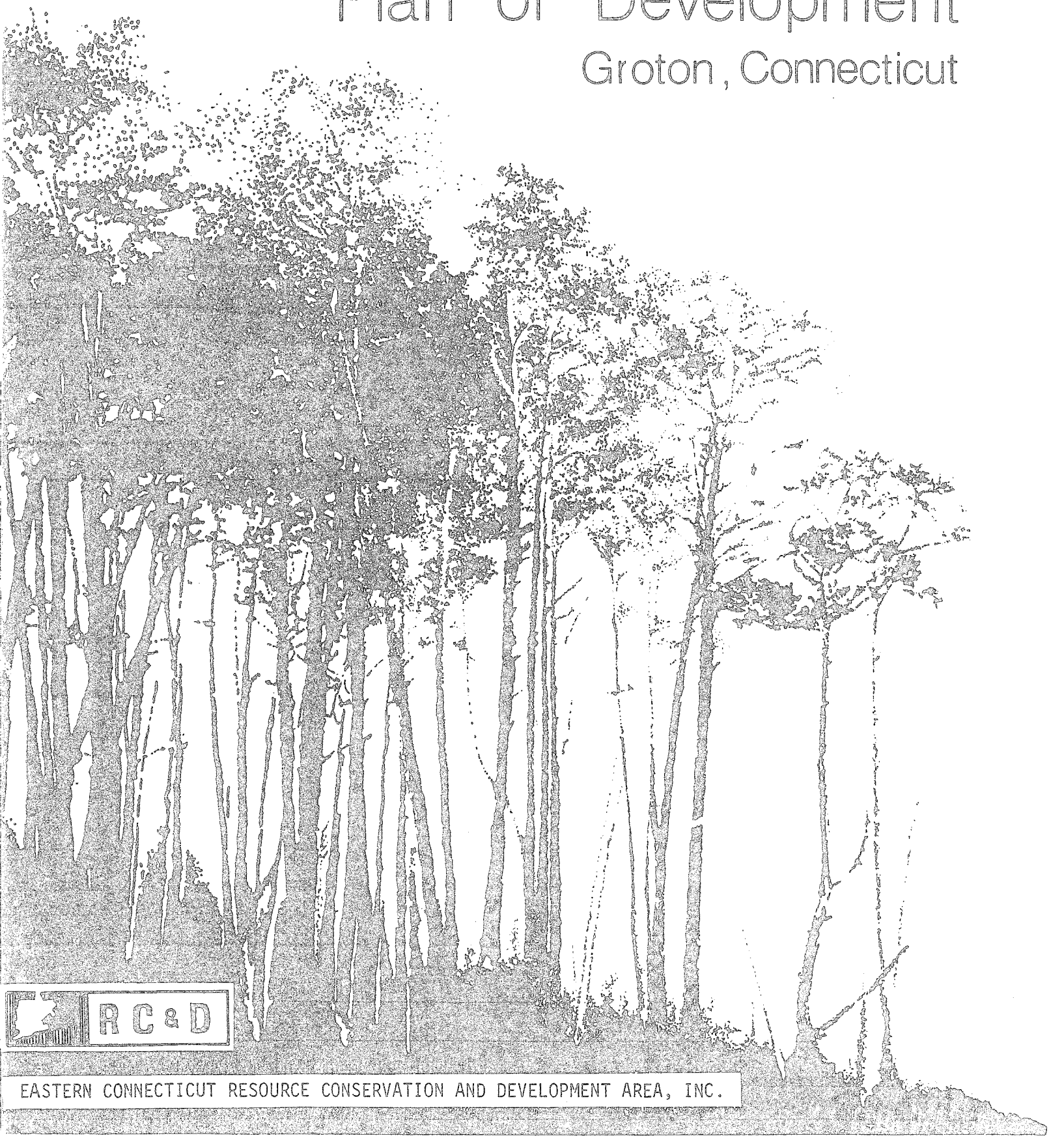
Environmental Review Team Report

Plan of Development

Groton, Connecticut

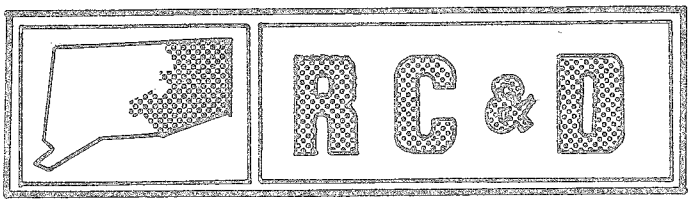


RC&D

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team Report on Plan of Development Groton, Connecticut

