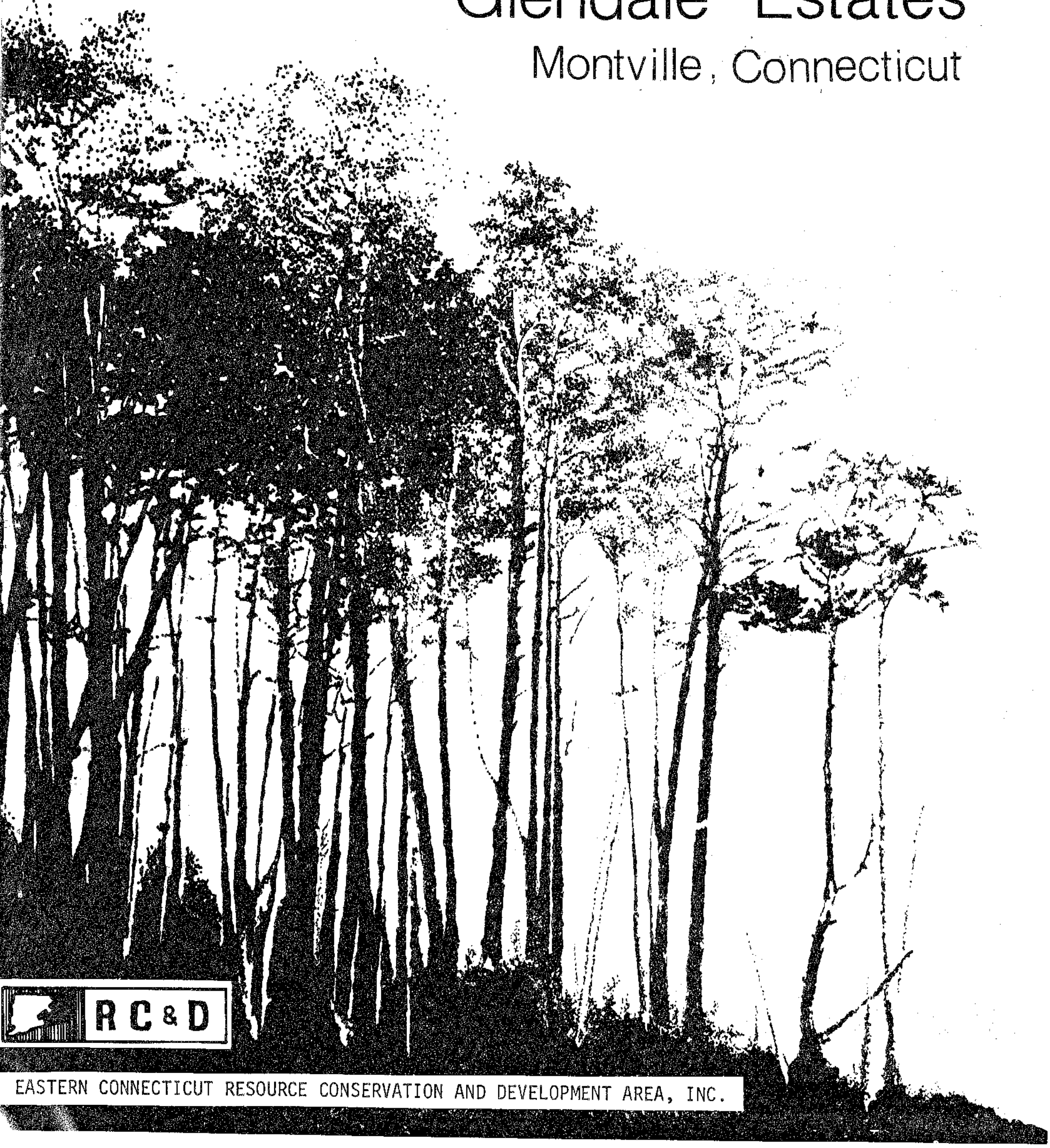
Environmental Review Team Report

Glendale Estates

Montville, Connecticut



EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team Report

on

Glendale Estates

Montville, Connecticut

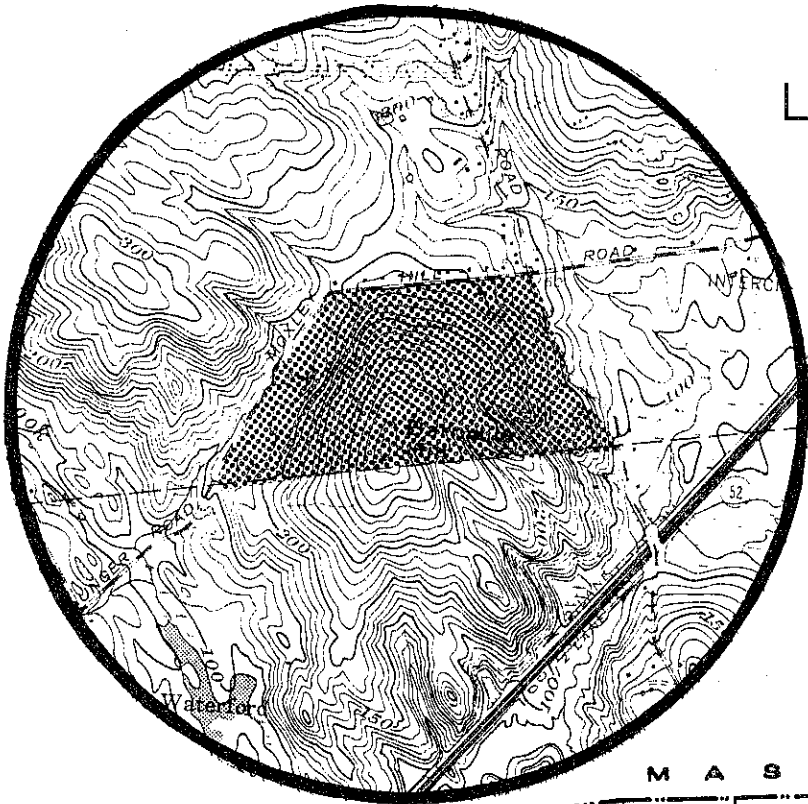
October 1979

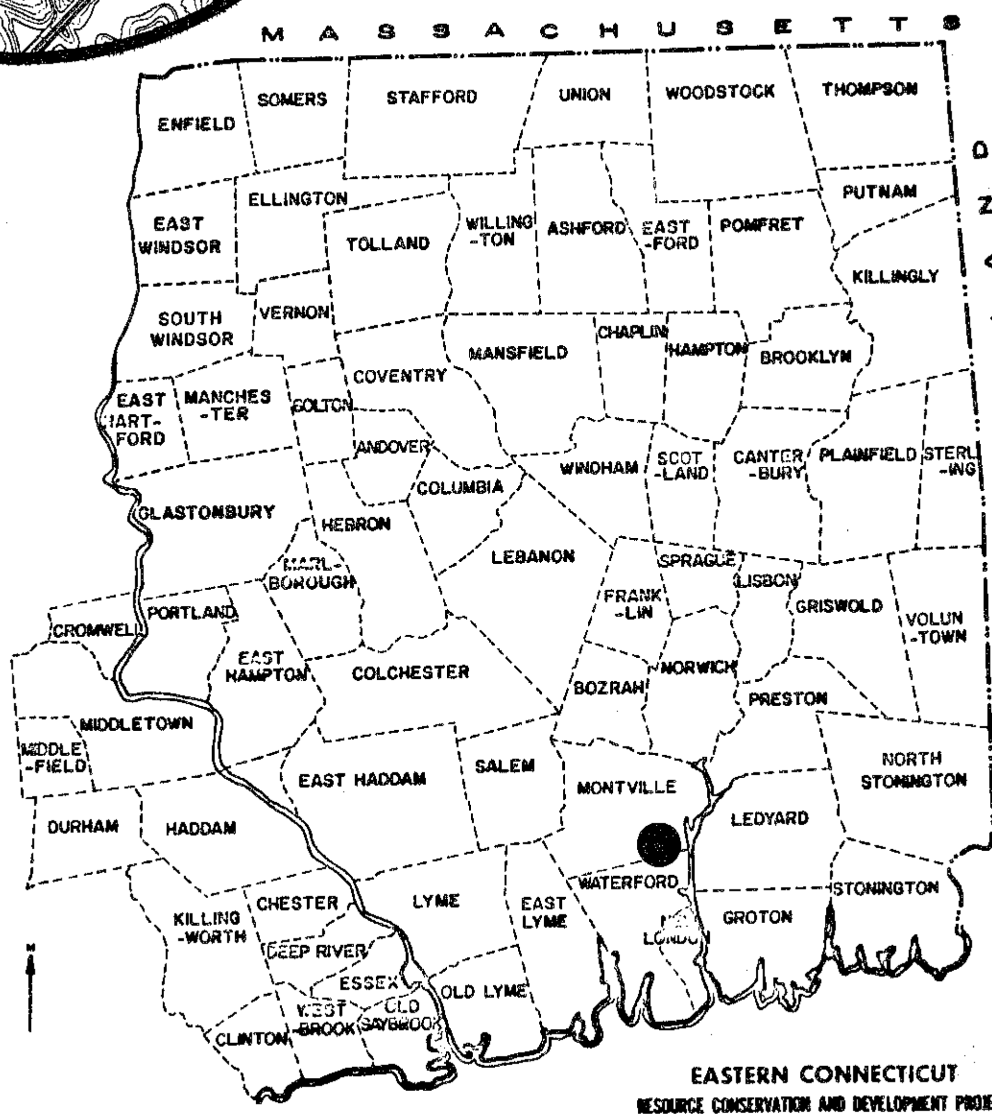
eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site

