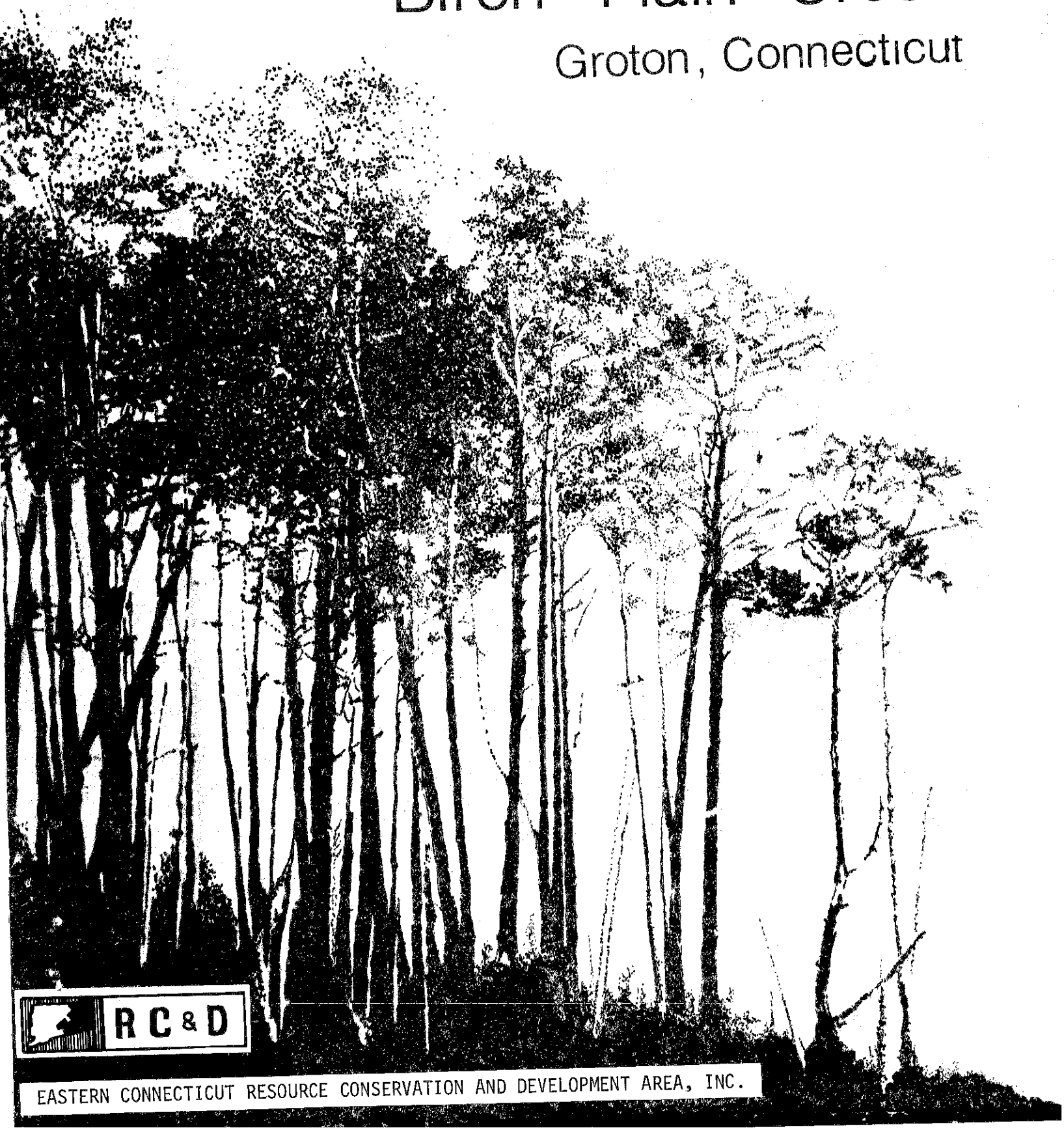
Environmental Review Team Report

Birch Plain Creek

Groton, Connecticut



R C & D

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

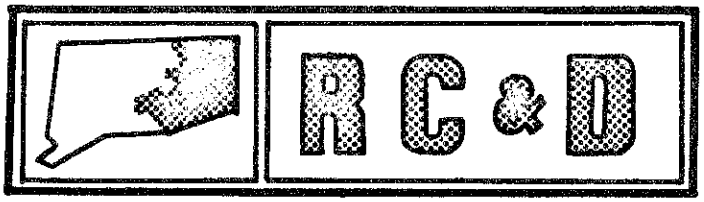
Environmental Review Team Report

on

Birch Plain Creek

Groton, Connecticut

September 1979

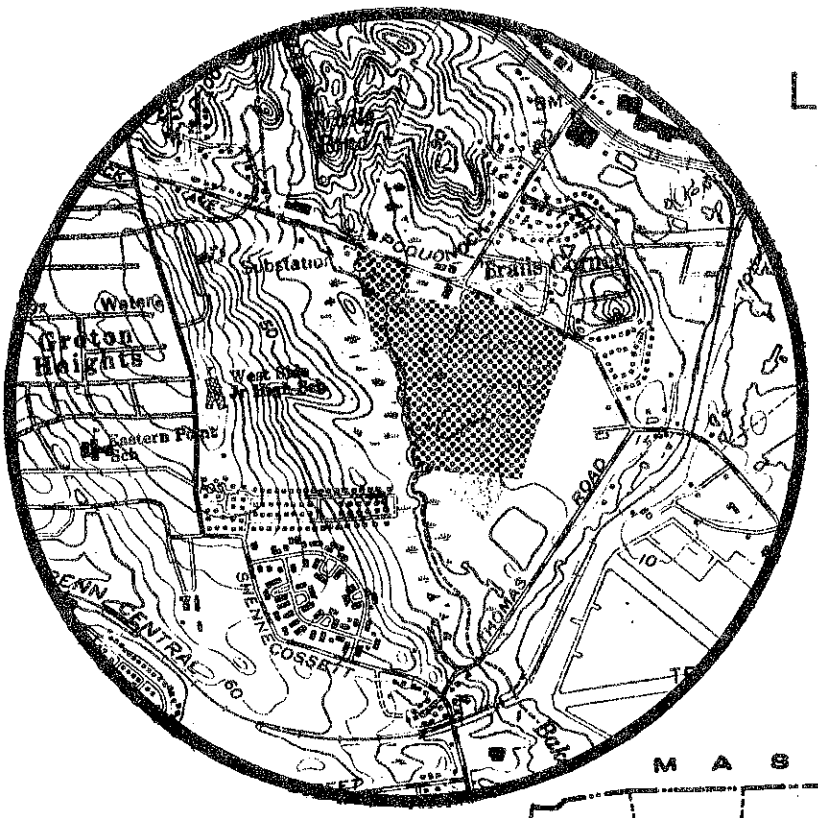


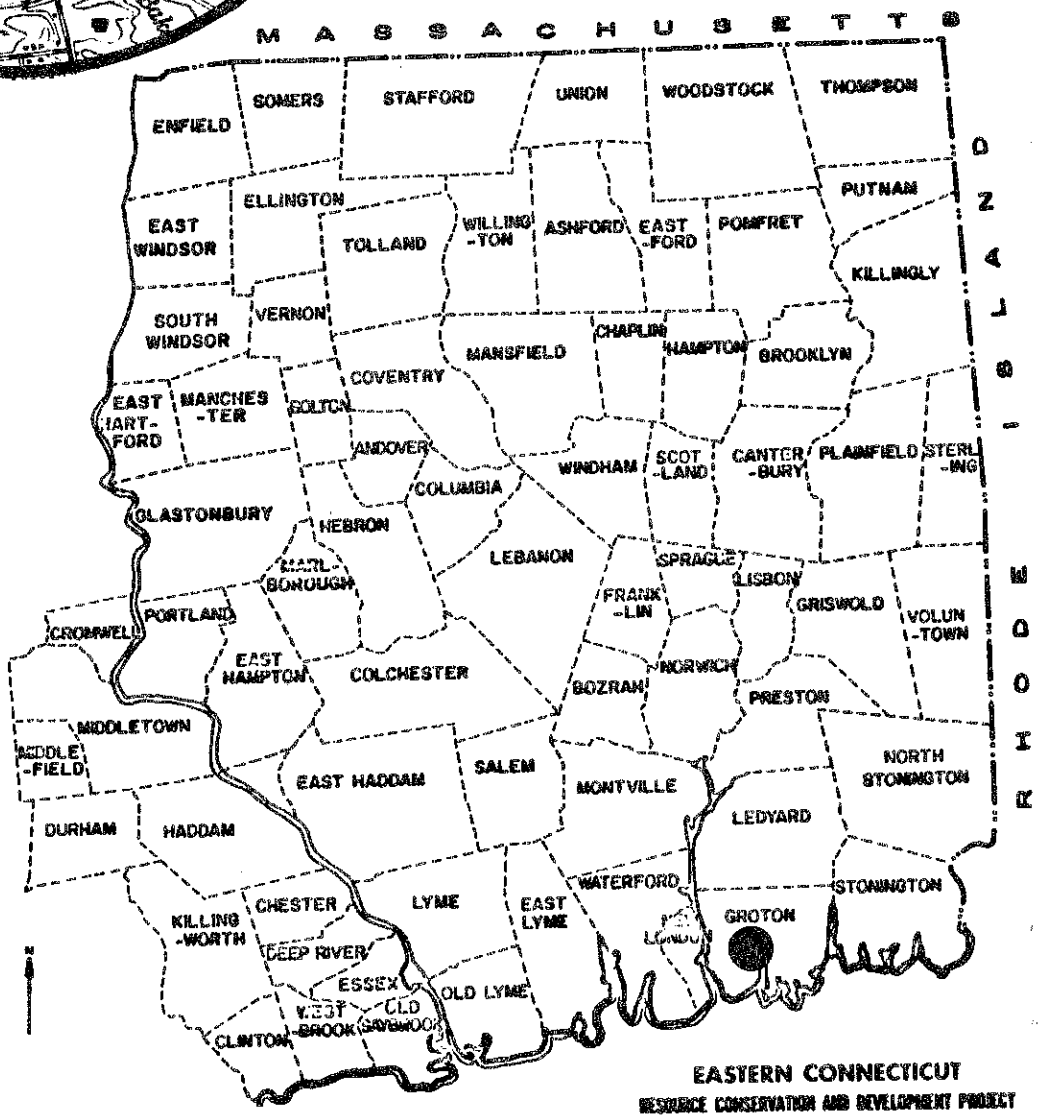
eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site

BIRCH PLAIN CREEK
GROTON, CONNECTICUT





ENVIRONMENTAL REVIEW TEAM REPORT
ON
BIRCH PLAIN CREEK
GROTON, CONNECTICUT

This report is an outgrowth of a request from the Town of Groton Planning Department 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.

