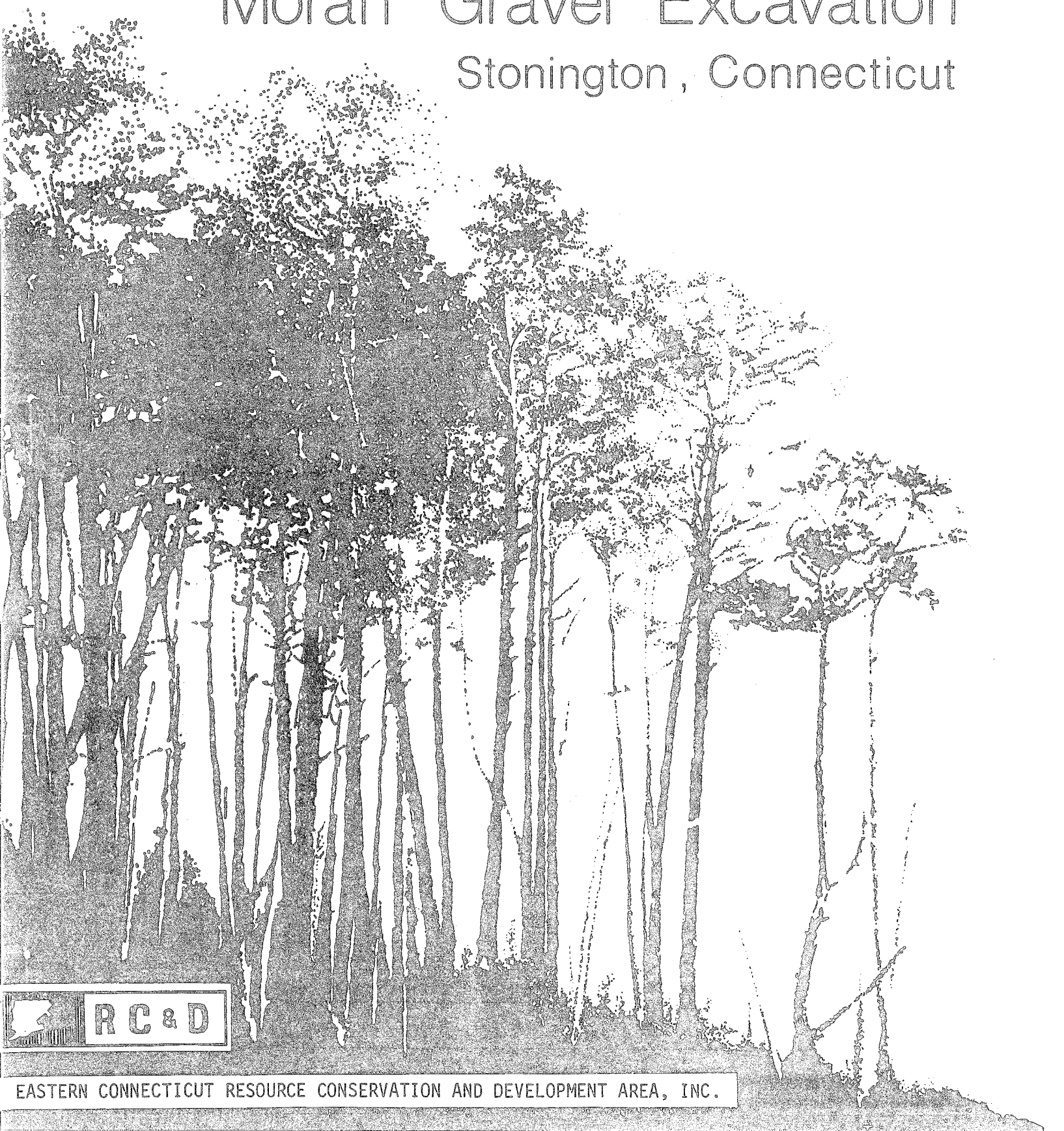
# Environmental Review Team Report

# Moran Gravel Excavation

## Stonington, Connecticut



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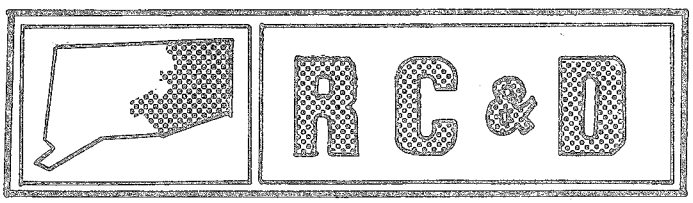
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

# Environmental Review Team Report on Moran Gravel Excavation Stonington, Connecticut

November 1980

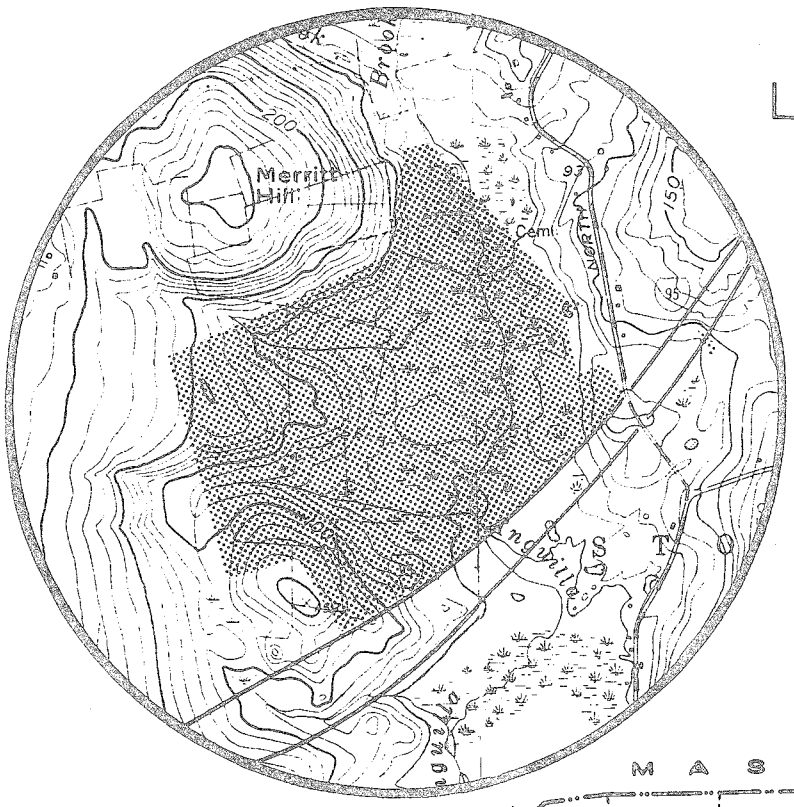



eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

# Location of Study Site

MORAN GRAVEL EXCAVATION
STONINGTON, CONNECTICUT





EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

# ENVIRONMENTAL REVIEW TEAM REPORT
# ON
# MORAN GRAVEL EXCAVATION
# STONINGTON, CONNECTICUT

This report is an outgrowth of a request from the Stonington Inland Wetlands 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.