GLENDALE ESTATES
MONTVILLE, CONNECTICUT





EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
GLENDALE ESTATES
MONTVILLE, CONNECTICUT

This report is an outgrowth of a request from the Montville Zoning and Planning Commission to the New London County Soil and Water Conservation District (S&WCD). The Development (RC&D) Area Executive Committee for their consideration and approval as a project measure. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist of the United States Department of Agriculture (USDA), Soil Conservation Service (SCS). Reproductions of the soil survey map as well as a topographic map of the site were distributed to all ERT participants prior to their field review of the site.

The ERT that field checked the site consisted of the following personnel: Gary Domian, District Conservationist, Soil Conservation Service (SCS); Mike Zizka, Geologist, Department of Environmental Protection (DEP); Irene Palmer, Soil Conservationist (SCS); Rob Rocks, Forester, (DEP); Don Capellaro, Sanitarian, State Department of Health; Tom Seidel, Regional Planner, Southeastern Connecticut Regional Planning Agency; Bob Hust, New London County S&WCD; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

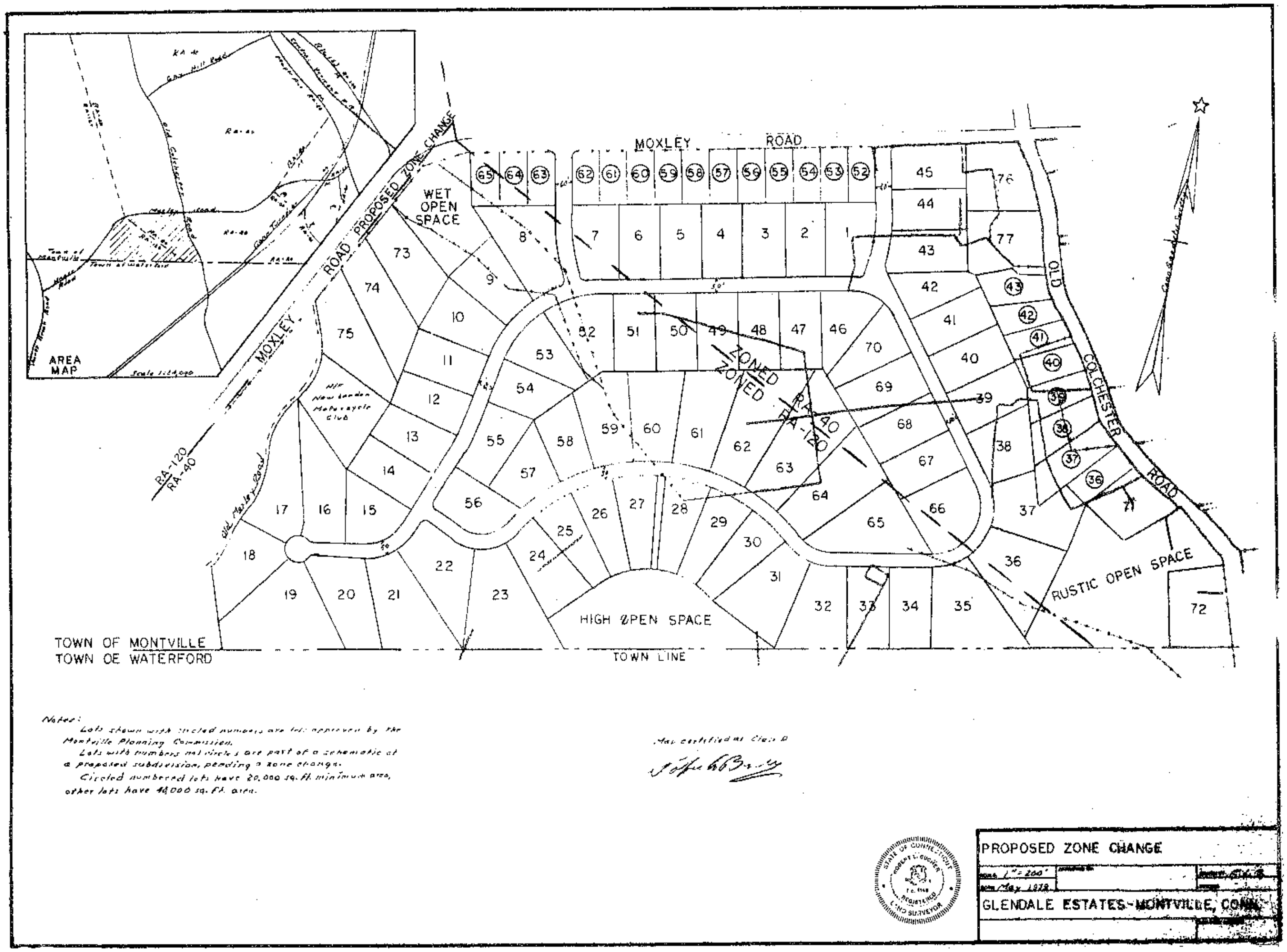
The Team met and field checked the site on Thursday, September 27, 1979. Reports from each Team member were sent to the ERT Coordinator for review and summarization for the final report.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. 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 of Montville. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

The Eastern Connecticut RC&D Project Committee hopes you will find this report of value and assistance in making your decisions on this particular site.

If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

Preliminary Subdivision Plan



INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for Glendale Estates, a 100± acre site located in southern Montville on Moxley Hill Road. The parcel consists of extremely stony and rigorous terrain which is presently vegetated. Large rock outcrops and sheer cliffs forming ravines are prevalent in the southeastern section of the site. The property is currently divided between the RA-40 zone (1 acre lots) and the RA-120 zone (3 acre lots). It was understood that the landowners intend to subdivide the parcel into 77 one acre lots, as shown on the preliminary plan prepared by Robert Bucher, L.S., May 1979. In order to proceed with this plan, the landowners have applied for a zone change from RA-120 to RA-40 for the entire parcel.

The proposed lots will be served by on-site wells and on-site septic disposal systems. A loop road which has two outlets onto Moxley Hill Road will serve as access to interior lots. Three open space areas have been set aside in separate areas of the proposed development.

The Team is concerned with the effect of the proposed development on the natural resource base of the site and surrounding area. Although severe limitations to development are evident on this site, many can be overcome with proper engineering practices. Use of these engineering methods can be costly, however, making a proposal economically unfeasible for the developer. In this case, slope, shallow-to-bedrock soils, wetlands and soil stoniness will be major factors determining engineering and construction costs.

Storm water runoff increases from this development proposal will be significant (see Hydrology section of this report, Tables I & II). A sediment and erosion control plan should be designed for this proposal and implemented during construction. Technical help in developing such a plan can be obtained from the New London County Soil Conservation Service Field Office in Norwich. Because this site is on a north facing slope, icing on driveways and roadways during winter months will cause significant problems to future residents. Footing drains will no doubt also be required to prevent flooded basements in wet areas of the site.

Due to slope, stoniness and shallow to bedrock soils, location and installation of septic systems will be difficult. These soil conditions also indicate a potential for poorly renovated septic effluent to enter the ground water bearing fractures of the bedrock on site, thereby contaminating well water in the future subdivision.

Locations of potential public water supplies in the town of Waterford will not be significantly effected by this proposal.

Regarding the potential zone change in this area, in the Team's opinion a change to RA-40 for the entire parcel would not benefit the natural resource base of this site. Given the environmental constraints of this parcel, consideration should be given to changing some of the designated RA-40 section to RA-120 (see Zoning section of this report).

ENVIRONMENTAL ASSESSMENT

GEOLOGY

The Glendale Estates site is located within the Montville topographic quadrangle area. Bedrock and surficial geologic maps of that quadrangle have been published by the U.S. Geological Survey. They are, respectively: Map GQ-609 and Map GQ-148. Both maps are by Richard Goldsmith.

