Lake, a public water supply reservoir.

An alternative to on-site septic systems in this area would be to pump the domestic waste via grinder pumps to the municipal sewer line. However, because of the extremely shallow to bedrock conditions, it seems likely that much blasting would be required.

A trench of 4 feet deep would be desired for burying the discharge line for the grinder pump so that it is adequately protected from frost.

The presence of rock outcrops and shallow soils throughout most of the site will undoubtedly pose problems for the placement of sewer lines, electric/telephone lines, water lines or any other underground utility. Competent bedrock encountered at shallow depth on the site will require blasting in order to install utility lines. Any blasting that is required on the site should be conducted under the supervision of qualified personnel familiar with state of art blasting techniques. This will help to minimize undue seismic shock and potential damage claims. In this regard, it is recommended that a pre-blast survey of nearby properties be conducted to minimize the chances for unwarranted damage claims. Because the areas that need blasting contain moderate to steep slopes, it is important to develop a sound erosion sediment control plan. Blasting will undoubtedly mobilize fine particles which may cuase siltation to nearby watercourses. It would also be wise to complete the blasting before the construction of houses are commenced on the site.

Based on present plans, the wetlands in the western parts will need to be crossed by the proposed access road to the site and the sanitary sewer line proposed. Depending on the desired house location, additional crossings of regulated soils by driveways may also be required.

Although undesirable, wetland crossings are feasible provided they are properly engineered. When constructing roads or driveways over wetland soils provisions should be made to mitigate adverse environmental impacts. The most obvious technique available to mitigate the impact on the wetland is to avoid the wetland altogether and develop in adjacent areas that will have minimal impact. Both of these measures may, however require that the site plan be modified. Another valuable technique is to properly size and locate culverts so as to allow the natural flow of water to continue. This will minimize the alteration of the water levels in the wetland. Finally, road construction through wetlands should preferably be done during dry climatic conditions. To accomplish this, unstable soil material beneath the proposed road should be removed. The road bed should then be backfilled with a proper road base fill material and the installation of culverts may be necessary. The road should be at least 1.5 feet or preferably two feet above the surface elevation of the wetland. This will allow for better drainage of the roads and it will also decrease frost heaving potential of the road. Effective erosion and sedimentation control measures should also be implemented.

Similar provisions will need to be taken during the installation of the sanitary sewer. This activity should also be done during the summer months.

8. WATER SUPPLY

Although Ellington Center has a public water supply system, the subdivision plan calls for on-site wells to serve each lot. According to the applicant's attorney, a study undertaken by the developer found that the extension of the public water supply line was not economically feasible. It is understood that each lot in the subdivision would need to derive its water supply from drilled wells, cased with steel pipe into solid rock and completed as open boreholes in the Glastonbury gneiss.

The exact yield of a bedrock-based well is a function of many geologic factors such as the number and size of fractures present in the bedrock. Since fractures in bedrock are irregular, there is no practical way of predicting the yield of a bedrock well drilled in a specific location. Even with geophysical exploration, it is extremely difficult to predict such yields. As such, the yield of a well tapping crystalline rocks cannot be estimated with any certainty before drilling. Although not prolific aquifers, drilled wells into metamorphic bedrock are generally sufficient for residential demands.

An assessment of 28 bedrock-based wells has been conducted for the Upper Connecticut River Basin which includes the study area. The yields of these wells ranged from 0.7 to 25 gallons per minute with a mediam yield of 9 gal/min. According to a study (Hydrogeologic Evaluation of Water Quantity Resources From Bedrock For The Proposed Edgewater Heights Subdiviison, Ellington, Connecticut, by Geotoxi Associates, Inc., April, 1987) conducted for the applicant, well completion reports for 26 bedrock wells from the surrounding neighborhoods were reviewed. It was found that well yields ranged from 3 to 50 gallons per minute, with a mean value of 13.9 gallons per minute. It should be pointed out that some of the wells surveyed may tap a rock formation other than Glastonbury gneiss. A yield of 3-5 gallons per minute is generally desired for residential use.

A typical well depth is likely to be 150 feet or more, but some wells might be expected to be as deep as 300 feet. Experience has shown however, that the chance of obtaining a substantial increase in well yield at aquifer penetrations greater than 300 feet is slim.

A water-related concern expressed by Town officials on the review day is whether or not the proposed 50 drilled wells will interfere with each other or possibly neighboring wells during pumping periods. This situation may cause the yield of a particular well or wells to be seriously depleted, especially since municipal sewers will transport sewage effluent from the site. As a result, renovated effluent from on-site systems will not be available as recharge to the bedrock aquifer.