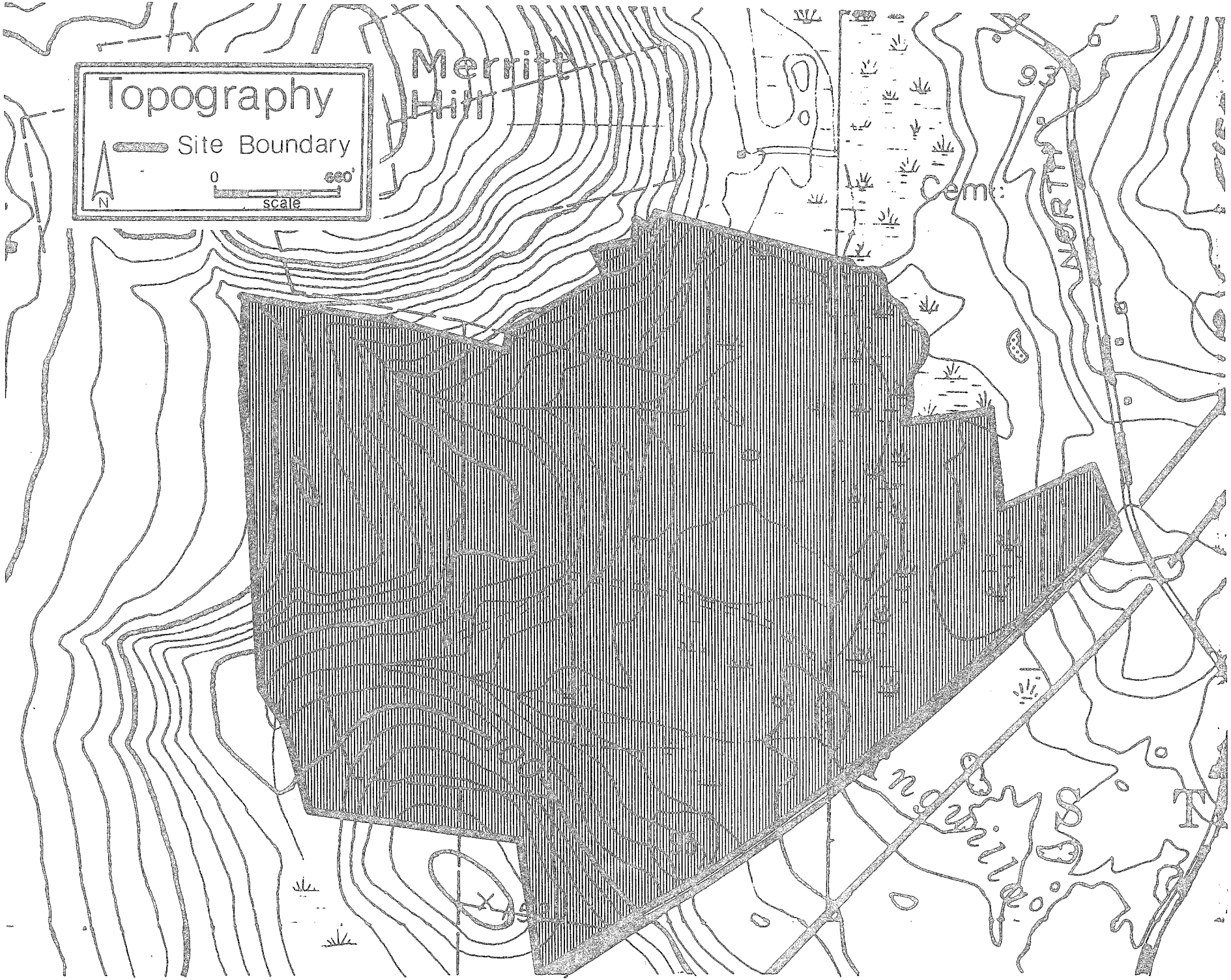
The ERT that field checked the site consisted of the following personnel: Gary Domian, District Conservationist, Soil Conservation Service (SCS); Mike Zizka, Geologist, Department of Environmental Protection (DEP); Rob Rocks, Forester, DEP; Andy Petracco, Recreation Specialist, DEP; Tom Seidel, Regional 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, August 7, 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 consideration that should be of concern to the developer and the Town of Stonington. 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.


Topography
Site Boundary
0
660'
scale
N
Merrit
Hill
Cem.
93
NORTH
Reservoir
S
T

# INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an assessment of the impact of the proposed Moran Gravel Excavation. The site is approximately 220 acres in size and is located to the west of North Anguilla Road and to the north of I-95. It is situated in the Anguilla Brook watershed which is one of the Town's high potential groundwater sources. It is understood that the property is currently in the private ownership of several owners and will be leased to Mr. Moran for gravel excavation purposes.

Mr. Moran intends to excavate gravel from the site to supply his family business and meet the local need for construction material. The excavation would not exceed 100 acres at a depth of 20 feet. Two development/excavation plans have been proposed for the site. The original plan called for excavation of an 80 acre section of the parcel. The second plan which was presented to Team members after the field review, shows excavation of two smaller areas totalling 49 acres. In this plan the existing access road would remain and a smaller portion of the wetlands would be impacted. Both proposals would result in creation of a fresh water lake on the site.

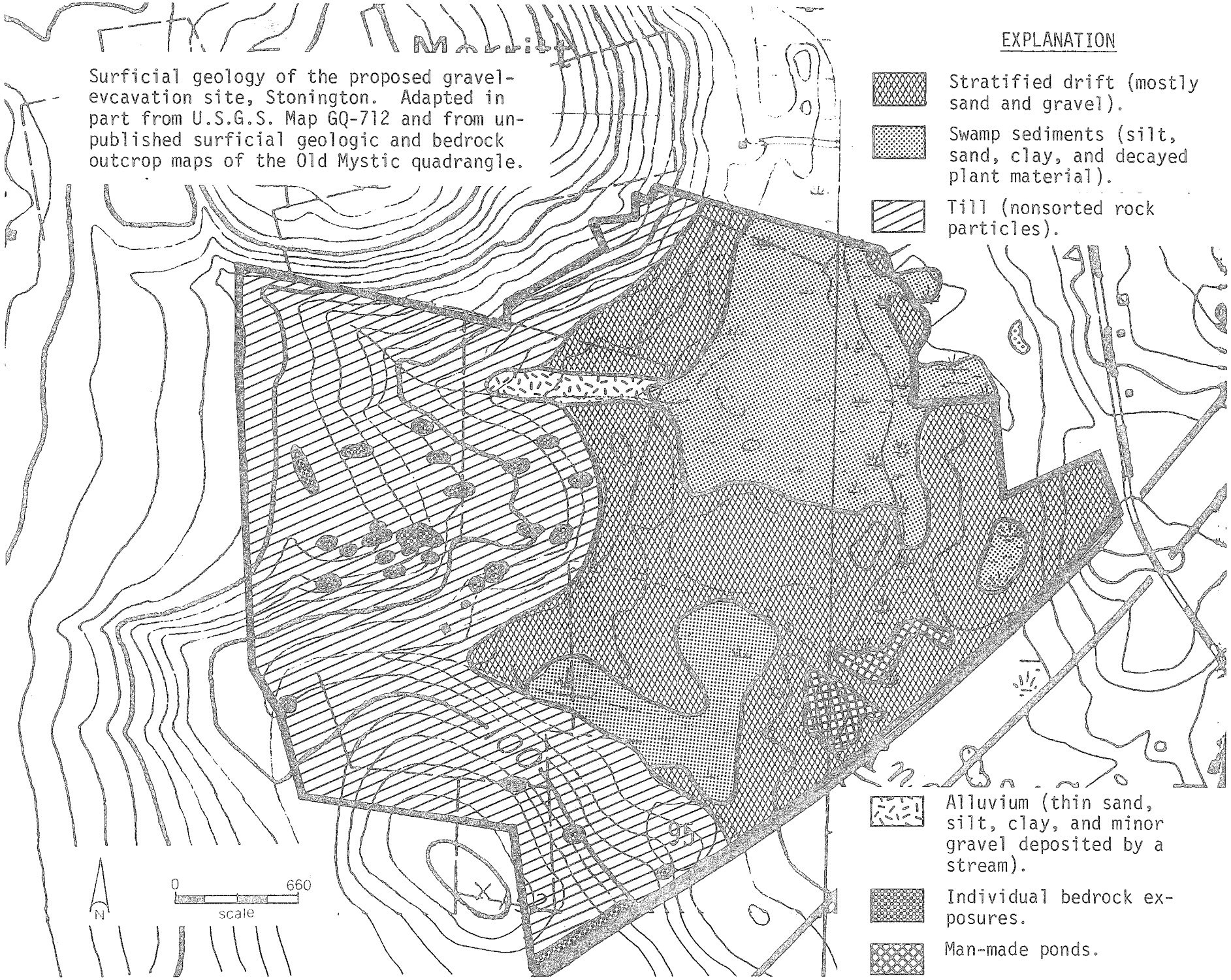
The Team is concerned with the impact of this proposal on the resource base of the site. As previously discussed, this site is located in the watershed of Anguilla Brook, one of the town's high potential groundwater sources. It should be noted, however, that the site is a secondary source area of the aquifer and the site of highest potential groundwater availability is located approximately one mile south of the site. The proposed excavation would result in a water supply change from groundwater to surface water (wells to reservoirs). The town must analyze this change from the standpoint of comparative desirability and feasibility. Some factors which should be considered include the volume of available water, the quality of this available water and the cost to the town for either program. (See Hydrology section of this report for more detailed discussion.)