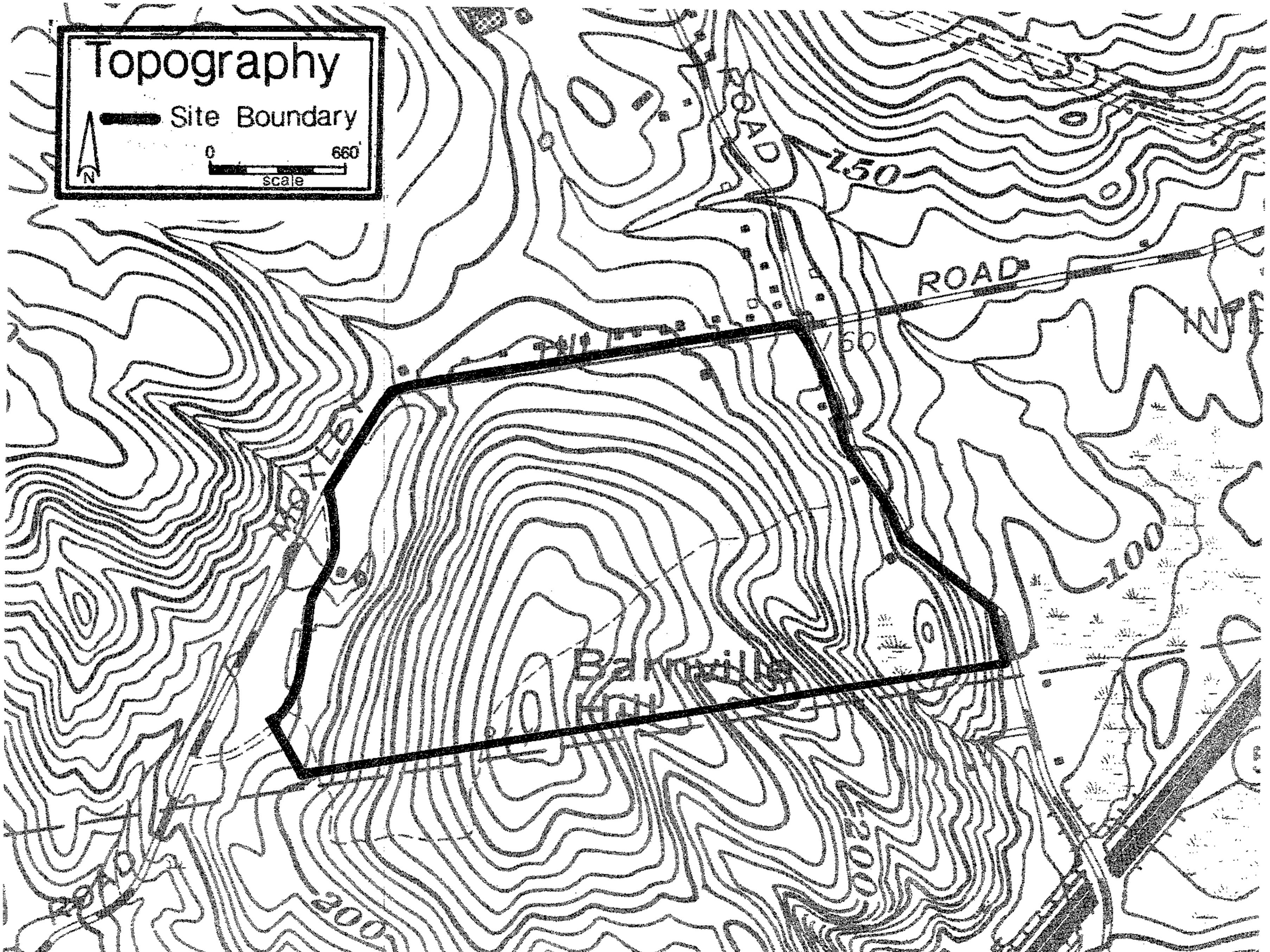
The bedrock, which crops out extensively in the southern portion of the site, has been subdivided by Goldsmith into several units of somewhat different and distinctive composition. These units need not be treated individually for the purposes of this report. For the most part, the bedrock consists of gneisses: crystalline rocks in which thin bands or streaks of platy or elongated minerals alternate with bands of more rounded mineral grains. The mineral composition is typically granite; that is, rich in quartz and potassium feldspar with lesser amounts of biotite, hornblende, and plagioclase feldspar. Garnet, diopside, sillimanite, and muscovite occur in relatively minor amounts. In some areas, lenses or layers of quartz-rich rock (quartzite) or hornblende-rich rock (amphibolite) occur between layers of the gneisses.

Overlying bedrock on most of the site is an unconsolidated glacial deposit known as till. Till consists of rock fragments of widely varying shapes and sizes. These fragments were incorporated into an ice sheet as it moved across pre-existing land surfaces, and were redeposited from the ice without substantial reworking by meltwater. Because of the coarse-textured local bedrock, which provided the bulk of the parent material of the till, the texture of the till is generally sandy, loose, and very stony. Nevertheless, the texture is variable; compact layers of till (hardpan) may be found in some areas. The accompanying illustration shows the surficial geology of the site.

HYDROLOGY

Development of the site as presently planned will lead to increased runoff volumes and, unless artificial retential measures are used, increased peak flows in local streams. These increases may, in turn, cause erosion and sedimentation problems. The steep slopes and shallow soils on the site would force the developer to do a substantial amount of cutting, filling, and grading, adding to the risk of erosion.

Increases in runoff volumes and peak flows for relatively small drainage areas may be estimated by a procedure outlined in Technical Release No. 55 of the Engineering Division, Soil Conservation Service. This procedure is based upon an analysis of slopes, soil types, land usage, and other factors. Effects were calculated for five storms of different frequencies: 2-year, 10-year, 25-year, 50-year, and 100-year. The 100-year storm, for instance, would have a frequency of occurrence of once every hundred years; however, this figure represents an average. The 100-year storm may not occur, or may occur several times, during a given 100-year period. From a statistical analysis of precipitation records, rainfall amounts which would occur during a 24-hour period may be assigned to each storm event. The calculations used in this report derive from rainfall charts of Connecticut prepared by L.A. Weiss of the U.S. Geological Survey.



Topography
Site Boundary
0
660
scale
N
ROAD
ROAD
150
100
200
200

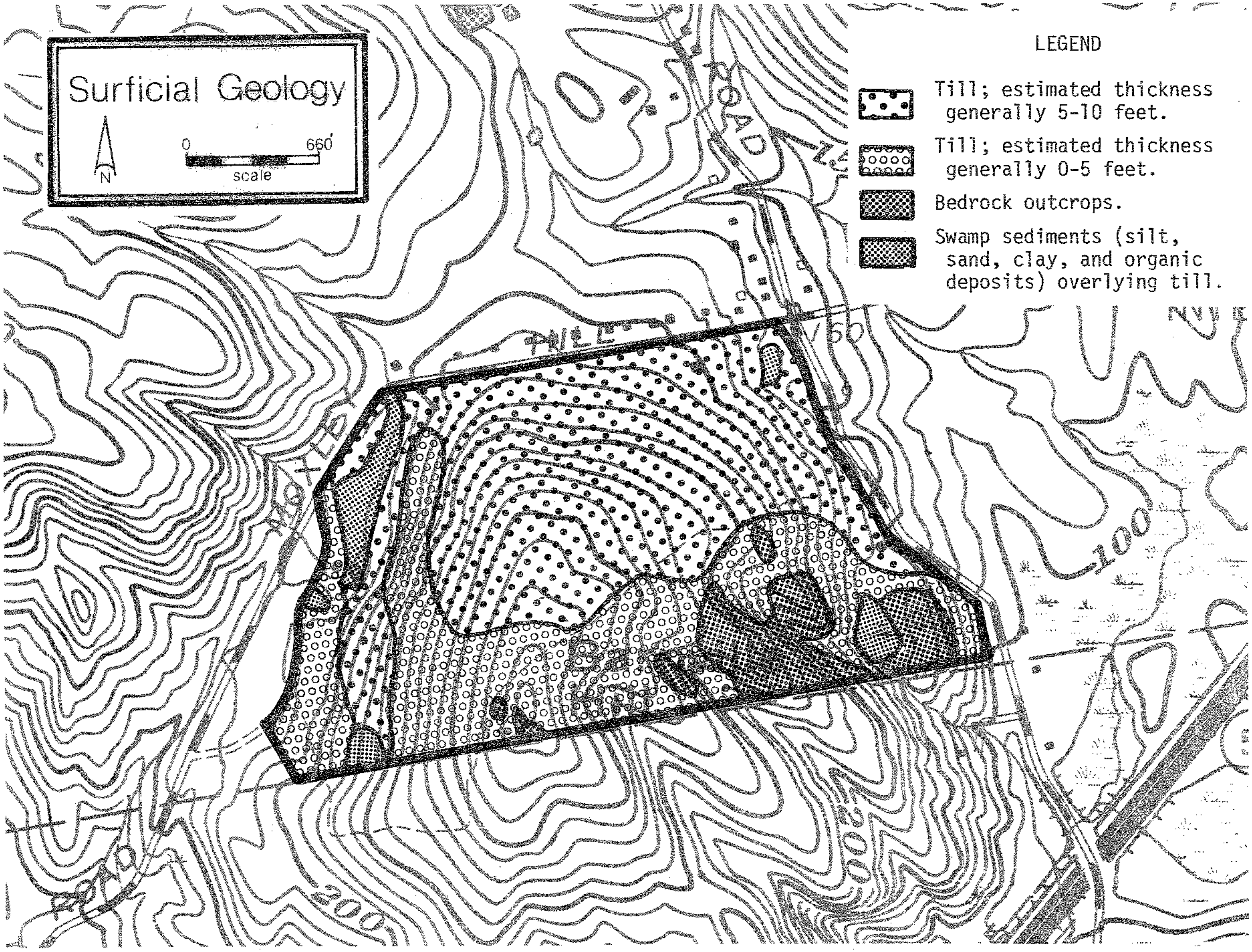

Surficial Geology
N
0
660'
scale
LEGEND
Till; estimated thickness generally 5-10 feet.
Till; estimated thickness generally 0-5 feet.
Bedrock outcrops.
Swamp sediments (silt, sand, clay, and organic deposits) overlying till.
ROAD
100
200

