Mountain Laurel Estates Subdivision

North Stonington, Connecticut

October 1990

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT

Eastern Connecticut Resource Conservation and Development Area, Inc.

Mountain Laurel Estates Subdivision

North Stonington, Connecticut

Review Date: August 16, 1990
Report Date: October 1990

EASTERN CONNECTICUT
ENVIRONMENTAL REVIEW TEAM

Eastern Connecticut
Resource Conservation and Development Area, Inc.
1066 Saybrook Road
P.O. Box 70
Haddam, Connecticut 06438
(203) 345-3977

ENVIRONMENTAL REVIEW TEAM REPORT
ON

MOUNTAIN LAUREL ESTATES SUBDIVISION
North Stonington, Connecticut

This report is an outgrowth of a request from the North Stonington Inland Wetlands Agency and the Planning and Zoning Commission to the New London County Soil and Water Conservation District (SWCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Area Executive Council 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 Thursday, August 16, 1990. Team members participating on this review included:

Nick Bellantoni	**State Archaeologist** **CT Museum of Natural History**
Dan Mayer	**Environmental Analyst** **DEP - Inland Water Resource Division**
Dawn McKay	**Zoologist** **DEP - Natural Diversity Data Base**
Pete Merrill	**Forester** **DEP - Patchaug State Forest**
Liz Rogers	**District Conservationist** **USDA - Soil Conservation Service**
Richard Serra	**Regional Planner** **Southeastern CT Regional Planning Agency**
Elaine Sych	**Environmental Review Team Coordinator** **Eastern Connecticut RC&D Area, Inc.**
Bill Warzecha	**Geologist/Sanitarian** **DEP - Natural Resources Center**

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, a topographic map, a soils map and a list of concerns. During the field review the Team members were given more information. The Team met with, and were accompanied by the Chairman of the Inland Wetlands Agency and the Chairman of the Planning and Zoning Commission, as well as several commission members and the engineer and surveyor for the project. 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 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 this 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 Council hopes you will find this report of value and assistance in making your decisions on this proposed subdivision.

If you require additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P.O. Box 70
Haddam, Connecticut 06438
(203)345-3977

Table of Contents

Table of Maps

1. Location, Zoning and Land Use

The Mountain Laurel Estates subdivision site, about 409 acres in size is encompassed by the towns of North Stonington, Preston and Griswold. Based on the site plan distributed to Team members, an approximate breakdown of site acreage by town includes the following: 310 acres are located in North Stonington; 32 acres are located in Preston; and 67 acres are located in Griswold. These acreages may differ depending upon the final town boundaries used.

The site, which is irregularly shaped, abuts Miller Road on the south and private, undeveloped land that is wooded on the east, north and west. Access to the subdivision site will be made available via Miller Road. Currently, the site is accessed most easily via former haul roads created by a timber harvest operation that occurred on the majority of the site probably about 10-20 years ago.

A review of a 1934 air photo that includes the site and vicinity indicates very little change has occurred in the site's character during the past 56 years except for the timber harvest operation. Open, pasture land occurred mainly in a small area in the southern parts but has been reverting back to wooded land since 1975. Stonewalls transecting the site gives testimony to its agricultural past. Every effort should be made to preserve the stonewalls on the site, where possible.

At the present time, the site is characterized largely by wooded upland that is generally unused. Two large wetland areas occur in the northeast corner and southern limits of the site. A large percentage of the former wetland that is located in North Stonington is presently proposed as open space land. Other regulated areas found on the site occur primarily as narrow bands of wetlands that parallel the intermittent streamcourses on the site. In order to access the subdivision site under the present road layout, inland-wetlands will be crossed or impacted by road grading at 6 locations (this includes access road to the proposed open space).