The proposed excavation does have the potential for causing increased sedimentation in Anguilla Brook. A sediment and erosion control plan should be prepared for this proposal and should be implemented prior to commencement of excavation. A phased approach which maintains a streambank buffer would be appropriate for this proposal. The Soil Conservation Service field office in Norwich can provide assistance to the developer or the town in preparing such a plan.

The creation of surface water in place of vegetation on the site will affect the local climate. The intensity of the natural frost pocket will be decreased during fall and winter. Average wind speed will be increased. There will also be an increase in the distance pollutants will travel north from I-95.

Due to staffing difficulties, the Team is presently unable to provide information on the wildlife potential for this site. Recreation potential for this parcel is extremely high and would be greatly enhanced by creation of a lake on the site.

Before plans are approved, town commissions should have the developer prepare a management plan for the proposal which would include: the total amount of gravel to be removed, the number of daily trips by truck to and from the site, the general path of travel of these trucks, access to the main highway to be used for transport of mined materials, and hours of operation.




Surficial geology of the proposed gravel-evcavation site, Stonington. Adapted in part from U.S.G.S. Map GQ-712 and from unpublished surficial geologic and bedrock outcrop maps of the Old Mystic quadrangle.

# ENVIRONMENTAL ASSESSMENT

## GEOLOGY

The proposed gravel excavation is located in an area encompassed by the Old Mystic and Ashaway topographic quadrangles. Bedrock and surficial geologic maps of the Ashaway quadrangle have been prepared by Thomas Feinenger and J.P. Schafer, respectively, and have been published by the U.S. Geological Survey (Maps GQ-403 and GQ-712). A bedrock outcrop map of the Old Mystic quadrangle, by Richard Goldsmith, is on file at the Natural Resources Center in the State Office Building in Hartford. A preliminary surficial geologic map of the Old Mystic quadrangle is also filed with the Natural Resources Center.

Small exposures of bedrock are numerous within the western part of the site. Elsewhere, bedrock is covered by sediments of glacial or more recent origin. Nowhere is bedrock covered by unusually thick sediments; the depth to bedrock probably is less than 35 feet in most parts of the site and generally less than 15 feet in the western section. The rock itself is a medium-grained gneiss composed largely of quartz, microcline, oligoclase, and biotite, with lesser percentages of muscovite, hornblende, garnet, sillimanite, and magnetite.

In the hilly western section of the site, till forms the predominant surficial deposit. Till is a glacial sediment composed of rock debris deposited directly from an ice sheet. The rock particles and fragments include sizes ranging from clay to boulders and shapes ranging from round to angular to flat. There is little or no sorting of grain sizes within the deposit, and textures may vary from sandy and loose to silty, stony, and tightly compact. "Hardpan" is a colloquial name for till in Connecticut.

In the flatter eastern section of the site, stratified drift, overlain in some places by swamp sediments, forms the predominant surficial deposit. Stratified drift consists of rock debris that was sorted and generally layered by meltwater issuing from wasting glacier ice. Sand and gravel are the predominant components of the stratified drift, but silt, clay, and occasional large boulders are interspersed in small percentages. It is the stratified drift that would be mined under the present proposal.

The swamp sediments overlying stratified drift in a few areas consist largely of silt, clay, fine-grained sand, and decomposing plant remains. In the normally wet parts of the site, the swamp sediments may be more than 5 feet thick; elsewhere (in seasonally wet areas) the sediments are very thin.

## HYDROLOGY

The property is located in the watershed of Anguilla Brook, the major tributary of the Wequetequock River estuary. The stratified drift deposits in the valley of the brook have been identified as one of the highest-potential groundwater sources in the town of Stonington (other high-potential areas are the stratified drift deposits along Pawcatuck River, at the town's eastern border; and along Whitford Brook, a tributary of Mystic River, at the town's western border). Connecticut Water Resources Bulletin No. 15 indicates that the Anguilla Brook sediments

are capable of supplying an average of 3.4 million gallons of groundwater per day. This figure assumes that several high-yielding wells, each providing 100 to 800 gallons per minute, would be placed in suitable areas of the stratified-drift aquifer. The yield of any particular well would depend upon the thickness, texture, and other characteristics of the saturated section of the aquifer at that well's location. Hence, although a high water-supply potential may exist for the stratified drift as a whole, the potential of a specific site in the aquifer may be negligible.

In the Anguilla Brook aquifer, the thickest sediments, and therefore the areas of highest potential, appear to be located immediately south and north of Pequot Trail, approximately one mile south of the proposed gravel-excavation site. In that area, the thickness of the saturated section is estimated to exceed 40 feet. On the site itself, test pit information suggests (but does not clearly establish) that the saturated section is less than 40 feet thick at its maximum, and there it averages 20 to 25 feet thick. The sediments are coarse-grained and therefore are likely to have a good water-transmission capacity. The site would probably be considered to be a secondary-source area of the aquifer, having a water-supply potential that is good, but not as high as the Pequot Trail areas.

The proposed excavation would be 20 feet deep and would involve the removal of about 2.5 million cubic yards of overburden. The excavation would then become an 80-acre lake, which, together with the surrounding sections of the parcel, would be offered to the Town for purchase. The Town has expressed concern about the effect of this project on its prospective future water supplies.

To the extent that the project would remove sand and gravel that otherwise could serve as a water source, the proposal would indeed "destroy" a portion of the Anguilla Brook aquifer. All this really means, however, is that groundwater wells would no longer be an option for developing future water supplies on this site. The water would still be available, but in the form of surface water. The Town must therefore analyze the proposal from the standpoint of the comparative desirability-feasibility of groundwater sources versus surface-water sources. Many factors may enter into the evaluation process and the Team's role must end with pointing out some of them. The following considerations are among the most pertinent (not necessarily in order of priority).

