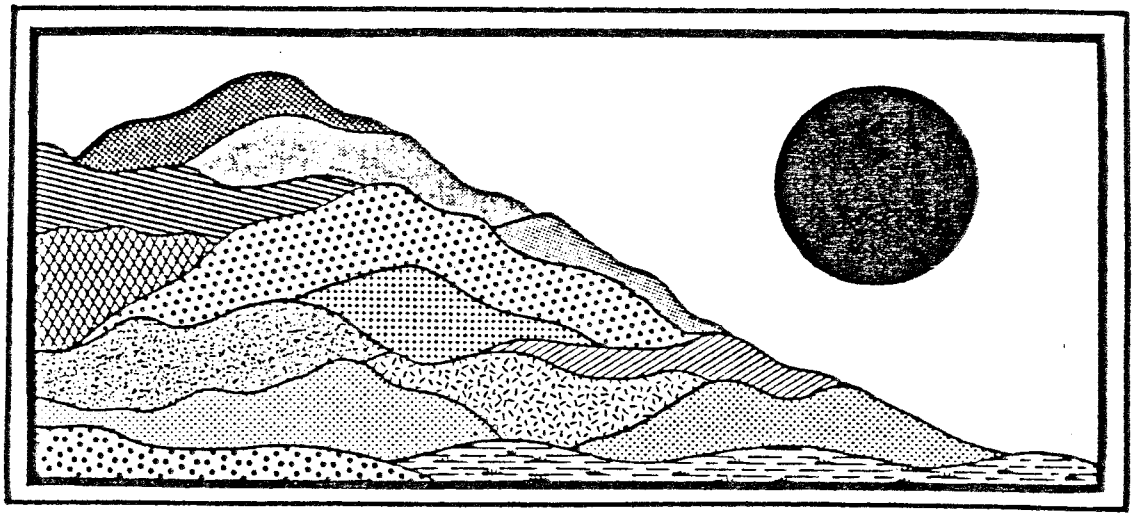
# JEREMY – HILL DEVELOPMENT CORPORATION

## STONINGTON, CONNECTICUT



AUGUST 1987

# ENVIRONMENTAL REVIEW TEAM REPORT

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

# JEREMY – HILL DEVELOPMENT CORPORATION

## STONINGTON, CONNECTICUT

**Review Date:** JUNE 23, 1987

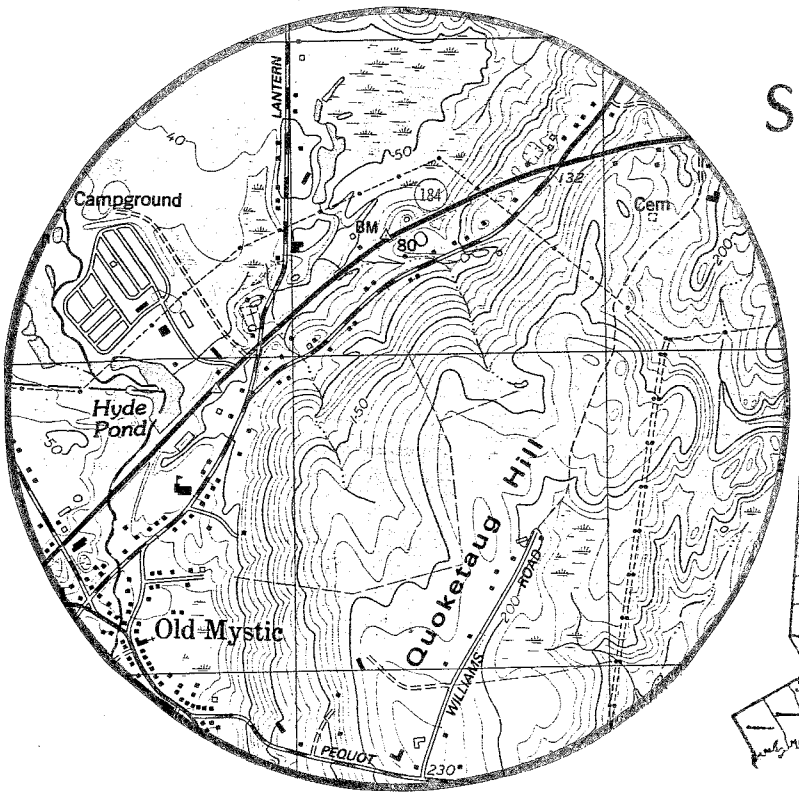
**Report Date:** AUGUST 1987

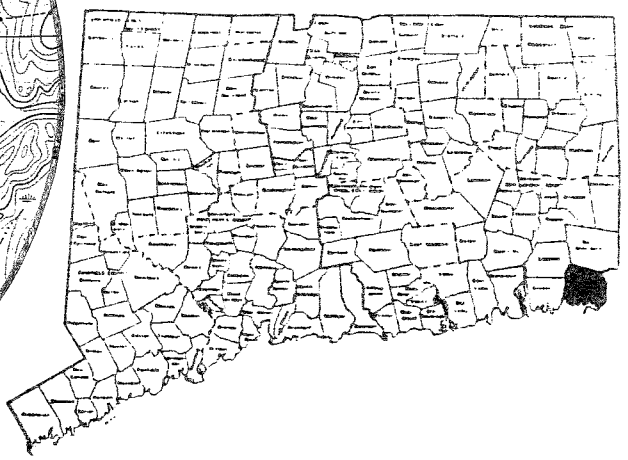
RC&D

ENVIRONMENTAL REVIEW TEAM
PO BOX 198
BROOKLYN, CONNECTICUT 06234

# Site Location

JEREMY-HILL DEVELOPMENT CORP.
STONINGTON, CONNECTICUT




EASTERN CONNECTICUT

RESOURCE CONSERVATION

& DEVELOPMENT AREA

# ENVIRONMENTAL REVIEW TEAM REPORT

# ON

# JEREMY-HILL DEVELOPMENT CORP. SUBDIVISION

# 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. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The ERT met and field checked the site on Tuesday, June 23, 1987. Team members participating on this review included:

| | |
|---|---|
| Barry Cavanna | --District Conservationist<br>U.S.D.A., Soil Conservation Service |
| Tom Seidel | --Regional Planner<br>Southeast CT Regional Planning Agency |
| Elaine Sych | --ERT Coordinator<br>Eastern CT RC&D Area |
| Bill Warzecha | --Geologist<br>DEP, Natural Resources Center |
| Judy Wilson | --Wildlife Biologist<br>DEP, Eastern District Headquarters |

Prior to the review day, each team member received a summary of the proposed project, a list of the Town's concerns, a location map, topographic map, and a soils map. During the field review the team members were given a preliminary lot layout and test hole information. The Team met with, and were accompanied by members of the Inland Wetlands Commission, the Stonington Land Use Clerk, the Developer and neighbors of the site. Following the review, reports from each team member were submitted to the ERT Coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site designs or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project--all final decisions and conclusions rest with the Town and landowner.

This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the developer and the Town. The results of the Team action are oriented toward the development of better environmental quality and the long-term economics of land use.

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

If you require any additional information, please contact:

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

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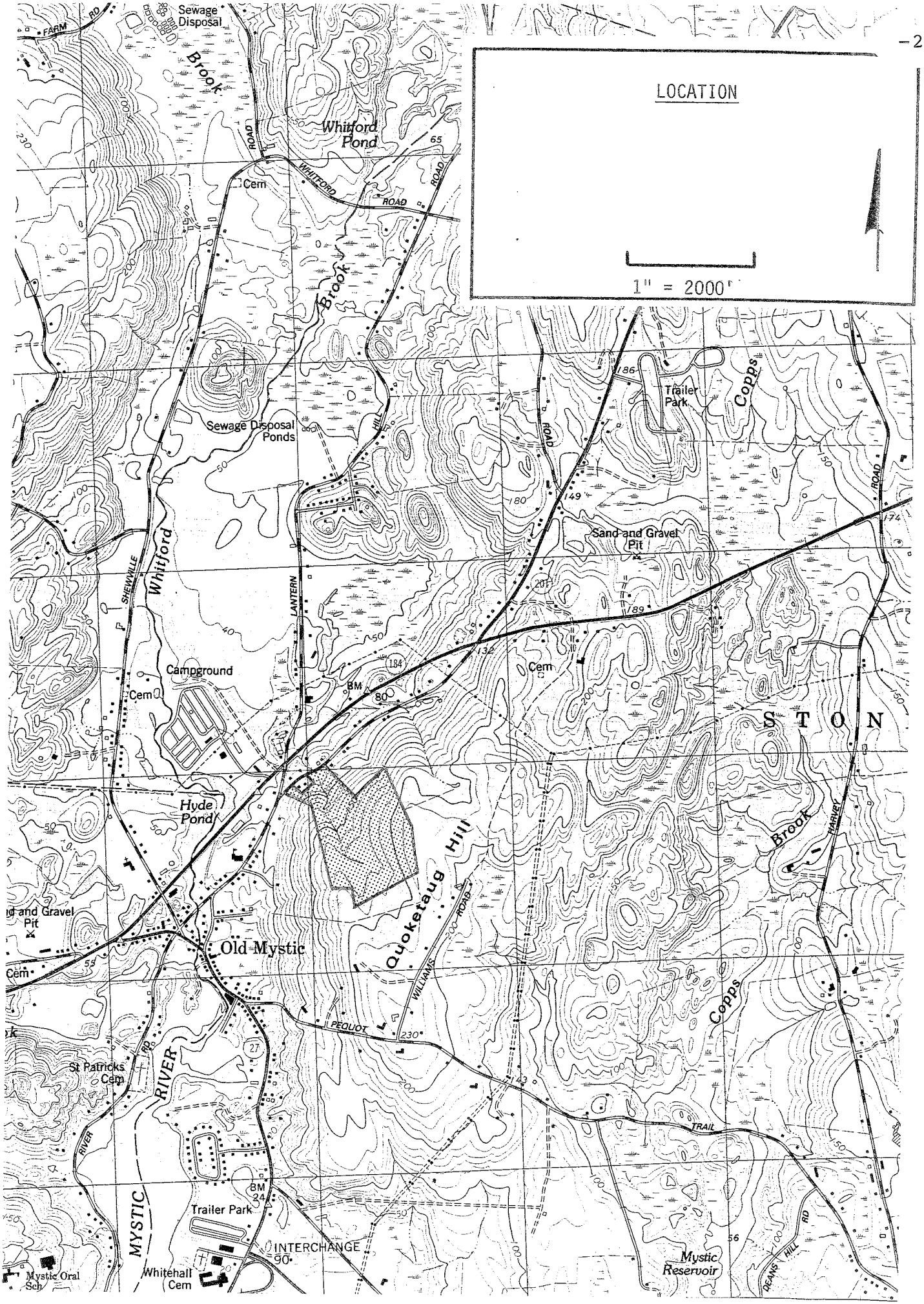

LOCATION
1" = 2000'
Sewage Disposal
FARM RD
Brook
Whitford Pond
ROAD
WHITFORD ROAD
Cem
Brook
Sewage Disposal Ponds
HILL
Trailer Park
Copps
ROAD
Sand and Gravel Pit
SHEWVILLE
Whitford
LANTERN
Campground
Cem
BM
Cem
S T O N
Hyde Pond
Brook
HARVEY
Quoketaug Hill
WILLIAMS
ROAD
Old Mystic
Cem
PEQUOT
TRAIL
St Patricks Cem
RIVER
MYSTIC
RIVER
BM
Trailer Park
INTERCHANGE
90
Whitehall Cem
Mystic Oral Sch
Mystic Reservoir
DEANS HILL RD