When any type of well or group of wells are pumped, it can generally be expected to result in some lowering of the water table especially near the well. Instead of moving toward discharge zones, such as a stream or spring seep, the groundwater moves towards the pumping well in every direction. The pumping well creates an artificial discharge area by lowering the water table around the well and withdrawing water from saturated fracture zones in the bedrock. This results in a cone of depression or an area of drawdown. The area of drawdown will depend largely upon the duration and rate of pumping wells, the aquifer's physical characteristics, the natural slope of the water table, and the availability of recharge to the bedrock aquifer. Assuming 320 gallons of water per day lot, the estimated home water use for the entire subdivision on a daily basis is about 14,720 gallons or 5.3 million gallons per year. Therefore, one can expect to lose ±5.3 million gallons of water per year of potential recharge to the bedrock aquifer via the municipal sewer line. This could have a serious impact on the bedrock wells, particularly on low yielding wells, during droughty periods and/or over long periods of time (i.e., 10 or 20 years).

In view of this potential problem, every effort should be made to ensure that domestic wells serving the subdivision will have adequate amounts of water. This might be accomplished by first drilling and developing several wells on the site prior to construction to determine potential yields. Once a well is developed some effort should be made to determine its zone of influence during pumping period and determine its affect on nearby wells. If lot sizes are large, conservative separating distances can be maintained. This may help to minimize the chance for mutual interference between pumping wells unless the wells all tap the same fracture zone.

According to Water Resources Bulletin #15, a rough rule-of-thumb is that the distance between crystalline bedrock wells should be at least twice the thickness of the aquifer (any geologic formation capable of producing useable amounts of water). The water bearing part of bedrock is ordinarily about 150 feet thick suggesting a minimum separation of 300 feet between wells if they penetrate average bedrock, or if evidence to the contrary is lacking. Adequate spacing between wells does not guarantee that they will yield enough water, but it safeguards whatever yields are obtainable. This does not take into consideration the loss of recharge of renovated septic system effluent to the municipal sewer system.

In summary, a conclusive determination has to be made that the loss of recharge via the municipal sewer line will not affect the long term yields of the proposed wells and that the average recharge rates to the well on each lot will not exceed the water demands of that lot. It should be kept in mind that if the need arose to extend the municipal water line to the site in the future it would be extremely costly.

The natural quality of groundwater in this area should be satisfactory. However, there may be a chance that elevated iron and manganese levels could affect well water quality. As a result, it may be necessary to install an appropriate water treatment system.

9. FISH RESOURCES

Shenipsit or Snipsic Lake is the primary surface hydrological feature. The lake has long been popular with trout and bass fishermen despite its limited access. During the early part of this century the lake was stocked by the state with smallmouth bass, yellow perch, sunfish, catfish, smelt, landlocked salmon and lake trout. Brown trout catches have been frequently noted in recent years, presumably as a result of immigration from feeder streams to the lake. Brook trout have also been reported by anglers.

Periodic discussions have been conducted by local towns and the state of Connecticut to determine how improved angling access might be provided without lowering water quality. To date no agreements have been reached. Given the very high rating that the lake enjoys as a fisheries resource, however, discussions are certain to continue.

Development should be discouraged on the steep slopes draining to the lake. Road drainage facilities should be carefully designed to eliminate sedimentation of the lake shore. As a consequence of the delicate nature of this property, the Town and developer should work closely to plan a subdivision with minimum numbers of dwellings to minimize septic leachate access to the lake.

The consequences of environmentally unsound development of the hill overlooking the lake can be expected to include:

1. Siltation of the lake shore below the development resulting in the proliferation of aquatic vegetation which is currently sparse in the lake's gravel substrate.

2. Higher fertility of the lake's water resulting in more frequent, denser algal blooms, and lower oxygen levels.

3. Low level changes in sodium and other ions in response to the influx of road salt. There is currently some road salt entering from existing paved surfaces in the lake's watershed.

Degradation of lake water quality ultimately can lead to a severe reduction in the amount of low temperature, high oxygen level water which is preferred by trout species. This process of eutrophication ultimately selects for species of fish other than trout, i.e., sunfish, perch, bullheads, etc.

About The Team

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a variety of federal, state, and regional agencies. Specialists on the Team include geologists, biologists, foresters, climatologists, soil scientists, landscape architects, archeologists, recreation specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area--an 86 town area.

The Team is available as a public service at no cost to Connecticut towns.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, sanitary landfills, commercial and industrial developments, sand and gravel operations, elderly housing, recreation/open space projects, watershed studies and resource inventories.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected officials of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the Chairman of your local Soil and Water Conservation District. This request letter should include a summary of the proposed project, a location map of the project site, written permission from the landowner allowing the Team to enter the property for purposes of review, a statement identifying the specific areas of concern the Team should address, and the time available for completion of the ERT study. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information regarding the Environmental Review Team, please contact Elaine A. Sych (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.