1. Volume of available water. The result of lake creation would be to increase the amount of water held within the 80 acres by somewhat more than the volume of solids removed (the "somewhat more" would come from the damming of the water at the lake outlet, causing a rise in the water table).

2. Quality of available water. Creation of the lake would render the water more susceptible to pollution. Salt, sand, and other contaminants from Interstate Route 95 would be a special concern. Contamination could also arise from the recreational activities allowed, particularly if swimming or boating were to be permitted. Development of nearby parcels would increase the potential for pollution from surface runoff. On the other hand, the absence of residential or commercial septic systems on the site itself would eliminate one of the more direct sources of potential pollution. Of course, development of much of the site's aquifer acreage would be difficult anyway due to the presence of wetlands.

3. Costs. Any drinking-water supply for public usage must meet federal and state standards for quality. Monitoring, treatment, reporting, and maintenance

procedures may differ for groundwater and surface-water sources. The Town would need to compare the costs of the necessary facilities and procedures for each source.

The establishment of a lake on the site would have hydrologic impacts in addition to those related to water-supply. Presently, the flow of Anguilla Brook south of the site is affected by changes in evapotranspiration (the combined losses of water to the atmosphere through evaporation and plant transpiration). In the future, evaporation would be the sole source of water loss to the atmosphere from the excavated acres. Evapotranspiration from wetland areas is thought to result in a slightly greater overall loss than evaporation from a free-water surface of the same area under the same summer conditions. On the other hand, evaporation occurs to some extent throughout the year (sublimation of ice is included for these purposes) while transpiration virtually ceases in the autumn. Hence, the normal variations in the flow rates of Anguilla Brook may be changed by the project. The ultimate nature of the lake outlet would also have a bearing on flows: spillway-controlled flows may dry up during rainless periods while gate-controlled flows may be partially maintained. Gate-controlled flows would be most desirable if the Town wishes to develop groundwater wells in the stratified drift near Pequot Trail. Wells placed in coarse-grained stratified drift near streams often draw a substantial portion of their yield by induced infiltration from the streams. During very dry periods, the flow in Anguilla Brook becomes negligible. If such flows could be bolstered by release from surface storage areas upstream, a Pequot Trail supply system could be seasonally benefited. If a spillway control is used for the lake, there would be essentially no change in well potential downstream.

## 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.

The gently sloping hills or uplands are occupied by Canton and Charlton fine sandy loams. The soils are designated by the soil mapping unit symbol 11B. The symbol B denotes a 3 to 8% slope. The Canton soils formed in a fine sandy loam mantle underlain by friable gravelly sand glacial till. The Charlton soils formed in friable glacial till. The soils are well drained and are moderately or rapidly permeable. Surface runoff is medium from Canton soils and medium to rapid from Charlton soils.

The sloping hills or uplands are occupied by Canton and Charlton fine sandy loams. The soils are designated by the soil mapping unit symbol 11C. The symbol C denotes an 8 to 15% slope. The Canton soils formed in a fine sandy loam mantle underlain by friable gravelly sand glacial till. The Charlton soils formed in friable glacial till. The soils are well drained and have moderately rapid or rapid permeability. Surface runoff is medium from Canton soils and medium to rapid from Charlton soils.

The gently sloping hills or uplands are also occupied by Canton and Charlton very stony fine sandy loams. The soils are designated by soil mapping unit symbol 11XB. The symbol X denotes a very stony surface condition. The symbol B denotes a 3 to 8% slope. The Canton soils formed in a fine sandy loam mantle underlain by friable gravelly sand glacial till. The Charlton soils formed in friable glacial till. The soils are well drained and have moderately rapid or rapid permeability. Surface runoff is medium from Canton soils and medium to rapid from Charlton soils.

The gently sloping to sloping and moderately steep hills or uplands are occupied by Charlton-Hollis are occupied by Charlton-Hollis fine sandy loams. Topographic relief is influenced by underlying bedrock. The soils are designated by 17LC and 17LD consecutively. The symbol C denotes a 3 to 15% slope, the symbol D denotes a 15 to 35% slope. The Charlton soils formed in friable glacial till. The soils are well drained and have moderately rapid or rapid permeability. The Hollis soils formed in glacial till less than 20 inches deep over grainte, gneiss and schist bedrock. Hollis soils are shallow, well drained and have moderate permeability. Surface runoff is medium to rapid from Charlton soils and medium to very rapid from Hollis soils.

The gently sloping to sloping hills or uplands are also occupied by Hollis-Rock Outcrop complex. The soils are designated by soil mapping unit symbol 17MC. The symbol M denotes an extremely stony surface condition and the symbol C denotes a 3 to 15% slope. Hollis soils formed in glacial till less than 20 inches deep over granite, gneiss and schist bedrock. Hollis soils are shallow well drained and have moderate permeability. Surface runoff is medium to very rapid. Rock Outcrop consists of exposed, weathered and unweathered granite, gneiss and schist bedrock.

The gently sloping to sloping hills or uplands are occupied by Narragansett-Hollis complex. These soils are designated by soil mapping unit symbol 200C. The symbol C denotes a 3 to 15% slope. The Narragansett soils formed in silt mantled friable glacial till are well drained and have moderate permeability in the surface layer and subsoil, and moderately rapid or rapid permeability in the substratum. Hollis soils formed in glacial till less than 20 inches deep over granite, gneiss and schist bedrock. Hollis soils are shallow, well drained and have moderate permeability. Surface runoff is slow to rapid from Narragansett soils and medium to very rapid from Hollis soils.

The nearly level and gently sloping stream terraces and outwash plains are occupied by Tisbury silt loam. The soils are designated by the soil mapping unit symbol 45A. The symbol A denotes a 0 to 5% slope. Tisbury soils formed in silt mantled glacial outwash. The soils are moderately well drained and have moderate permeability in the surface layer and subsoil, rapid or very rapid permeability in the substratum, and a seasonal high water table at 18 to 24 inches. Surface runoff is slow or medium.

The level or nearly level stream terraces and outwash plains are occupied by

Haven silt loam. The soil is designated by soil mapping unit symbol 63A. The symbol A denotes a 0 to 3% slope. Haven soils formed in water sorted 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 gently sloping stream terraces and outwash plains are occupied by Haven silt loam. The soil is designated by soil mapping unit symbol 63B. The symbol B denotes a 3 to 8% slope. Haven soils formed in water sorted 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 unit symbol 25A. The symbol A denotes a 0 to 3% slope. Ninigret soils formed in water sorted outwash. The soils are moderately well drained and have moderately rapid permeability. The seasonal high water table is at 18 to 24 inches. Surface runoff is slow to moderate.

The gently sloping outwash plains or stream terraces are occupied by Agawam fine sandy loam. The soils are designated by soil mapping unit symbol 96B. The symbol B denotes a 3 to 8% slope. Agawam soils formed in water sorted sands. The soils are well drained and have moderately rapid permeability in the surface layer and subsoil and have rapid permeability in the substratum. Surface runoff is medium.

Also mapped on site were Udorthents, smoothed. This soil is indicated by soil mapping unit symbol ML2. Udorthents are areas that have been disturbed to an extent that the natural layers are no longer recognizable. It is not possible to make statements on the soils origin, drainage, watertable, or permeability because the soil has been disturbed from its natural state.