December 1980

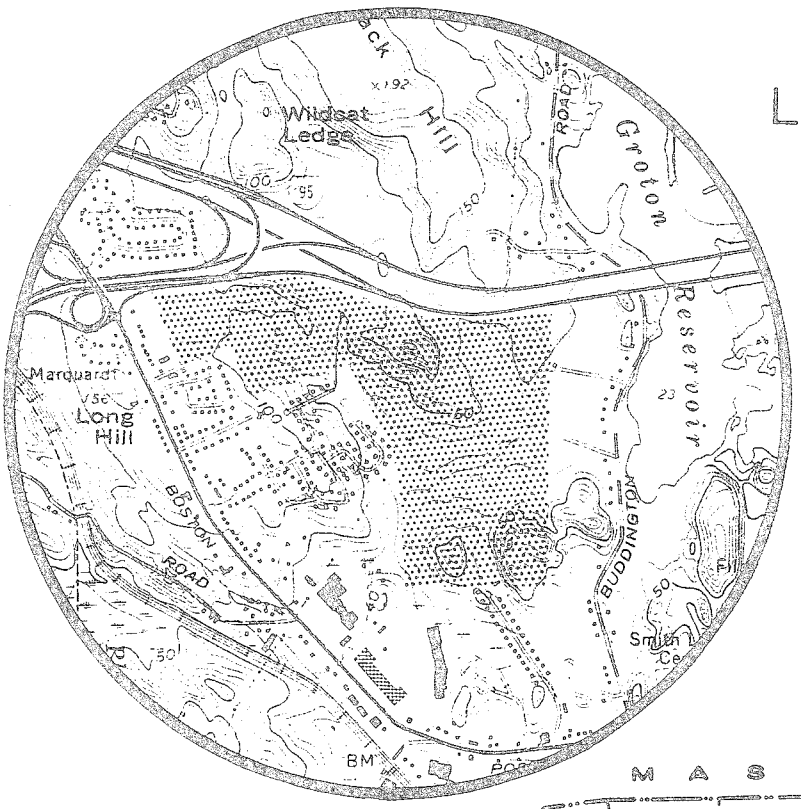


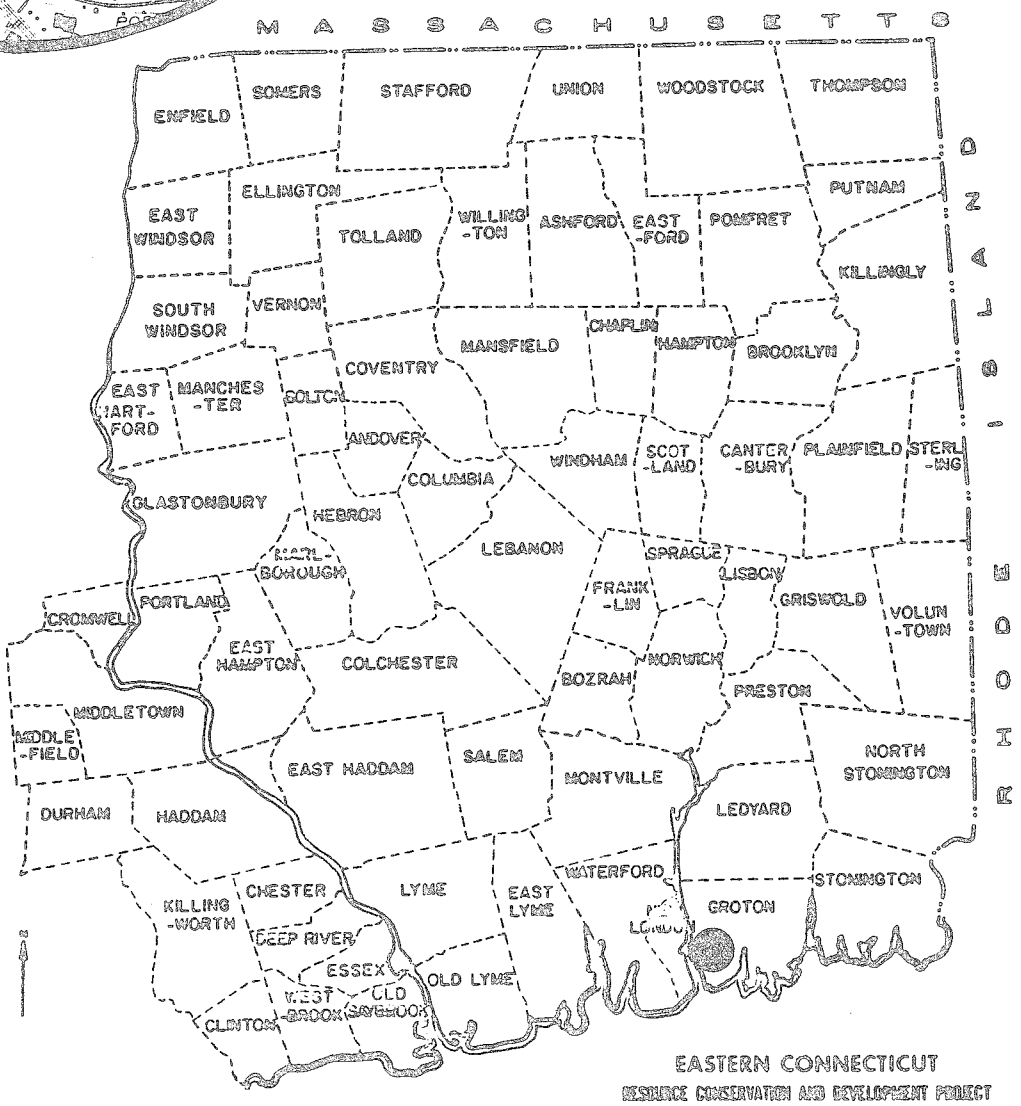
eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site

PLAN OF DEVELOPMENT
COURT COLVER PROPERTY AND LHDD
GROTON, CONNECTICUT





ENVIRONMENTAL REVIEW TEAM REPORT
ON
PLAN OF DEVELOPMENT COURT COLVER PROPERTY AND LHDD
GROTON, CONNECTICUT

This report is an outgrowth of a request from the Groton Planning Commission to the New London 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 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); Rob Rocks, Forester, DEP; Tom Seidel, Regional Planner, Southeastern Connecticut Regional Planning Agency; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field checked the site on Thursday, October 9, 1980. 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 Groton. 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.


Reservoir
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BUDDINGTON
BOSTON
Topography
Site Boundary
0
660'
scale
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INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an assessment of the Town of Groton's plan of development for the Long Hill Design District and the adjacent Court Colver property. The sites are located in the western section of the Town. The Long Hill Design District, (LHDD), is north of Route 1 and its commercial development, and west of Buddington Road. The Court Colver property is located south of I-95 and abutting Route 1 on the east. The sites are presently in varied private ownerships. The Court Colver parcel is being proposed for development which is in conformance with existing zoning. The Long Hill Design District is currently being considered for a zone change to allow higher density development. No proposed development plans for either parcel had been presented to the Team. The Team evaluated the resource base of each parcel and the effect of potential development as proposed by the Plan of Development.

The Long Hill Design District site can be characterized as having a rugged topography in its northern and southern sections. A broad lowland, which includes some regulated wetland soils, diagonally crosses the site in its central area. Vegetation is generally very dense. Several swaths of vegetation have been removed for establishment of sewer lines and to facilitate maintenance of electric power lines. Soils on this parcel range from steeply sloping and stoney, to regulated wetlands. The Court Colver property has steeply sloping topography in its northeastern and southeastern sections. Large bedrock exposures and loose boulders are also prevalent in this area. A large wetland and an intermittant watercourse extend through the south central portion of the site. A sewer line right-of-way has been cleared of vegetation.

The Plan of Development shows the Court Colver property as serving tourist-commercial and multi-family residential needs. The areas set aside for tourist commercial use are large parcels which could offer facilities and services to the tourists visiting Southeastern Connecticut. Restaurants, motel and hotel accommodations, and moderately sized convention facilities will be needed as the area expands to accommodate tourist trade. Provision should be made so that these types of uses could locate on the parcels in conjunction with other uses currently permitted by the Zoning Regulations. The property is currently zoned for residential multi-family (RMF) and design-retail (DRD).

The Long Hill Design District (LHDD) has been designated by the Plan for moderate density residential development. The Plan also discusses the environmental limitations of this parcel and suggests that they be used to aesthetic advantage where possible. A scheme for using portions of the wetlands for creation of a series of lakes to control storm water run-off was also included in the Plan.

The Team was concerned with the effect of the Plan of Development on the natural resource base of both sites. Both sites have serious limitations to standard construction practices; these limitations can be overcome with proper engineering techniques., however, these measures can become costly, making a project financially unfeasible for a developer. Most development limitations

have been well defined in the Plan of Development. These limitations, however, were only related to the LHDD and not the Court Colver property. Many of the same limitations exist on both parcels.

As public sewer and water would be provided for any development on either site, problems with establishment of on-site disposal and water supply will not exist. Major limitations to development on both sites include exposed bedrock areas, shallow soil depth to bedrock, steep slopes, wetland soils and soils with a seasonal high water table. These areas are all shown in mapped form within the body of this report.

The Team generally concludes that the Plan should try to encourage use of the easily developable soils on both sites, those with severe limitations should be reserved as open space buffer zones. Sediment and erosion control plans should be included in sections of the Plan and in the Zoning Regulations regarding these areas. Proposed uses are compatible with those in the immediate vicinity, but density of development should consider the environmental limitations pointed out in this report. Both parcels should be developed creatively, using the environmental limitations to advantage where possible. The Commissions must determine what their overall planning strategy will be for both sites and work toward those goals. As discussed later in the report, if minimization of storm water run-off is desired, then vertical instead of horizontal development should be encouraged. If housing is a priority, then perhaps it should be developed in dense clusters with a low overall tract density, leaving the severely limited areas for open space use.