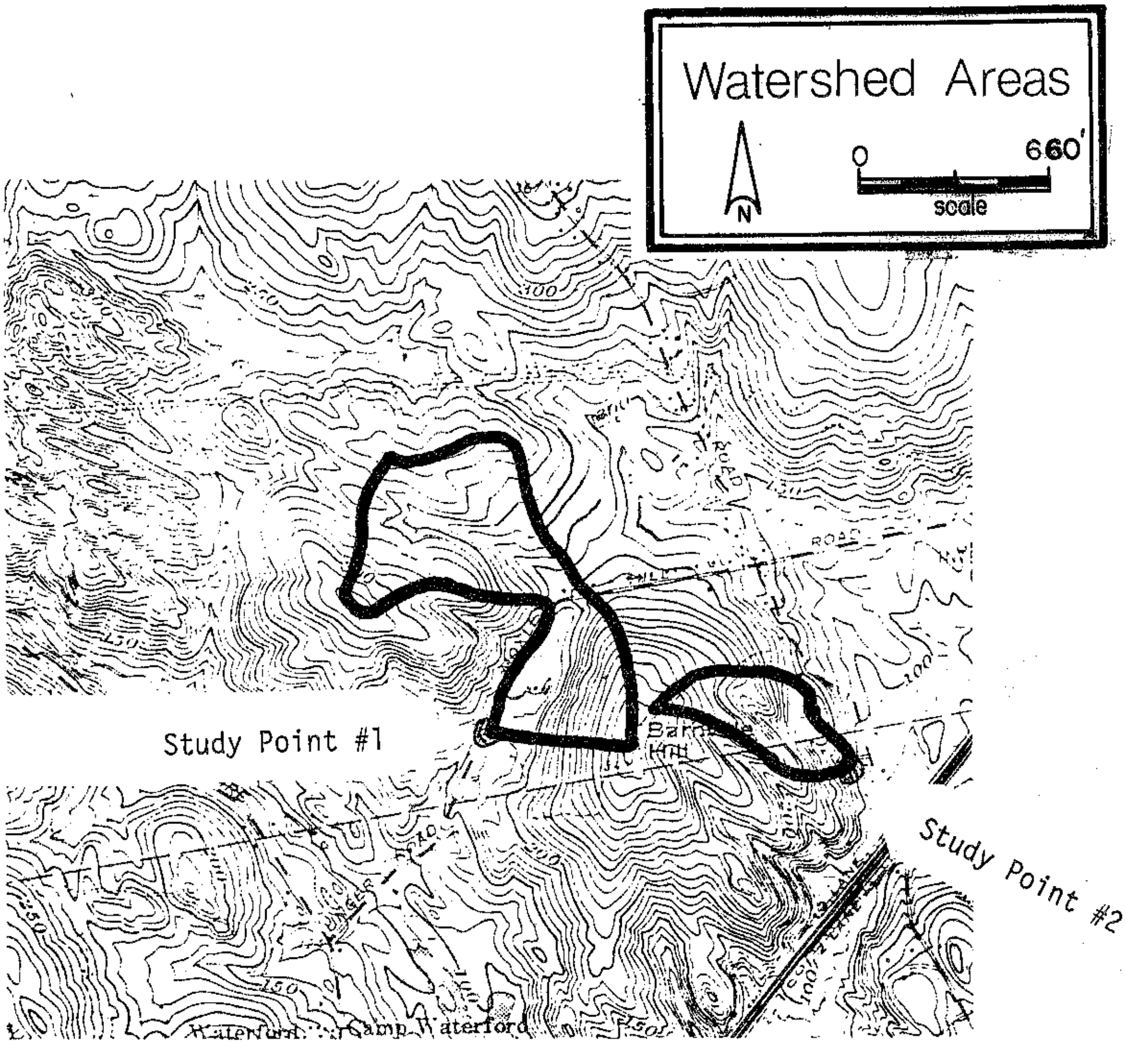
Table 1 shows the estimated increases in runoff following the proposed development of the property. The percentages of increase are greater for the less frequent (greater magnitude) storms because the absorptive capacity of the soil decreases with continued rainfall; hence, the effectiveness of an initially highly permeable soil may not be much greater than that of an initially slowly permeable soil after both become saturated as Table I shows, potential runoff increases are significant for all the studied storm events.

Table II gives the estimated increases in peak flows following development for two small streams at the points where they pass through culverts near the site. Stream No. 1 enters the site at the northwest corner, flows southward about 1,000 feet, then turns west to cross under Moxley Road at the point of study. Stream No. 2 originates in a wetland near the southeast corner of the property and flows southeastward to cross under a driveway at the point of study. Although development would affect other streams to the north and northeast of the site, the most significant peak flow changes would probably occur at the two points of study examined herein. This conclusion is based upon the relatively large portions of the watersheds of the two points that would be developed under the current plan. An accompanying illustration shows the location of the study points and their drainage areas.

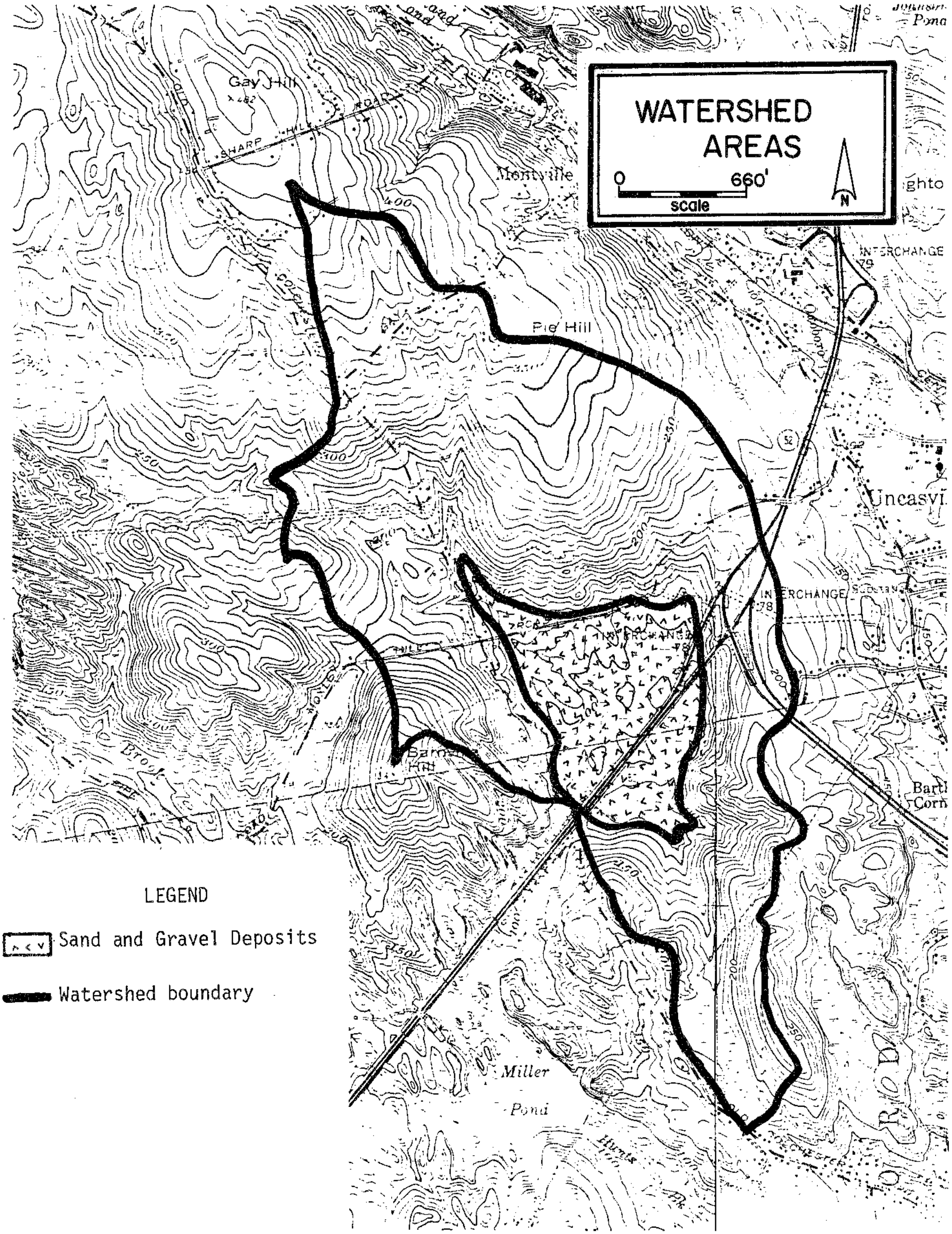
Drainage from the north central section of the property ultimately enters a flat swampy area bordered by Route 52, Moxley Road, and Old Colchester Road (see accompanying illustration). This area contains sand and gravel deposits that are believed to have potential as a future water supply source for the Montville area (source: "Water Supply Report for Groton, Montville, New London, and Waterford", prepared for the Southeastern Connecticut Water Authority by Camp, Dresser & McKee, Inc., Boston, May, 1978). Since the quality of water derived from wells in that area may be influenced by drainage from the Glendale Estates site, the suitability of the site for a large number of septic systems should be carefully examined. Alternative, but less promising, locations for future water supply needs were noted in the report cited above. One location was near Lake Cuheca, just southwest of the site in Waterford, and another was at Miller Pond, south of the site. Both alternatives lie within the drainage path of surface water and groundwater from the property, but neither would tend to be as highly influenced because of the larger watersheds included.