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

The nearly level stream terraces or outwash plains are occupied by Raypol silt loam. The soils are designated by 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, rapid or very rapid permeability in the substratum and a high water table at or near the surface 7 to 9 months of the year. Surface runoff is slow. Raypol silt loam is a designated wetland soil, regulated under Public Act 155.

The level or nearly level areas on uplands are occupied by Ridgebury, Leicester and Whitman extremely stony fine sandy loams. Ridgebury and Whitman soils formed in compact glacial till, Leicester soils formed in friable glacial till. The soils are poorly drained except for Whitman, which is very poorly drained. Ridgebury and Whitman soils have moderate to moderately rapid permeability in the surface layer and subsoil, and slow or very slow permeability in the substratum (fragipan).

Leicester soils have moderately rapid permeability. The soils have a watertable at or near the surface 9 to 10 months of the year. Surface runoff is slow from Leicester soils, medium from Ridgebury soils, and high from Whitman soils. Ridgebury, Leicester and Whitman extremely stony fine sandy loams is a designated wetland soil and regulated under Public Act 155.

The following soils qualify as Prime Farmland soils: Canton and Charlton fine sandy loams (11B), Ninigret fine sandy loam (25A), Tisbury silt loam (45A), Haven silt loam (63A and 63B), and Agawam fine sandy loam (96B). 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 outwash soils that are found on site are a good source of sand, or sand and gravel. The Tisbury silt loams (45A) and Haven silt loams (63A, 63B) are both rated as good sources of sand and gravel. Ninigret fine sandy loams are a good source of sand but lack gravel. The remaining soils on site have limitations for use as sources of sand and gravel because of excess fines or excess organic matter. Test pit information will indicate the presence or lack of sand and gravel deposits in questionable areas.

There are two plans for excavation of sand and gravel on the site. The first plan proposes excavating approximately 100 acres of land which includes over 33% of the wetland soils found on the entire property. Upland glacial till soils will also be excavated, these are rated as unsuitable for sand and gravel because of excess fine soil material.

The second plan calls for the excavation of approximately 40 acres in areas where known sources of sand and gravel are found. Wetlands would be less affected by this plan.

The main body of water that will be directly affected by the proposed excavation will be Anguilla Brook, which runs south through the Adrian and Palms muck soils. Two feeder streams enter Anguilla Brook from the west side of the property and pass through areas where sand and gravel will be mined. Sedimentation into Anguilla Brook is inevitable if proper precautions are not taken prior to beginning the excavation. A Sediment and Erosion Control Plan should be requested by the land developer and implemented prior to the beginning of the excavation. The plan can be requested through the New London County Soil and Water Conservation District.

One concept to be considered to reduce damage to Anguilla Brook and the surrounding wetlands is excavating the sand and gravel in "cells" or sections, and completing the excavation in a cell before moving onto the next cell. During excavation in each cell, a stream bank buffer zone should be reserved so that equipment and excavation does not enter the immediate area of the brook or its banks. This concept will have a positive effect on reducing the amount of sediment that will reach the brook.

After completion of the gravel excavation limitations to most uses on this site are caused by the depth to bedrock, wetness and slope steepness.

Nature trails throughout the area are only limited by steep slopes, rockiness and wetness in the poorly drained soils. Limitations for this use can be overcome by careful planning, such as routing trails around steep slopes and dangerously rocky areas. Trails directly through wetlands may not be possible because of excessive wetness. Short spurs from a main trail could offer access to the wetland by a simple boardwalk that leads to a small observation area. The boardwalk could be removed for the winter and wet spring months.

Sanitary facilities would be limited to the deep, well drained, gently sloping Canton and Charlton soils (11B, 11C) located in the western portion of the property. The remaining soils have either moderate or severe limitations due to wetness, shallow depth to bedrock, and slope, as slow percolation rates prohibit the introduction of sanitary facilities with leach beds.

Active recreation, such as baseball, soccer, or tennis will have to be located in areas that are well-drained or capable of being drained. The areas for these sports will also have to be nearly level and stone-free. The area that would be suitable for sanitary facilities would also be well suited for active recreation.

## VEGETATION

This site totals approximately 240 acres and may be divided into four vegetation types. These include Old Fields, 104± acres; hardwood swamp, 95± acres; mixed hardwoods, 35± acres; and open fields, 2± acres with 4± acres of ponds (see vegetation type map and vegetation type descriptions). Initial clearing of the 100 acres proposed for the gravel excavation will have the largest impact on vegetation. Trees which are removed for this excavation should be utilized for fuelwood. Construction of the proposed 80 acre pond (after excavation) may raise the water table in the surrounding areas. This change in the water table may cause mortality in the trees, shrubs and herbaceous vegetation in the affected area.

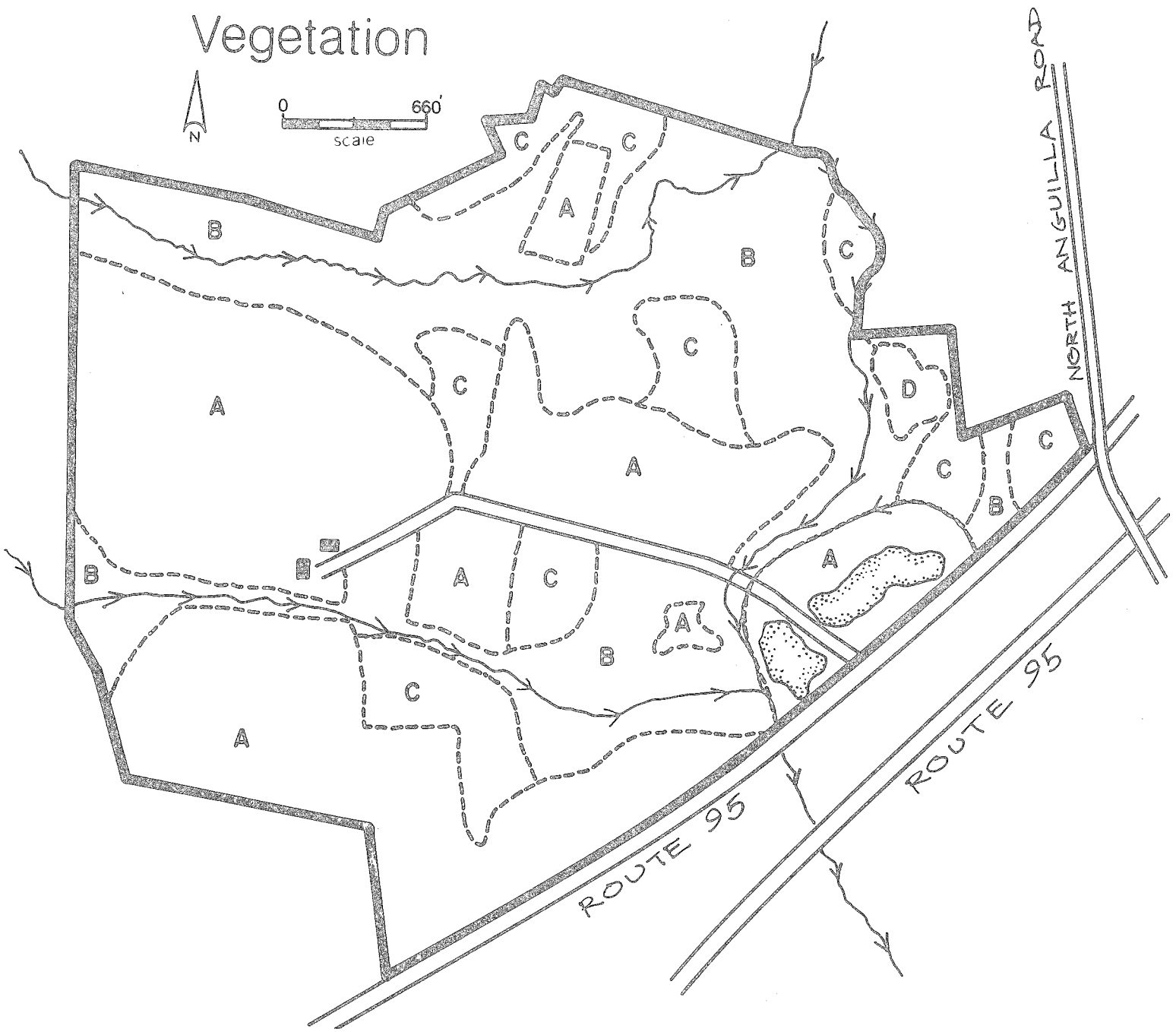
Fuelwood thinnings in the crowded hardwood swamps will help to improve residual tree health and vigor, ultimately resulting in improved forest stability.