ENVIRONMENTAL ASSESSMENT

GEOLOGY

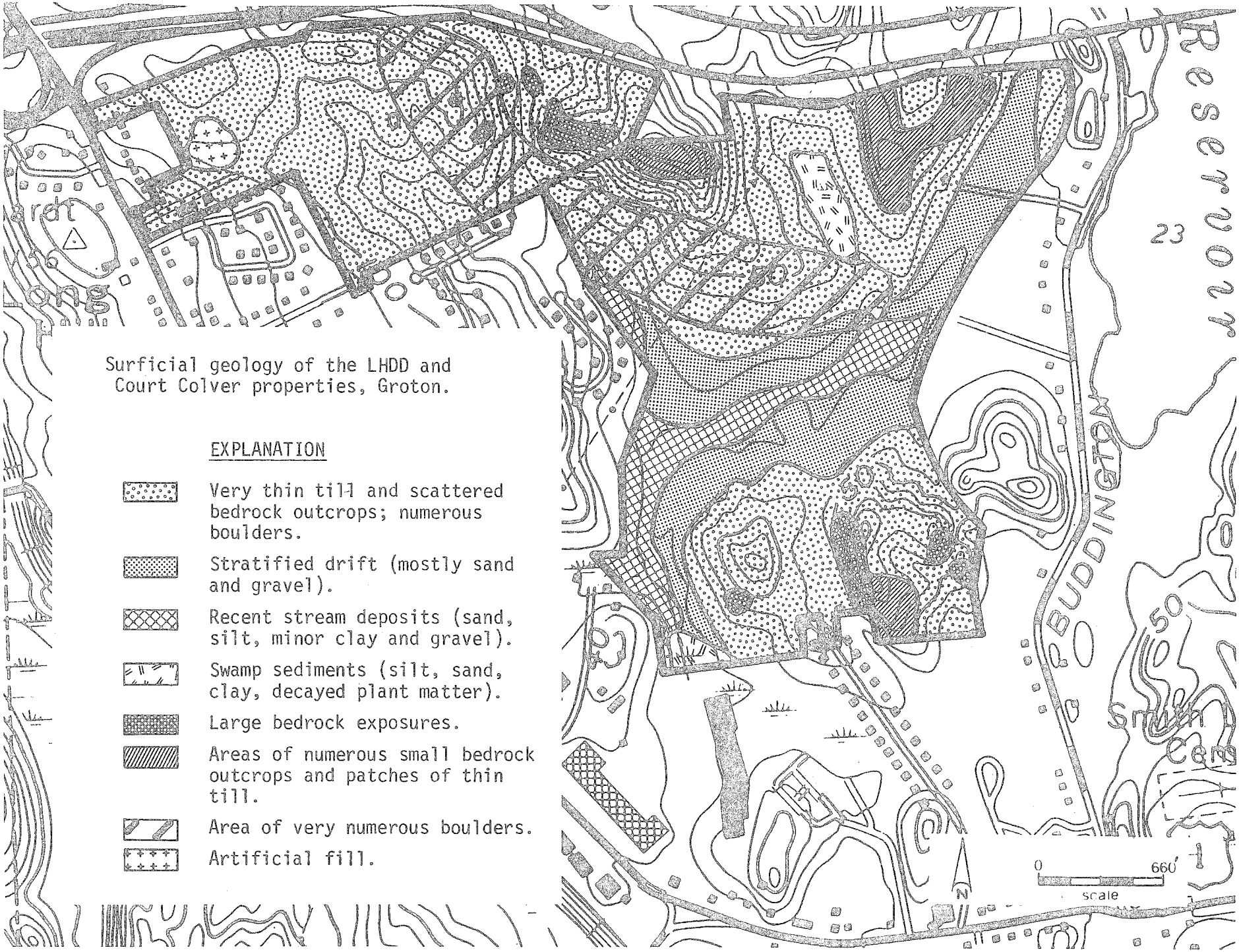
The Long Hill Design District tract is topographically diverse, ranging from steep rocky slopes to flat wetlands. Four distinct knolls are found within the site, one at or near each corner. The morphology of each knoll is controlled by bedrock, which crops out extensively in all but the southwestern knoll. The bedrock is largely a type described as "gneiss". In gneisses, minerals with an elongate shape have become aligned to form a streaky or banded pattern. The alignment is not strong enough to allow the rock to be easily separated along surfaces of mineral grouping. If such parting surfaces were present, giving the rock a slabby appearance, the rock would be described as "schist". Schists are believed to be the predominant bedrock type underlying the flatter central section of the site.

The major minerals comprising both the gneisses and schists are quartz, feldspar, biotite, hornblende, and muscovite. To a great extent, the classification of bedrock on the site depends upon the abundance of biotite, a dark mica. The parting surfaces in the schists are likely to result from concentrations of biotite, whereas the more massive gneisses are generally composed largely of quartz and feldspar with biotite grains scattered throughout the rock.

The knolls are covered thinly and incompletely with glacial sediments, mostly till. Till consists of a nonsorted mixture of rock particles ranging in size from clay to large boulders. The percentages of the different grain sizes are variable from place to place, but sand and pebbles probably represent the largest fraction. Deeper pockets of till are more likely to be finer-grained (i.e. having a high or moderate amount of silt and clay) and more compact. The numerous boulders scattered about the surface of the site are mostly derived from local bedrock exposures; the boulders were moved short distances by glacier ice. The boulders are most concentrated on the northwestern and southwest knolls.

The central, gently to moderately sloping section of the tract contains sediments deposited by glacial meltwaters. Unlike till, which was deposited directly from the ice, the meltwater sediments, called stratified drift, have been substantially sorted by grain size. Sand and gravel are the predominant components. The central section also contains thin floodplain sediments along the principal streams, and accumulations of organic matter, sand, silt, and clay in some flat, depressional areas.

The geology of the Court Colver property is similar to that of the shallow-to-bedrock portions of the Long Hill Design District. The easternmost section of the site contains a massive bedrock exposure that drops sharply into the valley of a small brook. The central and western sections contain an irregular but mostly thin blanket of till over bedrock. Several smaller bedrock outcrops occur in this section. The property is also characterized by an unusual abundance of boulders.



Surficial geology of the LHDD and Court Colver properties, Groton.

EXPLANATION

- Very thin till and scattered bedrock outcrops; numerous boulders.
- Stratified drift (mostly sand and gravel).
- Recent stream deposits (sand, silt, minor clay and gravel).
- Swamp sediments (silt, sand, clay, decayed plant matter).
- Large bedrock exposures.
- Areas of numerous small bedrock outcrops and patches of thin till.
- Area of very numerous boulders.
- Artificial fill.

HYDROLOGY

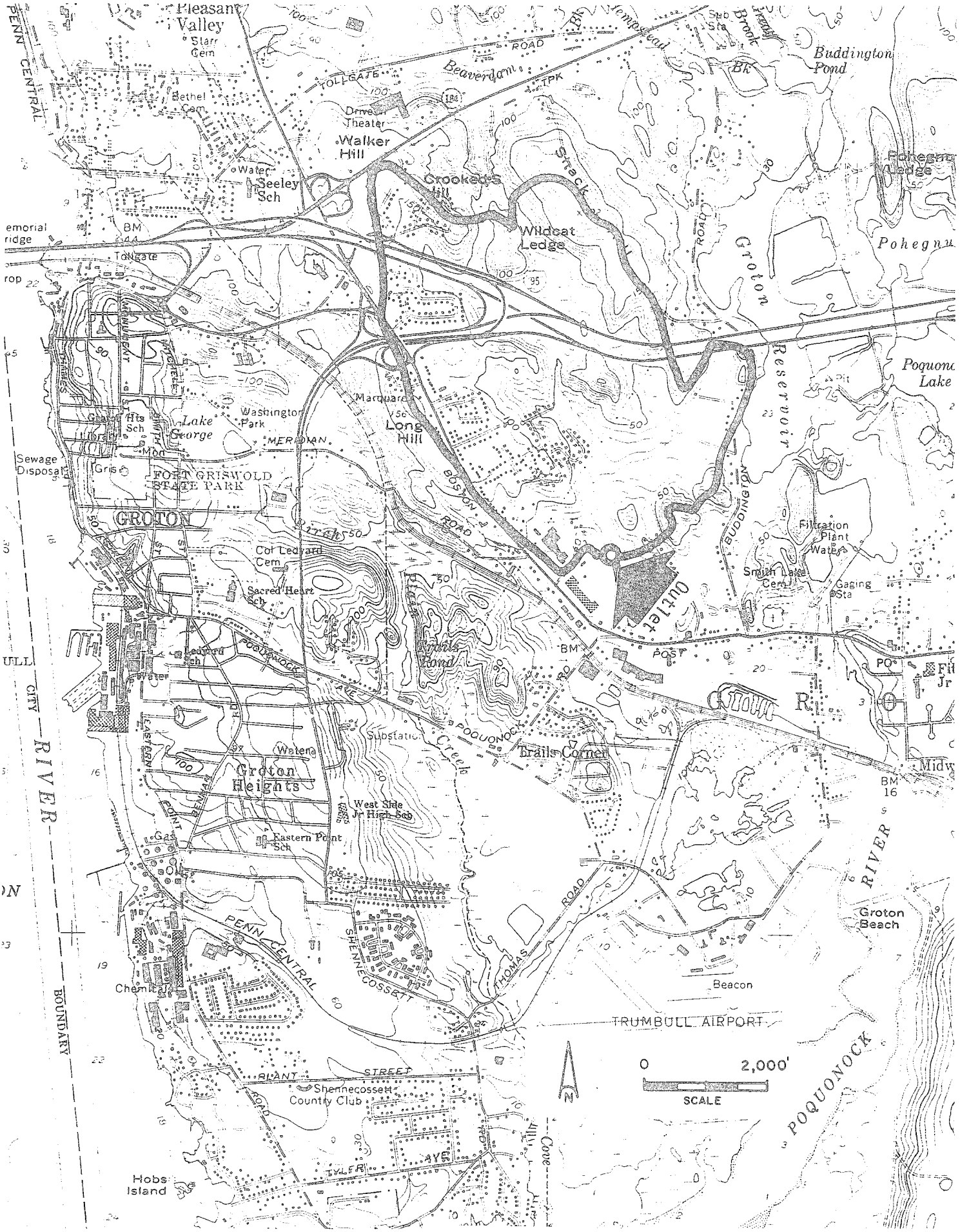
Two small brooks cross the Long Hill Design District parcel. One brook originates in wetlands north of Interstate Route 95 and south of Wildcat Ledge. This streamcourse crosses the eastern section of the Court Colver tract and then roughly follows the western boundary of the LHDD. The second brook originates in wetlands north of the trailer park on Buddington Road. This streamcourse parallels the eastern boundary of the property for approximately 1600 feet, cuts westward across the tract, and joins the first brook near the power line. The "merged" streamcourse passes into a concrete pipe at the northern end of the parking lot of a shopping mall and ultimately is discharged into a stream system leading to Baker Cove. The overall drainage area at the pipe inlet appears to be about 550 acres, but since significant changes in drainage patterns have accompanied local developments, particularly the highway system, this estimate may be much greater or less than the actual value. All but 6 acres of the site are within this drainage area; the six acres are located in the southeastern corner.