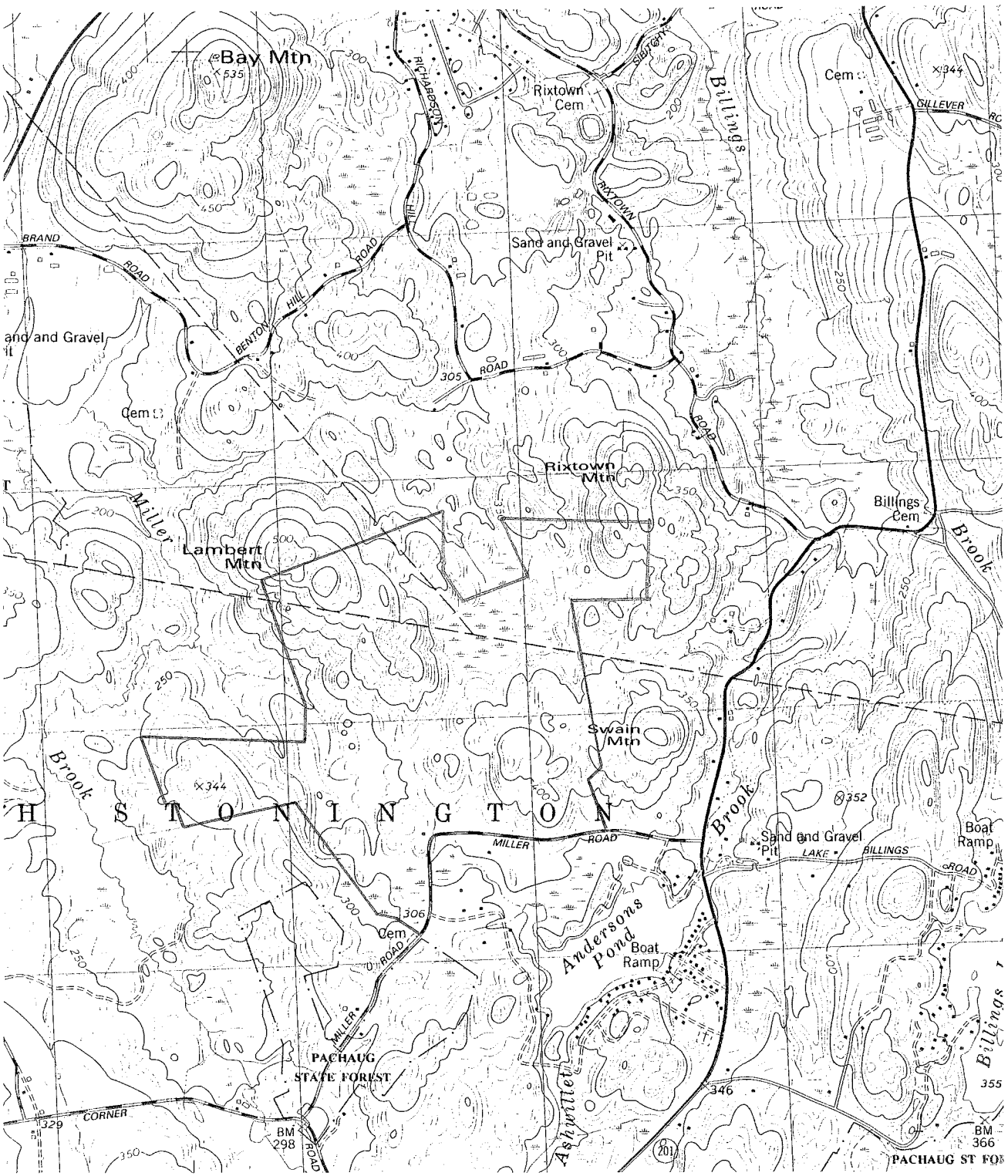
The portion of the site that lies within North Stonington is zoned R-80, a residential zone that allows single-family homes on lots of 80,000 square feet or more. Zoning for the site which lies in Preston and Griswold is unknown. Present plans indicate that all lots exceed 1.8 acres or more.

As mentioned earlier the site is generally unused. Low density residential land-uses predominate near the site except at Andersons and Billings Pond, where medium density residential land use occurs. Both are real estate lakes located south/southeast of the site. Approximately 56 acres located in the southern parts of the site drain directly to Andersons Pond; the remainder of the site ultimately drains to Miller Brook, a north flowing streamcourse that is tributary to Broad Brook in Preston. A review of air photos for the site and vicinity, which date back 56 years, indicate that there has been an increase in residential land use, especially during the past 10 years.

LOCATION MAP

Scale 1" = 2000'