## I. INTRODUCTION

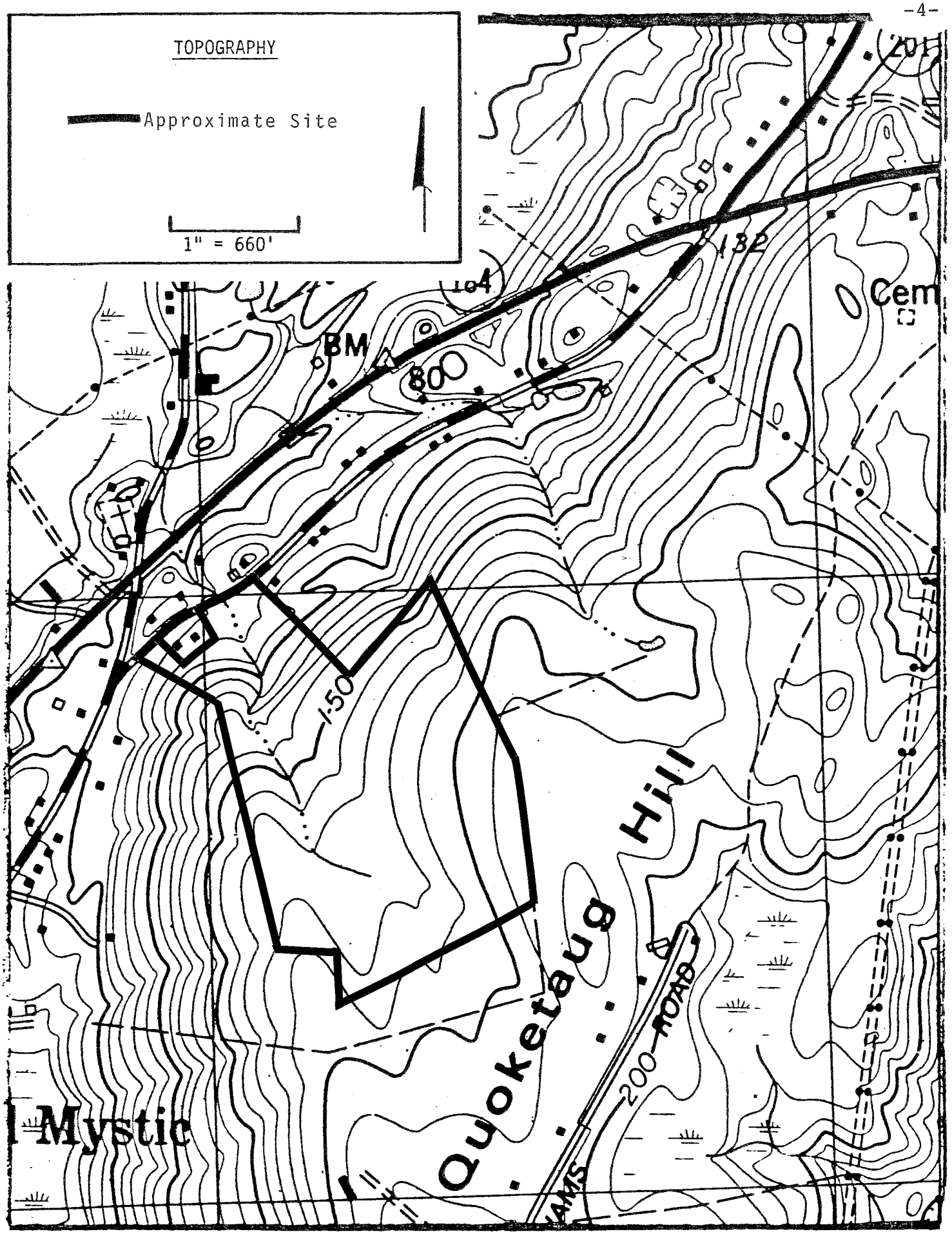
The Stonington Inland Wetlands Commission has asked for Environmental Review Team assistance in reviewing a proposed 15 lot subdivision. The following sections of this report contain natural resource information about the site. Also areas of concern are highlighted and recommendations made as to how to mitigate any negative impacts. The preliminary plan used by the Team Members is dated 06/01/87.

## II. TOPOGRAPHY AND GEOLOGY

The proposed 15 lot subdivision is located on ± 52 acres of land in northwest Stonington. It lies at the northern end of a rock-cored drumlin hill called Quaketaug Hill. The geologic term "drumlin" refers to a large, elongated hill consisting of ground-up rock particles and fragments (till) plastered by moving glacial ice on a core of crystalline bedrock. The bedrock, or ledge was not observed on the parcel of land walked by the Team on the review day, nor was it encountered in any of the deep test pits excavated on the site for subsurface sewage disposal exploration. It should be pointed out that continuous ledge was observed in the front yard of the Whitford Property, which adjoins the subject parcel on three sides.

It is not uncommon to find relatively thick deposits (20-40 feet) of glacial till on drumlin hills.

The till or drumlin materials were deposited by glacial ice moving across the hill of ledge from north to south-southeast. Most of this sediment was deposited by lodgement beneath the former ice sheet, but some may have been let down from within or from the surface of the ice as it was wasting during the period of glacial retreat. As a result of these different processes, two types of till have been recognized in Connecticut. One is commonly sandy and loose while the other is silty to clayey, platey and compact. The compact variety has a "hardpan" layer, which is generally encountered below the rooted and weathered surface. This material is very slowly permeable, so that an intense or extended rain may quickly saturate the upper soil levels. Based on soil mapping data and deep test hole information, both varieties of till are found on the site. (See Geologic Development Concerns). As is common in much of eastern

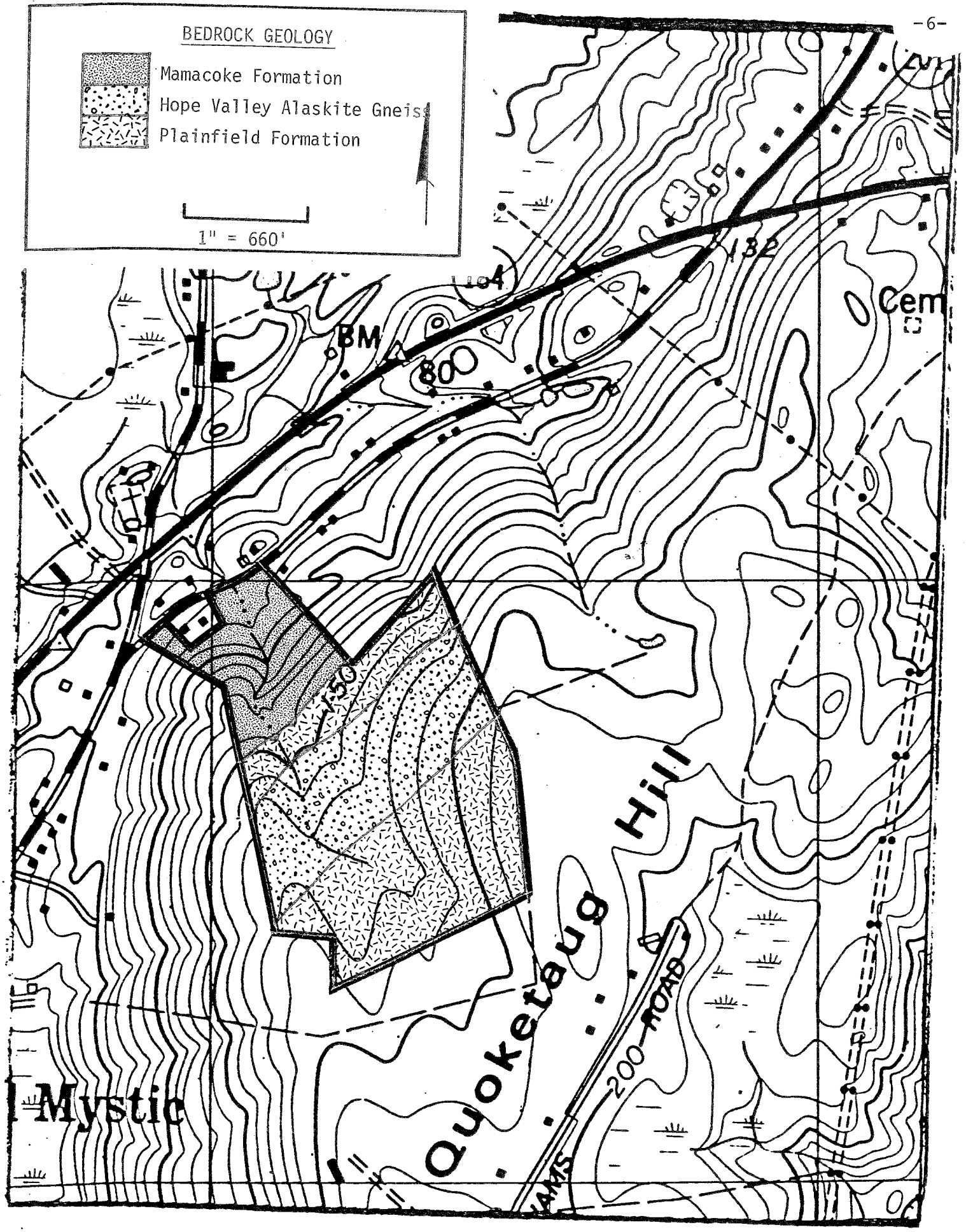

TOPOGRAPHY
Approximate Site
1" = 660'
201
182
104
Cem
BM
800
150
Quoketaug Hill
200
ROAD
Mystic

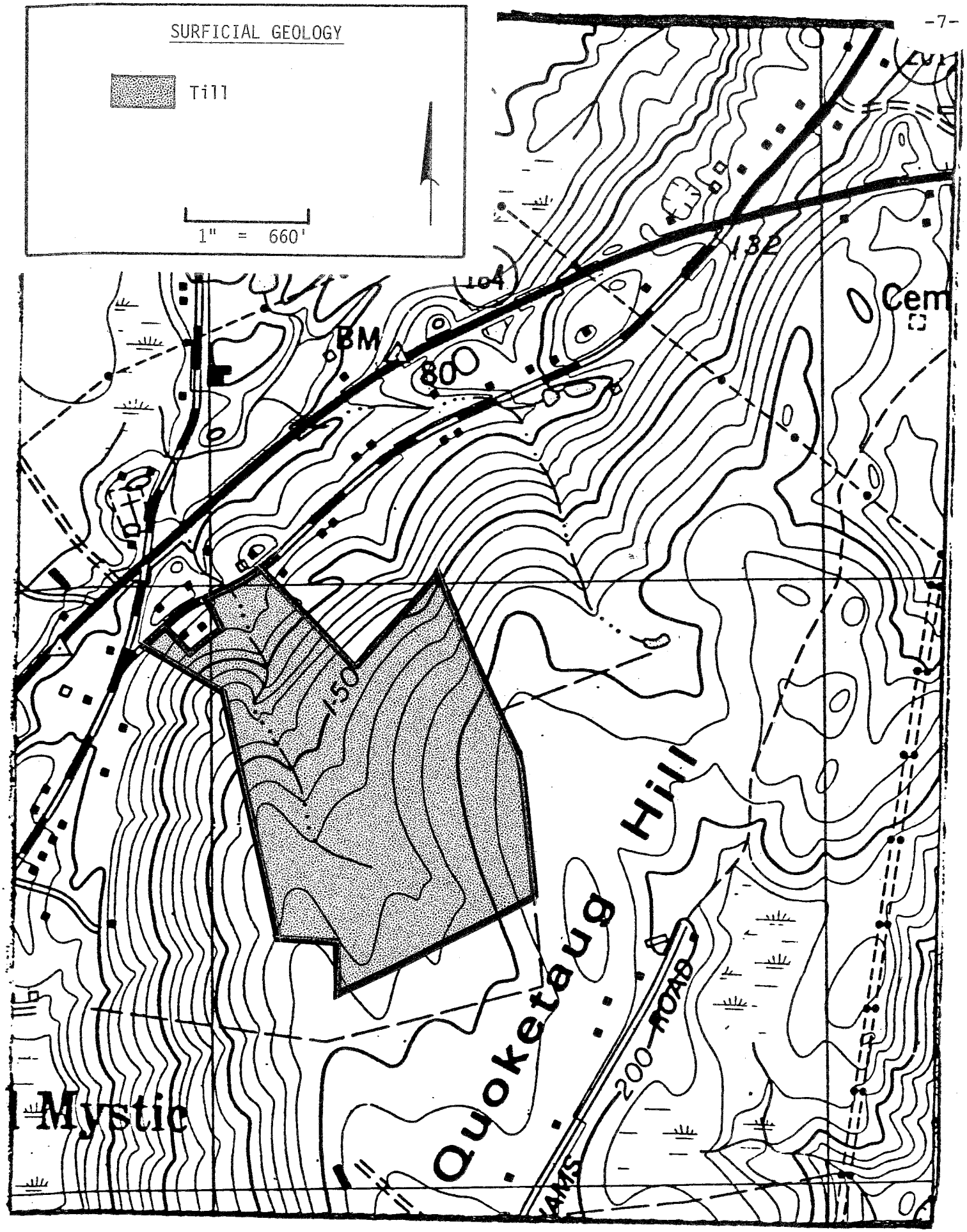
Connecticut, cobbles and boulders are prevalent on the site and provided the material for the extensive network of stonewalls visible throughout the parcel. (References: Preliminary Surficial Geologic Map for the Old Mystic Quadrange, by Joseph Gaffney, 1976 and Soils Survey of New London County, Connecticut.)

Overlying till on the site, primarily along drainageways are regulated inland-wetland soils. It should be noted that wetland soils broaden in the southern part of the site. A certified soil scientist has flagged the wetland soils on the site and superimposed their boundaries onto the subdivision map. It is estimated that about 13 acres or 25 percent of the site is comprised of regulated wetland soils.