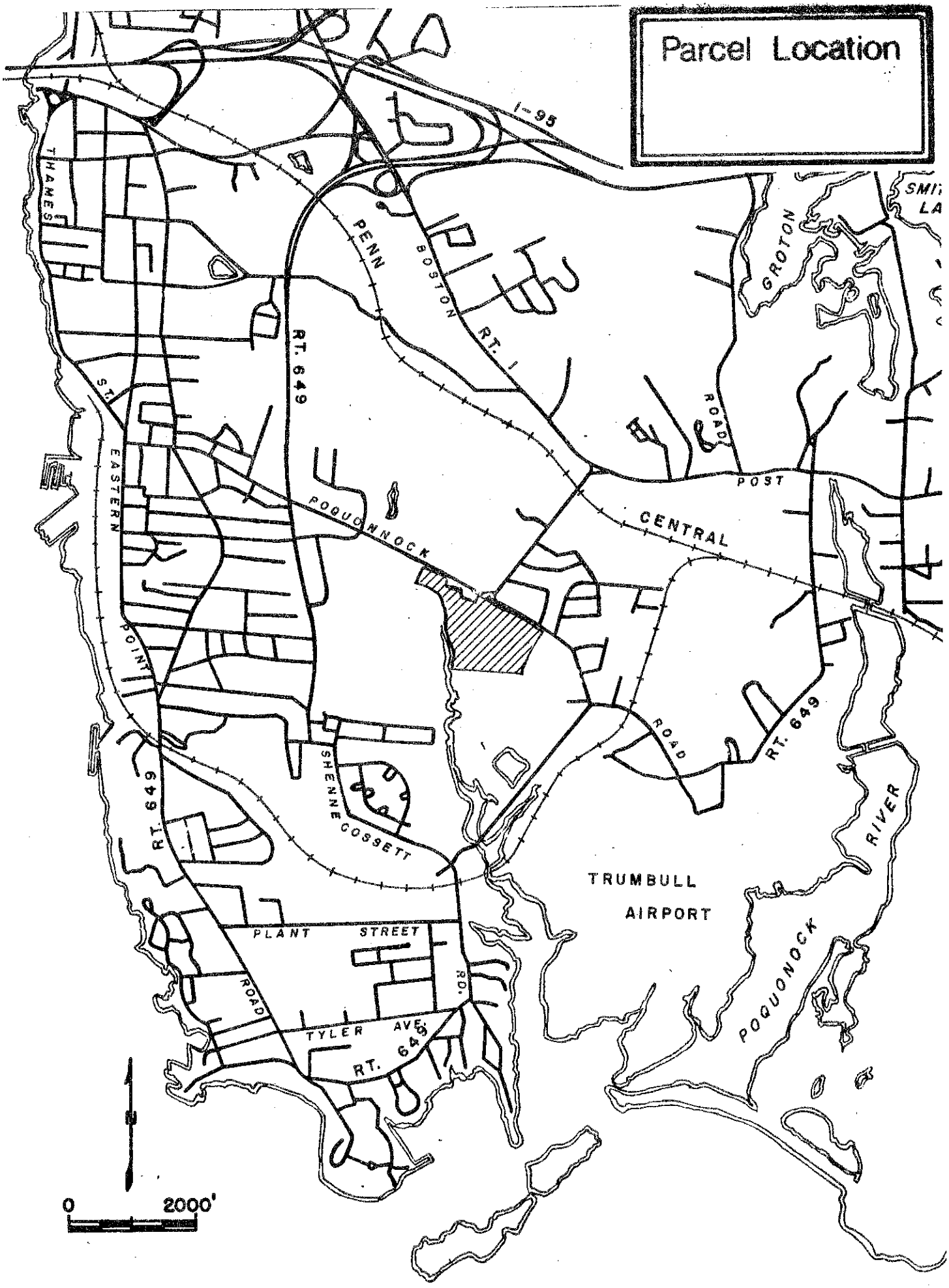
The ERT that field checked the site consisted of the following personnel: Gary Domian, District Conservationist, SCS; Mike Zizka, Geologist, Department of Environmental Protection (DEP); Tom Smith, Biologist, DEP, Rob Rocks, Forester, DEP; Don Capellaro, Sanitarian, State Department of Health, Jim Butler, Regional Planner, Southeastern Connecticut Regional Planning Agency (SCRPA); Ron Rozsa, Marine Ecologist, Coastal Area Management, (DEP); and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field checked the site on Thursday, June 21, 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. As requested by the Town, this report, which identifies the existing resource base of the Birch Plain Creek Property, shall constitute the environmental assessment portion of the Town's open space application for Federal Department of the Interior, Heritage Conservation and Recreation Service funds to assist in the development of this property.

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.


Parcel Location
I-95
THAMES
PENN
BOSTON
RT. 1
GROTON
RT. 649
ROAD
POST
POQUONNOCK
CENTRAL
EASTERN
POINT
SHENNECOSSETT
TRUMBULL
AIRPORT
PLANT
STREET
TYLER
AVE.
POQUONOCK
RIVER
0
2000'

DESCRIPTION OF THE PROPOSAL

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for a parcel known as the Birch Plain Creek property. The site consists of 42.5 acres and is located in the Town of Groton, Connecticut with frontage on High Rock Road and Poquonock Road, (See Parcel Location Map) and is further identified on the Groton Assessors Maps 30 and 41, Block 151, Lot 60.

The review site embraces both an upland outwash land system and a tidal marine land system positioned immediately south of Poquonock Road and between Trumbull Golf Course and Birch Plain Creek to the east and west respectively. This parcel is located on the westernmost perimeter of an extensive outwash plain which occupies a spacious lowland valley between a series of drumlinoid hills. Intensive development on this plain and in the coastal area attests to the suitability of these sites for development. Much of this plain today is blanketed by moderate to high residential density development. The Groton-New London Airport also occupies part of the plain. No other outwash plains exist in Groton and this town owned parcel may in fact represent the only remaining significant natural remnant of a once biologically significant plain.

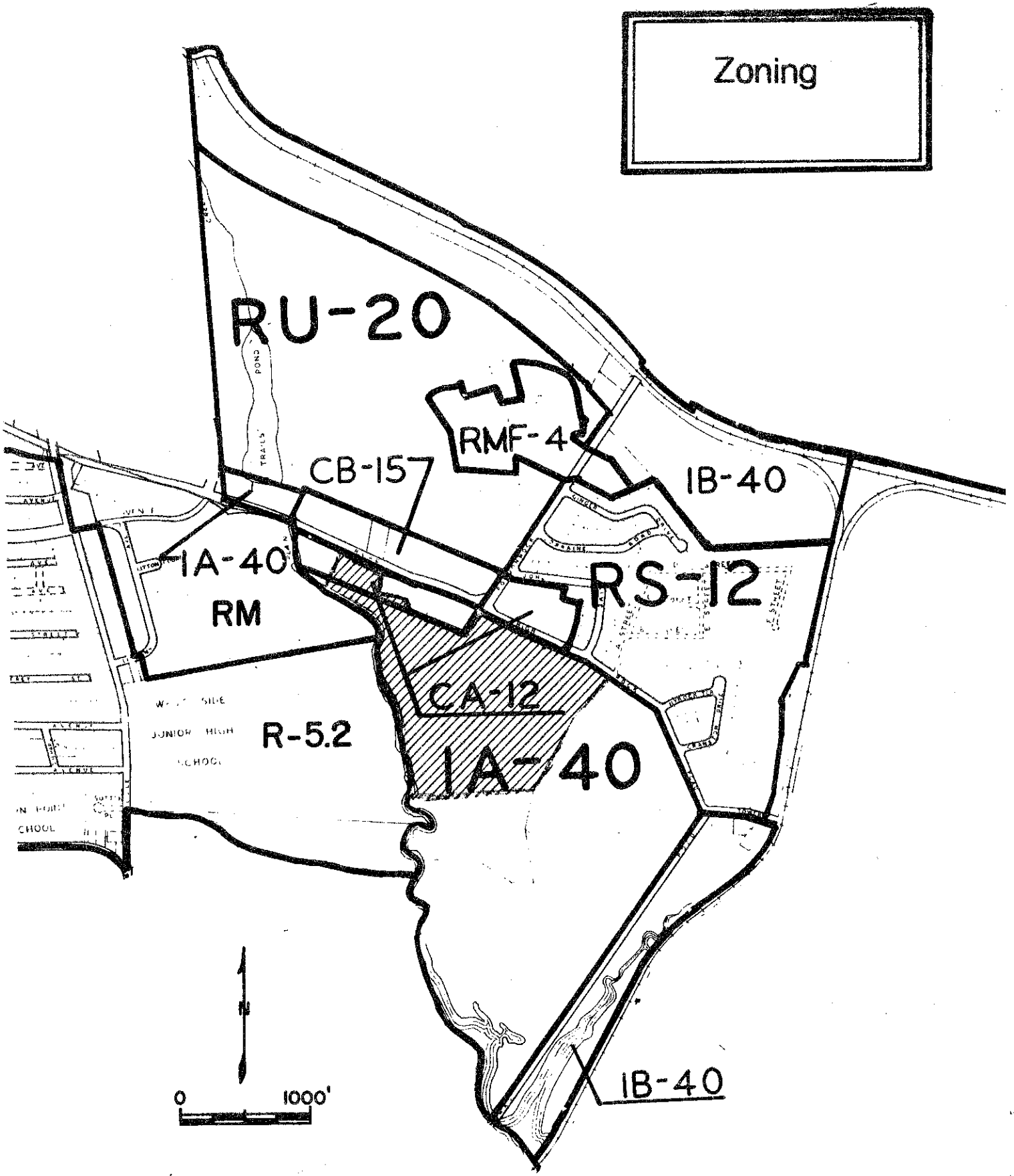
In the not-too-distant past, as many as 9 or 10 rare plants inhabited this plain. At least seven of these were presumably extirpated when the Groton-New London Airport was constructed. Inspection of the University of Connecticut herbaria disclosed that one state rare plant was collected in the Birch Plain Creek tidal wetlands near Poquonock Road. At the time of this review, a plant that has never been collected in Connecticut was discovered on the upland sand plain.

The area of concern is an irregular undulating plain composed of sandy outwash. Currently much of this plain supports a young forest composed of red maple. This landscape has a multitude of small basin or depression wetlands; some presumably are kettles. To the west, at the juncture of the plain and the drumlinoid land system is a small valley through which flows Birch Plain Creek. By virtue of the proximity of this valley to Long Island Sound, the creek is both tidal and brackish. Mean tidal range in this vicinity is on the order of 2.7 feet. Fringing this estuarine creek is a marine land system or tidal wetland ecosystem supporting mostly brackish marsh vegetation.

Elevations generally do not exceed ten feet. The still water flood level incidental to a 100-year coastal event, as mapped by FEMA (formerly HUD-FIA), is eleven feet for this area. Thus, practically this entire landscape is flood prone.

Three soil series occur here: the Westbrook, a tidal wetland soil; the moderately well drained Ninigret on upland areas; and the Raypol, in small depressional wetlands within the upland areas.

This review is in response to a request from the Town of Groton Planning Department, which is interested in limitations to development of recreational facilities on this site. The parcel is Town-owned, having been acquired by the Town in 1975 with Housing and Urban Development Open Space funds. These funds require that the property be utilized for open space and recreational purposes. At some time in the future, the Town will apply for funding that can be applied to the creation of an active recreation facility on this site. Before applying for any funding the Town wishes to determine the types of recreation that are best suited for the site.


Zoning
RU-20
RMF-4
CB-15
IB-40
1A-40
RM
RS-12
CA-12
R-5.2
1A-40
IB-40
0
1000'

The Town's recently completed "Open Space/Recreation-Historical/Cultural Plan" (1979) assesses the adequacy of Groton's recreational opportunity through the following criteria:

1) every citizen should be within 1/4 to 1/2 mile of publicly owned open space and developed recreational areas in order to facilitate walking or bicycling to such areas;

2) the density of population in the neighborhood, the lot sizes, types of housing units, and amount of vacant land;

3) access to or presence of existing facilities; and

4) future growth potential of a neighborhood.

The neighborhood that any future recreational facility on this site would serve contains a high density trailer park and moderate density single family residences. Also located within walking distance is the Pequot Village elderly housing development; however, sidewalks are not continuous between this development and the site. Other than this parcel, there are no town-owned parks which are in the walking or cycling range of the residents of this neighborhood. A privately owned golf course does lie in the southeastern portion of the neighborhood. Sewers are present in some areas of the neighborhood and are proposed for the rest. This could prompt some in-filling of residential development and the upgrading of some existing low intensity properties to the higher intensities for which they are zoned. The Town Plan recommends that the Town should make an immediate small investment into the development of some type of active recreational area on this property, including the construction of sidewalks along the entire frontage of the parcel.

DESCRIPTION OF THE ENVIRONMENT

PRESENT/PAST LAND USES

The Birch Plain Creek property is now used as open space, and has been so used for the past twenty-five years, Prior to that time, the northern portion of the site was used as an active nursery, which explains the existence of some vegetation that is not native to the site. There are no structures standing on the property.

The present land uses in the neighborhood surrounding the parcel are agricultural, commercial (golf course), moderate and high density residential, industrial, and public (Trumbull Airport). The major portion of this property is zoned light industrial. The zoning districts in the vicinity of this site include single family residential, multiple family residential, rural residential, industrial, and commercial (see Zoning Map).