Table I: Estimated runoff depths (inches) on the site before and after development.

Storm Event	Estimated rainfall	Estimated runoff before development	Estimated runoff after development
2-year, 24-hour	3.0	0.55	0.91 (65% increase)
10-year, 24-hour	4.75	1.57	2.18 (39% increase)
25-year, 24-hour	5.75	2.27	2.98 (31% increase)
50-year, 24-hour	6.75	3.01	3.83 (27% increase)
100-year, 24-hour	8.0	4.01	4.93 (23% increase)



PEAK FLOW STUDY POINTS



LEGEND

Sand and Gravel Deposits

Watershed boundary

Table II: Estimated peak flows (cubic feet per second) at two sites, both before and after development.

SITE #1

Storm Event	2-year	10-year	25-year	50-year	100-year
Peak flow before development	23	72	113	156	215
Peak flow after development	28	82	126	171	234
Percent increase in peak flow	23	13	11	10	9

SITE #2

Storm Event	2-year	10-year	25-year	50-year	100-year
Peak flow before development	7	26	41	58	81
Peak flow after development	14	38	57	77	103
Percent increase in peak flow	100	45	37	33	28

VEGETATION

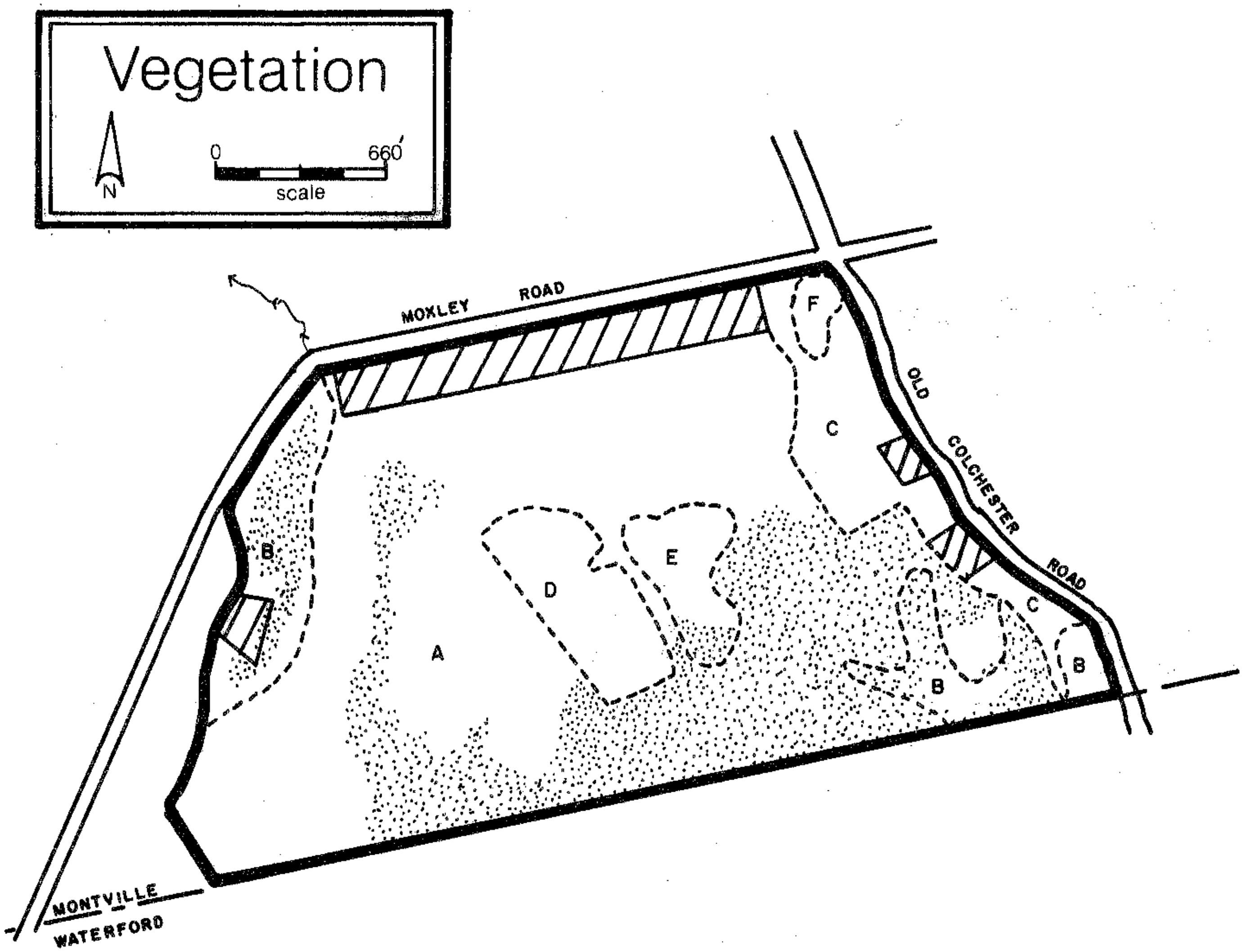
The proposed Glendale Estates site is completely forested, except for one acre of open marsh located in the northeastern corner of the property. This tract can be divided into six vegetation types. (See Vegetation Type Map).

The majority of trees are crowded on 75$^{\pm}$ acres of this property. A thinning to reduce stocking would improve tree health and vigor, however, timber management practices will be difficult due to steep slopes and excessive rockiness on most of the site.

Vegetation Stand Descriptions

Stand A. (Mixed Hardwoods). This 75-acre over-stocked stand is made up of medium quality pole-size black oak, and white oak, with occasional big tooth aspen, mockernut hickory and red maple. Many of the trees in this stand are declining in health, and vigor as a result of excessive crowding in some areas and lack of adequate moisture in other areas. The understory is dominated by a dense growth of mountain laurel with scattered witch hazel, chestnut sprouts, flowering dogwood, azalea, mapleleaf viburnum and arrowwood. Ground cover vegetation is limited to areas where mountain laurel has not become dense. In these areas huckleberry and clubmosses are prevalent.

Stand B. (Hardwood swamp). Medium quality pole to sawlog size red maple, black gum, white oak, yellow birch and occasional tulip tree are present in this 12-acre fully-stocked stand. Highbush blueberry, spicebush, sweet pepperbush, arrowwood and scattered mountain laurel form a dense understory throughout this stand. Ground cover vegetation consists of spaghnum moss, cinnamon fern, hay scented fern, spinulose woodfern and skunk cabbage.



LEGEND

- Road
- Property Boundary
- Stream
- Vegetation Type Boundary
- Residential Area, Approximately 9-acres.
- Poor Operability-steed slopes, excessive rockiness.

VEGETATION TYPES*

Stand A	Mixed hardwoods, over-stocked pole-size, 75-acres.
Stand B	Hardwood swamp, fully-stocked pole-to-sawlog size, 12-acres.
Stand C	Old field, fully-stocked, sapling-to-pole-size, 9-acres.
Stand D	Pine, fully-stocked, sapling-to-pole-size, 6-acres.
Stand E	Mixed hardwoods, fully-stocked sawlog-size, 4-acres.
Stand F	Open marsh/swamp, 1-acre.