The bedrock geology of the site is well described by Richard Goldsmith in Map I-1424, "Bedrock Geologic Map of the Old Mystic and Part of the Mystic Quadrangles, Connecticut, New York and Rhode Island". The rock core of the Quaketaug Hill drumlin can be divided into three southwest-northeast trending belts of crystalline metamorphic (rocks geologically altered by heat and pressure deep within the earth's crust) rocks. Goldsmith identifies the rock belts as (1) a biotite gneiss, (Mamacoke Formation) in the front portion of the site; (2) quartzites and schists (Plainfield Formation), in the central and rear part of the site; and (3) granitic gneisses (Hope Valley Alaskite Gneiss) in the central part of the site. All of these rocks are very old and have been highly deformed due to metamorphic processes. The bedrock structure has influenced to some degree the shape of the landforms and the drainage patterns on Quaketaug Hill. However, as mentioned earlier, deep test hole information, indicates the depth to bedrock exceeds 6 to 8 feet or more throughout the site. Slopes on the site range between gentle to moderately steep. The steepest slopes are found in the front parts of the site and generally parallel North Stonington Road.

Because the bedrock surface is relatively deep (6-8 feet or more), it should not pose any major problems in terms of the proposed development. However, since prospective homes will need to rely on the underlying bedrock as a source of water, it will have at least some impact on water quality and quantity. This will be discussed further in the Water Supply Section of the report.


BEDROCK GEOLOGY
Mamacoke Formation
Hope Valley Alaskite Gneiss
Plainfield Formation
1" = 660'
BM
800
Cem
Quoketaug Hill
Mystic
200
ROAD
AMS


SURFICIAL GEOLOGY
Till
1" = 660'
104
182
BM
800
Cem
150
Quoketaug Hill
200
ROAD
AMS
Mystic

## III. GEOLOGIC DEVELOPMENT CONCERNS

It is understood that the 15 homes in the proposed subdivision would be served by on-site septic systems and individual water supply wells. All lots except one would be accessed by a ± 1,500 foot cul-de-sac off of North Stonington Road.

The major geologic limitations found on the parcel is terms of the proposed subdivision include the following:

(1) Areas of moderatley steep slopes, which prevail along the front part of the property.

(2) The presence of regulated inland-wetland soils, which generally parallel the drainageways in the site, but which also widen in the southern parts.

(3) The presence of some "hardpan" soils which have moderately slow percolation rates and which have seasonally high water tables.

The above mentioned limitations will weigh heaviest on the ability to provide adequate on-site sewage disposal systems. The presence of inland-wetland soils and moderately steep slopes will also be a hindrance in terms of road and driveway construction.

Numerous deep test pits on the site had been performed by the applicant's engineer (Smilas Engineering). This work involved excavating deep test pits, generally 6 to 8 feet deep, which typically encountered topsoil, a weathered and rooted subsoil, and then a more compact "hardpan" zone or parent material.

As mentioned, ledge was not encountered in any of the deep test pits. Mottling of groundwater was commonly noted in the test pit results submitted to Team members indicating a seasonally high water table. Both were encountered in the hardpan zone, but also in the overlying rooted and weathered subsoil zone. It seems likely that the seasonally high water level is a perched water table, resulting from the relatively low permeability of the hardpan zone.

Based on deep test hole information, it appears that subsurface conditions are suitable for on-site septic systems, but that engineered systems would be required. In order to overcome the seasonally high water table condition, most systems will require filled and raised systems at the most suitable area on each lot. It is expected that septic systems will be fairly

large because of the relatively slow percolation rates.

Properly installed curtain drains can also protect septic systems in areas of perched groundwater. A curtain drain is located up gradient from the septic system and is installed to intercept groundwater flow. It prevents the seasonal water table from rising up into the leaching system and impairing the hydraulic capacity. The curtain drain should be properly designed, constructed and outletted in compliance with the State Public Health Code and any Town regulations that may be applicable.

In terms of road and driveway construction, it is probable that difficulties will be encountered on the moderately steep slopes in the front portion of the site, particularly in view of the Town's slope requirements for roads (10%) and driveways (15%). Also, the presence of regulated wetland soils and the Town's 100 foot buffer requirement (septic systems and houses) from wetlands, may possibly require some realignment of the present preliminary lot layout.

## IV. SOILS

Details should be provided for the road as cuts and fills may require more filling than is indicated on plans, and consequently more wetland filling. The only way to know this would be by checking detailed engineering. An alternative is relocating the entrance road to the west up through lots 14 and 15. This relocation will result in fewer lots but would have less impact on wetlands especially if a change in access to lots 12 and 13 results. The area proposed for the wetland crossing should be maintained as it is the narrowest spot.

A detailed sediment and erosion plan should be developed for the project.

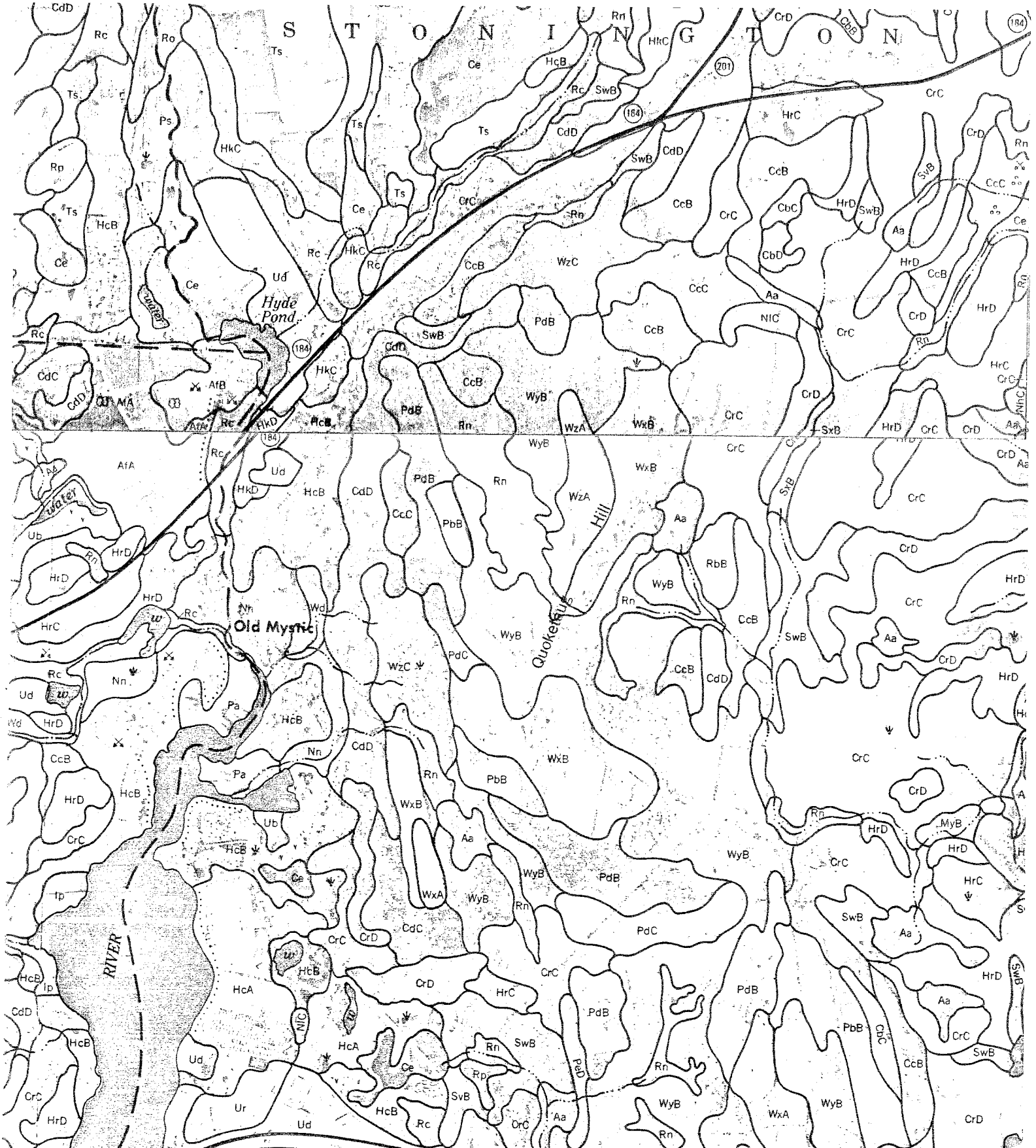
Soils Potential for Septic Systems: CcB-very high; CdD-high; PdB-medium; SwB-low; Rn-very low; WyB-low; and WzC-low. See the appendix for the guide.

United States Department of Agriculture

Soil Conservation Service

New London County
USDA-SCS
562 New London Turnpike
Norwich, CT 06360

Scale 1" = 1320'



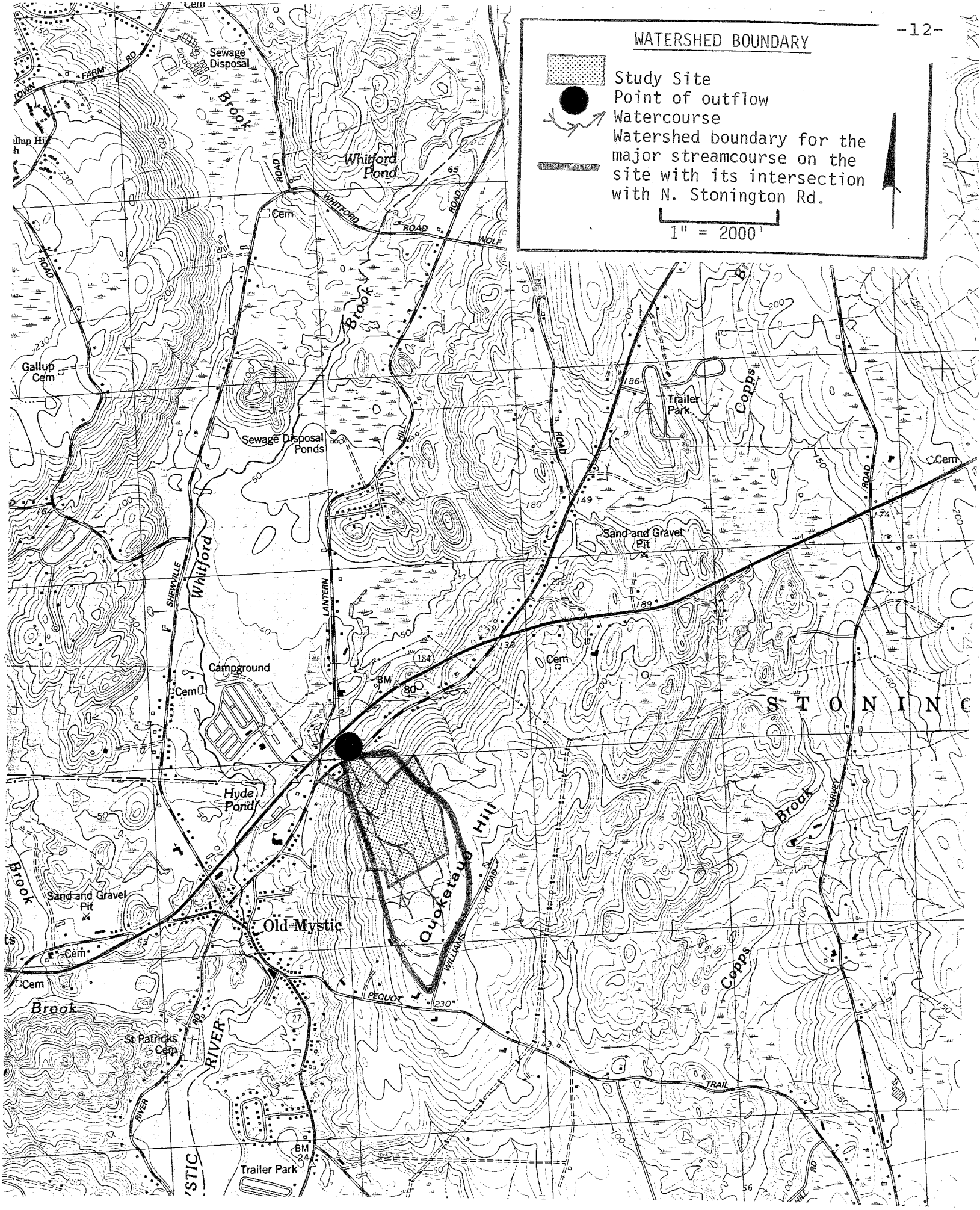
## V. HYDROLOGY

Surface runoff from virtually the entire site flows downslope via small seasonal drainageways toward the major watercourse bisecting the parcel. Water is then routed via the major unnamed watercourse on the site toward Whitford Brook. The intermittent drainageways on the site trend primarily in a northerly direction. Wetland areas generally parallel these watercourses. Consequently, the areas adjacent to these drainageway hold low potential for building or disposal sites.

The subdivision of the property as planned, followed by the construction of new homes, driveways, cul-de-sac and patios will lead to some increase in runoff from the site.