Only one stream crosses the Court Colver property. That stream, as mentioned above, crosses the eastern section and then follows the western boundary of the LHDD. A swale to the west of the stream carries surface drainage intermittently through the site, discharging ultimately into the stream. The swale is a natural groundwater conduit and is subject to seasonally high water tables.

Any analysis of hydrologic impacts of development on the LHDD and Court Colver properties must begin with a conceptual design for the number and location of structures. No such design is available at this time. It would be possible to estimate runoff and peak flow increases on the assumption that the entire tracts would be developed, but the severe limitations of the sites make such extensive development impractical and unlikely. The town's plan of development acknowledges these physical restraints and encourages "innovative building designs and layouts that will harmonize with the textures and features of the property." The plan also suggests that the drainage from the site could be directed to a storm-water retention pond, which could serve as an aesthetic focal point for at least the LHDD parcel. However, more specific criteria are necessary to evaluate local drainage conditions. Suggested densities alone are not helpful... for example, a single 50-unit high-rise on 10 otherwise undeveloped acres would cause a far less dramatic runoff increase than a development of 25 two-family houses in the same area.

In order for the retention pond concept to succeed, it would be important to know what the long-range peak inputs to the pond might be. The task is partly eased because much of the watershed of the outlet for the LHDD and Court Colver parcels is presently developed. Nevertheless, an area of approximately 100 acres north of I-95 near Shack Hill and Wildcat Ledge is still undeveloped. The ultimate usage of this land would influence the flows in the subject sites. Knowing the long-range peak inputs to a retention pond would be important to a proper design of both the pond and its outlet structure. It is true that the pond could be oversized to prevent peak flow increases that arise after development of the

Watershed of the drainage outlet from the LHDD (and Court Colver) parcel(s).



subject sites from having a detrimental impact downstream. However, the extimation of even an oversized basin would require more insight into how much of the land could actually be urbanized. To create a basin that could handle peak flows generated by a dense residential development on the total area of the tracts and on other watershed land, could conceivable be to waste a substantial amount of land in the southern portion of the LHDD, or at best to bring about an esthetically unattractive basin that only rarely if ever fills with water.

The considerations mentioned above suggest that the Plan of Development should be made more site-specific in the LHDD and Court Colver properties in order to have a better handle on the potential hydrologic impacts. If small residential lots in dense clusters are preferred and architectural ingenuity is desired, the plan might approach the parcels on a two-pronged basis: a relatively high cluster density and a relatively low overall tract density. If a minimization of runoff increases is desired, the use of vertical rather than horizontal space should be encouraged.

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.

Long Hill Design District

The gently sloping to sloping land forms at the highest elevations in the landscape are occupied by the Narragansett-Hollis complex. The soils are designated by the soil symbol 200C, the symbol C denotes a 3 to 15 percent slope. The Narragansett and Hollis soils are well drained. Narragansett soils formed in deep silt mantled friable glacial till. The Hollis soils formed in loamy glacial till less than 20 inches deep over bedrock. Narragansett soils have moderate permeability in the surface layer and subsoil, and moderately rapid or rapid permeability in the substratum. Hollis soils have moderate permeability. Surface runoff is slow to rapid for Narragansett soils and medium to very rapid for Hollis soils.

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

Nearly level to gently sloping landforms at the base of hills are occupied by Sutton very stony fine sandy loam. The soils are designated by mapping unit symbol 41XB. Sutton soils formed in loamy glacial till. The soils are moderately well drained, and have moderate or moderately rapid permeability. The seasonal high water table is at 18 to 24 inches. Surface runoff is slow to medium.

The gently sloping landforms down from the bedrock-controlled landforms are occupied by Canton-Charlton fine sandy loams. The mapping unit symbol is 11XB. The letter "X" denotes very stony conditions. The Canton soils formed in a fine sandy loam mantle underlain by gravelly sandy glacial till, derived mainly from gravel and gneiss. The Charlton soils formed in deep loamy glacial till. Canton soils have moderately rapid or rapid permeability. Charlton soils have moderate to moderately rapid permeability. Surface runoff is medium in Canton soils and medium to rapid in Charlton soils.

The nearly level stream terraces and outwash plains are occupied by Haven silt loam. The soils are designated by soil mapping unit symbol 63A. The symbol A denotes 0-3 percent slope. Haven soils formed in water sorted loamy material over stratified outwash. The soils are well drained and have moderate permeability in the surface layer and subsoil and very rapid permeability in the substratum. Surface runoff is medium.

The nearly level to gently sloping terraces or outwash plains are occupied by Ninigret fine sandy loam. The soils are designated by the soil mapping symbol 25A. Ninigret soils formed in water sorted outwash. The soils are moderately well drained and have moderately rapid permeability. The seasonal highwater table is 18 to 24 inches. Surface runoff is slow to moderate.

Depressional areas within outwash plains, lake plains, till plains and moraines are occupied by Adrian and Palms mucks. The soils are designated by the mapping unit symbol 91. Both soils formed in mucky organic deposits, 16 to 51 inches thick. The Adrian soils formed over sandy mineral deposits and the Palms soils formed over loamy mineral deposits. The soils are very poorly drained. Adrian soils have rapid permeability and the Palms soils have a moderately slow permeability. The high water table is at or near the surface 9 to 10 months of the year. Surface runoff for both soils is very slow. This soil is designated as a wetland soil and is regulated under Public Act 155.

The low lying, nearly level areas along drainageways in the landscape are occupied by Ridgebury, Leicester and Whitman extremely stony fine sandy loams. The soils are designated by the mapping unit symbol 43M. The Ridgebury and Whitman soils formed in compact glacial till; the Leicester soils formed in

friable glacial till. The Ridgebury and Leicester soils have moderate to moderately rapid permeability in the surface layer and subsoil and slow or very slow permeability in the substratum (fragipan). The Leicester soils have moderately rapid permeability throughout. The seasonal highwater table for Ridgebury and Leicester soils is at or near the surface 7 to 9 months of the year. The Whitman soil has a highwater table at or near the surface 9 to 10 months of the year. Whitman soils have high runoff potential. Runoff is slow to medium in Ridgebury soils and slow in Leicester soils. This soil is designated as a wetland soil and is regulated under Public Act 155.

Level or nearly level pockets and depressions on glacial outwash plains and terraces are occupied by Scarboro mucky loamy sand. The soils are designated by the soil mapping unit symbol 75. Scarboro soils formed in sandy glacial outwash deposits. The soils are very poorly drained and have rapid or very rapid permeability. The high water table is at or near the surface 9 to 10 months out of the year. Surface runoff is slow. This soil is designated as a wetland soil and is regulated under Public Act 155.

The low lying nearly level areas along drainage ways on stream terraces and outwash plains are occupied by Raypol silt loam. The soils are designated by the soil mapping unit symbol 464. Raypol soils formed in silty deposits less than 40 inches thick, over sand and gravel. The soils are poorly drained and have moderate permeability in the surface layer and subsoil, and rapid or very rapid permeability in the substratum. The highwater table is at or near the surface 7 to 9 months of the year. Runoff is slow. This soil is designated as a wetland soil and is regulated under Public Act 155.