——— Approximate Site Boundary

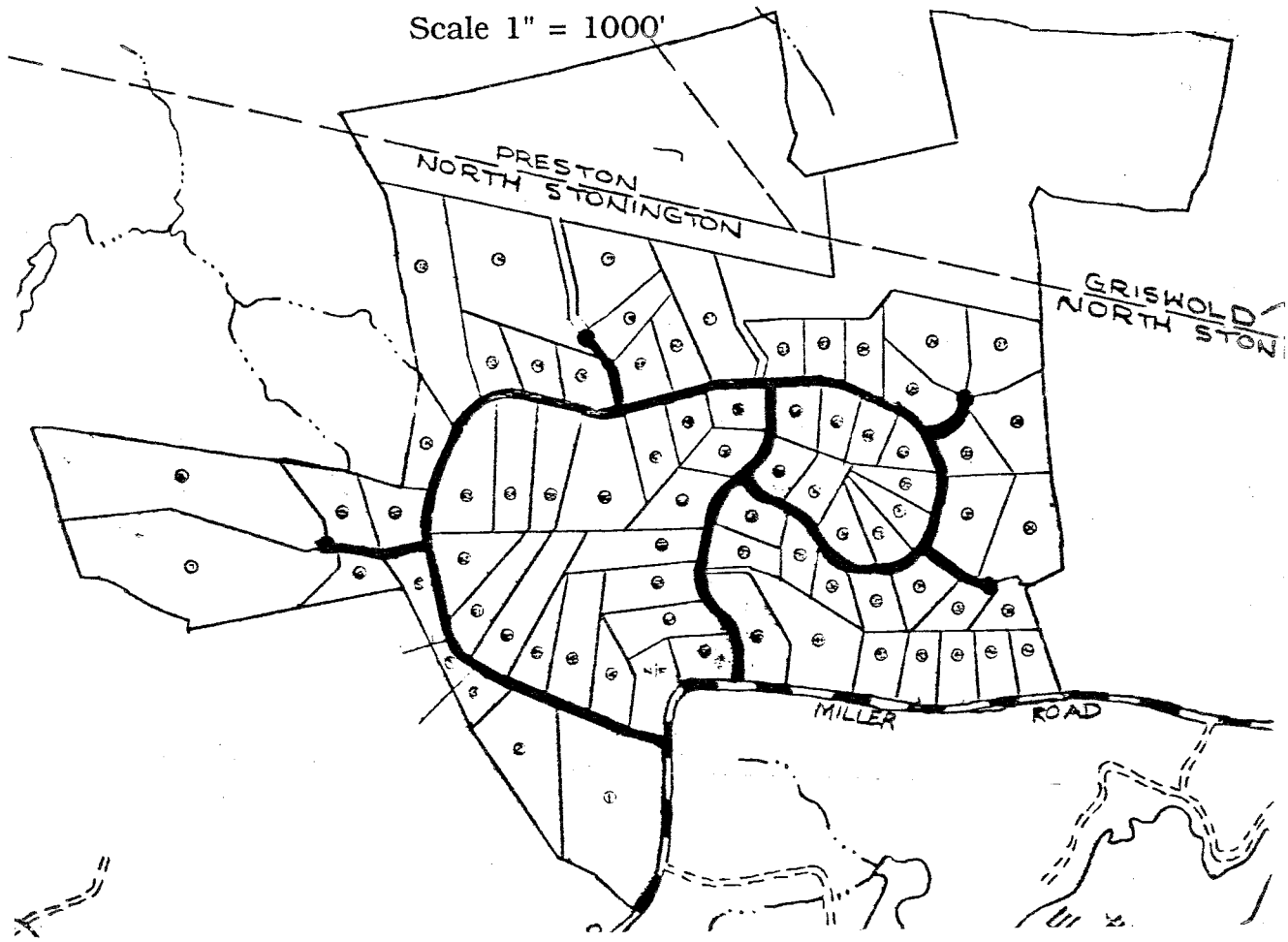


2. Project Description

The proposed project will consist of 75 building lots on about 310 acres in northern North Stonington. No plans for the development of the land area that lies within the towns of Preston and Griswold were shown on the subdivision plan. It should be pointed out that in general hostile surface and subsurface conditions characterizes the land in Preston and Griswold. Steep slopes, shallow to bedrock soils and wetlands are widespread and will be major hindrances with regard to the details of siting septic systems and access.

According to present plans, the 75 building lots which range in size from 1.8 acres to about 17 acres would be served by +2 miles of paved road that includes four ±600 foot long cul-de-sacs and, in North Stonington, about 8 acres of open space. The subdivision plan indicates that the 67 acres in the town of Griswold would also be designated as open space. The main access road will cross approximately 660 feet of wetlands. In some places, road grading or the access road to the proposed open space will impact wetlands. Lots 1, 40, and 49-53 contain moderate amounts (>40%) of regulated wetland soils. Buildings, septic systems and access drives on these lots may be within the 100 foot wetland setback requirement imposed by the town. Each lot in the proposed subdivision would be served by an individual on-site septic system and well.

LOT LAYOUT MAP



3. Climate and Topography

Dowhan and Craig (*Rare and Endangered Species of Connecticut and Their Habitats, 1976*) reports that the site lies in a zone known as the Southeast Hills ecoregion. This region is characterized by near coastal upland, lying within 30 miles of eastern Long Island Sound, and by low, rolling hills, moderately broad and level upland and valley bottoms and locally by steep and rugged topography.