Based on a simplification of Technical Release #55 (Urban Hydrology for Small Watersheds) a Soil Conservation Service publication, it is estimated that the curve number for the drainage area (see watershed map) would increase from 68 to 69 following development. "Curve numbers" relate the amount of precipitation during a storm event to the amount of direct runoff from the land. It is estimated that the amount of direct runoff shed from the drainage area for a 25 year storm event would increase from 2.39" (pre-development) to 2.48" (post-development). This represents an overall increase of about 4 percent. Because of the anticipated small increases in runoff and because of the high percentage of wetlands on the site which have some natural ability to detain stormwater, the increased runoff should not pose any flooding problems on or off the site. However, in order to prevent any possible flooding problems at North Stonington Pond, the project engineer needs to take a close look at the capacity of the stonelined culvert passing under the road in front of the property. Also, drainage pipes and culverts placed under driveways or the cul-de-sac will need to be properly sized. Therefore, it is strongly recommended that the applicant's engineer submit a stormwater management plan prior to subdivision approval for the project which includes detailed drainage calculations.

Another concern related to increases in runoff from the site is the potential for streambank and/or soil erosion. Because of the moderately steep slopes present and because of the erosive nature of the soil covering the site, the potential for erosion should be of concern. For this reason, it is urged that a sound erosion/sediment control plan accompany the stormwater management plan. This will hopefully prevent environmental damages to surface


WATERSHED BOUNDARY
Study Site
Point of outflow
Watercourse
Watershed boundary for the major streamcourse on the site with its intersection with N. Stonington Rd.
1" = 2000'
Whitford Pond
Hyde Pond
Sewage Disposal
Sewage Disposal Ponds
Gallup Cem
Campground
Trailer Park
Sand and Gravel Pit
Old Mystic
St Patricks Cem
Quaketaug Hill
Whitford Brook
Copps Brook
Brook
WHITFORD ROAD
WOLF ROAD
SHEWVILLE ROAD
LANTERN HILL ROAD
WILLIAMS ROAD
PEQUOT TRAIL
HARVEY HILL RD
RIVER ROAD
FARM ROAD
TOWN FARM RD
STONINGTON

water on and off site. Erosion and sediment control measures should be shown on the subdivision site plan. Once the control devices have been installed, Town officials should inspect them for proper installation and effectiveness.

According to present plans, inland wetland soils on the site will be crossed in two places in order to construct the proposed interior road system, and depending on desired house locations, driveways may also need to cross inland wetland soils. Although undesirable, wetland road crossings are feasible provided they are properly engineered. The road should be constructed adequately above the surface elevation of the wetlands. This will allow for better drainage of the road and also decrease the frost heaving potential of the road. Unstable materials should be removed and replaced by a permeable road base material. Road construction through wetlands should preferably be done during the dry time of the year and should include provisions for effective erosion and sediment control. Finally, culvert(s) should be properly sized and located so as not to alter the water levels in the wetland or cause flooding problems.

Any activity involving the modification, filling or removal of inland wetland soils will require a permit and ultimate approval by the Town's Inland Wetland Commission. Detailed plans of all wetland road crossings, which includes fill areas, volume of fill required, types of fill, etc., should be available to Town officials for their review. Development in areas covered by regulated wetland soil types should be avoided where possible.

Groundwater in the area is classified by the Department of Environmental Protection (Lower Thames River Basin Water Quality Report) as GA, which means that it is suitable for private drinking water supplies without treatment.

It should be noted that the spring, which serves Clyde's Cider Mill is localized east of the proposed open space area for the proposed subdivision. Based on the site plan, it appears that groundwater and surface water from lots 1 and 2 flow in the direction of the spring house. Because this relatively shallow, surface water supply is more susceptible to contamination than deep, drilled wells, the applicant should be very cautious when designing septic system locations (primary and reserve areas), drainage for roads or driveways, and addressing potential siltation problems due to soil disturbance on these lots with respect to the spring. It is understood that background water quality samples for the spring are available, which will be helpful should water quality problems arise due to development of the site, as well as in the future.

## VI. WATER SUPPLY

Water for homes in the proposed development would be supplied by private on-site wells. As lots would be about 2 acres in size there does not seem to be any particular reason why adequate on-site well supplies could not be constructed. The only suitable aquifer available is bedrock. Yields from bedrock wells depend upon the number and size of water-bearing fractures in different bedrock types and zones varies widely. According to Connecticut Water Resources Bulletin No. 15, Lower Thames and Southeastern Coastal Basins, there would be at least a 90 percent chance that a well along the site could yield at least 3 gallons per minute (gpm). Such yields should prove adequate for the household needs of an average family. In most cases, no more than 150 feet of bedrock should have to be penetrated to obtain these yields. If less than 1 gpm is achieved after drilling through 150 feet of rock, it may be more fruitful to drill in an alternate location than to extend the first well, as the density and size of fractures decreases markedly at such depths. It must be remembered, however, that the 150 feet refers to bedrock only and does not include overburden. In some parts of the site, the overburden alone may be forty (40) feet thick.

A properly located and cased well probably would be safe from effluent contamination on this site. Proper well construction and separating distances in accordance with State Public Health Code, Connecticut Well Drilling Board and Town regulations will allow for adequate protection of the quality of the bedrock aquifer. Natural groundwater quality should be good, although some possibility of undesirable high mineral (particularly iron) content exists, particularly those wells tapping the Plainfield Formation. Should well water prove to be high in mineral content, several filtration methods are available to overcome such problems.

## VII. WILDLIFE HABITAT

The property consists of ± 52 acres of hardwood forest. Within the mature hardwood forest is an intermittent stream and associated wetlands. There is a small seasonally wet depression located on the property.

All wildlife have the basic requirements of food, cover, water and living space. Habitat (vegetative classes) and habitat components (snag and den trees etc.), provide these requirements. A variety or diversity of habitats best fulfills the needs of most wildlife.

Although the area has generally low diversity currently, it does offer fair to good woodland type habitat. The addition of the intermittent stream enhances the value of the woodland to wildlife because it does add a measure of diversity.

Development will decrease the amount of habitat simply because the land will be occupied by physical buildings. The quality of the habitat will be decreased because an undeveloped area of land will be broken up with buildings and human activity.

Some species which require larger undeveloped areas will probably be forced out or will reduce their use of the area. They may be able to move into adjacent undeveloped areas if there is suitable habitat available and the competition with other species already occupying the area is not too great.

The woodland is composed of red maple, red and black oak, shagbark hickory and sassafras, along with other species. There is a thick understory composed of sassafras, black cherry and maple, along with dead and dying cedar.

The oaks and hickories provide mast for various wildlife such as deer and turkey and cover and nesting places for other varieties of wildlife. The thick understory provides a layer of vegetation beneath the canopy of trees which can supply a wide variety of nesting and feeding opportunities for a variety of birds. Mammals, not only use these areas to feed in, but also to move through, because of the cover provided by the thick understory and thick ground covering.

In some areas of the forest there is dense vine growth in some of the trees, which can be valuable habitat component for wildlife such as birds, providing them with both food and cover.

The intermittent stream and its associated wetlands cover a portion of the proprosed project site. Although some wetlands are more valuable to wildlife than others, in general all wetlands are important because they help provide habitat requirements needed for survival.

These wet areas, even if wet only seasonally are useful for some species of amphibians and reptiles along with some mammals. Some species of mammals also make use of these wet areas by preying on amphibians and reptiles and using the area as a source of water during certain times of the year.

Development of this area will decrease the amount of habitat simply because the land will be occupied by physical buildings and roads. Man's activity in the area will greatly increase, even after construction is completed. Some species of wildlife will find not only the changes in habitat intolerable, but also the increased human activity will emigrate from the area. Sensitive bird species that may occupy the area include veeries, ovenbirds and scarlet tangangers. An undisturbed 60 acre woodlot is probably the minimum size necessary to attract the most sensitive bird species to an urban area. Other's more tolerable of man's activities, might even be attracted to the area. Some of these types of adaptable species such as raccoons, squirrels, and rabbits will tolerate certain levels of development and may move to open space areas, backyards and may become a nusiance to residents.

A buffer area (of at least 100 feet) should be left around any wet areas and/or intermittent streams.

If and when the initial clearing for building is done, try to leave as many trees and shrubs as possible, especially those which are useful to wildlife such as oaks, cherries, dogwoods etc. Trees with vines are also important to preserve.

Leave as many snag trees (standing dead trees) and den trees (trees with holes) as possible. These trees are used by insect eating birds and cavity nesting birds and mammals.

## VIII. LAND USE AND TRANSPORTATION

The area of the proposed subdivision is located in the western portion of Stonington, northeast of the Village of Old Mystic. Single-family homes are located along North Stonington Road in the area of the proposed subdivision. A working cider mill is located on the west side of North Stonington Road and the road proposed for the subdivision.

This area is depicted as low density uses on the Regional

Development Plan with residential densities of less than one unit per 1.5 acres. The Stonington Plan of Development recommends rural residential development for this area with residential densities of one unit per two acres. The area is zoned for rural residential uses with residential lot size of one unit per 80,000 square feet. On a land use basis, the proposed development will be compatible with existing and proposed uses for the area.

No major road improvements are indicated in the Regional Transportation Plan for North Stonington Road. Improved sight lines are recommended for the intersection of Routes 184 and 201 (this intersection is northeast of the proposed development where North Stonington Road intersects with Route 184).

The proposed subdivision contains fifteen lots and an additional area set aside for open space purposes.

Data published by ConnDOT* indicate that a residential subdivision can be expected to generate 10.6 weekday trips per unit. Of this number, 7.9% can be expected to occur during the morning peak hous and 10.1% during the evening peak hour. Fifteen new single-family homes could be expected to generate 159 daily trips with a morning peak of thirteen trips and an evening peak of sixteen trips. No traffic counts exist for local roads in Stonington. Construction of the proposed road will have to meet the standards of the Stonington Town road ordinance and the Stonington Subdivision Regulations for items such as storm drainage, slopes, pavement width and type, curves and intersection sight lines.

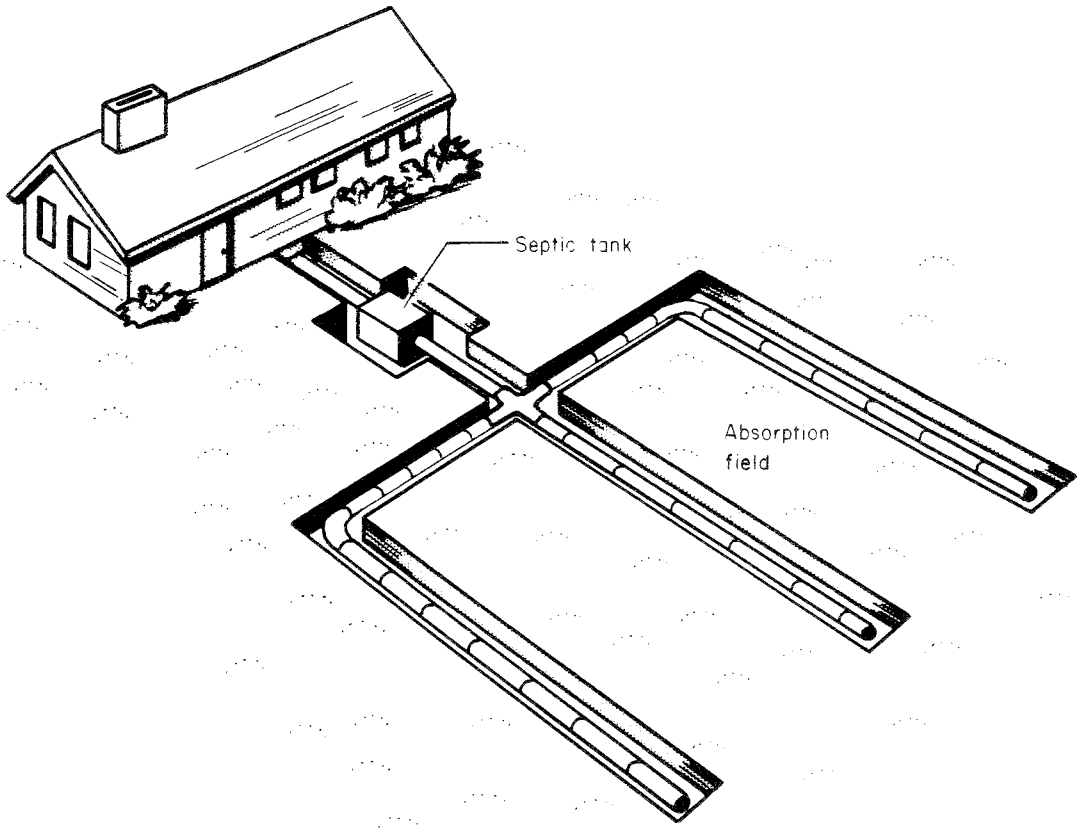
*Trip Generation Study of Various Land Uses Supplement A, by Israel Zevin. Connecticut Department of Transportation, 1975.