EXISTING SOCIO-ECONOMIC CONDITIONS

The population of the Town of Groton is estimated at 37,800 (1978 State Health Department), making it the second largest town in the Southeastern Connecticut Region. Groton has exhibited a steady increase in population since 1959. This growth has been

slower than its rate of increase during the 1940's but slightly faster than the growth of the State for the same period. It is forecast that the Town will have a population of 38,228 in 1980, 39,003 in 1990, and 39,948 in 2000 (1979 State Health Department and Office of Policy and Management estimates). Having a large military base within the town, it is not surprising to find that there are an unusually large number of males within the population. The 1970 census indicated that there were 1,395 black persons in Groton, or 4% of the total population. Groton is following a pattern similar to the national trend concerning natural increase: birth rates are declining, while death rates are remaining approximately the same. The 1970 census determined Groton's median income to be $9,584.

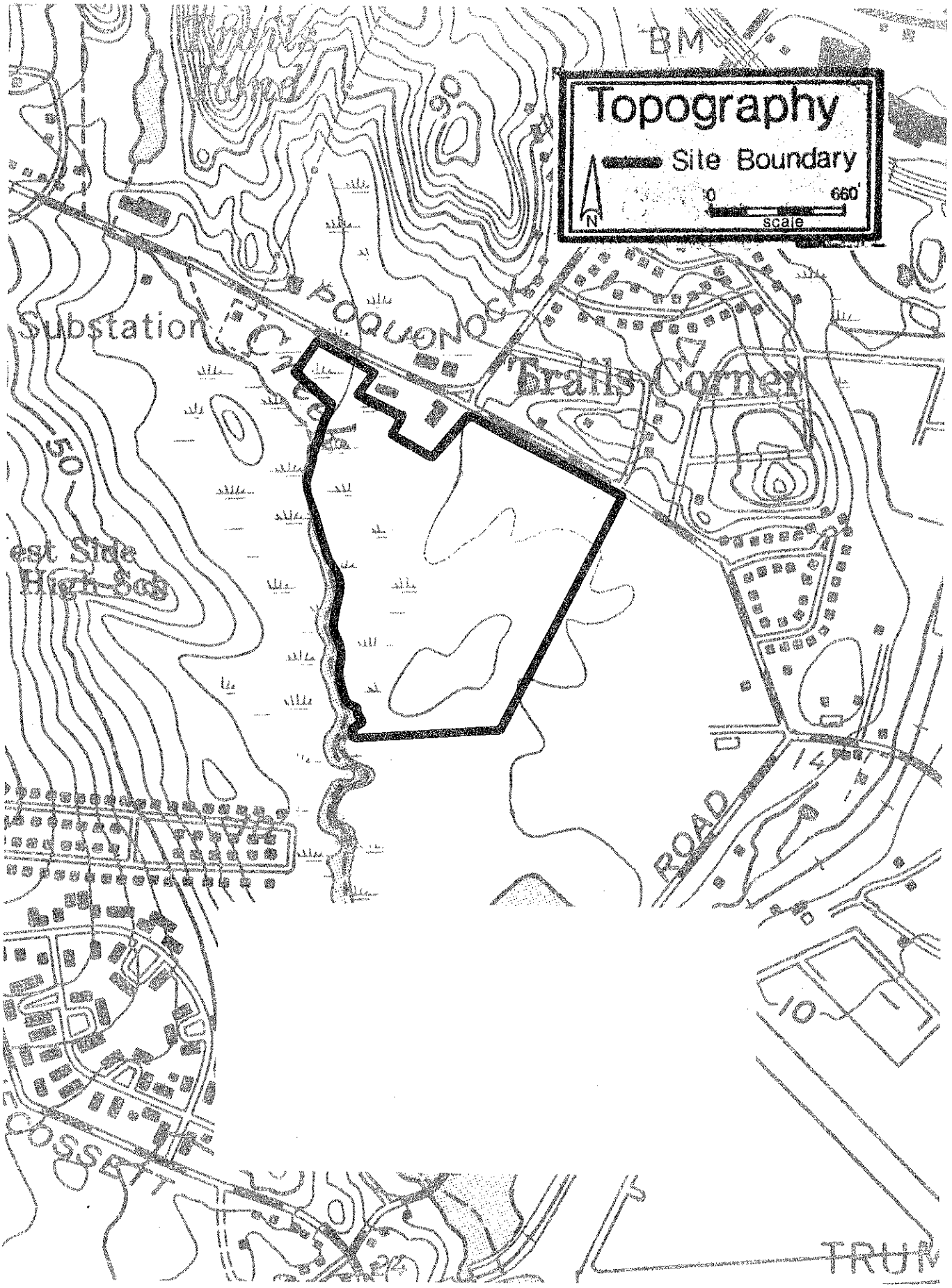
Groton can be described as a net importer of labor. 25-30% of the region's total labor force is employed within the Town of Groton, with most of them found at Electric Boat. General Dynamics, Electric Boat Division, Southeastern Connecticut's largest employer, provides jobs to over 22,000 people. The United States Naval Submarine Base employs approximately 10,000 military personnel and 1,000 civilians. Pfizer, Inc., one of the nation's largest producers of pharmaceuticals and chemicals, employs more than 2,700 people. Other large employers in Groton include Arwood Corporation, Hess Oil, Christie Plating Company, and Soneco Service, Inc. An important segment of Groton's well-developed economic structure is its commercial base. Groton has the largest retail base in Southeastern Connecticut in terms of dollar volume, according to Connecticut Tax Department figures.

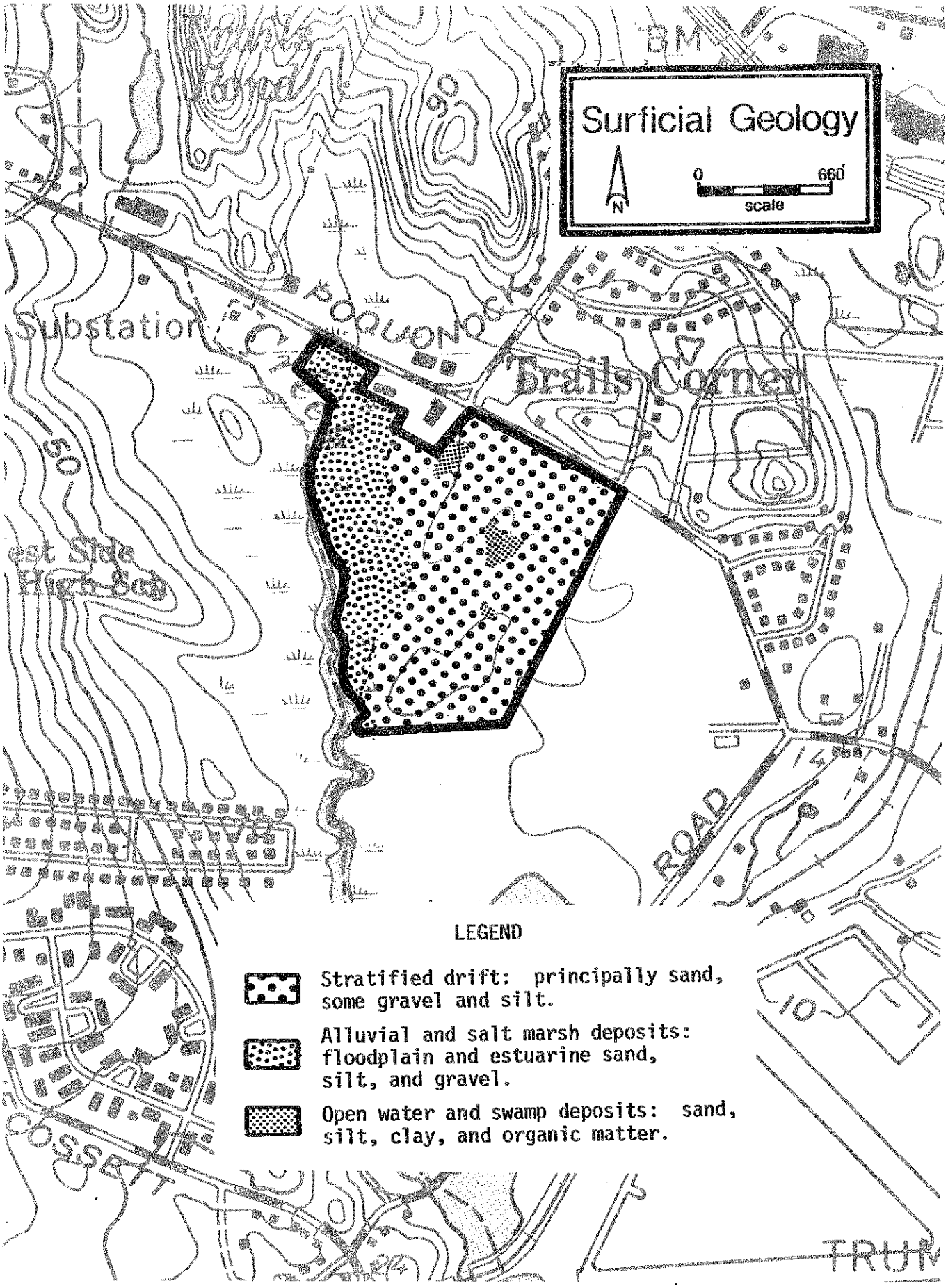
EXISTING TRANSPORTATION ROUTES

The Birch Plain Creek property has frontage on Poquonock and High Rock Roads, both classified as secondary thoroughfares in the Town's 1978 "Circulation and Transportation Plan." The site is located approximately 1/2 mile south of Route 1, a major east-west road in the town. Poquonock Road connects the site to Route 1, making it easily accessible by automobile from other parts of the town. More importantly, the site can readily be made accessible by other modes of transportation, especially in the immediate neighborhood, with some minor improvements. Presently, sidewalks exist along some of the frontage of the site and along part of Poquonock Road leading to Route 1. The "Circulation and Transportation Plan" for the town indicates that sidewalks for the entire frontage of the site and a continuous connection north to Route 1 are pending, and are included in the Town's "Capital Improvement Program." An existing bikeway presently runs up Thomas Road to High Rock Road and then travels east on High Rock Road. A connection towards the site would serve a large portion of the neighborhood's population. There is currently no public bus service in Groton, but this will soon change with the 1980 initiation of the Southeast Area Transit (SEAT). SEAT has scheduled local service along Route 1 and Poquonock Road towards the City of Groton, traveling directly past the site.

SURFACE AND SUBSURFACE GEOLOGIC CONDITIONS

The Birch Plain Creek site is part of a long, approximately one-mile-wide series of sand and gravel deposits that fills the Poquonock River-Groton Reservoir basin. Although pebble and cobble gravels are common in other areas within this series, sand appears to be the principal deposit on the site itself. Gravel may be more extensive at depth. The deposits within the entire series were laid down by meltwater issuing from a receding glacier ice sheet. Three small ponds exist on the site; these are fed by groundwater and are slowly filling in with organic and


Topography
Site Boundary
0
660'
scale
N
BM
Substation
Trails Corner
50
ROAD
10
TRUN


Surficial Geology
N
0
660'
scale
BM
Substation
Trails Corner
50
ROAD
10
LEGEND
Stratified drift: principally sand, some gravel and silt.
Alluvial and salt marsh deposits: floodplain and estuarine sand, silt, and gravel.
Open water and swamp deposits: sand, silt, clay, and organic matter.

mineral sediment. Salt marsh deposits consisting of partly decomposed organic material mixed or interbedded with estuarine silt and sand lie along the western boundary of the property. The surficial geology of the site is shown in an accompanying illustration.

Bedrock underlies the site at depths exceeding 10 feet. The rock was classified as New London Gneiss in U.S.Geological Survey Map GQ-574, "Bedrock Geologic Map of the New London Quadrangle", by Richard Goldsmith. This rock consists primarily of light gray, medium-to fine-grained, massive gneiss composed of the minerals oligoclase, quartz, microcline, biotite, magnetite, and hornblende.