The following soils qualify as Prime Farmlands: Haven silt loam (63A), Ninigret fine sandy loam (25A).

Prime farmland, as defined by the U. S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

The highest hills in this parcel of land are occupied by sloping to steeply sloping soils that are shallow to bedrock. (Soil mapping unit symbols: 200C, 17LC, 17LD, 17MC and 17MD.) The shallow soils are mixed with deeper soils within the same mapping unit. Generally, the shallow and exposed bedrock soils are found at the highest point in the mapping unit and the deeper soils are found at lower elevations in the mapping unit.

These soils have natural limitations to development due to short steep slopes, exposed bedrock, shallow to bedrock areas and areas of large surface stones and rock. Public water and sewer is available, so establishment of on-site wells and on-site septic systems will not pose problems. Land preparation to locate buildings,

parking lots and roadways on these soils will require bedrock removal by blasting and ripping, and use of this material as fill on-site. Where a lack of fill occurs, it will be necessary to borrow from an area of deeper soils. The most serious limitations of this type will occur at the highest points in the landscape.

At the base of the shallow to bedrock landforms are deeper soils that are not limited due to steep slopes or shallow to bedrock conditions. However, some of these soils have seasonal highwater tables or are soils designated as wetland soils.

The wetland soils (mapping unit symbols 464, 75, 43M, 91) are regulated by the local commissions under Public Act 155. Preliminary discussions with development planners indicate that the wetlands will be disturbed little as possible for aesthetic quality and stormwater control. The wetlands can also provide a natural barrier or screen between development areas.

Glacial till soils lower in the landscape have limitations due to surface stoniness (mapping unit symbol 11B) and seasonal highwater tables (mapping unit symbol 41XB). The seasonal highwater table at 18 to 24 inches is a limitation that can be overcome by drainage and land regrading. It is important to note that the soils mapped as 41XB occupy drainageways in the landscape. If these areas are filled in, natural drainage patterns will be interrupted, causing ponding and flooding of areas not previously affected. Use of these areas as natural drainageways to the wetlands is suggested.

Low in the landscape, adjacent to the wetlands are outwash soils that are well drained (mapping unit symbols 63A) and moderately well drained (mapping unit symbols 25A). The moderately well-drained soils have a seasonal highwater table 18 to 24 inches from the surface. Subsurface drainage and land regrading can overcome these limitations. These well and moderately well drained soils have moderate limitations due to frost heaving and are unstable in shallow excavations.

Sediment and erosion control measures should be incorporated in the plan for the entire project. The soils most subject to erosion are those on steep slopes that are disturbed and not protected from runoff. Depending on the planned pattern of development, runoff water can be diverted from most construction areas when properly planned. The hills in the northwest and southwest sections of this parcel would be most prone to erosion and could cause sedimentation into the wetlands. The soils mapped as 63A and 25A are particularly erosive when protective groundcover is removed.

Court Colver Property

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 symbol 17LC. 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. Surface runoff is medium to very rapid for Hollis soils and medium to rapid for Charlton Soils.

The sloping to moderately steep and steep slopes at the highest elevations in the landscape, are occupied by Hollis-Charlton-Rock outcrop complex. The soils are designated by the soil symbol 17MD. 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. The Rock outcrop is rock that is exposed. Surface runoff is medium to very rapid for Hollis soils and medium to rapid for Charlton soils.

The gently sloping to sloping landforms at the highest elevations in the landscape are occupied by the Narragansett-Hollis complex. The soils are designated by the soil symbol 200 C, the symbol C denotes a 3 to 15 percent slope. The Narragansett and Hollis soils are well drained. Narragansett soils formed in deep silt mantled friable glacial till. The Hollis soils formed in loamy glacial till less than 20 inches deep over bedrock. Narragansett soils have moderate permeability in the surface layer and subsoil, and moderately rapid or rapid permeability in the substratum. Hollis soils have moderate permeability. Surface runoff is medium to rapid for Narragansett soils and medium to very rapid for Hollis soils.

Natural soil areas that have been disturbed to the extent that the natural layers are no longer recognizable are delineated by the mapping unit symbol ML2, Udorthents, smoothed. Interpretations for these soils are variable.

The low lying, nearly level areas along drainageways in the landscape are occupied by Ridgebury, Leicester and Whitman extremely stony fine sandy loams. The soils are designated by the mapping unit symbol 43M. The Ridgebury and Whitman soils formed in compact glacial till; the Leicester soils formed in friable glacial till. The Ridgebury and Leicester soils have moderate to moderately rapid permeability in the surface layer and subsoil and slow or very slow permeability in the substratum (fragipan). The Leicester soils have moderately rapid permeability throughout. The seasonal highwater table for Ridgebury and Leicester soils is at or near the surface 7 to 9 months of the year. The Whitman soil has a highwater table at or near the surface 9 to 10 months of the year. Whitman soils have high runoff potential. Runoff is slow to medium in Ridgebury soils and slow in Leicester soils. This soil is designated as a wetland soil and is regulated under Public Act 155.

Development of this property is enhanced by the availability of water and sewer. Soils that are shallow to bedrock occupy the high points in the landscape. The steepest slopes east of the brook have bedrock exposed on them. The brook drains south through the property toward the Long Hill Design District and eventually is piped underground at the shopping mall. When this area is developed, much of the runoff will be directed toward the brook. Increased rates of runoff from this area will have to be taken into consideration when determining the suitability of the outlet underneath the mall parking lot.

Limitations that will be encountered on site will be short steep slopes, bedrock exposures, shallow to bedrock soil areas and a sizeable area of wetlands in the south central part of the property. Land development will require ledge removal and may require fill to be brought in as cover material. Roads and streets should be developed along the contour of the land to avoid extensive cutting and filling in ledge areas. The most serious limitations will be on the steep slopes on the highest points in the landscape. The smoother landforms lower in the landscape contain areas of deep soil, but pockets of ledge will also be found. Also, surface stones and large boulders may present a limitation to land development on the lower slopes.

The wetlands soils (43M) are regulated by the local wetlands commission under Public Act 155. The wetlands should be considered as an asset to this development and should be planned as part of the storm water control plan. If "zero discharge" is required, the wetland soils may have to be developed into water retention areas.

Soil erosion and sedimentation will be of concern on the steep slopes where vegetation is removed and runoff water is allowed to run down slope, eroding the soil. The east portion of the property, on both sides of the brook, is an area where sediment and erosion control plans should be implemented so that sediment is not allowed to reach the brook. The soils in this area mapped as 200C, Narragansett-Hollis complex, are susceptable to erosion when the topsoil is removed.

VEGETATION

The 40± acre Court Colver Property may be divided into three major vegetation types. These include mixed hardwoods, 32± acres; hardwood swamp 6± acres; and open/disturbed area, 2± acres. The vegetation present on Long Hill Design District site may be divided into three major categories. These include three mixed hardwood areas, totaling 79± acres; hardwood swamps, which total 16± acres and open area/utility lines which total 5± acres. (Please see the Vegetation Type Map and Vegetation Type Descriptions).

Vegetation Type Description

Type A. (Mixed Hardwoods) This 32± acre fully-stocked stand is made up of pole with occasional sawtimber-size black oak, white oak, black birch, red maple, mockernut hickory, American beech and occasional red oak. Larger trees of higher quality are found near the wetland (hardwood swamp) areas where more moisture is available. The trees are beginning to decline in vigor and health in the drier sections of this stand. The total volume at present, ranges between 14 and 20 cords per acre. A crown thinning of perhaps one third of the total volume which is focused on removing the poorest quality trees would benefit the residual trees in this stand. This thinning is limited to areas where large rocks and boulders do not hinder the operation of harvesting equipment.