# Appendix

# SOIL POTENTIAL RATINGS

# SEPTIC TANK ABSORPTION FIELDS FOR SINGLE FAMILY RESIDENCES

# NEW LONDON COUNTY, CONNECTICUT




**New London County Soil and Water Conservation District**

**1986**

# SOIL POTENTIAL RATINGS

# SEPTIC TANK ABSORPTION FIELDS

# FOR

# SINGLE FAMILY RESIDENCES

# NEW LONDON COUNTY, CONNECTICUT

Prepared by a Local Interdisciplinary Committee

the

U.S. Department of Agriculture

Soil Conservation Service

and the

Connecticut Department of Health Services

1986


## Acknowledgements

This addendum to the Soil Survey of New London County, Connecticut, was prepared with the assistance of Robert J. Schuch, Professional Engineer, Dicesare - Bentley Engineers, Inc.; Gary P. Sharpe, Professional Engineer, McDonald - Sharpe & Associates; Frank Kolwicz, Sanitarian, Waterford; George Calkins, Sanitarian, East Lyme; Bill Warzecha, Geologist, Connecticut Department of Environmental Protection; Ken Avery, Installer, Avery Construction; Ferhard Amt., Planner, Southeastern Connecticut Regional Planning Agency; Ted Willerford, Principal Sanitary Engineer (Retired), Connecticut Department of Health Services; and Frank Schaub, Principal Sanitary Engineer, Connecticut Department of Health Services. Barry Cavanna, District Conservationist; Marc B. Beroz, Soil Resource Specialist; Roy Shook, Assistant State Soil Scientist; and Edward H. Sautter, State Soil Scientist, all from the Soil Conservation Service, provided guidance in interpreting the soil survey data and in establishing procedures to develop the soil potential ratings.

CONTENTS

## INTRODUCTION

The Soil Survey of New London County, Connecticut, was published in 1983. The soil survey provides information on the location and characteristics of various kinds of soils within the county. Areas of similar soils are delineated on aerial photographs. The soils and their associated landscapes are described in the text.

The survey report also contains interpretations or ratings of the soils for various land uses. The interpretations are based on the soil properties that affect the intended use. These interpretations are dynamic. They must be periodically revised to reflect improved soils data, new technology, and the needs of the soil survey report users.

## PURPOSE

The purpose of this document is to update and expand the interpretations for septic tank absorption fields in the New London County soil survey report. These updated interpretations are in the form of soil potentials. Soil potentials are interpretive ratings that stress the suitability of use rather than the avoidance of problems for a specific purpose.

The interpretations in this report deal only with a soils potential for septic tank absorption fields and does not address the use of soils for other purposes.

The information presented here will be useful to groups or individuals involved with urban development such as local officials, builders, engineers, realtors, home buyers, and other decision makers. The soil potential ratings may be used to predict the kinds and seriousness of problems that may be encountered when installing a septic tank absorption field as well as possible ways these problems can be overcome.

These soil potential ratings were developed for planning purposes and are not intended as recommendations for soil use. They help the users determine the relative suitability of soils for septic tank absorption fields. The special requirements identified to overcome soil problems are a guide to planning and are not to be applied at a specific location without on-site investigation for design and installation.

## SOIL POTENTIAL RATINGS

Soil potential ratings are classes that indicate the relative quality of a soil for a particular use compared to other soils in a given area. Because comparisons are made only among soils in New London County, ratings of a given soil in another county may differ.

The rating criteria were developed by a committee of local sanitarians, engineers, and installers. The soils information was provided by Soil Conservation Service soil scientists. The committee defined the performance and site conditions of a "base" system (see Performance Standard).

This provided a standard against which various combinations of soil properties for the soils within New London County could be compared.

The engineering and installation practices used to overcome various soil problems were listed and their costs estimated. This information was used to identify the problems and costs associated with installing a septic tank absorption field on each of the soils in the county.

Soils with no or minor problems for the installation of absorption fields were rated the highest. Conversely, soils requiring extensive site modification and design were rated the lowest. The ease of system installation, and hence cost, formed the basis of the rating scheme.

## SEPTIC TANK ABSORPTION FIELDS - DEFINITION

Septic tank absorption fields are subsurface systems of tile or perforated pipe, galleries or drywells that distribute effluent from a septic tank into the surrounding soil.

## PERFORMANCE STANDARD

The performance standard is composed of two parts. First it identifies the capabilities of a "base" septic system. A "base" system is one that is installed in a soil common to the area with the best combination of properties for absorption fields. The system works, meets state health code regulations and is not difficult to install. The absorption field is expected to disperse sewage effluent into the surrounding soil without the effluent coming to the surface or backing up because of heavy use or adverse weather conditions. Use of the system should not pollute the groundwater.

The "base" septic system is assumed to be for a single family, three bedroom home on a 1-acre lot with a private water supply or a 1/2-acre lot with public water supply. The system has a 1,000 gallon septic tank and a 375 to 750 square foot absorption area.

The second part of the performance standard addresses soil characteristics. To a large degree soil and landscape characteristics determine the ultimate cost of a septic system. This part of the performance standard identifies those soil characteristics that are present for construction of a "base" system. These soil characteristics are:

1. Slope is less than 15 percent.
2. Percolation rate is 1 to 30 minutes/inch.
3. Seasonal high water table is three feet or more below the soil surface.
4. Depth to bedrock is greater than 72 inches.
5. The soils do not flood frequently as a result of tides, or streams and other water courses overflowing their banks. Frequent is defined as at least once every two years.

## RATING CLASSES

The rating class definitions refer to a septic tank absorption field installation which will meet state health code regulations. An engineer's design of the septic system is required by state health code regulations for soils in each class except where otherwise noted.

Soils with very high potential have characteristics that meet the performance standard. A "base" system (defined in the Performance Standard Section on page 2) can be readily installed in these soils at an index cost of x. The cost x represents the going rate for installing a septic tank absorption field in a soil that has soil characteristics within the performance standard and does not require an engineered design. The cost of installing a septic tank absorption field in a soil that has soil characteristics outside of the performance standard are higher. The higher total cost reflects the cost of additional time, materials, and in the case of engineered systems, engineering services. The more difficult the soil limitations are to overcome, the higher the cost. The cost of installing absorption fields is expressed as a multiple of x and is called the cost factor. They are index values and vary with the amount of effort (cost) required to overcome limiting soil characteristics. A cost factor of 3.0x to 3.5x means that the estimated cost of overcoming adverse soil properties is 3.0 to 3.5 times more than a field installed in a soil with very high potential. These cost factors provide relative estimates of overcoming adverse soil properties.

> The cost factors are only a guide. Actual expenditures for a septic system at a home site will vary both above and below the index ranges given. Actual costs for a septic system are influenced by on-site features, landowner preferences, and other conditions and variables not dependent on the soil. Appendix 7 on page 24 lists some site conditions and design considerations not represented in the ratings.

For example: a corrective measure may be gravel fill to overcome a soil limitation. The amount of gravel, cubic yards needed, and its cost at the gravel pit is figured into the cost factor. The trucking cost of the gravel from the pit to the septic system site is not included in the cost factor. Transportation costs are reflective of distance from the gravel source. While the trucking cost is a real expense to the landowner, it is variable and not figured in the index cost factor.

The soil potential ratings and associated cost factors are defined as follows:

Very high potential. These soils have the best combination of characteristics for septic tank absorption fields. An engineer's design is not required. The cost factor is 1X.

High potential. These soils have limitations which can be easily overcome using standard installation practices. An engineer's design is required in most cases. The cost factor ranges from 1.25X to 2.0X.

Medium potential. These soils have significant limitations that are generally overcome using commonly applied designs. The cost factor ranges from 2.0X to 2.5X.

Low potential. These soils have limitations which require extensive design and site preparation to overcome. These soils are commonly used for septic tank absorption fields in this area. The cost factor ranges from 2.5X to 3.5X.

Very low potential. These soils have severe soil limitations which require extensive design and site preparation to overcome. These soils are rarely used for septic tank absorption fields in this area. The cost factor ranges from 3.5X to 6.0X.

Extremely low potential. These soils have severe limitations which are extremely difficult to overcome. A permit for absorption field installation cannot be issued unless the naturally occurring soils meet the minimal requirements outlined in the state health code. It is unlikely that these soils can be improved sufficiently to meet state health code regulations.

Not rated. Areas labelled "NOT RATED" have characteristics that show extreme variability from one location to another. The work needed to overcome adverse soil properties cannot be estimated without on-site investigation.

Figure 1 on page 17 is a graphic representation of the relationship of potential rating to cost.

## EVALUATION CRITERIA

The evaluation criteria are soil properties that can significantly affect the cost of installing a septic tank absorption field. These soil properties correspond to criteria identified in the state health code regulations, as well as factors deemed significant by the local committee which developed these ratings. The evaluation criteria are listed in the first column of Appendix 1 on page 18.

Each criterion listed on Appendix 1 is divided into several ranges of values. These values are assigned into classes. For example, the evaluation criterion, depth to water table, is divided into three classes: water tables deeper than three feet is a slight limitation, 3.0 to 1.5 feet is a moderate limitation, and less than 1.5 feet is a severe limitation. The values defining each rating class were chosen based on three considerations: 1) Is the data compatible with state health code regulations? 2) Can the information be obtained from presently available soil survey data? and 3) Do these values identify significant differences in the cost of installing a septic system that meets the performance standard?

The five evaluation criteria are:

Percent Slope. Slope is the inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Perc Rate (Percolation Rate). A percolation test is intended to measure the rate at which the soil will absorb effluent. Measurements are made in minutes per inch and are called the perc rate. The perc rate is not a measure of any

one physical property of the soil. Instead, it is related to many factors including soil texture, kinds of clay minerals, bulk density, structure, size and configuration of pores, number and size of rock fragments, depth to water table, antecedent moisture conditions, chemical composition, etc. Perc rates have been related to the sizing of leach fields through empirical data.

The perc rate for the most restrictive layer within three feet of the soil surface is used in determining the potential rating. The perc rate assigned to a soil was determined based on the soil's permeability and experience of the committee members.

Depth to water table. This is the depth from the soil surface to a zone of saturation at the highest average level during the wettest season. The depth to water table is determined primarily through the presence of rust colored and/or gray soil mottles.

Flooding. Flooding is the temporary covering of the soil surface by water from streams overflowing their banks or inflow from high tides. The Soil Survey of New London County, Connecticut, identifies soils that flood at a frequency of at least once every two years. It is these soils that the flooding evaluation criterion addresses.

Depth to bedrock. Depth to bedrock is the depth from the soil surface to consolidated rock. Only bedrock within 20 inches of the soil surface is noted in the Soil Survey of New London County, Connecticut. For the purpose of this report, the soils identified as not having bedrock within 20 inches are assumed to be 72 inches or more deep.

## CORRECTIVE MEASURES

Corrective measures are any design or construction practices that may be required on a site. The kinds of measures identified are dependent on the limiting soil characteristics and commonly used solutions for dealing with those soil limitations. Without an on-site investigation, it is impossible to predict exactly what improvements a site will need in order for the septic tank absorption field to work. For this reason, the site improvements are divided into two categories.

Common corrective measures. These are the on-site improvements that are most likely to be needed on a site having a particular kind of soil.

Possible additional corrective measures. These improvements may be necessary on some sites. Whether they are needed depends on the degree of the limiting soil and site characteristics.

The commonly applied corrective measures are identified in Appendices 2 through 6 (pages 19-23). In these appendices, the column labelled CONCERNS identifies why corrective measures are needed on a site having the specified soil feature. The appendices also identify the state regulations which may be applicable if a particular soil feature is present on a site. This information is located in the column labelled STATE REGS. The numbers in this column reference the footnotes.

The column labelled OTHER CONSIDERATIONS lists the practices or site requirements that may be needed to construct an absorption field. These measures do not alleviate soil problems. Instead, they may be needed to allow for the installation of a system or to determine the most practical solution to a soil or site problem.

## SOIL POTENTIAL RATINGS BY MAP UNIT

The Soil Survey Report of New London County, Connecticut, identifies and displays the dominant soils in the county. This data is on maps having a photographic background. The symbols on the maps identify map units. Each map unit symbol represents a unique combination of soils. Areas with the same symbol have the same composition.

The soil survey report does not replace on-site investigation. The report identifies the probability of finding a particular soil or combination of soils.

> The maps in the soil survey report are at a scale of 1:15,840. At this scale, areas of contrasting soils smaller than 2.5 acres in size are generally not delineated. Maps enlarged from the soil survey report do not provide more detailed soils information. More detailed information can only be obtained through on-site investigations. These investigations may significantly refine the data shown in the published soil survey.