SOILS

Mineral soils occupy the nearly level to gently sloping remnants of a glacial outwash plain. Shallow depressions with gently sloping sides are found in the outwash plain. Man-made drainage ditches and what appear to be borrow areas are also found in the study area.

The nearly level to gently sloping outwash plain is occupied by Ninigret fine sandy loam and is denoted on the soil map as 25A with slopes of 0 to 5 percent. The soil formed in water-sorted outwash. The soils are moderately well-drained and have a seasonal high water table at 18 to 24 inches. Ninigret soils have moderately rapid permeability.

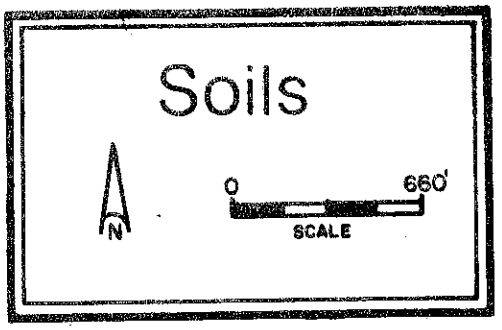
The shallow depressions on the outwash plain are occupied by Raypol silt loam, denoted on the soil map as 464 with level or nearly level slopes. The soils formed in silty deposits, less than 40 inches thick, over sand and gravel. The soils are poorly drained and have a high water table at or near the surface 7 to 9 months of the year. Raypol soils have moderate permeability in the surface layer and subsoil, and rapid or very rapid permeability in the substratum.

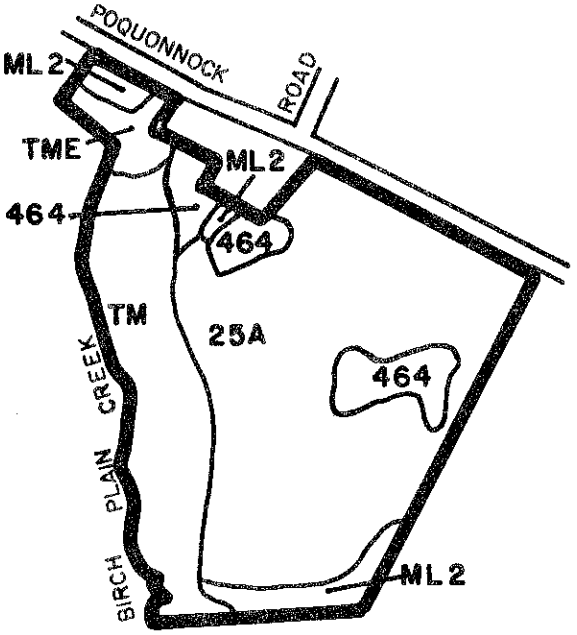
The mineral soils are bordered on the west by organic soils that occupy the level or nearly level tidal flat adjacent to Birch Plain Creek. The organic soils are Westbrook mucky peat and Westbrook mucky peat, low salt, denoted on the soil map as TM and TME respectively. The soils formed in partially decomposed organic material between 16 and 51 inches thick over loamy deposits. Westbrook soils are subject to twice-daily inundations by salt water.

Also found on the northwest corner of the property and along the southern edge of the mineral soils are areas of soil material that have been excavated and filled by man. These soils are Udorthents, denoted on the soil map as ML2. It is not possible to make statements on the soils origin, drainage, water table, or permeability because the soil has been disturbed from its natural state.

The limitations to most uses on this site depend on the depth of high water table, but the degree of limitation will depend on the particular proposed use. The soil limitations charts in the Appendix to this report list various land uses for recreational development, sanitary facilities and building site development, relative to their potential limitations.

The Ninigret soils exhibit severe limitations for use in sanitary waste disposal because of a seasonally high water table and excessive permeability in the subsoil that may allow pollution to enter groundwater. The Raypol exhibits similar characteristics, but compounds the limitations because of a prolonged seasonally





SOIL LEGEND

Symbol	Soil Name	Slope
25A	Ninigret fine sandy loam	0-5%
464	Raypol silt loam	
ML2	Udorthents	
TM	Westbrook mucky peat	
TME	Westbrook mucky peat, low salt	

high water table. The Westbrook soils have limitations similar to Raypol but are also subject to flooding.

Site selection for small buildings, such as restroom facilities or maintenance sheds, is severely limited in the Westbrook soils because of wetness, flooding, corrosivity, instability, and excess salt. Raypol soils also have severe limitations due to wetness and frost action. The Ninigret soils have a variability of limitations due to a seasonally high water table that is not as long in duration as that of Raypol and Westbrook soils. When shallow excavations are necessary, wetness and soil instability are the major limiting factors. Wetness and frost heaving impose moderate limitations for small commercial buildings and local roads. Establishing a lawn on Ninigret soils will not pose a serious problem, but during periods of prolonged dryness, droughty conditions could exist.

Seasonally high water tables become less of a limitation for general recreational use in soils such as the Ninigret. Poorly drained soils such as Raypol are severely limited because of the long duration of water at or near the surface 7 to 9 months out of the year. The Westbrook soils are severely limited for most recreational uses that require trafficability. The limitations are wetness, flooding, and excess humus.

The soils generally indicate that the area would be well-suited for group types of recreation, particularly jogging trails, nature trails, and ballfields. Trails would be easy to install because the landscape is already nearly level.

Ballfields and parking lots could also be developed but would require more land preparation. The land most suitable for ballfields is located south along High Rock Road and 200 to 300 feet into the property. Beyond 300 feet and going south, the soils are dominately Ninigret, but small depressional areas exist within the soil boundaries. The depressions would be more poorly drained than Ninigret and probably are more closely related to Raypol. Ballfields would require leveling this area and hauling in fill to bring up the grade to that of the surrounding Ninigret soils. The disadvantages of filling in the low spots would be the removal of water recharge and storm water storage areas, and the destruction of upland wetlands within the boundaries of the property. The parking lot shares the same advantages and disadvantages as the ballfields. The parking lot should be located near High Rock Road so that as little land as possible will be disturbed. The parking lot should be graded in such a way that runoff does not directly enter the tidal marsh. The runoff can be directed into existing manmade ditches on the property.

Sediment and erosion control are of minor concern on this site. The soils are nearly level but can erode when disturbed, depositing sediment into drainage ditches on the property that eventually lead to the tidal marsh. Simple erosion control measures, such as haybales across depressions that drain the construction site, would suffice to control erosion. Disturbed areas such as the ballfield should be seeded as soon after construction as possible. Gravelled parking lots would further minimize erosion on the site by reducing the flow velocity of water coming from the lot.

WATER RESOURCES

Sand and gravel deposits similar to those found on the site often have potential for use as high-yield aquifers. In general, the coarser the texture of the deposits, the more potential they have for the establishment of highly productive

water-supply wells. Although very little is known about the subsurface texture of the surficial materials on the site, the fine-to medium-grained sands found in shallow test holes or animal burrows suggests that yields would not be as great on the site as they would be further north in the Poquonock River basin. Nevertheless, wells developed on the site might be capable of supplying more than 100 gallons per minute, assuming a sufficient thickness of sand.

Unfortunately, the proximity of salt water indicates the possibility that a well pumped heavily on the property would be subject to intrusion by such water. For this reason, more than any other, the site's sand and gravel deposits probably have only a slight potential for providing an additional source for water supply in Groton. Any water-supply needs for recreational activities on the site itself would best be served by the existing water mains.

VEGETATION

The review site is located in the Eastern Coastal Ecoregion of the Coastal Hardwoods Zone as identified by Dowhan and Craig (1976)*. An ecoregion is an area of land characterized by a regional climate as expressed by the vegetation. Long Island Sound modifies and generates certain environmental parameters that are responsible for the unique types and patterns of vegetation that occur exclusively in this natural land region. Astronomical phenomena, such as tides, coupled with salinity regulate the floristic composition and topographic position of plant communities on tidal wetlands (the marine floodplain or land system). Waves and tides acting in concert modify nearshore landscapes culminating in familiar landforms such as beaches, seacliffs, and rocky shores. Each of these support unique complexes of vegetation. Furthermore, Long Island Sound generates sea breezes that penetrate 5-10 miles inland, resulting in a regional (coastal) climate characterized by warmer temperatures in fall and winter but cooler climes in spring and summer. The coast experiences one of the longest frost-free seasons in the state, averaging 180 days. Nearshore winds generate and transport sea salts in the form of salt spray landward. As the salt-laden air stream impinges upon the vegetation, salt toxicity eliminates non-tolerant plants and trims or prunes coastal shrubs, thereby producing the familiar asymmetric shape.

Ecoregions can be further subdivided into more or less uniform landscapes containing a recurrent pattern of landforms, soils, and vegetation. These are called land systems wherein there exists a uniform climate and a characteristic pattern of land forms, soils, vegetation, and aquatic/wetland ecosystems. As noted earlier, only two land systems, the marine and outwash plain, are of importance here. Salient features in the outwash plain landscape are the undulatory to locally flat topography, the relief of 10 feet or less and the sandy substrate, in which the best-drained soils, occupy areas of moderate to high relief and the poorly drained wetlands occur only in the depressions or basins.

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* Dowhan, J.J. and Craig, R.J. 1976. Rare and Endangered Species of Connecticut and Their Habitats. Conn. Geol. Nat. Hist. Survey, Rpt. Invest. No. 6.

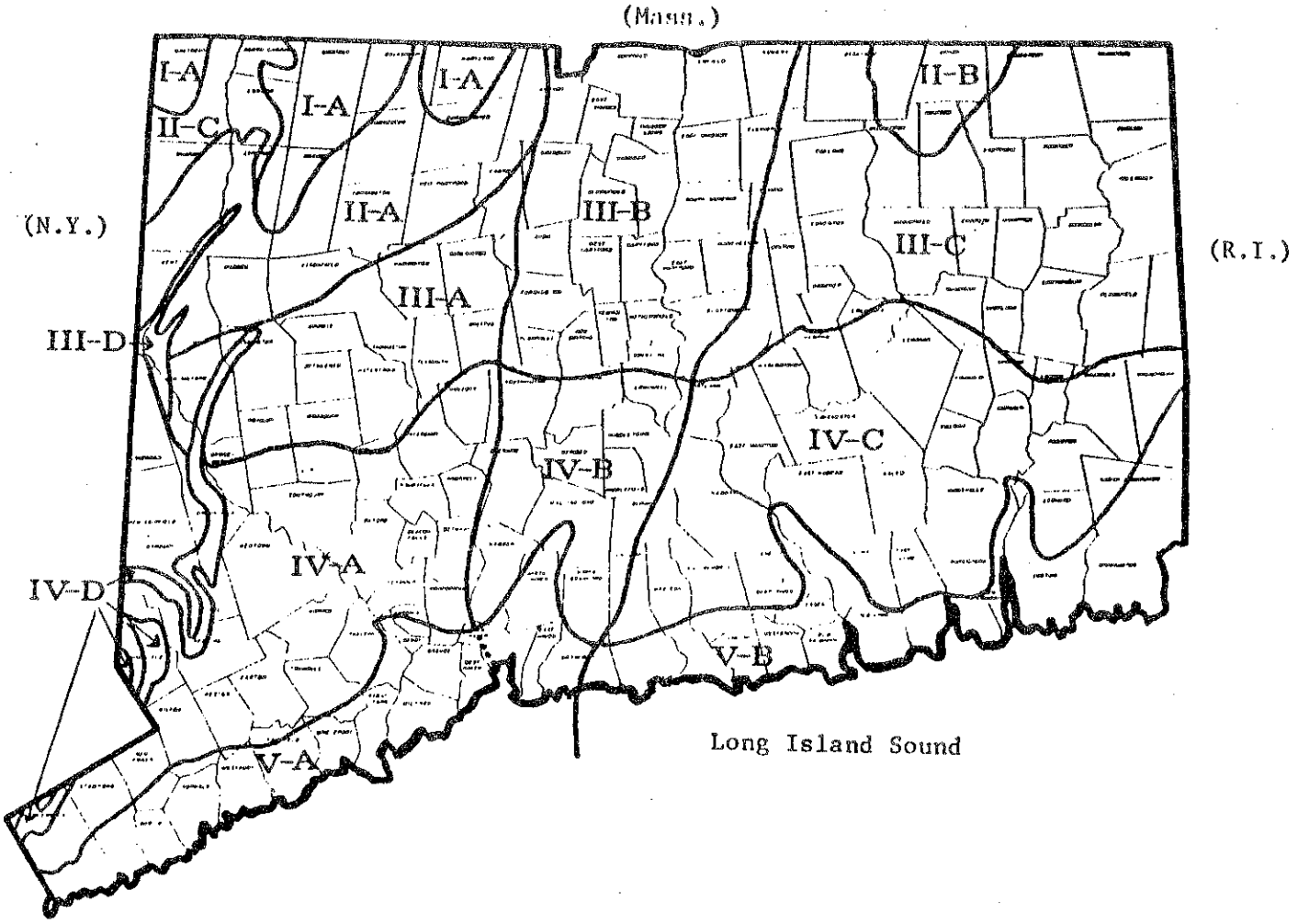


Fig. 1. Ecoregions of Connecticut

I. Northwest Highlands-Northern Hardwoods zone
   A. Northwest Highlands ecoregion

II. Northern Uplands-Transitional Hardwoods zone
   A. Northwest Uplands ecoregion
   B. Northeast Uplands ecoregion
   C. Northern Marble Valley