No rare or endangered plants were found during field review of this site.

### Vegetation Type Descriptions

Type A (Old Fields). Approximately 104 acres of old fields are present on this tract. These open areas may be divided into two types; old field and meadows. The old fields are located on the droughty, shallow to bedrock soils, and the meadows are located on the poorly drained soils near the hardwood swamps and ponds. Tree and shrub species in the old field areas include seedling and occasional sapling-size, big-tooth and quaking aspen, red maple, gray birch, choke cherry, black cherry, eastern red cedar, assorted fruit trees, autumn olive, gray-stemmed dogwood, red osier dogwood, highbush blueberry, male berry, bayberry, barberry, smooth sumac, staghorn sumac, winged sumac and multiflora rose. Vine species present include fox grape, summer grape, catgreenbrier, Oriental bittersweet, Japanese honeysuckle, Virginia creeper and poison ivy. Ground cover is composed of grasses, hairy cap moss, reindeer lichen, club moss, hayscented fern and assorted wildflower and week species, including goldenrod, Joe-pye-weed, deer tongue, milkweed, tall cinquefoil, dwarf St. John's wort, pasture thistle, Queen Ann's lace, wild straw-

# Vegetation




LEGEND

- Road
- Property Boundary
- Vegetation Type Boundary
- Stream
- Ponds, 4 acres
- Buildings

VEGETATION TYPE DESCRIPTIONS*

| | |
|---|---|
| TYPE A. | Old fields, 104± acres, grasses and shrub species. |
| TYPE B. | Hardwood swamp, 95± acres, overstocked, sapling to pole size. |
| TYPE C. | Mixed hardwoods, 35± acres, fully-stocked, sapling to pole size. |
| TYPE D. | Open fields, 2± acres, haylot. |

* 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.

berry, black-eyed-Susans, ox-eye-daisy, raspberry, buttercups, cow vetch, meadow beauty, fleabane, dogbane and Turk's cap lily.

Tree and shrub species which are dominant in the open meadow areas are red maple seedlings, white ash seedlings, arrowwood, sweet pepperbush, swamp azalea, winged sumac, speckled alder and silky willow. Herbaceous vegetation includes sedges, sensitive fern, meadowsweet, steeplebush, goldenrod, deer tongue and in the wetter areas, phragmites.

Type B (Hardwood Swamp/Stream Belt). Sapling to pole size red maple in clumps on hummocks are present in these stands, which total approximately 95 acres. Stocking levels are quite variable, however, the majority of this area is over-stocked. Many of the trees in the over-stocked portions of these stands are declining in health and vigor as a result of their crowded condition. Total volume in pole size trees ranges between 13 and 17 cords per acre throughout this area. The numerous small open swamps (less than an acre in size) which are scattered throughout this area are vegetated with cattails, large blue flag iris and purple loosestrife. Dense patches of spicebush, sweet pepperbush and highbush blueberry along with scattered swamp azalea, swamp rose and deciduous holly are present in the understory of these stands. Ground cover vegetation includes tussock sedge, sphagnum moss, skunk cabbage, cinnamon fern, royal fern, sensitive fern, occasional larger blue flag iris, star flower, Virginia creeper, poison ivy and in the driest areas, club moss and Canada May flower.

Type C (Mixed Hardwoods). The majority of the sawtimber-size trees have been removed from the accessible portions of these stands which total 35± acres. Sapling and pole size white oak, black oak, black birch, black cherry and red maple remain in these stands, which are now at the low end of fully-stocked. Hardwood tree seedlings, blue beech, azalea, witch-hazel and highbush blueberry are present in the understory. Ground cover is composed of club moss, Virginia creeper, huckleberry, raspberry, dewberry, bracken fern, cinnamon fern and hay-scented fern.

Type D (Open Fields). Two acres of open fields are present within this tract. Grasses predominate with goldenrod and black-eyed-Susan which are also present.

The proposed gravel excavation on this tract, which is not to exceed 100 acres, will have a significant initial impact on the vegetation. This impact comes about through vegetation clearing and removal on the 100 acres chosen for excavation.

It is difficult to determine how much vegetation will be cleared from the different vegetation types, because the boundaries of the excavation areas are not clear, as yet.

Clearing and excavation activities in the old field and hardwood swamp areas (see vegetation type map) will not take valuable tree-growing land out of production. Most of these areas are considered low in potential crop tree productivity. These areas do, however, provide high quality wildlife habitat, which will be completely lost when these areas are excavated.

Excavation which takes place in the mixed hardwood stands (see vegetation type map) will take moderately valuable timber land out of production. The mixed hardwood areas to be cleared, total only 10 acres and have already had their sawtimber-size trees removed.

The proposed 80 acre lake, when filled, has the potential to permanently raise the water table in surrounding areas, especially if the proposed dam is constructed.

Any permanent rise in the water table has the potential to drown roots and eventually cause mortality in the trees, shrubs and herbaceous vegetation present in the affected areas.

Over time, vegetation which is able to adapt to the new water table conditions will become established. These changes will alter the appearance and character of the vegetation in the disturbed areas, however, these changes may have a positive effect on wildlife habitat. The progression from an area dominated by tree species, to an area dominated by shrub and herbaceous species will, over time, offer much in terms of food and cover for wildlife.

Suggested Vegetation Utilization and Management

Utilization of the trees, which will be removed during the clearing operation prior to excavation, for fuelwood, is advisable. Clearing operations in the hardwood swamp areas will produce between 13 and 17 cords per acre, and perhaps 7 to 11 cords per acre in the mixed hardwood stands, which have already had the sawtimber-size trees removed. In light of the high demand for alternative heating fuels, marketing the fuelwood produced will not be difficult.

The trees in the hardwood swamp areas are declining in health and vigor as a result of their crowded condition. Many of the trees are tall, have very small crowns and shallow root systems. These conditions cause these trees to be somewhat unstable.

A fuelwood thinning from above in areas, which will not be cleared for excavation, will open up the canopy and allow some sunlight in to stimulate growth in the residual trees. This practice will ultimately result in a healthier more stable forest.

This thinning should remove approximately one-quarter of the volume, focusing on removal of the unhealthy trees, damaged trees, and trees which are directly competing with healthy, high-vigor trees. The reduction in competition between residual trees for space, sunlight and nutrients should result in an overall improvement in the tree health and vigor.