Table 1 assigns a potential rating to each map unit. The list of map units are in alphabetical order. The potential rating is based on the ease of installing a septic tank absorption field in the dominant soil(s) of the map unit.

The majority of the map units are composed of one dominant soil or of several soils with similar characteristics. A single potential rating is listed for these map units. Other map units are composed of two kinds of contrasting soils. In these cases, an overall potential rating is listed for the map unit, followed by ratings for the individual soil components that make up that map unit. The Soil Survey of New London County, Connecticut, should be consulted for additional information concerning map unit composition.

The limiting soil characteristics for each map unit are identified in the column labelled CONCERNS. The special design or construction practices that may be required on a site are listed in the column labelled CORRECTIVE MEASURES. The term corrective measures is defined on page 5.

ADDITIONAL CONSIDERATIONS are practices and site specific land evaluations that may be needed before selecting a leach field site. These additional considerations do not alleviate soil problems. Instead, they may be needed to identify and determine the extent of limiting soil or landscape features, allow for the installation of a system, or determine the most practical solution for a soil problem.

Table 1 also identifies the state regulations which may be applicable if particular soil features are present on the site. This information is located in the column labelled STATE REGULATIONS. The numbers in this column reference the footnotes.

Table 2 groups the soil map units by potential rating classes.

TABLE 1

SOIL POTENTIAL RATINGS FOR SEPTIC TANK ABSORPTION FIELDS BY MAP UNIT
NEW LONDON COUNTY, CONNECTICUT

| MAP SYMBOL | MAP UNIT NAME | POTENTIAL RATING | CONCERNS | CORRECTIVE MEASURES | ADDITIONAL CONSIDERATIONS | STATE REGULATIONS |
|---|---|---|---|---|---|---|
| Aa | - Adrian muck | EXTREMELY LOW | Organic soils, depth to water table. | | Drainage needed. Access to drainage outlet unlikely. | 2,3,4 |
| AfA | - Agawam fine sandy loam, 0-3% slopes | HIGH | Fast perc rate. | Double separating distance between wells and absorption field. | | 1 |
| AfB | - Agawam fine sandy loam, 3-8% slopes | | | | | |
| Ba | - Beaches | NOT RATED | | | | |
| BrB | - Broadbrook silt loam, 3-8% slopes | MEDIUM | Slow perc rate, depth to water table. + | Fill and/or curtain drain and drainage swale. Design absorption field to distribute effluent over a larger area. | Access to drainage outlet. | 1; possibly 2 depending on perc rate measured on-site. |
| CbB | - Canton and Charlton fine sandy loams, 3-8% slopes | VERY HIGH | None. | | | |
| CbC | - Canton and Charlton fine sandy loams, 8-15% slopes | | | | | |
| CbD | - Canton and Charlton fine sandy loams, 15-25% slopes | VERY HIGH | None. | | | |
| CcB | - Canton and Charlton very stony fine sandy loams, 3-8% slopes | VERY HIGH | None. | | | |
| CcC | - Canton and Charlton very stony fine sandy loams, 8-15% slopes | | | | | |
| CdC | - Canton and Charlton extremely stony fine sandy loams, 3-15% slopes | | | | | |
| CdD | - Canton and Charlton extremely stony fine sandy loams, 15-35% slopes | HIGH# | Slope. | Design and installation to accommodate for slope. | Increase area of investigation to utilize the flattest slopes. | 1 for slopes >25% |
| Ce | - Carlisle muck | EXTREMELY LOW | Organic soils, depth to water table. | | Drainage needed. Access to drainage outlet unlikely. | 2,3,4 |

# This rating applies to slopes up to 25%. On slopes greater than 25%, the potential rating may be significantly lower.
+ The water table in these soils is present only for a very brief period of time.

1 Identified as an area of special concern by state regulations - engineer's design required.
2 Identified as unsuitable in its natural condition by state regulations - an engineer's evaluation is needed to determine whether an absorption field can be built.
3 Identified as inland wetlands or tidal wetlands by state regulations. Local, state, and/or federal wetland permits may be required.
4 A permit to install an absorption field cannot be issued if the site cannot be drained. A permit cannot be issued if the groundwater level is less than 18 inches below the soil surface for one month or longer.

TABLE 1
(continued)

SOIL POTENTIAL RATINGS FOR SEPTIC TANK ABSORPTION FIELDS BY MAP UNIT
NEW LONDON COUNTY, CONNECTICUT

| MAP SYMBOL | MAP UNIT NAME | POTENTIAL RATING | CONCERNS | CORRECTIVE MEASURES | ADDITIONAL CONSIDERATIONS | STATE REGULATIONS |
|---|---|---|---|---|---|---|
| HrD | - Hollis-Charlton-Rock outcrop complex, 15-45% slopes | VERY LOW | | | Feasibility study. Increase area of investigation to utilize the deepest soils and flattest slopes. Verify depth to bedrock. | |
| | Hollis and Rock outcrop parts | extremely low | Depth to bedrock, slope. | | | 5 |
| | Charlton parts | high# | Slope. | Design and installation to accommodate for slope. | | 1 for slopes >25% |
| Ip | - Ipswich mucky peat | EXTREMELY LOW | Organic soils, depth to water table, flooding (tidal). | | Tidal flooding. No drainage outlet. | 2,3,4 |
| Ln | - Limerick Variant silt loam | EXTREMELY LOW | Depth to water table, flooding. | | Drainage needed. Access to drainage outlet unlikely. | 2,3,4 |
| MyA<br>MyB<br>MyC | - Merrimac sandy loam, 0-3% slopes<br>- Merrimac sandy loam, 3-8% slopes<br>- Merrimac sandy loam, 8-15% slopes | HIGH | Fast perc rate. | Double separating distance between wells and absorption field. | | 1 |
| NaB<br>NgB<br>NhC | - Narragansett silt loam, 3-8% slopes<br>- Narragansett very stony silt loam, 3-15% slopes<br>- Narragansett extremely stony silt loam, 3-15% slopes | VERY HIGH | None. | | | |
| NhD | - Narragansett extremely stony silt loam, 15-25% slopes | HIGH | Slope. | Design and installation to accommodate for slope. | | |
| NlC | - Narragansett-Hollis complex, very rocky, 3-15% slopes | MEDIUM | | | Feasibility study. Increase area of investigation to utilize the deepest soils. Verify depth to bedrock. | |
| | Narragansett part | very high | None. | | | |
| | Hollis part | extremely low | Depth to bedrock. | | | 5 |

# This rating applies to slopes up to 25%. On slopes greater than 25%, the potential rating may be significantly lower.

1 Identified as an area of special concern by state regulations - engineer's design required.
2 Identified as unsuitable in its natural condition by state regulations - an engineer's evaluation is needed to determine whether an absorption field can be built.
3 Identified as inland wetlands or tidal wetlands by state regulations. Local, state, and/or federal wetland permits may be required.
4 A permit to install an absorption field cannot be issued if the site cannot be drained. A permit cannot be issued if the groundwater level is less than 18 inches below the soil surface for one month or longer.
5 A permit to install an absorption field cannot be issued if the depth to bedrock, of the naturally occurring soil, is less than 24 inches.

TABLE 1
(continued)

SOIL POTENTIAL RATINGS FOR SEPTIC TANK ABSORPTION FIELDS BY MAP UNIT
NEW LONDON COUNTY, CONNECTICUT

| MAP SYMBOL | MAP UNIT NAME | | POTENTIAL RATING | CONCERNS | CORRECTIVE MEASURES | ADDITIONAL CONSIDERATIONS | STATE REGULATIONS |
|---|---|---|---|---|---|---|---|
| CrC | - Charlton-Hollis fine sandy loams, very rocky, 3-15% slopes | | MEDIUM | | | Feasibility study. Increase area of investigation to utilize the deepest soils. Verify depth to bedrock. | |
| | | Charlton part | very high | None. | | | |
| | | Hollis part | extremely low | Depth to bedrock. | | | 5 |
| CrD | - Charlton-Hollis fine sandy loams, very rocky, 15-45% slopes | | VERY LOW | | | Feasibility study. Increase area of investigation to utilize the deepest soils and flattest slopes. Verify depth to bedrock. | 1 for slopes >25% |
| | | Charlton part | high# | Slope. | Design and installation to accommodate for slope. | | |
| | | Hollis part | extremely low | Slope, depth to bedrock. | | | 5 |
| Du | - Dumps | | NOT RATED | | | | |
| HcA | - Haven silt loam, 0-3% slopes | | | Fast perc rate. | Double separating distance between wells and absorption field. | | 1 |
| HcB | - Haven silt loam, 3-8% slopes | | | | | | |
| HkA | - Hinckley gravelly sandy loam, 0-3% slopes | | HIGH | | | | |
| HkC | - Hinckley gravelly sandy loam, 3-15% slopes | | | | | | |
| HkD | - Hinckley gravelly sandy loam, 15-35% slopes | | MEDIUM# | Fast perc rate, slope. | Double separating distance between wells and absorption field. Design and installation to accommodate for slope. | Increase area of investigation to utilize the flattest slopes. | 1 |
| HrC | - Hollis-Charlton-Rock outcrop complex, 3-15% slopes | | LOW | | | Feasibility study. Increase area of investigation to utilize the deepest soils. Verify depth to bedrock. | 5 |
| | | Hollis and Rock outcrop parts | extremely low | Depth to bedrock. | | | |
| | | Charlton part | very high | None. | | | |

# This rating applies to slopes of up to 25%. On slopes greater than 25%, the potential rating may be significantly lower.

1 Identified as an area of special concern by state regulations - engineer's design required.
5 A permit to install an absorption field cannot be issued if the depth to bedrock, of the naturally occurring soil, is less than 24 inches.

TABLE 1
(continued)

SOIL POTENTIAL RATINGS FOR SEPTIC TANK ABSORPTION FIELDS BY MAP UNIT
NEW LONDON COUNTY, CONNECTICUT

| MAP SYMBOL | MAP UNIT NAME | POTENTIAL RATING | CONCERNS | CORRECTIVE MEASURES | ADDITIONAL CONSIDERATIONS | STATE REGULATIONS |
|---|---|---|---|---|---|---|
| Nn | - Ninigret fine sandy loam | LOW | Fast perc rate, depth to water table. | Fill. Double separating distance between wells and absorption field. | | 1 |
| Pa | - Pawcatuck mucky peat | EXTREMELY LOW | Organic soils, depth water table, flooding (tidal). | | Tidal flooding. No drainage outlet. | 2,3,4 |
| PbB | - Paxton and Montauk fine sandy loams, 3-8% slopes | MEDIUM | Slow perc rate, depth to water table. + | Fill and/or curtain drain and drainage swale. Design absorption field to distribute effluent over a larger area. | Access to drainage outlet. | 1; possibly 2 depending on perc rate measured on site. |
| PbC | - Paxton and Montauk fine sandy loams, 8-15% slopes | | | | | |
| PbD | - Paxton and Montauk fine sandy loams, 15-25% slopes | MEDIUM | Slow perc rate, slope, depth to water table. + | Fill/and or curtain drain and drainage swale. Design absorption field to distribute effluent over a larger area. Installation to accomodate for slope. | Access to drainage outlet. | 1; possibly 2 depending on perc rate measured on-site. |
| PdB | - Paxton and Montauk very stony fine sandy loams, 3-8% slopes | MEDIUM | Slow perc rate, depth to water table. + | Fill and/or curtain drain and drainage swale. Design absorption field to distribute effluent over a larger area. | Access to drainage outlet. | 1; possibly 2 depending on perc rate measured on-site. |
| PdC | - Paxton and Montauk very stony fine sandy loams, 8-15% slopes | | | | | |
| PeC | - Paxton and Montauk extremely stony fine sandy loams, 3-15% slopes | | | | | |
| PeD | - Paxton and Montauk extremely stony fine loams, 15-35% slopes | MEDIUM# | Slow perc rate, slope, depth to water table. + | Fill and/or curtain drain and drainage swale. Design absorption field to distribute effluent over a larger area. Installation to accomodate for slope. | Access to drainage outlet. | 1; possibly 2 depending on perc rate measured on-site. |
| Ps | - Pootatuck Variant fine sandy loam | VERY LOW | Fast perc rate, depth to water table, flooding. | Fill. Solution to flooding problem is site specific. | | 1,3 |

# This rating applies to slopes up to 25%. On slopes greater than 25%, the potential rating may be significantly lower.
+ The water table in these soils is present only for a very brief period of time.

1 Identified as an area of special concern by state regulations - engineer's design required.
2 Identified as unsuitable in its natural condition by state regulations - an engineer's evaluation is needed to determine whether an absorption field can be built.
3 Identified as inland wetlands or tidal wetlands by state regulations. Local, state, and/or federal wetland permits may be required.
4 A permit to install an absorption field cannot be issued if the depth to bedrock, of the naturally occurring soil, is less than 24 inches.