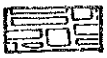
III. Northern Hills-Central Hardwoods-White Pine zone
   A. Northwest Hills ecoregion
   B. North-Central Lowlands ecoregion
   C. Northeast Hills ecoregion
   D. Central Marble Valley

IV. Southern Hills-Central Hardwoods zone
   A. Southwest Hills ecoregion
   B. South-Central Lowlands ecoregion
   C. Southeast Hills ecoregion
   D. Southern Marble Valley

V. Coastal Hardwoods zone
   A. Western Coastal ecoregion
   B. Eastern Coastal ecoregion

LEGEND FOR LAND SYSTEMS MAP

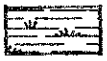
"Drumlinoid" Land System - contains streamlined hills with compact soils or fragipans on level summit lands.



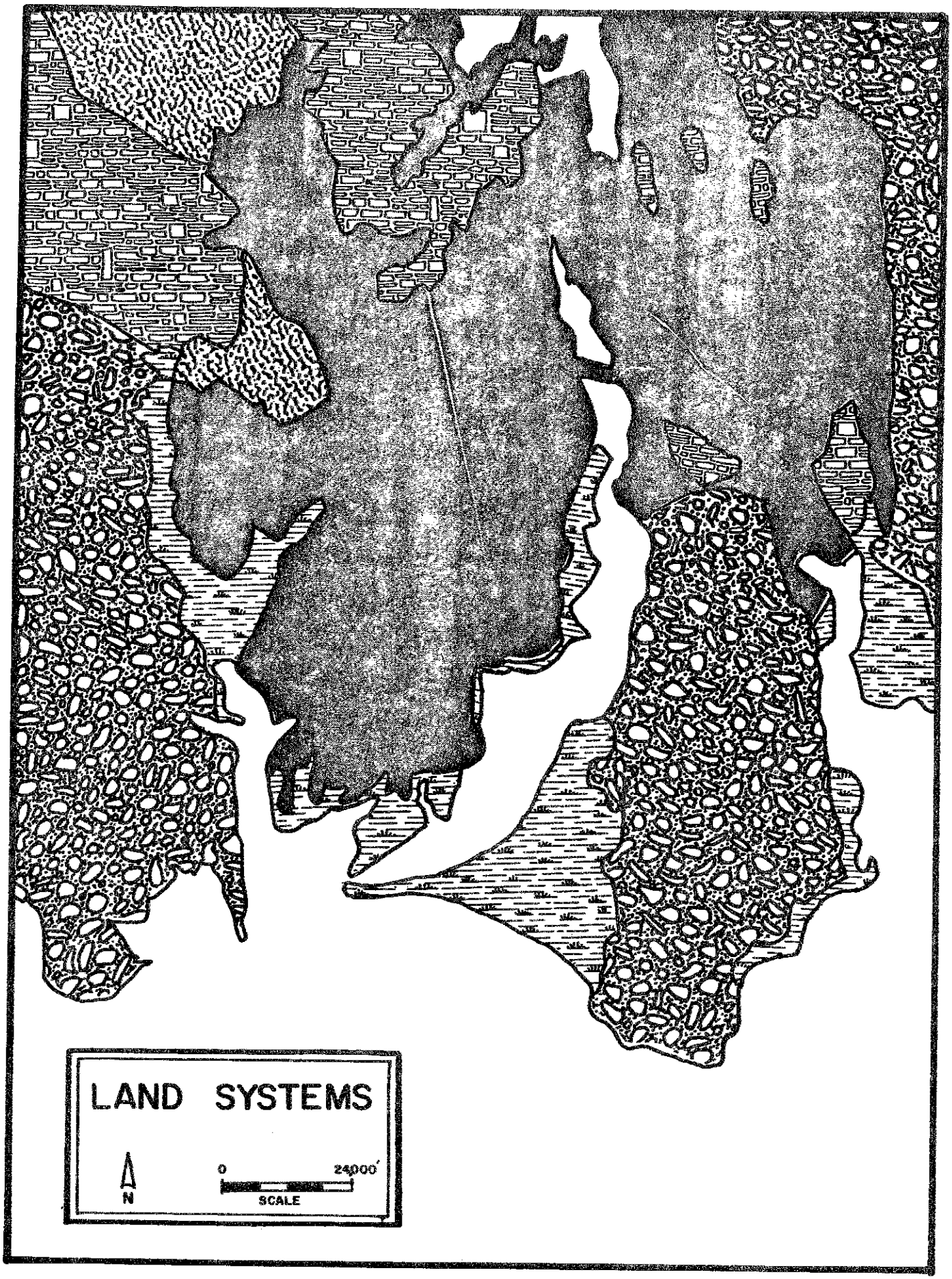
"Rocky Hill" Land System - irregular landscape of low to moderate sized hills with bedrock at or near the surface over considerable areas.

"Glacially Rounded Hill" Land System - more or less rounded hills with deeper mantle of till over bedrock (includes some small irregular plains of till).

"Outwash Plain" Land System - undulating to virtually horizontal sand plains with average relief of 10-20 feet.



"Marine" Land System - comprised of tidal wetlands, mostly saline and brackish marshes and their associated tidal creeks and intertidal flats and occasionally, when these intersect Long Island Sound, a barrier beach is present.


LAND SYSTEMS
N
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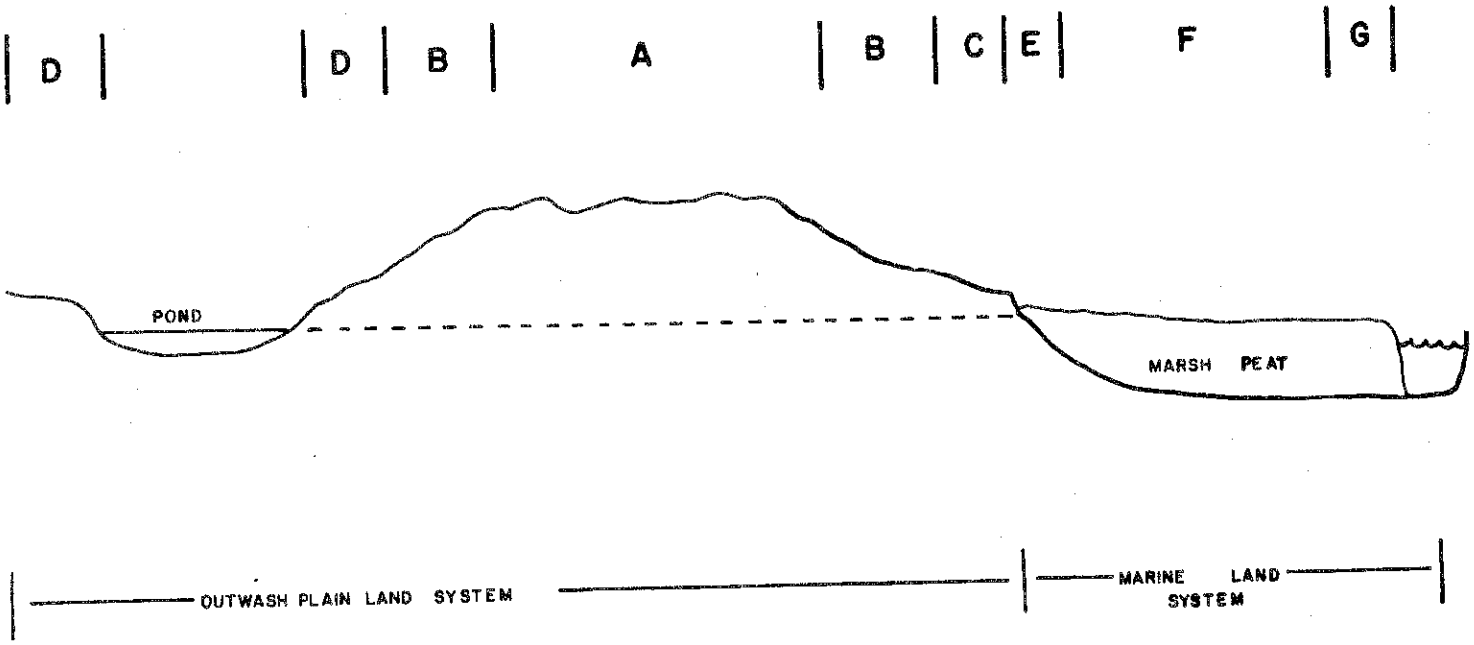
24000'
SCALE

Marine land systems, confined to sheltered embayments, are characterized by gently seaward-sloping topography, poorly drained organic soils (peat), a measureable quantity of salts in the soil, and a recurrent pattern or mosaic of four microtopographic communities (Miller and Egler, 1950).* The vegetation on the marine flood plain is wholly herbaceous, composed mostly of grasses, sedges, rushes, and cattails. Plants are distributed across this landscape in accordance with individual tolerances to salinity, flood duration, nutrients, etc. as modified by intense competition amongst adjacent wetland plants.

In the following paragraphs, the vegetation on each land system is described, its soil requirements noted, and a generalized topographic sequence of soils and vegetation depicted. Topography is so intricately complex in both land systems that mapping of plant communities is impossible. Also, the vegetation here can not be worked into a uniform classification for this ecoregion since few outwash plains currently support natural vegetation or soils. Therefore the community nomenclature employed here is solely for this report. Vernacular and scientific names are in accordance with Dowhan (1979).**



A. Red Maple - Northern Arrowwood
B. Red Maple - New York Fern
C. Sour Gum - Sweet Pepperbush
D. Swamp Pin Oak
E. Switch Grass Border
F. Salt Hay, Spike Grass, Cattail and Sedge Complex
G. Switch Grass - Ditch Border

* Miller, W.R. and Egler, F.E. 1950. Vegetation of the Wequetequock-Pawcatuck tidal marshes, Connecticut. Ecol. Mongr. 20:141-172.

** Dowhan, J.J. 1979. Preliminary Checklist of the Vascular Flora of Connecticut. Conn. Geol. Nat. Hist. Sur., Rpt. Invest. No. 8.

Red Maple - Northern Arrowwood Forest

This community is confined to the better-drained and elevated ridges and flats of the moderately well-drained Ninigret series only where the (soil) moisture regime is 3 (somewhat moist).# Red Maple (Acer rubrum), decidedly the dominant and conspicuous tree in the canopy, is accompanied by red cedar (Juniperus virginiana) and especially black cherry (Prunus serotina). Both cedar and cherry are, in part, relict plants indicative of an earlier period when this site was either open fields or woodland. As the red maple canopy enlarges and closes, light demanding trees will diminish in abundance.

Dominant in the shrub layer is northern arrowwood (Viburnum recognitum), a plant most frequent in and characteristic of certain wetlands in Connecticut. However, in the coastal regions, this shrub is conspicuous on mesic soils and rich silt loams. Primary associates are high bush blueberry (Vaccinium corymbosum) winterberry (Holly), red maple and black cherry. Locally abundant are catbrier (Smilax rotundifolia) and Asiatic bittersweet (Celastrus orbiculatus).