Vegetation

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scale

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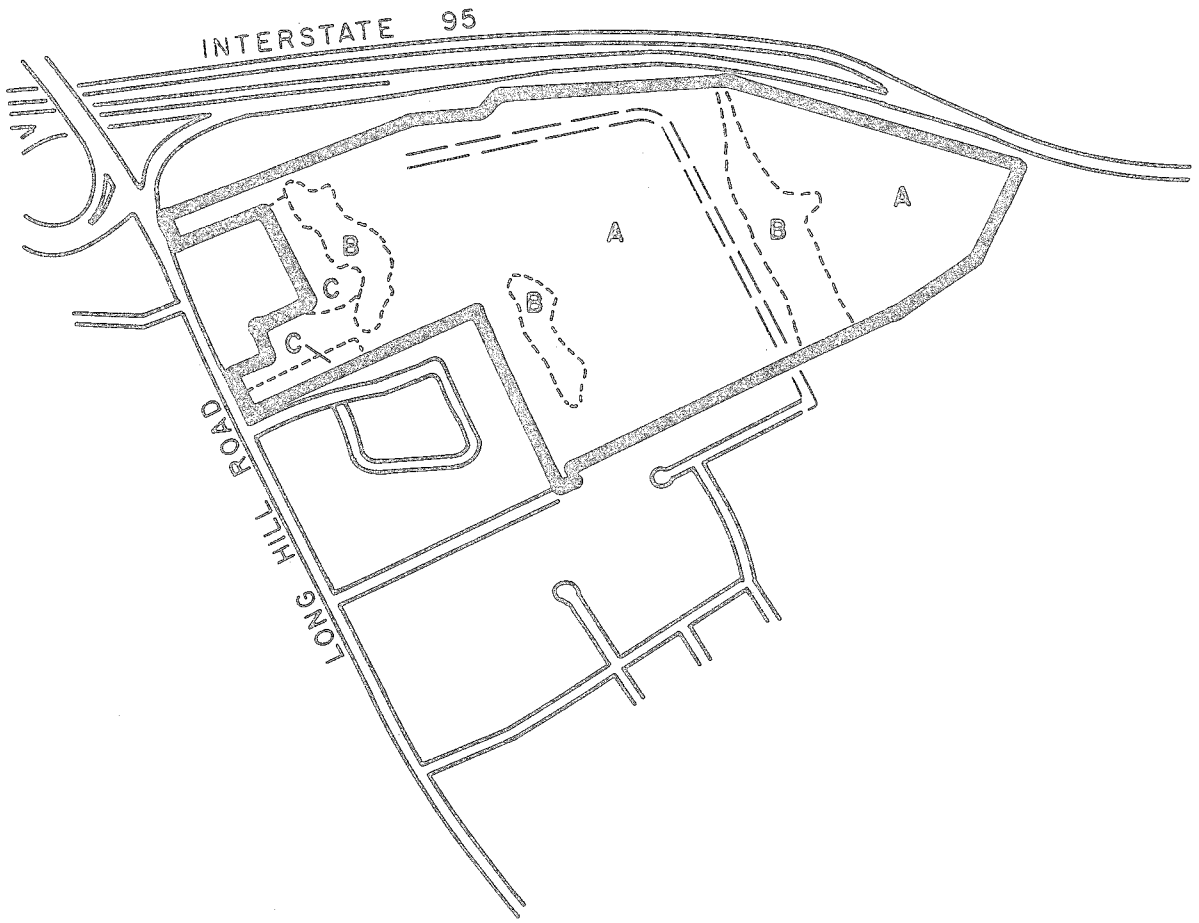


LEGEND

- Roads
- Property Boundary
- Vegetation Type Boundary
- Dirt Road

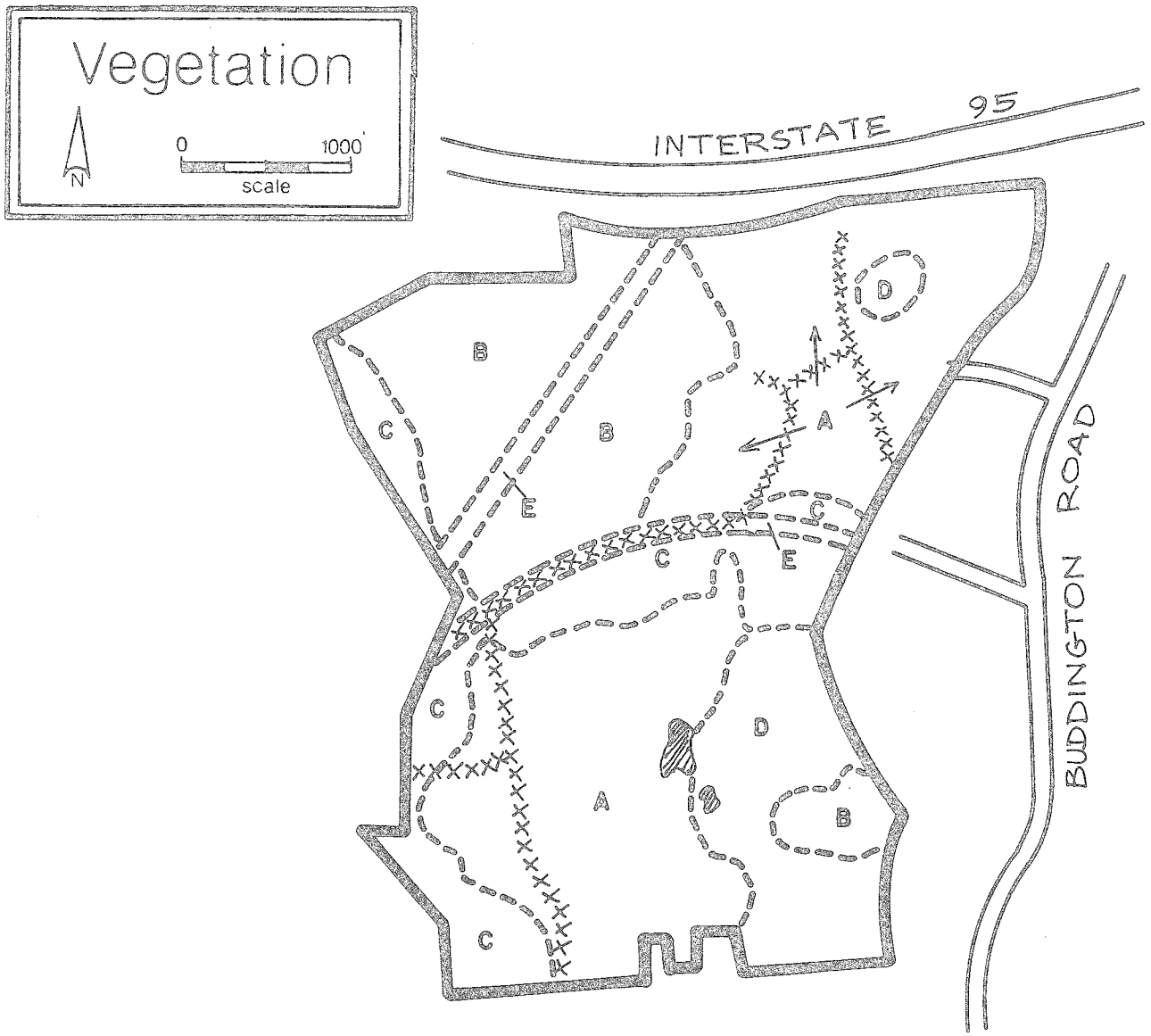
VEGETATION TYPE DESCRIPTIONS*

TYPE A. Mixed hardwoods, 32± acres, Fully stocked pole with occasional sawtimber-size.

TYPE B. Hardwood swamp, 6± acres, Fully to over stocked, pole with occasional sawtimber-size.

TYPE C. Open disturbed area, 2± acres, Shrub species.

* Seedling-size = Trees less than 1 inch in diameter at 4 1/2 feet above the ground (d.b.h.)
Sapling-size = Trees 1 to 5 inches in d.b.h.
Pole-size = Trees 5 to 11 inches in d.b.h.
Sawtimber-size = Trees 11 inches and greater in d.b.h.



LEGEND

Roads

Logging Roads

Property Boundary

Vegetation Type Boundary

Pond Area 1-acre

VEGETATION TYPE DESCRIPTIONS*

TYPE A'. Mixed hardwoods, recently harvested 46±acres.

TYPE B'. Mixed hardwoods, 20±acres.