TABLE 1
(continued)

SOIL POTENTIAL RATINGS FOR SEPTIC TANK ABSORPTION FIELDS BY MAP UNIT
NEW LONDON COUNTY, CONNECTICUT

| MAP SYMBOL | MAP UNIT NAME | POTENTIAL RATING | CONCERNS | CORRECTIVE MEASURES | ADDITIONAL CONSIDERATIONS | STATE REGULATIONS |
|---|---|---|---|---|---|---|
| RaA<br>RaB<br>RbB | - Rainbow silt loam, 0-3% slopes<br>- Rainbow silt loam, 3-8% slopes<br>- Rainbow very stony silt loam, 0-8% slopes | LOW | Slow perc rate, depth to water table. | Fill, curtain drain and drainage swale. Design absorption field to distribute effluent over a larger area. | Access to drainage outlet. | 1; possibly 2 depending on perc rate measured on-site. |
| Rc | - Raypol silt loam | VERY LOW** | Fast perc rate, depth to water table. | Curtain drain and fill. Double separating distance between wells and absorption field. | Access to drainage outlet. | 2,3,4 |
| Rd<br>Rn | - Ridgebury fine sandy loam<br>- Ridgebury, Leicester, and extremely stony fine sandy loams | VERY LOW** | Depth to water table. | Curtain drain and fill. | Access to drainage outlet. | 2,3,4 |
| Ro | - Rippowam fine sandy loam | EXTREMELY LOW | Fast perc rate, depth to water table, flooding. | | Drainage needed. Access to drainage outlet unlikely. | 2,3,4 |
| Rp | - Rock outcrop-Hollis complex | EXTREMELY LOW | Depth to bedrock, slope. | | | 5 |
| Sf | - Scarboro mucky fine sandy loam | EXTREMELY LOW | Fast perc rate, depth to water table. | | Drainage needed. Access to drainage outlet unlikely. | 2,3,4 |
| Sg | - Sudbury sandy loam | LOW | Fast perc rate, depth to water table. | Fill. Double separating distance between wells and leach fields. | | 1 |
| SvA<br>SvB<br>SwB<br>SxB | - Sutton fine sandy loam, 0-3% slopes<br>- Sutton fine sandy loam, 3-8% slopes<br>- Sutton very stony fine loam, 0-8% slopes<br>- Sutton extremely stony fine sandy loam, 0-8% slopes | LOW | Depth to water table. | Fill, curtain drain and drainage swale. | Access to drainage outlet. | 1 |

**The rating assumes that the water table in the naturally occuring soil can be drained to a depth of 18 inches or more.

1 Identified as an area of special concern by state regulations - engineer's design required.
2 Identified as unsuitable in its natural condition by state regulations - an engineer's evaluation is needed to determine whether an absorption field can be built.
3 Identified as inland wetlands or tidal wetlands by state regulations. Local, state, and/or federal wetland permits may be required.
4 A permit to install an absorption field cannot be issued if the site cannot be drained. A permit cannot be issued if the groundwater level is less than 18 inches below the soil surface for one month or longer.
5 A permit to install an absorption field cannot be issued if the depth to bedrock, of the naturally occurring soil, is less than 24 inches.

TABLE 1
(continued)

SOIL POTENTIAL RATINGS FOR SEPTIC TANK ABSORPTION FIELDS BY MAP UNIT
NEW LONDON COUNTY, CONNECTICUT

| MAP SYMBOL | MAP UNIT NAME | POTENTIAL RATING | CONCERNS | CORRECTIVE MEASURES | ADDITIONAL CONSIDERATIONS | STATE REGULATIONS |
|---|---|---|---|---|---|---|
| Ts | - Tisbury silt loam | LOW | Fast perc rate, depth to water table. | Fill. Double separating distance between wells and leach fields. | | 1 |
| Ub | - Udorthents-Pits complex, gravelly | NOT RATED | | | | |
| Ud | - Udorthents-Urban land complex | | | | | |
| Ur | - Urban land | | | | | |
| W | - Water | | | | | |
| Wd | - Walpole sandy loam | VERY LOW** | Fast perc rate, depth to water table. | Curtain drain and fill. Double separating distance between wells and absorption field. | Access to drainage outlet. | 2,3,4 |
| We | - Westbrook mucky peat | EXTREMELY LOW | Organic soils, depth to water table, flooding (tidal). | | Tidal flooding. No drainage outlet. | 2,3,4 |
| Wh | - Westbrook mucky peat, low salt | | | | | |
| WvA | - Windsor loamy sand, 0-3% slopes | HIGH | Fast perc rate. | Double separating distance between wells and absorption field. | | 1 |
| WvB | - Windsor loamy sand, 3-8% slopes | | | | | |
| WxA | - Woodbridge fine sandy loam, 0-3% slopes | LOW | Slow perc rate, depth to water table. | Fill, curtain drain and drainage swale. Design absorption field to distribute effluent over a larger area. | Access to drainage outlet. | 1; possibly 2 depending on perc rate measured on-site. |
| WxB | - Woodbridge fine sandy loam, 3-8% slopes | | | | | |
| WxC | - Woodbridge fine sandy loam, 8-15% slopes | | | | | |
| WyB | - Woodbridge very stony fine sandy loam, 0-8% slopes | | | | | |
| WyC | - Woodbridge very stony fine sandy loam, 8-15% slopes | | | | | |
| WzA | - Woodbridge and Rainbow extremely stony soils 0-3% slopes | | | | | |
| WzC | - Woodbridge and Rainbow extremely stony soils, 3-15% slopes | | | | | |

**The rating assumes that the water table is the naturally occurring soil can be drained to a depth of 18 inches or more.

1 Identified as an area of special concern by state regulations - engineer's design required.
2 Identified as unsuitable in its natural condition by state regulations - an engineer's evaluation is needed to determine whether an absorption field can be built.
3 Identified as inland wetlands or tidal wetlands by state regulations. Local, state, and/or federal wetland permits may be required.
4 A permit to install an absorption field cannot be issued if the site cannot be drained. A permit cannot be issued if the groundwater level is less than 18 inches below the soil surface for one month or longer.

TABLE 2

MAP UNIT GROUPED BY SOIL POTENTIAL RATING FOR SEPTIC TANK ABSORPTION FIELDS
NEW LONDON COUNTY, CONNECTICUT

| MAP SYMBOL | MAP UNIT NAME |
|---|---|
| | - - - VERY HIGH POTENTIAL - - - |
| CbB | Canton and Charlton fine sandy loams, 3 to 8 percent slopes |
| CbC | Canton and charlton fine sandy loams, 8 to 15 percent slopes |
| CcB | Canton and Charlton very stony fine sandy loams, 3 to 8 percent slopes |
| CcC | Canton and Charlton very stony fine sandy loams, 8 to 15 percent slopes |
| CdC | Canton and Charlton extremely stony fine sandy loams, 3 to 15 percent slopes |
| NaB | Narragansett silt loam, 3 to 8 percent slopes |
| NgB | Narragansett very stony silt loam, 3 to 8 percent slopes |
| NhC | Narragansett extremely stony silt loam, 3 to 15 percent slopes |
| | - - - HIGH POTENTIAL - - - |
| AfA | Agawam fine sandy loam, 0 to 3 percent slopes |
| AfB | Agawam fine sandy loam, 3 to 8 percent slopes |
| CbD | Canton and Charlton fine sandy loams, 15 to 25 percent slopes |
| CdD | Canton and Charlton extremely stony fine sandy loams, 15 to 35 percent slopes |
| HcA | Haven silt loam, 0 to 3 percent slopes |
| HcB | Haven silt loam, 3 to 8 percent slopes |
| HkA | Hinckley gravelly sandy loam, 0 to 3 percent slopes |
| HkC | Hinckley gravelly sandy loam, 3 to 15 percent slopes |
| MyA | Merrimac sandy loam, 0 to 3 percent slopes |
| MyB | Merrimac sandy loam, 3 to 8 percent slopes |
| MyC | Merrimac sandy loam, 8 to 15 percent slopes |
| NhD | Narragansett extremely stony silt loam, 15 to 25 percent slopes |
| WvA | Windsor loamy sand, 0 to 3 percent slopes |
| WvB | Windsor loamy sand, 3 to 8 percent slopes |
| | - - - MEDIUM POTENTIAL - - - |
| BrB | Broadbrook silt loam, 3 to 8 percent slopes |
| CrC* | Charlton-Hollis fine sandy loams, very rocky, 3 to 15 percent slopes |

*The ratings of these map units are based on the weighted average of their component parts. The rating of each component is listed by map symbol on Table 1.

TABLE 2
(continued)

MAP UNIT GROUPED BY SOIL POTENTIAL RATING FOR SEPTIC TANK ABSORPTION FIELDS
NEW LONDON COUNTY, CONNECTICUT

| MAP SYMBOL | MAP UNIT NAME |
|---|---|
| | - - - MEDIUM POTENTIAL - - - (continued) |
| HkD | Hinckley gravelly sandy loam, 15 to 35 percent slopes |
| NlC* | Narragansett-Hollis complex, very rocky, 3 to 15 percent slopes |
| PbB | Paxton and Montauk fine sandy loams, 3 to 8 percent slopes |
| PbC | Paxton and Montauk fine sandy loams, 8 to 15 percent slopes |
| PbD | Paxton and Montauk fine sandy loams, 15 to 25 percent slopes |
| PdB | Paxton and Montauk very stony fine sandy loams, 3 to 8 percent slopes |
| PdC | Paxton and Montauk very stony fine sandy loams, 8 to 15 percent slopes |
| PeC | Paxton and Montauk extremely stony fine sandy loams, 3 to 15 percent slopes |
| PeD | Paxton and Montauk extremely stony fine sandy loams, 15 to 35 percent slopes |
| | - - - LOW POTENTIAL - - - |
| HrC* | Hollis-Charlton-Rock outcrop complex, 3 to 15 percent slopes |
| Nn | Ninigret fine sandy loam |
| RaA | Rainbow silt loam, 0 to 3 percent slopes |
| RaB | Rainbow silt loam, 3 to 8 percent slopes |
| RbB | Rainbow very stony silt loam, 0 to 8 percent slopes |
| Sg | Sudbury sandy loam |
| SvA | Sutton fine sandy loam, 0 to 3 percent slopes |
| SvB | Sutton fine sandy loam, 3 to 8 percent slopes |
| SwB | Sutton very stony fine sandy loam, 0 to 8 percent slopes |
| SxB | Sutton extremely stony fine sandy loam, 0 to 8 percent slopes |
| Ts | Tisbury silt loam |
| WxA | Woodbridge fine sandy loam, 0 to 3 percent slopes |
| WxB | Woodbridge fine sandy loam, 3 to 8 percent slopes |
| WxC | Woodbridge fine sandy loam, 8 to 15 percent slopes |
| WyB | Woodbridge very stony fine sandy loam, 0 to 8 percent slopes |
| WyC | Woodbridge very stony fine sandy loam, 8 to 15 percent slopes |
| WzA | Woodbridge and Rainbow extremely stony soils, 0 to 3 percent slopes |
| WzC | Woodbridge and Rainbow extremely stony soils, 3 to 15 percent slopes |

*The ratings of these map units are based on the weighted average of their component parts. The rating of each component is listed by map symbol on Table 1.