Dense patches of the following herbaceous plants alternate to form a mosaic: poison ivy (Toxicodendron radicans), bristly dewberry (Rubus hispidus), Canada mayflower (Maianthemum canadense), and clubmoss (lycopodium flabelliforme). Dispersed throughout are smaller colonies of wood aster (Aster divaricatus), honeysuckle (Lonicera japonica), and catbrier.

Below is a partial list of plants, especially the dominant and conspicuous plants that characterize this community. Dominant species in this and subsequent descriptions are preceded by an asterisk.

Tree Layer	Shrub Layer	Herb Layer
*Red Maple	*Northern Arrowwood	*Poison Ivy
Black Cherry	Black Cherry	*Bristly Dewberry
Red Cedar	Asiatic Bittersweet	*Clubmoss
	High Bush Blueberry	*Canada Mayflower
	Catbrier	
	Red Maple	
	Meadow Sweet (Spriaea latifolia)	
	Winterberry	
	Wild Grape (Vitis labrusca)	

Red Maple - New York Fern Forest

This community develops on a topographic position that is intermediate (mid-slope) between the ridges and poorly drained depressions. At these transitional positions, the soil moisture content is elevated to a moisture regime of 4 (moist).

The (soil) moisture regime scale is evaluated on the basis of soil drainage, soil structure, texture and climate. Moisture regime is a field approximation of the amount of water available to plants and is a better indicator of the types of plant communities that will occur on a landscape than soil drainage or soil series alone. In fact, a soil mapping unit commonly will contain more than one moisture regime and therefore support two or more plant communities.

At this particular outwash plain, this increase in soil moisture is conspicuously manifest in the species composition of the herbaceous layer, although there are measurable but subtle changes in the floristic composition of the tree and shrub layers. Trees such as red maple that are adapted to and tolerant of a very broad range of ecological conditions are less sensitive to changes in soil moisture, although significant differences do occur in site index values of trees.

Red maple is the dominant and comspicuous element in the forest canopy with black cherry in a subordinate position. An occasional swamp pin oak (Quercus palustris) can be found. Northern arrowwood is the preeminent shrub. Associated with this are high bush blueberry and winterberry.

Diagnostic of the herbaceous layer is the abundance of ferns including New York fern (Thelypteris palustris), royal fern (Osmunda regalis) and especially cinnamon fern (Osmunda cinnamomea). Locally dominant and interspersed throughout this fern glade are Canada mayflower, poison ivy, and clubmoss.

A list of the primary plants on the moist phase of the Ninigret is as follows:

Tree Layer	Shrub Layer	Herb Layer	
*Red Maple	*Northern Arrowwood	*Cinnamon Fern	Royal Fern
Black Cherry	Winterberry	New York Fern	Catbrier
Pin Oak	High Bush Blueberry	Canada Mayflower	White Lettuce (Prenanthes sp.)
	Catbrier	Poison Ivy	
		Clubmoss	Wild Yam (Dioscorea villosa)

Sour Gum - Sweet Pepperbush Forest

In sheltered estuaries, where the upland interfaces with coastal waters or tidal wetlands, there exists a zone of upland soil of variable width that is influenced to a greater or lesser extent by a brackish or saline water table and occasional flooding incidental to coastal storms. At this confluence, the vegetation is more or less an edge effect representing a modification of the contiguous upland community at its shoreward perimeter.

Upland margins influenced particularly by full strength seawater invariably support a canopy dominated by sour gum (Nyssa sylvatica) or, occasionally, sassafras. However, at this brackish location red maple is dominant and sour gum is subordinate. Sweet pepperbush (Clethra alnifolia), diagnostic of this edge phenomena, is common throughout with lesser amounts of northern arrowwood and highbush blueberry. Clubmoss, Canada mayflower, and cinnamon fern are the primary herbs here.

Below is a list of the principal plants in this community:

Tree Layer	Shrub Layer
*Red Maple	*Sweet Pepperbush
Black Cherry	Northern Arrowwood
Swamp Pin Oak	Highbush Blueberry
Sour Gum	Catbrier
White Oak (Quercus alba)	Red Maple
	Shadbush (Amelanchier sp.)

Herb Layer
Clubmoss
Canada Mayflower
Cinnamon Fern
Common Wood Fern (Dryopteris intermedia)
Blue Stemmed Goldenrod (Solidago caesia)

Freshwater Wetland Vegetation

Wetlands are merely surface phenomena or manifestations of the groundwater table. At the review site, a multitude of depression wetlands, which are common on sandy plains, occur throughout the outwash land system. Here, the water table exceeds the soil surface for a significant part of the growing season, creating intermittent or ephemeral ponds. The duration of flooding is a function of both the amount of rainfall and the elevation of the basin. As the groundwater volumes diminish during the growing season, the water table drops and the pools or ponds disappear. Few plants are adapted to this lengthy period of flooding except for aquatic plants, which understandably cannot persist here due to the temporary nature of the pools.

There are two basic wetland communities here. A stunted form of the Red Maple-Cinnamon Fern type occupies those virtually horizontal wetland soils such as Raypol wherein the soil surface is of sufficient elevation to limit the duration of flooding to a short period or preclude inundation entirely. The conspicuous plants here are red maple, northern arrowwood, sweet pepperbush and cinnamon fern. Associates are an occasional pin oak, marsh fern, royal fern, and sensitive fern (Onoclea sensibilis).

The depression or kettle wetlands support a forest canopy composed mainly of swamp pin oak. This oak, nearing its northern range limits in southern New England, is practically confined to these intermittent pond perimeters in most of eastern Connecticut. The variable floristic composition and areal extent are a function of a fluctuating water table, duration of the pools, and the slope/elevation of soil surface. Salient species in the shrub and herbaceous layers are northern arrowwood, meadow sweet, highbush blueberry, sensitive fern, New York fern, poison ivy, touch-me-not (Impatiens capensis), swamp milkweek (Asclepias incarnata), jack-in-the-pulpit (Arisaema atrorubens), cinnamon fern and royal fern.

A recurrent and diagnostic element of these basins is not only the restriction of the Pin Oak community to the perimeter of the pools but also the nature of the organic matter in the basin. These pools collect and concentrate organic matter, but unlike upland aerobic situations where the organic matter is rapidly transformed into humus, the alternating periods of inundation and the saturated nature of the soil and organic layers preclude rapid decomposition. Thus, the center of the depression invariably has a mineral base mantled with organic muck.

Vegetation of the Marine Land System

Coastal estuaries are vital and indispensible resource areas which provide valuable resting, feeding, and nursery grounds to a multitude of coastal wildlife, including many commercially and recreationally significant species of finfish, shellfish, and waterfowl. One singularly important subsystem or ecosystem, confined exclusively to sheltered estuaries, is the productive marine grasslands known as tidal

wetlands. In coastal waters with a measurable concentration of salt water, two tidal wetlands are common, namely the salt and brackish (tidal) marsh. Both are gentle seaward-sloping marine floodplains (marine land system) composed mainly of organic peats. Each are subjected twice daily to tidal inundations. Understandably, the salinity in an estuary is maximum at the mouth but diminishes progressively "upstream" until the water becomes entirely fresh. Therefore, salt marsh plants, such as salt hay (Spartina patens) or spike grass (Distichis spicata), which are adapted to full strength seawater, are abundant on the lower estuary but are replaced progressively upstream by brackish marsh plants such as cattails and sedges. The boundary between these two marsh types is generally a broad transition zone, or ecotone.

Wetland microrelief is complex and irregular, thereby precluding the formation of regular and distinct zones of grasses as commonly pictured in general ecology textbooks. The marsh vegetation is generally a complex pattern or mosaic of plants. Certain plants, however, are repeatedly limited to one topographic position with regard to tidal and flood duration.

The Birch Plain Creek wetland is an exemplary brackish marsh displaying little evidence of substantive modification. Throughout the coast, the natural functions and biophysical characteristics of numerous brackish wetlands have been irreveribly altered through filling, dredging, or modification of tidal circulation patterns, or the natural vegetation has been wholly displaced by the brackish reed (Phragmitis australis). Mosquito ditches, common in Connecticut, and their associated spoil banks or levees scar the brackish marsh landscape.

Ditch borders, low in elevation and flooded twice a day, support a vegetation composed principally of switchgrass (Panicum virgatum) with lesser percentages of swamp rose (Rosa palustris) and poison ivy. Diagnostic brackish plants include mock bishop's weed (Ptilimnium capillaceum) and great bulrush (Scirpus validus). In the northernmost area where the effect of freshwater is most profound, a host of freshwater plants co-occur with the brackish marsh species. These are marsh fern (Thelypteris palustris), blue flag (Iris versicolor), tussock sedge (Carex stricta), marsh St. John's wort (Triadenum virginicum), sedge (Carex atlantica) and rush (Juncus effusus).

Salt marsh plants, such as salt hay and spike grass are infrequent in the brackish marsh landscape but rarely absent. Generally, the distribution of these plants coincides with a mid-slope position, wherein evaporation and transpiration concentrate sea salts and raise the soil salinity. Mid-slopes in the northern marsh sector support small "colonies" of salt hay and spike grass. Associates are the three squared sedge (Scirpus olneyi) spike rush (Eleocharis rostellata), sedge (Carex albotuescens), seaside goldenrod (Solidago sempervirens) and red top grass (Agrostis stolonifera). Downstream, as salinities increase in the creek and marsh soils, the abundance of salt hay and spike grass increases until practically the entire rectangular marsh panels (delimited by ditches) support pure and extensive colonies of these two grasses.

Inundation and soil salinities are minimum near the upland marsh border. Here abounds the three squared sedge (Scirpus olneyi). Principal associates are poison ivy, swamp rose, sedge (Carex albotuescens and C. altantica), switch grass and brackish water cattail. Locally, at this topographic position and in very poorly drained depressions on the mid-slope marsh are found dense colonies of the brackish water cattail, 5 to 6 feet in height.

Indicating the transition between the marsh and upland is a narrow grassland zone or belt which coincides with the position of extreme storm flooded levels. This is the preferential habitat of switch grass (Panicum virgatum). The actual associated species at any one location is extremely variable depending upon a multiplicity of events but especially salinity and presence or absence of organic (wrack) debris such as eelgrass stalks or the culms of marsh grass. Organic debris tends to increase the fertility of the site and moisture-holding capacity, thereby altering the floristic composition and improving plant vigor. The only anomaly is a small brackish reed community which presumably occupies a formerly disturbed switch grass zone. Reed, though present here, is not likely to invade the marsh further and supplant the marsh vegetation in the future unless circulation patterns are modified, rates of sedimentation are increased, or fill is placed directly on the marsh.

FINDINGS

1. The vegetation on the outwash plain is natural in that current communities evolved spontaneously. Moreover, based on the composition of plant communities on equitable habitats on either till or the few studied outwash plains, there apparently are not unique communities here.

2. It is evident from the land system map that the natural resources are not uniform or evenly distributed. Furthermore, there is only one extensive outwash plain in Groton, which today is mostly developed. Historically, this was a significant and unique plain that supported a great number of rare plants. Currently, the Town of Groton owns only a 42.5 acre parcel on this land system which is natural, exemplary, and affected little by development. This fact is of great importance from a local perspective and should be weighted accordingly in the decision-making process.

3. The tidal wetland and its vegetation is exemplary of brackish marshes and is natural, with the exception of the network of mosquito ditches that subdivide the marsh.

4. One state "rare" (state indeterminate) plant was collected in the brackish marsh in 1929. The label "state indeterminate" connotes both the unknown or unclear status of populations of these plants in Connecticut and the fact that this species has not been collected or observed in a great many years. However, it is not an uncommon event for rare plants such as this to persist at the same station for decades. This, coupled with the natural state of this wetland, would dictate that the probability of relocating this plant is high. Unfortunately, this is a late summer plant that cannot be adequately identified until September or October.