* Seedling size = trees less than 1 inch in diameter at 4 1/2 feet above the ground dbh
Sapling size = trees 1 to 5 inches in dbh
Pole size = trees 5 to 11 inches in dbh
Sawlog size = trees 11 inches or greater in dbh

Stand C. (Old field). Nine acres of old field located along Old Colchester Road are present on this tract. Sapling to pole-size Eastern red cedar and gray birch are dominant with sapling size black birch, red maple, big tooth aspen, apple-trees, Scotch pine and white pine. Hardwood tree seedlings, mountain laurel, witch-hazel, steeplebush, bayberry, raspberry, greenbrier and oriental bittersweet have become well established. Grasses and goldenrod form the ground cover in this stand.

Stand D. (Pine). Sapling to pole-size pitch pine fully occupy this 6 acre stand. Sapling size gray birch and black oak are also present. Many of the trees are of poor quality as a result of past fire damage. Mountain laurel, highbush blue-berry, bayberry, huckleberry and sweet fern have become extremely dense.

Stand E. (Mixed Hardwoods). This 4-acre fully-stocked stand is made up of medium quality sawlog-size black oak, white oak and mockernut hickory. Hardwood tree seedlings, gray birch, mountain laurel, flowering dogwood and maple-leaved viburnum are present in the understory. Ground cover consists of sweet fern, huckleberry and hay scented fern.

Stand F. (Open marsh/swamp). Cattails, skunk cabbage, a variety of sedges and scattered red maple seedlings form the vegetative cover in this one acre marsh. Grasses, goldenrod and assorted weed species are present along the perimeter of this area.

An effort should be made to preserve the healthiest trees and some of the healthiest flowering shrubs on this tract for aesthetic quality, shade, wildlife habitat and environmental stability. In many cases healthy trees and natural flowering shrubs on a building lot may enhance the value of that lot as much as twenty percent.

Many of the soils present in Stand A (Mixed hardwoods) are excessively drained, rocky and shallow to bedrock. The limited moisture reserves in these areas reduce tree growth rate potentials. These trees will respond to forest management prac-tice, however, the steep slopes, excessive rockiness and outcrops limit the use of most harvesting equipment in this area.

Saturated soils and rockiness limit operability in Stand B (Hardwood swamp) to the summer months, when the ground is dry and to mid-winter when the ground is solidly frozen. Timber management in both of these areas will be difficult and costly.

The variable topography of this tract will necessitate extensive excavating, filling and grading for the construction of roads, driveways, buildings and septic systems. These actions disturb the balance between soil aeration, soil moisture levels and the physical composition of the soil. Trees are very sensitive to changes in the condition of the soil within the entire area under their crowns. Soil dis-turbances and direct mechanical injury may cause a decline in tree health and vigor and even mortality within three to five years. Great care should be taken not to disturb the soil near trees or to cause mechanical injury to trees that are to be preserved. Individual trees and even groups of trees that are to be saved should be temporarily but clearly marked so they may be avoided during construction activity.

Windthrow is a potential hazard in the parts of Stand A (Mixed hardwoods) where the soils are shallow to bedrock and also in Stand B (Hardwood swamp) where a high water table is present throughout much of the year. The depth of tree root systems is severly limited in both areas, and trees have difficulty becoming securly anchored. This hazard is lessened where the underlying bedrock is highly fractured, giving tree roots opportunities for deeper penetration.

Large linear openings which allow wind to pass through rather than over these stands may increase the windthrow hazard. The creation of such openings especially in Stand B (Hardwood swamp) should be avoided if possible. A light thinning in Stand A prior to development will stimulate crown and root growth and also help to increase tree wind firmness and stability.

Many of the sawlog-size trees in Stand E have large dead branches which will eventually break apart and fall off. This may become a potential hazard if utility lines or houses are constructed near these trees. As a precautionary measure the large dead branches should be properly removed from these trees prior to project construction completion.

Suggested Management Techniques

The trees in Stand A (Mixed hardwoods) are crowded. This condition is causing a general decline in tree health and vigor. A thinning, although desirable, would be difficult in most areas of this stand due to the steeply sloped, rocky nature of this site, (see Vegetation Type Map) and the poor vehicular access.

If the proposed roads are developed several areas where operability is not a severe limiting factor will become accessible. Ideally, fuelwood thinnings in these areas, removing approximately 1/3 of the volume (between 4 and 6 cords per acre) should be implemented prior to construction. These thinnings should focus on removing unhealthy and poor quality trees, and those trees which are directly competing with healthy trees. This action would reduce competition between residual trees for water, sunlight and nutrients. As a result of this thinning the trees will eventually become healthier, more wind firm and better able to withstand the environmental stresses brought about by development. If this thinning is not implemented, lot owners could thin this area on an individual lot basis.

Specimens of flowering dogwood, mountain laurel and apple trees maybe stimulated to flower if sunlight filtering through the forest is increased. Removal of several trees in the over story above these shrubs will increase the full sunlight reaching them and as a result flowering will be improved. In some areas trees removed for road construction and partial clearing of lots may be sufficient to stimulate flowering.

If this site is developed as proposed, trees cleared for roads, driveways, buildings and septic systems should be utilized as fuelwood. A publicly employed service forester could be contacted to assist the developer or land owner with the thinning operation. If more intensive help is desired, a consulting forester should be contacted.

WILDLIFE

Vegetation on the property consisted of shrubs, young tree growth with marginal mass production. Select areas provide good ground cover and forage for wildlife, especially upland game birds. Game birds were noted in the area of Barnville Hill. Sign of deer browsing and deer trails were observed in the southeastern section of the property. An area that would be beneficial biologically would be the wetlands in the southeast corner of the property. It has been noted that most of this area has been designated as Rustic Open Space.

SOILS

A detailed soils map of this site and detailed soils descriptions are included in the Appendix to this report, accompanied by a chart which indicates soil limitations for various urban uses. As the soil map is an enlargement from the original 1,320'/inch scale to 660'/inch, the soil boundary lines should not be viewed as absolute boundaries, but as guidelines to the distribution of soil types on the site. The soil limitation chart indicates the probable limitations of each of the soils for on-site sewage disposal, buildings with basements, streets and parking, and landscaping. However, limitations, even though severe, do not preclude the use of the land for development. If economics permit large expenditures for land development and the intended objective is consistent with the objectives of local and regional development, many soils and sites with difficult problems can be used. The soils map, with the publication, New London County Interim Soil Survey Report, can aid in the identification and interpretation of soils and their uses on this site. "Know Your Land: Natural Soil Groups for Connecticut" can also give insight to the development potentials of the soils and their relationship to the surficial geology of the site.

Generally, the deep soils, without a firm subsoil, are found at the base of north and west facing slopes on the property. An area of soils that have firm subsoil, referred to as fragipan, are found at a higher elevation on the north facing slope. The moderate to steep slopes and highest elevations, particularly along the southern end of the property, have soil types that are a combination of shallow to bedrock and deep soil pockets. Much of the bedrock is exposed on the steepest slopes and at the highest point in the landscape.

The low lying nearly level areas along drainage ways in the landscape are occupied by Ridgebury, Leicester, and Whitman extremely stony fine sandy loams. These soils are designated by the soil symbol 43M. The Ridgebury and Leicester soils formed in friable glacial till and the Ridgebury and Whitman are formed in compact glacial till. Permeability in the substratum is slow to very slow in the Ridgebury and Whitman soils, and moderately rapid in the Leicester soils. The Whitman soils have a highwater table at or near the surface 9 to 10 months out of the year, while the Ridgebury and Leicester soils have a highwater table at or near the surface 7 to 9 months out of the year.

Concave depressions on stream terraces and outwash plains are occupied by Raypol silt loam. These soils are designated by the soil symbol 464. The soils are poorly drained and formed in silty deposits, less than 40 inches thick, over sand and gravel. Raypol soils have moderate permeability in the surface layer and subsoil, and rapid or very rapid permeability in the substratum. The high water table is at or near the surface 7 to 9 months of the year.

Gently sloping landforms at the base of hills are occupied by Sutton extremely stony fine sandy loam. These soils are designated by the soil symbol 41MB. The soils are moderately well drained and are formed in friable glacial till. Sutton soils have moderate or moderately rapid permeability, and a seasonal high-water table at 18 to 24 inches.

The gently sloping hills and mounds are occupied by Canton and Charlton very stony fine sandy loams, and Canton and Charlton extremely stony fine sandy loams. These soils are designated by the soil symbols 11XB, 11XC and 11MC respectively. The symbol 'X' denotes very stony and the symbol 'M' denotes extremely stony. Both soils are well drained. The Canton soils formed in a fine sandy loam mantle, underlain by friable to loose gravelly sand glacial till. Canton soils have moderately rapid or rapid permeability. The Charlton soils formed in friable glacial till. Charlton soils have moderate to moerately rapid permeability.