TYPE C'. Hardwood swamp, 16±acres.

TYPE D'. Mixed hardwoods, 13±acres.

TYPE E'. Open area/utility lines 5±acres.

* Seedling-size = Trees less than 1 inch in diameter at 4 1/2 feet above the ground (d.b.h.)
Sapling-size = Trees 1 to 5 inches in d.b.h.
Pole-size = Trees 5 to 11 inches in d.b.h.
Sawtimber-size = Trees 11 inches and greater in d.b.h.

The understory is dominated by dense patches of mountain laurel, flowering dogwood, sassafras seedlings, American chestnut sprouts, maple-leaf viburnum and in the wetter areas highbush blueberry and sweet pepperbush. Huckleberry, lowbush blueberry, wild sarsaparilla, Canada Mayflower, cat-brier, poison ivy, cinnamon fern, bracken fern, club moss and rock polypody form the ground cover in this stand.

Type B. (Hardwood Swamp) Medium quality pole with occasional sawtimber-size red maple, white ash and yellow birch are present in this 6± acre fully to over-stocked stand. Scattered red oak and pin oak are present around the perimeter of this area. Sweet pepperbush, highbush blueberry, swamp azalea, deciduous holly, arrowwood and patches of mountain laurel form the understory in this stand. Ground cover is dominated by skunk cabbage, sphagnum moss, cinnamon fern, royal fern and sensitive fern. Management for timber products in this area would be, at best difficult, as a result of the saturated soils which are characteristic.

Type C. (Open/Disturbed Area) Disturbed areas total approximately 2 acres of this tract. The vegetation which is present includes seedling and sapling-size red maple and gray birch, along with sweet pepperbush, sweet fern, multiflora rose, spice bush, arrowwood, goldenrod and grasses.

Type A[1]. (Mixed Hardwoods) This stand which totals approximately 46 acres was recently harvested of all sawtimber-size trees. Most of the tops were salvaged and utilized as fuelwood. The stand is fully-stocked at present with seedling-size sprouts which include red oak, white oak, black oak, shagbark hickory, black birch and red maple. Occasional pole-size white oak, black oak, black birch and red maple are also present.

Shrub and herbaceous vegetation includes maple-leaf viburnum, mountain laurel, sweet pepperbush, huckleberry, grasses, goldenrod, club moss, bracken fern and hay-scented fern. The pole-size oaks which remain in this stand have severe epicormic branching (excessive branching on the bole of a tree, often stimulated by a exposure to sunlight).

Type B[1]. (Mixed Hardwoods) Pole and occasional sawtimber-size black oak, white oak, mockernut hickory, red maple and scattered black birch are present in this 20+ acre fully-stocked stand. Total volume in this stand ranges between 12 and 17 cords per acre. The understory is dominated by dense patches of mountain laurel, flowering dogwood, sassafras saplings, chestnut sprouts and maple-leaf viburnum. Groundcover vegetation is composed of huckleberry, lowbush blueberry, hardwood tree seedlings, wild sarsaparilla, striped pipissewa, Canada mayflower, cat-brier, poison ivy, hayscented fern and club moss.

Type C[1]. (Hardwood Swamp) The vegetation in the hardwood swamps, which total

16+ acres, is made up of poor quality sapling to pole-size red maple, with scattered white ash and black gum. Stocking levels are quite variable in these areas, ranging from understocked to overstocked. Sweet pepperbush, deciduous holly, high bush blueberry, swamp azalea, arrowwood and buttonbush form the understory in these stands. The groundcover present consists of skunk cabbage, tussock sedge, sphagnum moss, forget-me-not, cinnamon fern, royal fern and sensitive fern.

Type D[1]. (Mixed Hardwoods) This 13+ acre understocked stand is made up of poor quality pole with occasional sawtimber-size black oak, black birch, white oak, mockernut hickory and patches of American beech. Dense patches of mountain laurel are present in the understory along with American beech seedlings, witch hazel and scattered highbush blueberry. Grasses, huckleberry, Canada mayflower, hairy cap moss, bracken fern and wild sarsaparilla form the groundcover in this shallow to bedrock area.

Type E[1]. (Open Area/Utility Lines) Vegetation is becoming re-established on the areas which were cleared for utility lines and sewer lines. Gray birch, seedlings, big tooth aspen seedlings, sweet fern, bracken fern, hayscented fern, and tall cinquefoil have become established. Cattails, phragmities, tussock sedge, skunk cabbage and sweet pepperbush are present where wetland soils have been disturbed.

The Court Colver Property is presently zoned RMF (Residential Multifamily) and DRD (Design Retail). Development of this intensity anywhere on this tract or on the LHDD tract may have a significant impact on the vegetation present. This impact depends upon the magnitude of vegetation clearing which takes place during construction.

The widespread clearing of vegetation which commonly accompanies development of this intensity may indirectly allow the increased runoff generated from this area to accelerate erosion. The potential for siltation and sedimentation of the wetland areas within this property is high. The use of proper erosion control techniques, including prompt revegetation of the critical areas with sod, and the designation of buffer strips left undisturbed where possible, around wetlands and streambelts, may help to reduce soil loss and the resulting siltation and sedimentation of the sensitive wetland areas.

Planned or unplanned filling in of wetlands in such a way that natural drainage flows are blocked or restricted may cause a permanent change in the ground water table. A rise in the water table may cause mortality of the trees, shrubs and herbaceous vegetation growing in these areas. Dead and dying trees and shrubs can lower the aesthetic value of an area. Falling trees may become hazardous as use of the area becomes more intensive.

PLANNING CONCERNS

Court Colver Property

Surrounding land uses are moderate density residential and commercial on the east side of Route 1. A synagogue is located at the end of Maxson Road. Moderate density residential, multi-family and commercial uses are located along the west side of Route 1. On a land use basis the proposed multi-family and commercial uses would be compatible. Similar to the Town Plan of Development, the Regional Development Plan recommends the area for medium and high density mixed urban uses. The Town plan refers to the area as multi-family residential and tourist commercial with the area zoned, respectively, for multi-family and design retail districts. For both residential and commercial uses, the development should be clustered on the better sections of the Charlton-Hollis and Narragansett-Hollis soils. This should be possible with the availability of public sewer and water on the site.

Possible access to the multi-family zone could be provided through Brookshaven Road or Maxson Road, but this would mean new traffic on existing residential streets. A better approach would be to provide access to both the commercial and residential areas with a new road extending southeast to a future road connection between Drozdyk Drive and Buddington Road. This would provide additional access to the shopping center area rather than using Route 1, which has an 18,300 average daily traffic count in this area. If this road enters Route 1 along the northern portion of the Colver property it may intersect with the right-hand turning and lane for the I-95 east bound entrance ramp. This would probably necessitate the reconstruction of the beginning of the entrance ramp. A central or southern portion of the property tie-in with Route 1 could probably avoid this problem. In any case signalization will probably be needed at the new intersection with Route 1.

Long Hill Design District

The Long Hill Design District is located in the western portion of the town, north of Route 1 and west of Buddington Road. Groton's major commercial center is located immediately south of the area and moderate density residential uses are found to the west in the general vicinity of Wayne Road. Single family homes and a mobile home park border the proposed zone change to the east along Buddington Road. I-95 forms the northern boundary of this area.

The area is well located with respect to shopping facilities, major highways, and mass transit. Government, school, and library facilities are located about 1 1/2 miles east of the site along Route 1. Both the regional development plan and the town plan recommend this area for the town center concept.

A 1971 cost-benefit study of this area by SCRPA,* indicated that for various kinds of residential and commercial land uses the Town would experience a net financial gain. Alternatives examined were single-family development, townhouse development, apartment, garden, elevator development, and Town Center development. The Town Center included commercial, office and elevator apartment uses. Residential densities ranged from 4 to 15 units per acre.

For new development in this area it would be desirable to increase access to the interior of the area and to avoid all new traffic entering Route 1 at one point. Route 1 has an average daily traffic count of 18,300 in this area. Its volume capacity ratio is 0.80 west of the Poquonnock Road intersection and 1.4 east of the Poquonnock Road intersection. A ratio of 0.75 is considered congested and a ratio of 1.25 is considered the intolerable threshhold.