If this thinning is agreed upon, it should be implemented during the summer months, when the ground is dry or the winter months, when the ground is frozen. A consultant forester or public service forester should be contacted to help mark the trees that are to be removed.

CLIMATE

The area is in the Connecticut coastal region; therefore, the climate is basically mild and humid in all seasons. During fair weather, the area is subject to the normal on-shore, off-shore breezes which increase human comfort in the summertime.

The surrounding topography is gentle and, therefore, does not influence the

| Week of the Year | Average Daily Radiation (gcal/cm/day) Level |
|---|---|
| March 1 | 246 |
| March 8 | 225 |
| March 15 | 265 |
| March 22 | 361 |
| March 29 | 322 |
| April 5 | 349 |
| April 12 | 428 |
| April 19 | 394 |
| April 26 | 368 |
| May 3 | 347 |
| May 10 | 384 |
| May 17 | 347 |
| May 24 | 485 |
| May 31 | 438 |
| June 7 | 412 |
| June 14 | 382 |
| June 24 | 409 |
| June 28 | 493 |
| July 5 | 524 |
| July 12 | 364 |
| July 19 | 447 |
| July 26 | 402 |
| August 2 | 415 |
| August 9 | 435 |
| August 16 | 431 |
| August 23 | 480 |
| August 30 | 364 |
| Sept. 6 | 361 |
| Sept. 13 | 310 |
| Sept. 20 | 286 |
| Sept. 27 | 268 |
| Oct. 4 | 114 |
| Oct. 11 | 255 |
| Oct. 18 | 253 |
| Oct. 25 | 243 |
| Nov. 1 | 199 |
| Nov. 8 | 149 |
| Nov. 15 | 182 |
| Nov. 22 | 171 |
| Nov. 29 | 158 |
| Dec. 6 | 158 |
| Dec. 13 | 148 |
| Dec. 20 | 124 |
| Dec. 27 | 144 |
| Jan. 3 | 175 |
| Jan. 10 | 156 |
| Jan. 17 | 183 |
| Jan. 24 | 188 |
| Jan. 31 | 204 |
| Feb. 7 | 221 |
| Feb. 14 | 231 |
| Feb. 21 | 235 |

local climate in any limiting manner. The air pollution load from I-95 is relatively high at this site.

The following data was taken from The Climate of Connecticut, Connecticut Geological and Nautral History Survey, Bulletin 99, 1965:

| | |
|---|---|
| Mean Annual Precipitation | 48" |
| Mean Annual Temperature: | 51°F |
| Average date of last occurrence of 32°F temperature in spring | April 15 |
| Average date of first occurrence of 32°F temperature in fall | October 25 |
| Average length of freeze-free season | 190 days |
| Average winter wind velocity and direction | 7.5 mph, south |
| Average heating degree days | 5600 |

The average number of hours of daily sunshine and the average weekly solar radiation received on a horizontal surface at the site are listed below:

| | Average number of hours of daily sunshine | Approximate day lengths |
|---|---|---|
| January | 4.5 | 9 hours |
| February | 6.0 | 10 hours |
| March | 6.0 | 12 hours |
| April | 7.0 | 13 hours |
| May | 8.0 | 14 hours |
| June | 9.0 | 15 hours |
| July | 9.0 | 15 hours |
| August | 8.0 | 13 hours |
| September | 7.0 | 12 hours |
| October | 6.0 | 11 hours |
| November | 5.0 | 10 hours |
| December | 4.5 | 9 hours |

The creation of a surface water body in place of a vegetated site will probably affect several local climatic processes. The water surface temperature will be higher on fall and winter nights than a vegetated survace. Therefore, the intensity of the natural frost pocket will be decreased during these seasons.

The average surface wind speed at the site will be increased due to the smooth water surface. This same change in surface cover from rough vegetation to smooth water will increase the distance air pollutants from I-95 will travel to the north.

## PLANNING CONCERNS

Surrounding land uses are undeveloped and low density residential. Interstate I-95 is located along the southeast edge of the site. The Regional Development Plan recommends this area for low density uses. The site is zoned for low density uses at three acres per unit.

Alternative land uses would be low density residential, farming, and undeveloped.

If a 50± acre lake is developed this will leave about 170 acres undeveloped. If the Town acquires this property it will then have land for a community park, recreation area, and open space-wildlife area. The lake would provide public swimming for Town residents which is currently lacking. The Town would also be acquiring a future groundwater site for when a public supply is needed for the eastern section of Stonington. The aquifer should still be a viable supply even with the sand and gravel mining, although its form will have changed from ground water to surface water. The mining activity should meet the requirements of Section 5.45 of the Stonington Zoning Regulations. The erosion and sediment control provisions of Section 2.9 should also apply, so that excess silt and sediment can be prevented from entering Anguilla Brook and the aquifer. In this respect it would be helpful if a vegetated buffer zone could be maintained between the mining operation and the brook.

No improvements are scheduled in the Regional Transportation Plan for Anguilla Road. Detailed information pertaining to the operation of the proposed gravel excavation was not available, consequently impact on traffic conditions and duration of the excavation process could not be evaluated.

## RECREATION POTENTIAL

The 220 acre tract is gentle in topography and would lend itself to a variety of recreational uses. A gravel mining operation with the resultant pond(s) created would unquestionably enhance the recreational value of the site. It was pointed out that the tract provides excellent wildlife habitat. The natural features observed on the site suggest that it would afford good food and cover opportunities for wildlife.

The creation of a large pond or ponds by excavation would unquestionably alter the tract markedly and affect the flora, fauna, aquifer, recreation potential, and to some degree, the microclimate. The scale of the excavation would, in large part, determine the extent of the changes. Rapid, large scale site alteration would have a more striking effect that would be more immediately discernible. The long term effects from the suggested operation should be carefully assessed and weighed against the projected needs of the community. Obviously, if a community is in danger of not having an adequate water supply, then that aspect alone will be an overriding concern and one which will take precedence over any recreation considerations. If the two needs can be met (i.e. water supply and water based recreation) in a minimally conflicting manner, then the plan offered may well serve these dual needs.

The potentially disruptive effects of an excavation operation involving earthmoving equipment, truck traffic, etc., must be considered as well as the benefits that could be derived, based on an assessment of the most important needs of the town and the landowners.

Open space land is a valuable commodity for a town, since it gives that town a cushion for meeting future natural resource needs. Projecting those needs and planning for them is often a difficult task but is important to avoiding high cost crisis management. While budget constraints often pose problems in trying to provide for future needs, the long term economic benefits of prudent planning for those needs will more often than not bring with it a real long term economic advantage.