The gently sloping land forms higher in the landscape are occupied by Paxton and Montauk very stony fine sandy loams. The soils are designated by the soil symbol 35XB. The soils are well drained and formed in compact glacial till. Both soils have moderate permeability in the surface layer and subsoil, and slow permeability in the substratum (fragipan). The Montauk soil has a coarser textured substratum.

The moderately steep slopes and longer sloping landforms adjacent to the highest elevations in the landscape, are occupied by Charlton-Hollis fine sandy loams, very rocky. These soils are designated by the soil symbols 17LC and 17LD. Both soils are well drained. The Charlton soils formed in deep friable glacial till, and the Hollis soil formed in glacial till less than 20 inches deep over bedrock. Charlton soils have moderate to moderately rapid permeability, the Hollis soils have moderate permeability.

The sloping to moderately steep and steep slopes at the highest elevations in the landscape, are occupied by Hollis-Charlton-Rock outcrop complex, and Rock outcrop-Hollis complex. The soils are designated by the soil symbols 17MC, 17MD, and RD for the Rock outcrop-Hollis complex. The Hollis and Charlton soils are well drained. The Hollis soil formed in glacial till less than 20 inches deep over bedrock. Charlton soils formed in deep friable glacial till. The Hollis soils have moderate permeability and the Charlton soils have moderate to moderately rapid permeability. The Rock outcrop is rock that is exposed.

Two of the soils mapped on the site are designated as wetland soils and are regulated under Public Act 155. Wetlands provide a valuable, yet underrated function in storm water control. They provide storage for many excess cubic feet of water that are the result of heavy rains or snow melt. While the drainage area adjacent to the wetlands (watershed) contributes water to the wetlands, it's soil cover provides for storage of water within the soil. As the soil layers reach their peak storage capacity, the water will then begin to flow over land into the wetlands.

The explanation above is a basic hydrological concept, yet it points out potential problem areas. First, if a wetland is filled in, regardless of watercourse 'piping', a valuable form of storage is dissipated. Without making up for this loss in storage above and below the fill area, the water will simply find another way of storing itself, usually by flooding areas not previously flooded or by running over land where it has not previously run. Second, the watershed has a capacity to store a certain amount of water, and allows a certain amount of water to runoff in a given time. When storage area is consumed within a watershed, and replaced by rooftops and paved roadways, water can no longer be stored in these areas. The water will run off into soil areas, saturate these soils, and cause runoff over land to begin earlier than prior to development disturbance. The water normally stored up to the saturation point, now becomes an added volume of water to put into a decreased area of storage, the filled in or altered wetlands.

Storm water management is critical on the entire property, not only because of wetlands, but also because of moderately steep to steep slopes, shallow to bedrock soils and soils with a hardpan. The problem is one of controlling and storing stormwater runoff. The higher elevations on the property are governed by shallow to bedrock roils and would have a higher runoff rate over a given amount of time than would the deeper well drained soils. The hardpan soils, while more absorptive than the shallow soils, would have a limited capacity to store water due to the firm, impermeable substratum. The runoff water from this area now flows west, down a moderately steep slope of shallow to bedrock soils, directly into a wetland or onto a well drained glacial till which does have a capacity to store more water than the two previous soil types. However, the area of this particular soil is limited and abuts a moderately well drained soil and a wetland. The remainder of the runoff water flows northwest from the hardpan soil, directly onto the deep glacial till, which eventually drains water from this part of the watershed into the wetland. Most all of this watershed is wooded.

A portion of the watershed in the area reviewed flows north to Moxley Hill Road, and then east along the road to Old Colchester Road. The need for storm water management here to protect the homes along the south side of Moxley Hill Road is obvious. This portion of the watershed is wooded.

The watershed north and east of the crest of Barnville Hill flows east, then eventually southeast. The watershed includes a small portion of the hardpan soil, but is predominatly shallow to bedrock, particularly on the south facing elongated hills. All of this watershed is wooded and is sloping to steeply sloping.

This discussion has described the existing watershed. When factors of paved roads, roof tops, diversion of water by land grading, altering wetlands and removing forest vegetation are introduced, storm water planning becomes a pre-requisite to any planned development. Storm water will run off in greater quantities per given amount of time when the plan is implemented. Present storm water control features such as culverts will have to be evaluated to see if they will be able to handle the additional flow, that will be generated off site. (See peak flow increase estimates, Table I & II).

Limitations for homesite location, septic systems and roadways are well exhibited on the Use and Limitation chart in the Appendix. Major limitations to most uses are slope, shallowness to bedrock, fragipan, and wetness. Severe limitations do not indicate that land cannot be used, but they do indicate that more economic resources are necessary to overcome these problems adequately. Alternative plans should be considered for areas with severe limitations.

WATER SUPPLY

Although an area of stratified drift (sand and gravel) deposits with potential for high-yielding water-supply wells lies just to the east of the site, the only suitable aquifer on the site itself appears to be bedrock. Bedrock is commonly capable of yielding small amounts of groundwater that are adequate to meet the needs of an average family. Connecticut Water Resources Bulletin No. 15 reports that nine out of ten bedrock wells in the lower Thames and southeastern coastal river basins yielded 3 gallons per minute or more. However, since the yield of a bedrock based well is dependent upon the number and size of water-transmitting fractures penetrated, and since the distribution of such fractures is irregular and generally unpredictable, the yield of any new bedrock well is difficult to forecast.

The initial quality of groundwater derived from bedrock wells on the site is likely to be good. The gneisses that dominate the local bedrock are composed largely of minerals that contain only small amounts of iron, manganese, calcium, and other troublesome elements in a readily soluble form. The proximity of bedrock to the surface on much of the site leads to some concern for future water quality. Inadequate soil depths may cause renovation of septic-system effluent to be incomplete, allowing contaminants to enter the bedrock fracture system. Since the site is located on a hill, it is certain that part of the well water will be derived from precipitation falling on and infiltrating the soils on the property. Hence, the proper operation of septic systems is crucial. It has been recommended that septic-system density in till covered areas of Connecticut be no greater than one per acre.* Considering the steep, shallow-to-bedrock conditions on the site, a lower density would appear to be more suitable.

A potential future ground water supply site is located east of the proposed development between Old Colchester Road and the Interchange 78 connector. This was identified in a 1978 study by Camp, Dresser and McKee, Inc. Since runoff from the eastern portion of the proposed development will be draining through this stratified drift area the storm drainage system should be carefully designed so that this aquifer is available for future use.

WASTE DISPOSAL

Sanitary waste disposal in this outlying section of town would have to depend upon on-site sewage disposal systems. The existing municipal system is a considerable distance away and possible expansion to include sewering of this area is not anticipated in the foreseeable future. Topographic and soil survey mapping data shows a number of factors which are very unfavorable for establishment of subsurface sewage disposal systems. The primary adverse conditions are the slopes which originate from the steep rock ridges, boulders and underlying shallow bedrock and areas of wetness and/or which conduct flows from surface runoff or intermittent streams. The slopes and exposed rock in some portions of the site are such that any type of development would be very difficult, if at all possible. It is the Public Health Code requirement that the bottom of any sewage leaching system be at least 4 feet above bedrock. This would mean that bedrock should not normally be within 7 feet of the ground surface. In addition, where the property slope begins to exceed 10 percent, conditions become more difficult for subsurface sewage disposal even though favorable soil may be present. Previous knowledge of some of

* Holzer, T.L., 1975, "Limits to Growth and Septic Tanks", in Water Pollution Control in Low Density Areas: Proceedings of a Rural Environmental Engineering Conference, W.J. Jewell and R. Swan, Eds., University Press of New England.

the existing lots fronting on Moxley Hill and Old Colchester Roads has shown a seasonal high ground water condition which also must be taken into account for the proper installation of sewage disposal systems and their satisfactory operation. Footing drains, systems to intercept and lower ground water along with elaborate means to collect and control storm water runoff would probably be necessary, particularly if more of the interior, higher land is developed.

The State Department of Health Services has recommended, where conditions are favorable, a minimum size lot of one acre where both individual wells and sewage disposal systems are used. However, in this case where a number of difficult or unfavorable conditions exist, where there has apparently been no extensive field investigation or engineered layout showing possible house sites, well locations, storm and surface water drainage systems, seepage tests and deep observation holes, etc. to support a zone change, it would be strongly recommended the area be restricted for large lot zoning. There may also be a need for a reapprisal of proposed lots in the one acre zone, particularly the area towards the upper southeast side.

ROADS/TRAFFIC

Moxley Hill Road will provide the only access to the proposed development. This is a narrow local street with moderate density residential development and open space uses along it. Moxley Hill Road is recommended for widening and realignment between Old Colchester Road and Route 52 in the Regional Transportation Plan.

No local transit service is planned for Moxley Hill Road or Old Colchester Road in this area. Phase II local transit service is proposed for Route 163 and Old Colchester Road in the vicinity of Chesterfield Road.