Circulation could be improved by extending Drozdyk Drive northeast to Buddington Road. An extension of Laurelwood Road to the north might also be possible to tie into the extension of Drozdyk Drive, although this would change the character of this residential dead-end street. For the long-term development of both this area and the Colver property to the northwest, it would be desirable to have another new road which would extend from Drozdyk Drive northwest to Route 1 in general vicinity of Ronald Street.

Because of the site limitations of wetness, steep slope, and shallow to bedrock soils, it would be desirable to use a cluster design approach to locate the buildings on the best land, while maintaining the areas with limitations as open space, buffers, and recreation areas. Because public water and sewer are available, this clustering approach should be feasible. Since these utilities are provided, the question of residential density is then manifested in such things as building area, off-street parking, road, open space, and storm drainage requirements as well as potential traffic flows. A rough sketch or site plan should be used to determine if the buildings, off-street parking, etc., can be accommodated on the site with respect for the natural resource limitations.

In terms of traffic flows, a CONNDOT** study indicated an average of 10.6 weekday trips from single-family dwellings and 6.8 for apartment units. Using these figures a comparison can be made for one acre of residential development at various densities:

2 single-family homes per acre	4 units milti-family per acre	10 units multi-family per acre	15 units multi-family per acre
21.2 AWDT	27.2 AWDT	68 AWDT	102 AWDT

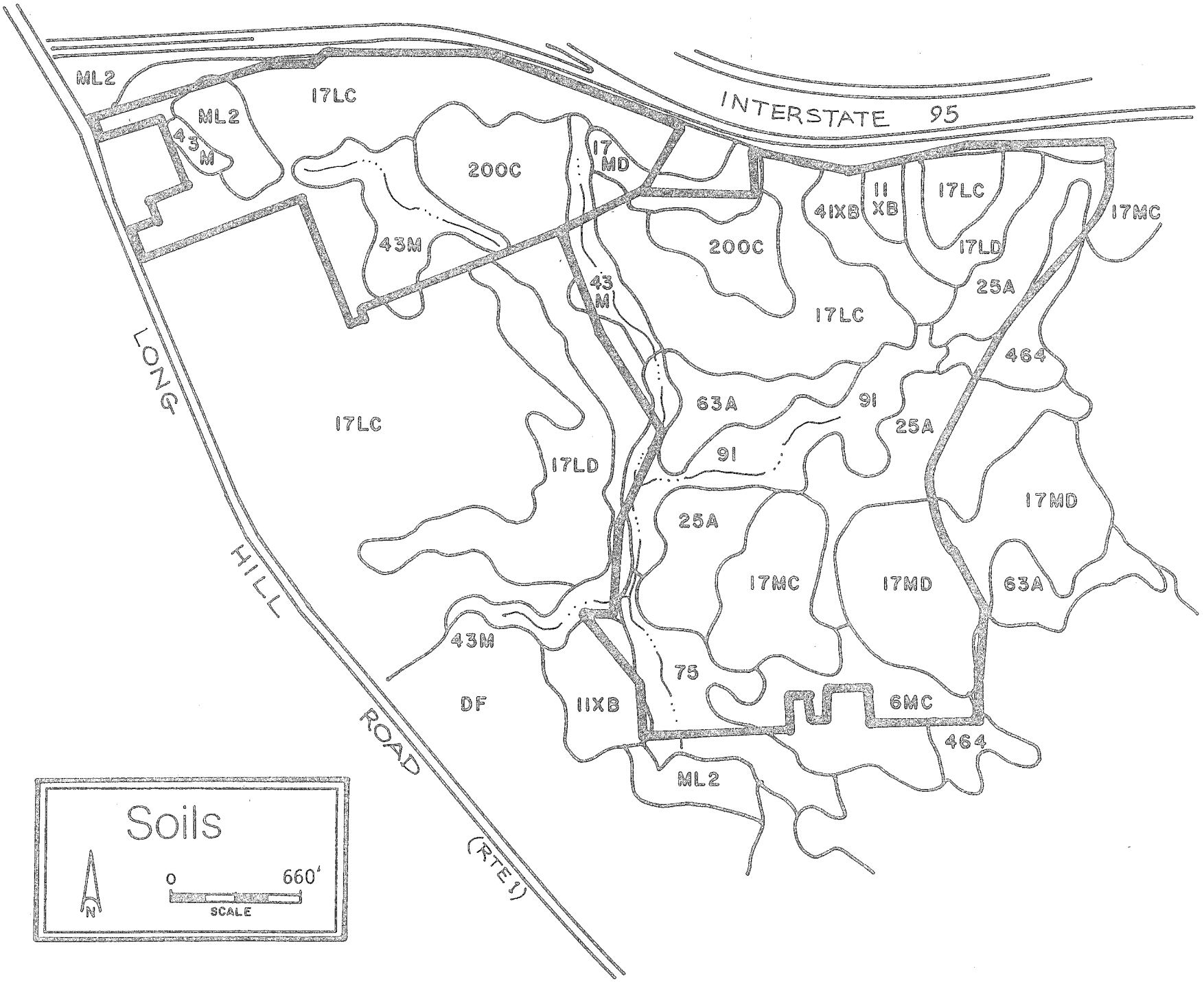
AWDT = average weekday trips

The CONNDOT figures may now be high since they were based on 1973 counts and do not reflect the increase in the cost of gasoline that has occurred since 1973. Since the proposed development will be next to the major shopping facilities in Groton, one could assume that some of these daily trips would be replaced by persons walking to shopping facilities. In addition, SEAT bus service is available at Anderson Little on Drozdyk Drive. Two hour interval corridor service to Norwich and New London and one hour local Groton service is currently provided.

*Cost Revenue Analysis of Alternative Land Uses on Two Sites in the Town of Groton, SCRPA, 1971.

**Trip Generation Study of Various Land Uses, CONNDOT, 1974.

Appendix


INTERSTATE 95
LONG HILL ROAD (RTE 1)
ML2
17LC
43M
200C
17MD
41XB
11XB
17LD
17MC
25A
464
63A
91
75
DF
11XB
6MC
Soils
N
0
660'
SCALE

LONG HILL DESIGN DISTRICT
GROTON, 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
Adrian-Palms	91	13	10	Wetness, floods, low strength	3	3	3	3
Canton-Charlton	11XB	3	2	Large stones	2	2	2	2
Charlton-Hollis	17LC	25	19	Slope, large stones, depth to rock				
Charlton Part					2	2	2	2
Hollis Part					3	3	3	3
Charlton-Hollis	17LD	5	4	Slope, depth to rock	3	3	3	3
Hollis-Rock Outcrop	17MC	9	7	Slope, depth to rock	3	3	3	3
Hollis-Rock Outcrop	17MD	14	11	Slope, depth to rock	3	3	3	3
Haven	63A	6	5	Frost action	1	1	2	1
Narragansett-Hollis	200C	7	5	Slope, large stones				
Narragansett Part					2	2	2	2
Hollis Part					3	3	3	3
Ninigret	25A	21	16	Wetness, frost action	3	3	2	1
Raypol	464	3	2	Wetness, frost action	3	3	3	3
Ridgebury, Leicester & Whitman	43M	3	2	Wetness, large stones	3	3	3	3
Scarboro	75	10	7	Wetness	3	3	3	3
Sutton	41XB	6	5	Frost action, wetness	3	3	2	2

Limitations: 1 = slight, 2 = moderate, 3 = severe.
** Regulated Wetland Soil Under Public Act 155.

COURT COLVER PROPERTY
GROTON, 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	26	49	Slope, large stones, depth to bedrock				
Charlton Part					2	2	2	2
Hollis Part					3	3	3	3
Hollis - Rock Outcrop	17MD	2	4	Slope, depth to rock	3	3	3	3
Narragansett - Hollis	200C	9	17	Slope, large stones, depth to rock				
Narragansett Part					2	2	2	2
Hollis Part					3	3	3	3
Ridgebury, Leicester & Whitman	43M	10	19	Wetness, large stones	3	3	3	3
Udorthents	ML2	6	11	Limitations Determined on Site				

Limitations: 1 = slight, 2 = moderate, 3 = severe.
** Regulated Wetland Soil Under Public Act 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.