Assuming the creation of at least one pond on the tract, some of the additional recreational possibilities might be:

1. swimming - if suitable water quality can be maintained;
2. fishing - if it is to be stocked, a fisheries biologist can assess the pond's potential for supporting particular species of fish;
3. boating - the limitation of use to canoes, rowboats, and sailboats and exclusion of motorboats is recommended;
4. ice skating;
5. ice fishing. (access might be problematic with snow cover)

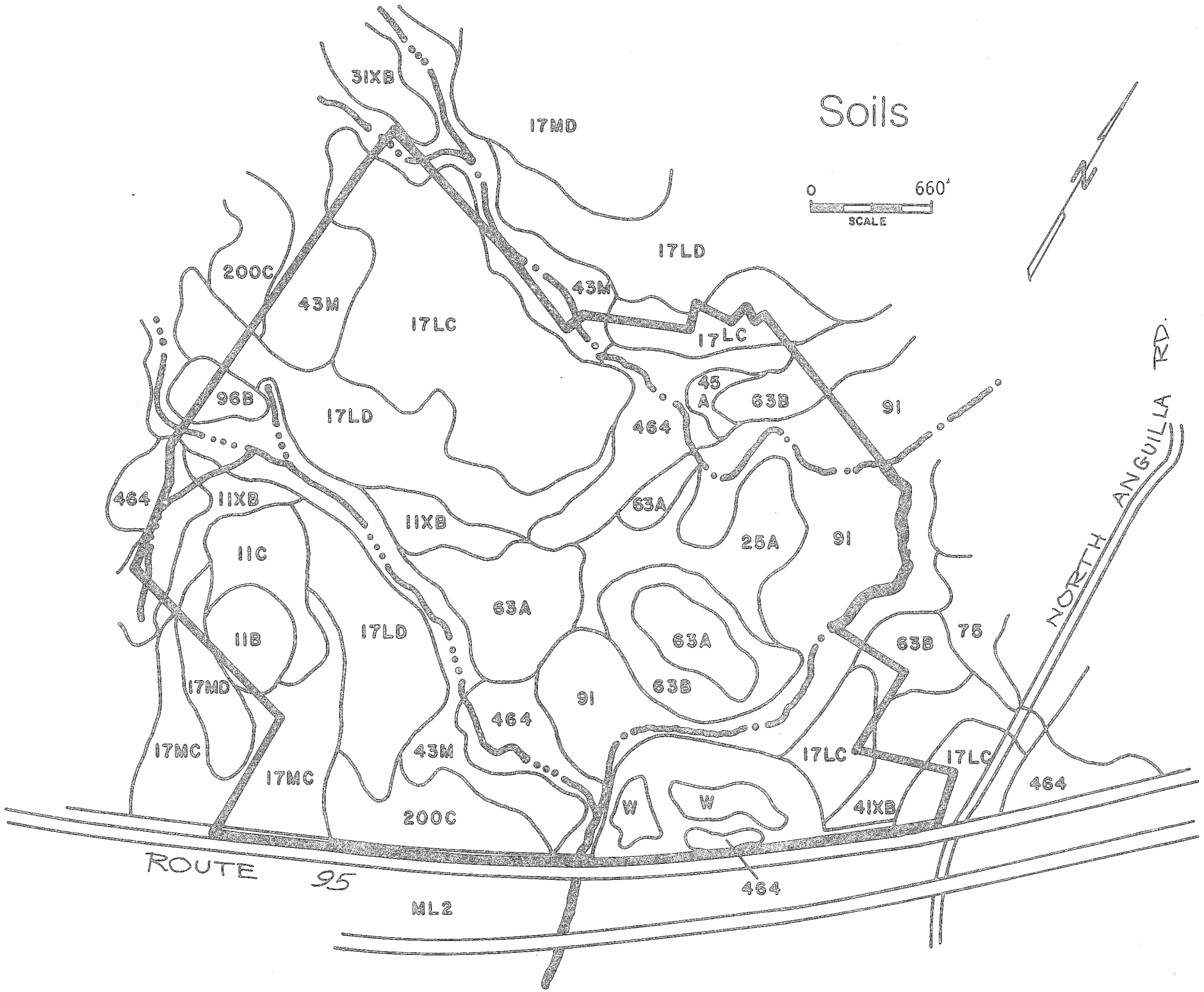
A beach and boat launch ramp would have to be installed. Since the beach would become the most heavily used facility, in season, parking adequate to meet the swimming and boating demands would have to be installed. Additional nearby facilities, such as a picnic area, would expand the demand for adequate parking. Parking areas should, of course, be properly installed to minimize flash runoff, siltation, etc. A gravel parking lot of relatively level grade provides much rainfall absorption capacity while a paved lot accentuates flash runoff. While more environmentally sound, a sizable gravel lot may create an unacceptable dust problem. There are special porous asphalt pavements however, which are water permeable, but they are more expensive to install than the standard type.

Any open fields remaining after the gravel mining operation is completed could be used for ball games, establishment of playgrounds, tennis and basketball courts, kite and model airplane flying and other related open field activities such as frisbee toss, informal soccer and football games, etc.

The tract is sufficiently large to enable establishment of a trail system for nature study, bird watching, snowshoeing, and like pursuits. Joggers could use these trails, thereby avoiding some of the hazards associated with street jogging. Cross-country ski use of the site, while not a primary consideration because of the climate and limited trail length is none the less a possibility. Beginning skiers, as well as experienced ones getting in shape for longer jaunts, could put a snowcovered trail network to good use. A fitness or parcourse could be compatible with a walking/jogging trail.

If winter activities are incorporated in a recreational development plan for the tract, the access road would either have to be plowed of snow or a small parking lot installed along North Anguilla Road with walk-in access from this point.

# Appendix


Soils
0
660'
SCALE
31XB
17MD
17LD
200C
43M
17LC
96B
45
A
63B
91
464
11XB
63A
25A
11C
11B
75
NORTH ANGUILLA RD.
W
41XB
ROUTE 95
ML2

## 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 | Shallow Excavatic |
| **Adrian-Palms | 91 | 34 | 13 | wetness,frost action | 3 | 3 | 3 | 3 | 3 |
| Agawam | 96B | 2 | 1 | cut banks cave | 1 | 1 | 1 | 1 | 3 |
| Canton-Charlton | 11B | 5 | 2 | slope | 1 | 2 | 1 | 1 | 3 |
| Canton-Charlton | 11C | 7 | 3 | slope | 2 | 2 | 2 | 2 | 3 |
| Canton-Charlton | 11XB | 6 | 2 | large stones | 2 | 2 | 2 | 2 | 3 |
| Charlton-Hollis | 17LC | 44 | 17 | slope,depth to rock | 2 | 2 | 2 | 2 | 2 |
| Charlton Part | | | | | 3 | 3 | 3 | 3 | 3 |
| Hollis Part | | | | | | | | | |
| Charlton-Hollis | 17LD | 30 | 12 | slope,depth to rock | 3 | 3 | 3 | 3 | 3 |
| Hollis-Rockoutcrop | 17MC | 11 | 4 | depth to rock | 3 | 3 | 3 | 3 | 3 |
| Haven | 63A | 17 | 7 | frost action | 1 | 1 | 2 | 2 | 3 |
| Haven | 63B | 13 | 5 | frost action | 1 | 1 | 2 | 1 | 3 |
| Narragansett-Hollis | 200C | 9 | 3 | slope | 2 | 3 | 2 | 2 | 3 |
| **Ninigret | 25A | 12 | 5 | wetness | 3 | 3 | 3 | 3 | 3 |
| **Raypol | 464 | 23 | 9 | wetness | 3 | 3 | 3 | 3 | 3 |
| **Ridgebury,Leicester Whitman | 43M | 28 | 11 | wetness | 3 | 3 | 3 | 3 | 3 |
| Sutton | 41XB | 2 | 1 | wetness | 3 | 3 | 2 | 2 | 3 |
| Tisbury | 45A | 2 | 1 | wetness,cut-banks cave | 3 | 3 | 3 | 1 | 3 |
| Udorthents | ML2 | 11 | 4 | | Limitations Determined On-site | | | | |

* Limitations: 1-slight; 2-moderate; 3-severe
** Regulated wetland soil under PA 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.