When traffic increases in the future from the two proposed roads entering and exiting onto Moxley Hill Road, circulation could be improved by extending the proposed western cul-de-sac from the development, west to Moxley Hill Road. This would provide another means of access for service vehicles such as school buses, fire trucks, and ambulances as well as automobiles.

It is not good planning to design long roads with grades steeper than 8-10%. Section VIII, M. of the Montville Subdivision Regulations permits a maximum grade of 8%. The Zoning and Planning Commission should examine this proposed subdivision plan for this concern since a road in the southwestern portion of the area exceeds this with a slope of 20% or greater.

SERVICES TO SUPPORT DEVELOPMENT

Supporting institutional (school, government, church) and some commercial development exists in Uncasville about 2 to 2 1/2 miles northeast of the proposed development. Institutional (school) services are also available about 3 miles north along Old Colchester Road.

SURROUNDING/ALTERNATIVE LAND USES

Surrounding land uses are moderate density and scattered residential, agriculture, and undeveloped. The Montville Town Plan recommends this area for low density residential uses. The cumulative effect of 75 houses on about 120 acres in a conventional subdivision will be to change the immediate area from rural to suburban in character.

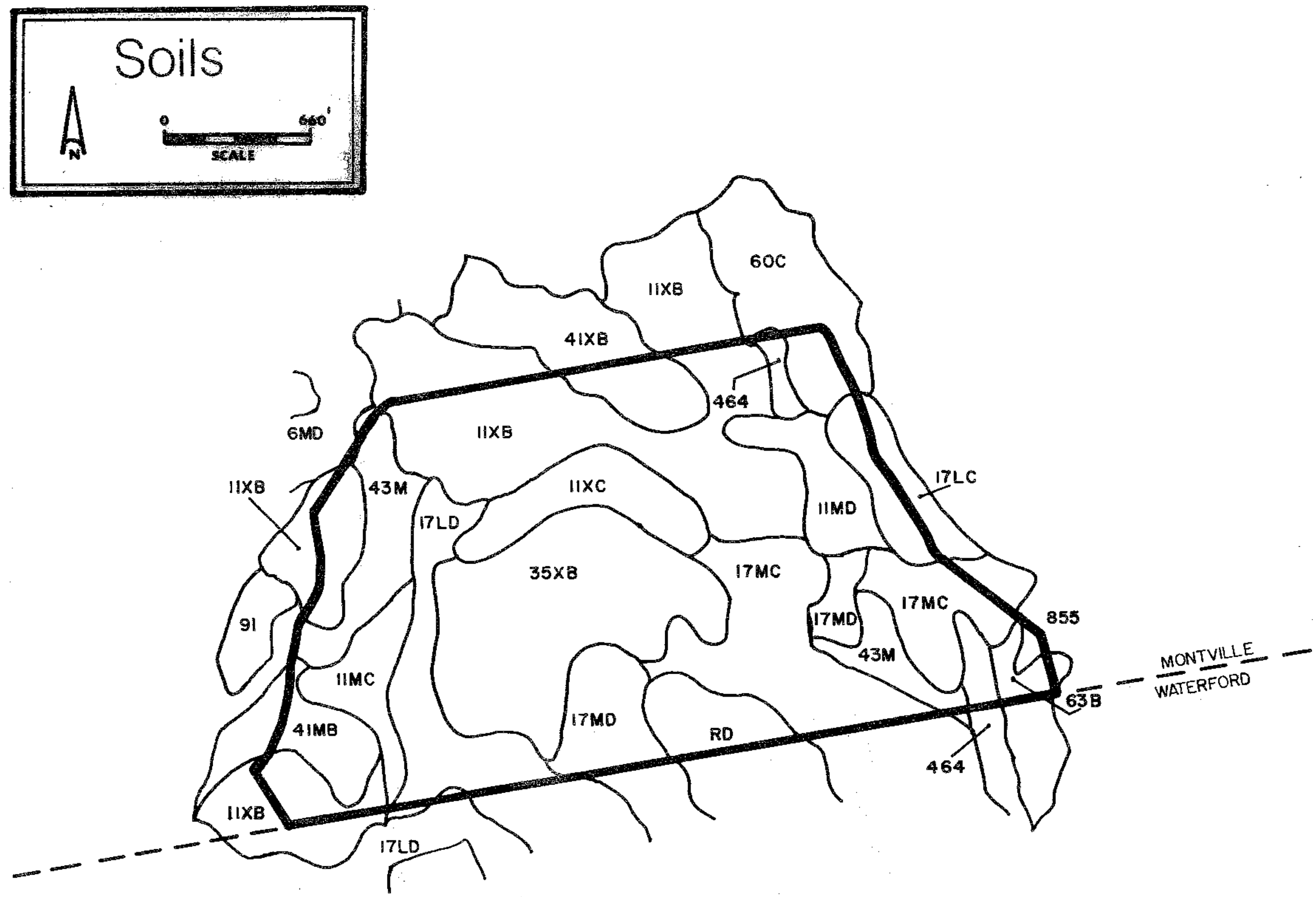
One possible alternative use is open space. The area is too stony, steep, and wet to be used for agriculture. The area lacks utilities and major arterial access needed for large commercial or industrial uses. The challenge will be to design any development taking into account the physical limitations imposed by the slope, soil, and bedrock conditions so that the rural character and attractiveness of the area can be maintained and not lost in the development process.

ZONING/DESIGN CONSIDERATIONS

Because of soil conditions such as wetness, steep slope, shallow to outcropping bedrock, and fragipan conditions it would appear best to keep the zoning at 3 acres per housing unit. Indeed, even some of the 1 acre zone in the southeast portion of the site would be better off zoned at 3 acres in size. This means that the present 47 one acre lots depicted in the RA 120 area would decrease to 20 or less. The rear of lots 73 through 75 are in wetland soil as well as sections of lots 44 and 45. Lots 11-15, and 21, 22, 54 through 56 in the western portion of the development are very steep. This will present economic feasibility problems for road and lot development. The overall slope in this area is 25-30% which will increase the runoff as development occurs. This presents problems for sewage disposal, basements, landscaping and driveways. Lots 34 through 38 also have these problems as well as a wetland soil.

Environmentally sound design begins by using soil, geology, and slope information to determine those areas that can best support development, especially the location of septic systems. Areas that cannot support development should be eliminated and proposed for open space or buffer use. After this, well location, roads, and finally lot lines can be added. This approach is not always as easy as dividing a piece of property into the maximum number of lots; however, a little care and forethought in subdivision design usually results in a better, more saleable project while concurrently avoiding future problems.

Appendix



Information taken from: New London County Interim Soil Survey Report, 1978; soil survey sheets #656, #806; prepared by the United States Department of Agriculture, Soil Conservation Service. Advance copy, subject to change.

GLENDALE ESTATES
MONTVILLE, CONNECTICUT

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Urban Use Limitations* On-Site Sewage	Buildings with Basements	Streets & Parking	Land-Scaping
Charlton-Hollis	17LC	3	2	Slope, Depth to rock				
Charlton Part					2	2	2	2
Hollis Part					3	3	3	3
Charlton-Hollis	17LD	8	7	Slope, Depth to rock	3	3	3	3
Hollis-Rock outcrop	17MC	16	15	Depth to rock	3	3	3	3
Hollis-Rock outcrop	17MD	6	5	Slope, Depth to rock	3	3	3	3
Canton-Charlton	11MD	4	3	Slope, Large stones	3	3	3	3
Canton-Charlton	11XB	24	20	Slope	2	2	2	2
Canton-Charlton	11MC	4	3	Slope, Large stones	3	3	3	3
Paxton	35XB	20	18	Slope, Frost action, Large stones	2	2	2	2
Sutton	41XB	3	2	Wetness, Frost action	3	3	2	2
Sutton	41MB	4	3	Large stones	3	3	2	3
Hinckley	60C	2	2	Slope	2	2	2	2

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Urban Use Limitations*: On-Site Sewage	Urban Use Limitations*: Buildings with Basements	Urban Use Limitations*: Streets & Parking	Urban Use Limitations*: Land-Scaping
Haven	63B	2	2	Frost action	1	1	2	1
**Ridgebury, Leicester, Whitman	43M	9	8	Large stones, Wetness	3	3	3	3
**Raypol	464	3	2	Wetness, Frost action	3	3	3	3
**Rumney	855	1	1	Floods, Wetness, Frost action	3	3	3	3
Rock Outcrop	RD	3	2	Slope, Depth to rock	3	3	3	3
		118	100					

*LIMITATIONS: 1 = slight, 2 = moderate, 3 = severe.
**Regulated wetland soil under P.A. 155.

SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations:" slight or no limitations; moderate limitations; and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. On-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

Slight Limitations

Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

Moderate Limitations

In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations.

Severe Limitations

Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.

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.

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, and a statement identifying the specific areas of concern the Team should address. 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 Jeanne Shelburn (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360.