5. During the field inspection, a plant never before collected in Connecticut and therefore new to the flora, was discovered on the outwash plain adjacent to a small wetland. Only one individual was discovered. Should this plant be added to the state list of rare plants, under the current system, in all likelihood the classification state indeterminant would be most appropriate. This species and its "population" dynamics in Connecticut are obviously poorly understood and there is a chance that it escaped from cultivation. Biologists will never know for certain whether this population developed naturally and spontaneously or was introduced into a Connecticut garden and subsequently escaped.

6. Since a multitude of small wetland basins dot the landscape, it may be impossible to find an adequate location and grade the landscape for an athletic field without irreversibly destroying an inland wetland. In assessing the significance of a wetland, a number of parameters should be considered, including, but not limited to, the occurence of rare and endangered species or communities, vegetation diversity, size, wildlife significance, education or scientific value, aesthetics and importance to adjacent wetland and upland ecosystems. Not all wetlands are of equal value. In applying these parameters to these small depression wetlands, the final value judgement would probably ascribe a low value to most of these parameters and the wetlands. This is not to state that these are without any importance. The ultimate goal of a wetland program should entail an effort to, at the minimum, preserve the most significant and unique wetlands and insure the preservation of at least one exemplary type of each wetland.

WILDLIFE

A large section of the property is tidal marsh, a soil type which severely restricts or precludes any development. This part of the site is best left alone, as any development impact in an estuarine environment has subtle and far-reaching consequences on both resident and oceanic species. A possibility here may be an osprey nesting platform; however, the amount of disturbance and vandalism from an adjacent high-use recreation area may make this a futile exercise.

The upland portion of this site provides little understory for wildlife food shrubs and herbaceous plants due to the uniform maple overstory. This situation could be improved for wildlife by selective cutting to release suppressed shrub growth. The cutting of some of the larger trees and planting of food shrubs will also result in wildlife improvement. If managed for wildlife, the site would support numerous songbirds and quail, squirrel, rabbit, chipmunk, raccoon, opossum, and other small mammals. A planting of food shrubs would also increase the aesthetics quality of the area while providing food, cover, and nesting sites.

PROBABLE FUTURE ENVIRONMENT

If development funding is not available, the site will remain as undeveloped public open space. It was understood that the property was originally purchased with a HUD open space acquisition grant and its use must remain in open space and recreation.

ENVIRONMENTAL IMPACT

QUANTIFIABLE LAND USE CHANGES

The development of an active recreational facility on this site will not have any quantifiable land use change. The entire parcel is proposed to be used for recreation and open space in the Town's 1973 "Plan of Development". The site currently acts as open space, and due to the confinement of recreational areas to those parts of the site without natural limitations, it will continue to function largely as open space.

SOCIO-ECONOMIC CHANGES

The development of an active recreational facility on this site will provide recreational opportunity to a neighborhood that is deficient in this respect, and will continue to preserve an area that is subject to the possibility of inappropriate development. The 1970 Census indicated that the surrounding neighborhoods contained 293 low-income families (16% of the town's total low-income families). Therefore, this development could provide recreational facilities for a significant portion of Groton's low-income population. The surrounding area has grown significantly over the years with no corresponding development of recreation areas. Allocation of a portion of this parcel will help meet the recreational goal that every Groton resident have a developed recreation facility within 1/4 - 1/2 mile distance of their home.

TRANSPORTATION ROUTES

Since this site is intended to be developed as a neighborhood park, the amount of traffic generated should not cause congestion, safety problems, or hazards on the existing thoroughfares. However, to safely handle the expected pedestrian and bicycle travel, sidewalks and bike paths will have to be extended and upgraded on the routes leading to the site.

ENERGY CONSUMPTION

The development of this parcel as a primarily neighborhood facility should actually lead to a reduction in energy consumption, as the number of vehicle miles travelled will be reduced. Residents in this locale can now walk or bicycle to this facility, rather than driving to a park in another part of town for their recreational pursuits.

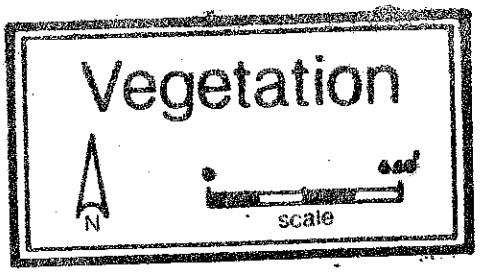
AIR QUALITY AND NOISE

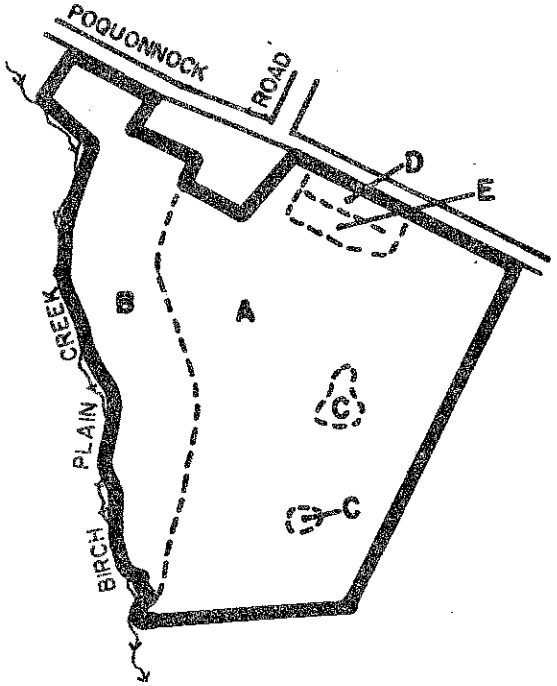
As with energy, any reduction in vehicle miles travelled should have a positive effect on air quality and the ambient noise level. The recreational uses suitable for the site would have negligible impacts upon the air quality and noise level of the area. Construction activities may minimally affect air quality (dust) and noise level, but this activity is expected to be of short duration.

FOREST RESOURCES/MANAGEMENT

Stand A. (Mixed Hardwoods) - Poor quality sapling to pole-size red maple with occasional red oak of sprout origin and Norway maple, near Poquonock Road, are present in this 27-acre overcrowded stand. Highbush blueberry, black cherry seedlings, apple tree seedlings, shadbush, and arrow-wood are being shaded out of existence by the dense overstory. Groundcover vegetation consists of poison ivy, club moss, dewberry, Canada mayflower, cinnamon fern, and sensitive fern.

Stand B. Tidal Marsh 12-acres.





LEGEND

- Road
- Property Boundary
- Stand Boundary
- Creek

VEGETATION STAND DESCRIPTIONS*

STAND A	Mixed hardwoods, over-stocked sapling to pole-size, 27 acres.
STAND B	Tidal marsh, 12 acres.
STAND C	Hardwood swamp, under-stocked sapling-size, 1± acre.
STAND D	Open field, 1+ acre.
STAND E	Plantation, crowded, sapling to pole-size, 1 acre.

* Seedling-size = Trees 1 inch and smaller in diameter at breast height (dbh).
Sapling-size = Trees 1 to 5 inches in dbh.
Pole-size = Trees 5 to 11 inches in dbh.

Stand C. (Hardwood Swamp) - This 1+-acre understocked stand is made up of poor-quality sapling-size red maple. Sweet pepperbush, highbush blueberry, greenbrier, and skunk cabbage are also present. The seasonally high water in this stand limits tree growth potentials.

Stand D. (Open Field) - Hardwood tree seedlings are becoming established on this 1+-acre stand; however, grasses, goldenrod, and assorted weed species are dominant at the present time.

Stand E. (Plantation) - Sapling to pole-size Norway spruce are present in this crowded one-acre stand. An understory of Norway maple seedlings, red maple seedlings, and arrowwood is present around the edges of this stand.

If any sections of this property are cleared for development of recreational facilities, the wood products removed should be utilized. Clearings in Stand A will provide between 4 and 7 cords of fuelwood per acre.

The soils in Stand A are perhaps some of the best in Connecticut for the production of timber. At this time the dominant species growing in this stand is red maple. It was probably the first tree species to invade after the agricultural fields were abandoned.

At present these red maple are declining in health and vigor due to crowding. A thinning utilizing the "best tree selection method" would improve the condition of this stand without substantially stimulating the growth of the poison ivy present in the understory. This method thins stands to the greatest advantage of the best trees in the stand. Approximately 100 trees per acre should be chosen (this is about one tree every twenty feet). They should be the highest quality, healthiest trees in the stand and, where possible, species other than red maple. Two or three trees competing with the selected crop trees should be cut for fuelwood. This procedure will provide the crop trees with the additional space, sunlight, water, and nutrients they need for maximum growth.

The Norway spruce in the small plantation (stand E) are also crowded and would benefit by receiving a thinning. Cutting or killing between 1/4 and 1/3 of the number of trees present in this stand would provide space for the trees (residual) to grow and become healthier. The healthiest and highest quality trees which are usually the most aesthetic trees should be left to make up the residual stand.

If implementation of these thinnings is desirable, a state-employed service forester or consulting forester should be contacted to help the town select "best" trees and mark the trees to be removed.

EFFECT ON WATER RESOURCES

Certain recreation-related activities, particularly those involving a heavy use of fertilizer on lawns or the establishment of parking facilities on the site, have a minor potential for adversely affecting groundwater quality. However, the risk of such groundwater contamination is so small, and the possibility of using the groundwater for drinking purposes so slight, that the practical effects of the project on water resources would probably be negligible.

WATER SUPPLY

Water for public restroom facilities and for use in conjunction with the development of a picnic area would be from the Groton Public Water supply. Therefore this aspect should not present any particular concerns or problems.

WASTE DISPOSAL

The inclusion of public restroom facilities, a necessary feature for the proper sanitary development of a recreational area, will entail a satisfactory method of waste disposal. At the present time, this area or section of town does not have the availability of the public sewerage system. However, it is understood public sewers are proposed and should be available within the near future. In the interim, the installation of an on-site subsurface sewage disposal system would be needed with the use of conventional water-flush and hand-washing fixtures. High groundwater conditions would tend to impose a limitation on the area for subsurface sewage disposal purposes. However, where the underlying soil is pervious and slope is not a major factor, the ground grade can be elevated sufficiently above the normally anticipated high water level with suitable fill material to allow for the installation of a leaching system. Such a system should be based on proper testing, good engineering design, and proper construction with close supervision and inspection. It appears that the most suitable area for this purpose would lie towards the roadside (High Rock Road). This area is more removed from the tidal wetlands and would be close to the future public sewer line. In this respect it is recommended that provisions be made at this time for the future sanitary sewer connection for a comfort facilities building.

If necessary, sewage facilities for the more remote and less suitable or unsuitable land for subsurface disposal could be augmented with a type of non-water carriage sewer disposal.

A certain amount of refuse would be expected to be generated by people using a recreational area, particularly if there is picnicking and/or a snack bar operation. Therefore, it is essential that an adequate number of conveniently located refuse containers be provided for the sanitary storage of refuse. This will also prevent and control rodent and insect problems. Refuse should be collected on a regular basis for final off-site disposal at the town refuse disposal (sanitary landfill) area.

PROPOSED MITIGATING MEASURES

Provide and maintain a buffer strip of vegetation on all perimeters to insure an aesthetic/physical buffer between the golf course and town park and to limit the impact of any increased siltation subsequent to any clearing and grading that proceeds to accommodate the proposed types of active recreation. As the land is cleared and graded, if the new silt load into the tidal marsh is not checked by a buffer, then the brackish reed (Phragmitis australis) will inevitably invade new areas of high marsh, displacing natural vegetation.

The best examples of outwash vegetation occupy the southern triangular apex between Trumbull Golf Course and Birch Plain Creek tidal wetlands. This is then the optimal location for preservation of forest vegetation especially if (1) the

town desires to provide an area for passive recreation and/or educational study and (2) certain small wetlands are sacrificed in the northeast quadrant to accommodate an athletic field.