TABLE 2
(continued)

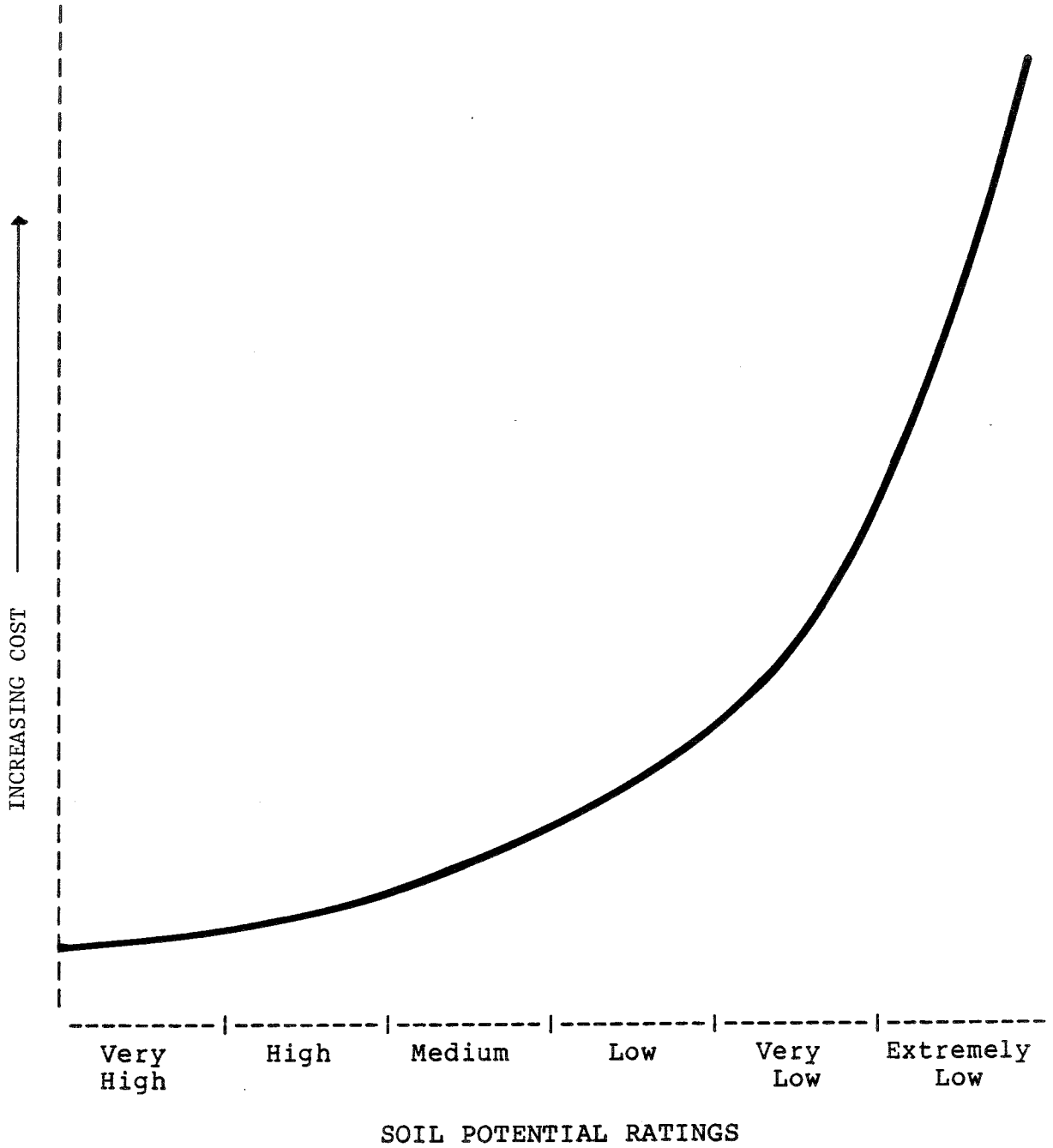
MAP UNIT GROUPED BY SOIL POTENTIAL RATING FOR SEPTIC TANK ABSORPTION FIELDS
NEW LONDON COUNTY, CONNECTICUT

| MAP SYMBOL | MAP UNIT NAME |
|---|---|
| | - - - VERY LOW POTENTIAL - - - |
| CrD* | Charlton-Hollis fine sandy loams, very rocky, 15 to 45 percent slopes |
| HrD* | Hollis-Charlton-Rock outcrop complex, 15 to 45 percent slopes |
| Ps | Pootatuck Variant fine sandy loam |
| Rc | Raypol silt loam |
| Rd | Ridgebury fine sandy loam |
| Rn | Ridgebury, Leicester, and Whitman extremely stony fine sandy loams |
| Wd | Walpole fine sandy loam |
| | - - - EXTREMELY LOW POTENTIAL - - - |
| Aa | Adrian and Palms mucks |
| Ce | Carlisle muck |
| Ip | Ipswich mucky peat |
| Lm | Limerick Variant silt loam |
| Pa | Pawcatuck mucky peat |
| Ro | Rippowam fine sandy loam |
| Rp | Rock outcrop-Hollis complex |
| Sf | Scarboro mucky fine sandy loam |
| We | Westbrook mucky peat |
| Wh | Westbrook mucky peat, low salt |
| | - - - NOT RATED - - - |
| Ba | Beaches |
| Du | Dumps |
| Ub | Udorthents-Pits complex, gravelly |
| Ud | Udorthents-Urban land complex |
| Ur | Urban land |
| W | Water |

*The ratings of these map units are based on the weighted average of their component parts. The rating of each component is listed by map symbol on Table 1.

FIGURE 1

RELATIONSHIP OF POTENTIAL RATINGS TO COST



APPENDIX 1

EVALUATION FACTORS

| EVALUATION CRITERIA | SLIGHT LIMITATION | MODERATE LIMITATION | SEVERE LIMITATION |
|---|---|---|---|
| Percent Slope | 0-15 | 15-25 | $>25$ |
| Perc Rate (minutes/inch) slowest or fastest within 40 inches | 1-30 | $<1$, 30-60 | $\geq 60$ |
| Depth to Water Table (feet) | $>3.0$ | 3.0-1.5 | $<1.5$ |
| Flooding (frequency) | None | - | Frequent (at least once every 2 years) |
| Depth to Bedrock (inches)* | $>72$ | - | $<20$ |

*Soils 20 inches deep to bedrock are identified in the Soil Survey of New London County, Connecticut. For the purpose of this report, the soils identified as not having bedrock within 20 inches are assumed to be 72 inches or more deep.

The slight, moderate, and severe limitation classes on this table were developed by the local interdisciplinary committee.

APPENDIX 2

CORRECTIVE MEASURES - SLOPE

| SOIL FEATURE | CONCERNS | COMMON CORRECTIVE MEASURES | STATE REGS. | POSSIBLE ADDITIONAL CORRECTIVE MEASURES | OTHER CONSIDERATIONS |
|---|---|---|---|---|---|
| 0-15% | None | None | | | |
| 15-25% | Difficulty of installation (access, machinery, etc.), Breakout | Design and installation to accommodate for slope. - Serial distribution of effluent through the use of high level overflows. | | | |
| >25% | Difficulty of installation, Breakout | Design and installation to accommodate for slope. - Serial distribution of effluent through the use of high level overflows. | 1 | | Special constrc-tion equipment and/or construc-tion methods. |

1 Identified as area of special concern by state regulations - engineer's design required.

APPENDIX 3

CORRECTIVE MEASURES - PERC RATE

| SOIL FEATURE | CONCERNS | COMMON CORRECTIVE MEASURES | STATE REGS. | POSSIBLE ADDITIONAL CORRECTIVE MEASURES | OTHER CONSIDERATIONS |
|---|---|---|---|---|---|
| 1-30 min/in* | | None | None | | |
| <1 min/in (fast perc) | Inadequate effluent renovation due to fast movement through the soil. | Double horizontal separating distance between wells and absorption field.<br>Verify that the depth to bedrock is greater than 10 feet. | 1 | | Hydraulic analysis may be required. |
| 30-60 min/in* (slow perc) | Slow acceptance of effluent into the soil due to restrictive soil layer (hardpan). | Design absorption field to distribute effluent over a larger area.<br>Curtain drain and drainage swale to divert surface and subsurface flows of water. | 1 | 0-2 feet of fill. | Need drainage outlet.<br>Hydraulic analysis may be required. |
| >60 min/in* (slow perc) | Slow acceptance of effluent into the soil due to restrictive soil layer (lacustrine deposits). | Special design of larger absorption field.<br>Fill may be required based on hydraulic analysis.<br>Curtain drain and drainage swale to divert surface and subsurface flows of water. | 2,6 | Soil replacement if more permeable soil is below restrictive layer. | Need drainage outlet. |

* Effective perc rates can be significantly reduced due to construction during wet periods of the year. The decrease in perc rates is due to smearing. Smearing is the disruption of wet, naturally occurring soil aggregates into a relatively smooth, slick, low porosity surface. Smearing is most likely to occur in soils with loamy or clayey textures.

1 Identified as Area of special concern by state regulations - engineer's design required.
2 Identified as unsuitable in its natural condition by state regulations - an engineer's evaluation is needed to determine whether an absorption field can be built.
6 A permit to install an absorption field cannot be issued if the perc rate is greater than 60 minutes/inch within 18 inches of the natural soil surface. This is mandated by state health code regulations.

APPENDIX 4

CORRECTIVE MEASUSURES - DEPTH TO WATER TABLE

| SOIL FEATURE | CONCERNS | COMMON CORRECTIVE MEASURES | STATE REGS. | POSSIBLE ADDITIONAL CORRECTIVE MEASURES | OTHER CONSIDERATIONS |
|---|---|---|---|---|---|
| >3.0 feet | NONE | None | | Curtain drain or shallow system may be needed when the water table is near the 3 foot depth. | |
| 3.0-1.5 feet | Groundwater interference with effluent dispersal. | Curtain drain and drainage swale to divert surface and subsurface flows of water, and/or 0-3 feet of fill. | 1 | | Need drainage outlet. Hydraulic analysis may be required. |
| <1.5 feet* | Groundwater interference with effluent dispersal. | Curtain drain and drainage swale to divert surface and subsurface flows of water, and/or 0-3 feet of fill. | 2,3,4 | | Need drainage outlet. Hydraulic analysis may be required. |

* The probable corrective measures listed for this soil feature apply only to mineral soils. Installation of an absorption field in organic soils requires the replacement of the organic materials.

1 Identified as area of special concern by state regulations - engineer's design required.
2 Identified as unsuitable in its natural condition by state regulations - an engineer's evaluation is needed to determine whether an absorption field can be built.
3 Possible inland wetlands or tidal wetlands by state regulations. Local, state, and/or federal wetland permits may be required.
4 A permit to install an absorption field will not be issued if the site cannot be drained. A permit cannot be issued if the groundwater level is less than 18 inches below the soil surface for one month or longer.

APPENDIX 5

CORRECTIVE MEASUSURES - FLOODING

| SOIL FEATURE | CONCERNS | COMMON CORRECTIVE MEASURES | STATE REGS. | POSSIBLE ADDITIONAL CORRECTIVE MEASURES | OTHER CONSIDERATIONS |
|---|---|---|---|---|---|
| None | None | None | | | |
| Frequent* | System backup. Erosion of raised system. | Fill to above specified maximum flood level. Maintain separating distance to areas of concentrated flow. | 1,3 | | Stabilization of fill slopes. |

* Areas that flood frequently, flood at least once every two years.

1 Identified as area of special concern by state regulations - engineer's design required.
3 Identified as inland wetlands or tidal wetlands by state regulations. Local, state, and/or federal wetland permits may be required.

APPENDIX 6

CORRECTIVE MEASUSURES - DEPTH TO BEDROCK*

| SOIL FEATURE | CONCERNS | COMMON CORRECTIVE MEASURES | STATE REGS. | POSSIBLE ADDITIONAL CORRECTIVE MEASURES | OTHER CONSIDERATIONS |
|---|---|---|---|---|---|
| > 72 inches | None | None | | | |
| 20-72 inches | Insufficient soil depth for effluent renovation. | 1-5 feet of fill. | 1 or 2 | | |
| < 20 inches | Insufficient soil depth for effluent renovation. Possible groundwater pollution. | Identified as unsuitable by state health code regulations. A permit cannot be issued for absorption field installation on these sites. | 5 | | |

* The Soil Survey of New London County, Connecticut, identifies soils that have bedrock within a 20 inch depth. For the purpose of this report, the soils identified as not having bedrock within 20 inches are assumed to be 72 inches or more deep. The state health code regulations do not coincide with these depth ranges. According to the health code, soils 48 inches to 60 inches deep are identified as an area of special concern and soils less than 48 inches deep are unsuitable in their natural condition. A permit to install an absorption field cannot be issued if the depth to bedrock of the naturally occurring soil is less than 24 inches.

1 Identified as an area of special concern by state regulations - engineer's design required.
2 Identified as unsuitable in its natural condition by state regulations - an engineer's evaluation is needed to determine whether an absorption field can be built.
5 A permit to install an absorption field cannot be issued if the depth to bedrock, of the naturally occurring soil, is less than 24 inches.

## SOME SITE CONDITIONS AND DESIGN CONSIDERATIONS NOT REPRESENTED IN THE RATINGS

The soil potential ratings for septic tank absorption fields were determined based on the ease of overcoming the soil limitations listed in Appendix 1. In many cases, the ease of constructing an absorption field (and therefore, cost), is determined by other factors. These factors may be site specific or result from local town requirements. A partial list of the factors that may influence cost but are not represented in the rating scheme follows.

Small areas of contrasting soils that were too small to delineate at the scale of the maps of the Soil Survey of New London County, Connecticut.

Boulders greater than three feet in diameter that cannot be moved by customary construction equipment.

Fill needed to compensate for the volume of material lost through the removal of stones and boulders.

Topographic configuration of property.

Measuring depth to water table during the spring months.

Local health department practices.

Inland wetland setbacks.

Time needed for approvals from regulatory agencies.

Easements.

Access to site for testing, construction, and system maintenance.

Landscaping.

Maneuvering around site features to be preserved such as stone walls and trees.

Tree and stump removal.

Hauling costs of fill and gravel.

Proximity of proposed absorption field to neighboring wells.

Time of year of construction.

Construction stakeout and supervision by an engineer or sanitarian.

# About The Team

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

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

## PURPOSE OF THE TEAM

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

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

## REQUESTING A REVIEW

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

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