Consider the protection of the two rare plants on this parcel and preserve their natural habitat. Therefore, in the future if the town elects to construct an elevated boardwalk in the tidal wetland to serve as a nature and educational trail, the trail should be designed so as to avoid the habitat of the "rare" tidal wetlands plant. However, in the instance of the "upland" rare plant growing contiguous to a wetland, the management options at this time should include only maintenance of natural vegetation there and avoiding the placement of trails or picnic facilities nearby. However, at this juncture, if an athletic field is a prime consideration and if its location coincides with the habitat of this plant (which will necessitate the sacrifice of an inland wetland also) then if the impact on the island wetland is acceptable, the construction of the field should proceed. Here it is not logical to attempt to protect this single plant and sacrifice the athletic field since (1) the plant is perhaps an escape from a garden and (2) it may not persist for more than a few months or years, or it may ultimately be trampled by an individual. If necessary, the plant can perhaps be transplanted to a comparable habitat in the southern portion of this park.

Since this plain is a coastal flood hazard area, then construction of sewer and water supplies should conform to the HUD-FIA guidelines and the town's regulations regarding flood hazard areas.

During the brief time investigating this review site, no mosquitoes were found in the salt marsh either as adults or larvae. Similarly, little or no pools of water were observed on the marsh that would serve as breeding areas for the Brown Salt Marsh Mosquito (Aedes cantator) and especially the Salt Marsh Mosquito (Aedes sollicitons). Presumably, the concentration of mosquitoes in the upland consists of freshwater mosquitoes that perhaps breed in the small depression pools on the plain itself.

In terms of future management of the tidal wetland, if any is necessary, there are a number of options. The first is to determine whether mosquitoes are breeding consistently in the marsh and in large numbers under average conditions. Note that the salt marsh mosquito is capable of long range flight and the local abundance of this mosquito here is not necessarily indicative that the source is the Birch Plain Creek wetlands. Similarly, since the salt marsh mosquito has been only implicated as a carrier of Easten Equine Encephalitis, and in that no documented human cases exist in Connecticut or Long Island, then the real issue is not the health potential but rather a nuisance issue. In many states there exists no active control program and local residents learn to tolerate or accept this nuisance without unduly burdening environment, threatening once plentiful wildlife such as the Osprey.

SHORT TERM VS. LONG TERM PRODUCTIVITY

The proposed use of the site is structured so that there will be minimal, if any, impact upon the environmental quality of the area. Future residents of this area will be able to enjoy an active recreational facility/open space land without leaving their immediate neighborhood. With the development of the proper facilities, this site could provide educational as well as recreational use to the public. Without the partial development of this site, the land will continue to function as open space without its full value being realized by the people living around it.

RECREATION POTENTIAL

The Town of Groton is seeking recommendations for recreational development of their 42± acre tract along Birch Plain Creek. Access to the site is via Poquonnock Road which forms the northern boundary. Informal parking is currently available on a gravel lot which provides supplemental parking space for an adjacent church. The western portion of the site is composed of tidal wetland and is unsuitable for active recreational pursuits. The northern portion (along Poquonnock Road) is most readily adaptable to recreation facility development. The drier, more open land is located here and activities and services such as a parking lot, picnic area, toilet building, possibly a modest sized ball field (after clear-cutting some small trees and some filling and grading), and a play area for such activities as horseshoe toss, bocce, etc. can be accommodated.

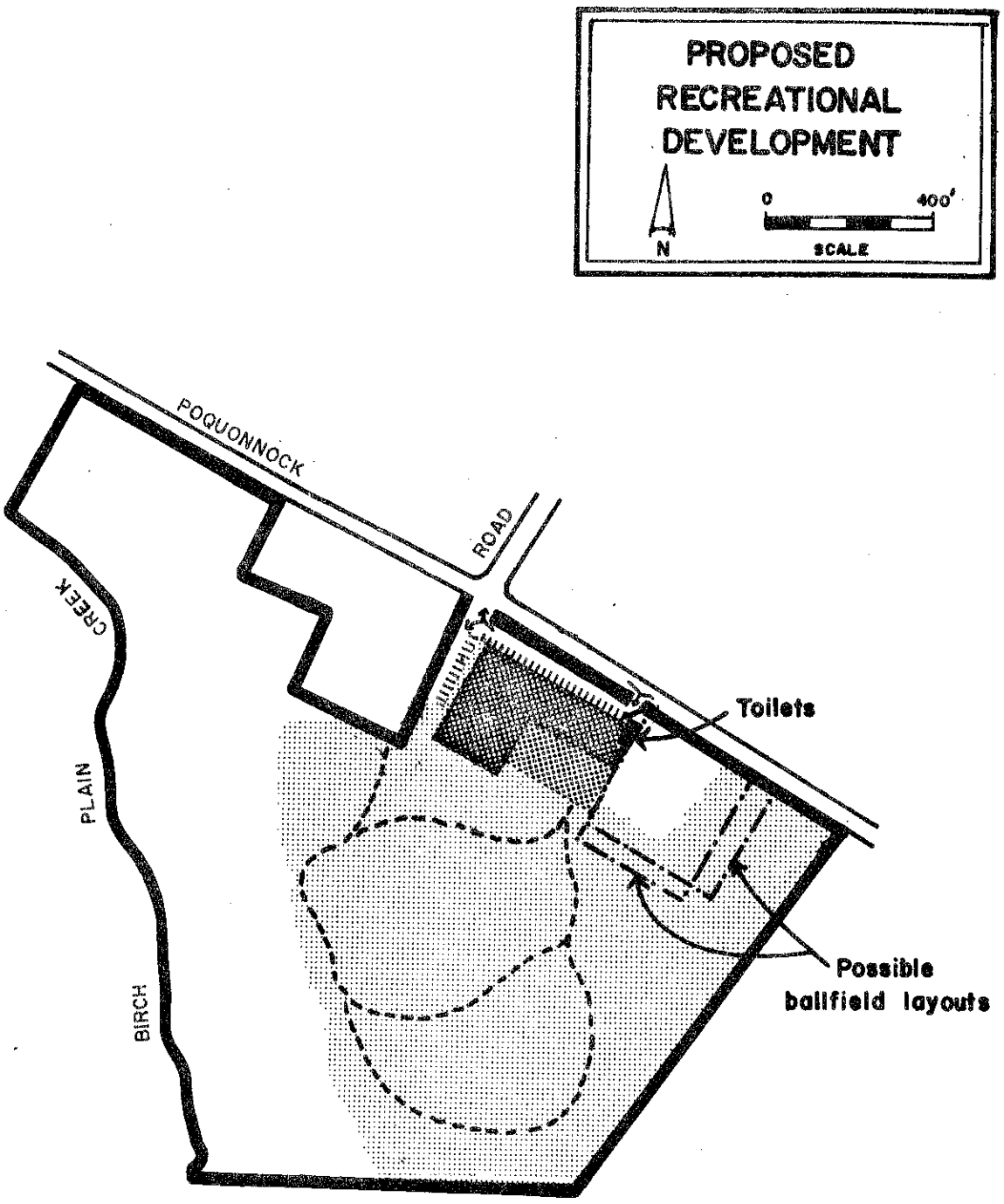
Included in a play area could be a small lawn for such activities as badminton, volley ball, crouquet, etc. Horseshoe pits and a bocce court could be on the ball field end of the play area (see accompanying illustration) with the lawn portion for the other activities lying to the west. If a ball field/play area separator is needed, a single row of shrubs or trees would suffice.

The southern part of the tract might best be left as woodland with a foot trail routed throughout. This would provide a buffer between the golf course and the area of more active recreational development. There would be the option for future recreational expansion and development within this greenbelt, though within the constraints imposed by the wetland portions of the site.

The contrasting habitats found on this site make possible a compact nature study trail where ecological relationships can be experienced. The woods and tidal marsh might be a good area for bird watchers. Extensive and intensive development of the site and adjacent open space land would diminish this potential, however. Any nature study foot trail installed should be partly routed along the marsh edge to enable comparisons between the two habitats and their occupants. If installed, a trail should be so constructed that erosion potential is minimized.

Provision should probably be made for a linear parking lot parallel to and with an entrance on Poquonock Road, approximately midway between the church entrance and the golf course. This lot would have single row parking with traffic routed one way. The entrance would therefore be on the east end of the lot and the exit on the west end where the gravel road is now located (near the church). The gravel road itself could be widened an additional 8-10 feet eastward to provide supplementary parking to the main lot. Some shrubs and trees would have to be cleared to accomplish some minor grading work. The main lot might best be paved to minimize dust conditions. Thirty to forty cars is the estimated capacity of the main lot being proposed. The secondary lot can possibly accommodate an additional 15-20 cars. The one-row configuration is suggested to minimize the amount of space lost along Poquonock Road.

An alternate parking lot layout could be the installation of one lot with a two-row configuration where the proposed secondary lot is located. This would necessitate some additional tree clearing and grading to the east with a resultant loss of some of the more desirable trees on the site. This would also eliminate some of the west end of the proposed picnic area, though this would be somewhat offset by a gain along Poquonock Road (net result - shortened east/west axis, lengthened north/south axis). The picnic area would thereby be located closer to



LEGEND

- Wooded Area of Site
- Picnic Area
- Play Area
- Foot Trail

Poquonock Road, tending to diminish the quality of the picnicking experience due to closer traffic flow.

In the two-lot configuration, planting a line of shade trees along the south edge of the primary parking lot proposed would enhance the appearance and usability of the picnic area and help keep parked cars cooler in the summer while softening the austere appearance of an open lot. If complete screening of the parking lot or Poquonock Road from the recreation area is desired, a hedge or tight row of conifers can be employed.

To accommodate a ball field of reasonable size, some trees would have to be clear-cut from the tract. When possible, an attempt to retain the conifers and larger trees should be made. The trees lining Poquonock Road should be retained. As indicated, clear-cutting will be necessary, particularly on the easterly portion, to establish the ball field. Growth here is of fairly uniform size, small trees resulting from open field abandonment. Orienting the longer axis of a rectangular ball field either north to sough or east to west may minimize the amount of tree cutting and/or earth moving necessary. Some selective tree thinning and pruning of lower branches will be required to establish picnic sites in the area proposed. Fireplaces or hibachi stands should be located where potential injury to trees is minimized.

If a playground is to be incorporated in the site development, it may best be located within the picnic area or adjacent to the play area which is intended for adult use. A tot area should be kept separate from a horseshoe toss or similar type area where darting children could be hurt.

A toilet building has been proposed for location on the east end of the picnic and parking area as indicated on the sketch.

Appendix

SOIL NAME/MAPPING SYMBOLS	USE AND LIMITATIONS OF SOILS						
	Septic Tank Absorption Fields	Sewage Lagoon Areas	Shallow Excavations	Small Commercial Buildings	Local Roads, Streets, Parking Lots	Lawns Landscaping	Continue Below
Ninigret (25A) Fine Sandy Loam 0-5% Slopes	Severe: 1,2	Severe: 1,3	Severe: 1,7	Moderate: 1	Moderate 8	Slight __	
Raypol (464) Silt Loam Nearly Level	Severe 1,4	Severe: 1,3	Severe: 1,7	Severe: 1,8	Severe 1,8	Severe 1	
Westbrook Mucky Peat (TM) Westbrook Mucky Peat Low Salt (TME) Nearly Level	Severe: 1,5	Severe: 1,5,6	Severe: 1,5,6	Severe: 5,11,6	Severe 1,14,5	Severe 1,5,12	
Udorthents (ML2) Smoothed	___Too Variable to Rate _____>						

Limitations Cont.	Camp/Pinic	Playground	Trails
Ninigret (25A)	Slight	Moderate: 1	Slight
Raypol (464)	Severe: 1	Severe: 1	Severe: 1
Westbrook (TM, TME)	Severe: 1,5,6	Severe: 1,5,6	Severe: 1,5,6
Udorthents (ML2)	___ Too Variable to Rate _____>		

Limitation Key

1. Wetness
2. Excessive Permeability May Cause Ground Water Pollution
3. Seepage
4. Prolonged High Water Table
5. Flooding
6. Excess Humus
7. Instability
8. Frost Action
9. Droughtiness
10. Excess Salt
11. Corrositiuity
12. Excess Salt
13. Shallow to Rock
14. Low Bearing Strenth

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.