The Southeast Hills region has a mean annual temperature of 49°F, average winter temperature of 29°F and average summer temperature of 69°F. The average length of frost free season is 140 days. Seasonal snow fall averages 40 inches and average annual precipitation is about 45 inches.

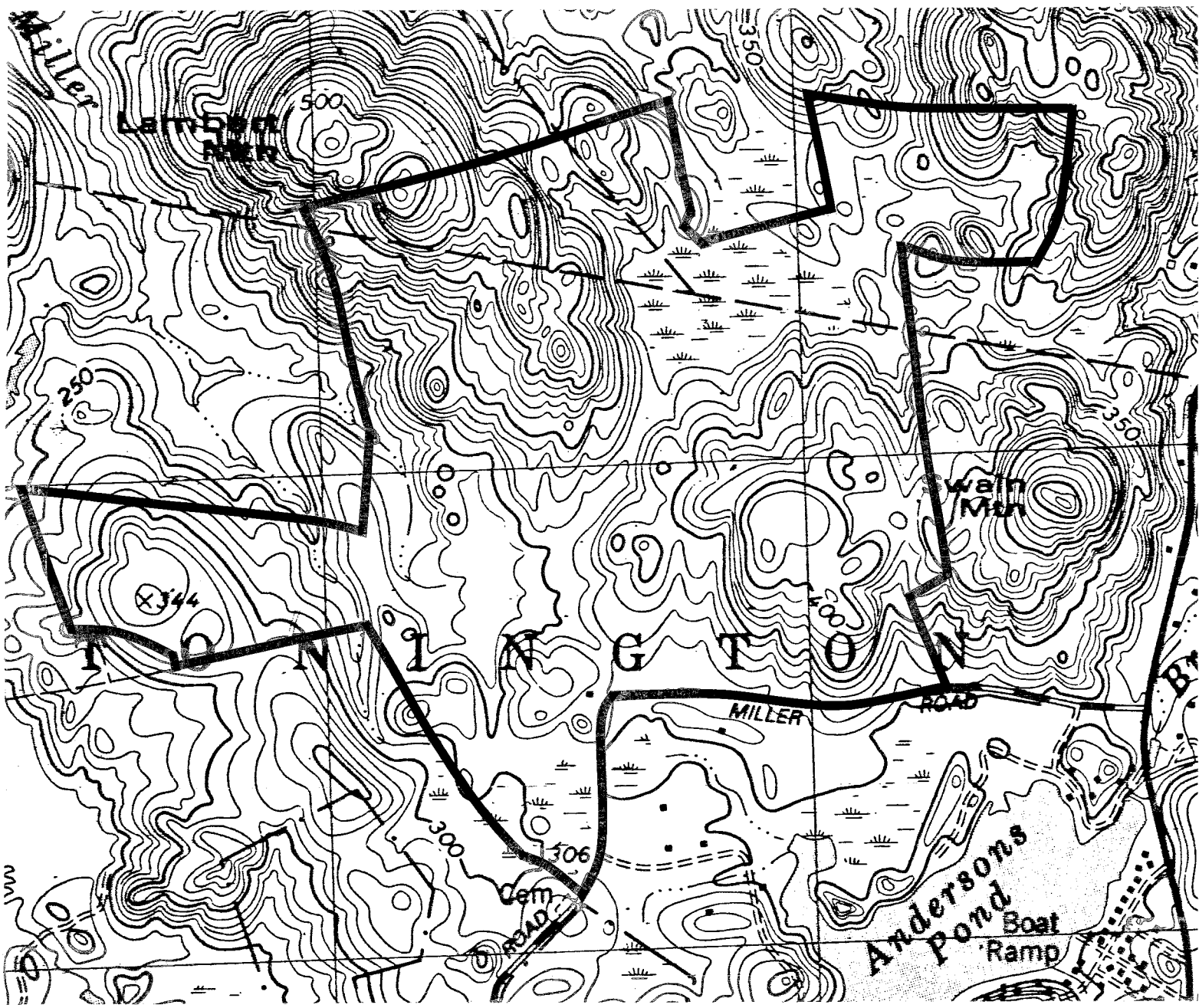
The site consists of hilly and irregular terrain that is controlled largely by the underlying bedrock. The site includes portions of Lambert, Rixtown and Swain Mountains that occur in the northwest, northern and eastern parts of the site, respectively. Slopes range between moderate to very steep. Small areas of gentle slopes occur in the southeast corner and on the crest of the rock-cored hills across the central parts. Steepest slopes occur in the northern, southeastern and northeastern parts of the site. Site elevations range from a high of 540 feet above mean sea level atop Lambert Mountain to a low of about 300 feet above mean sea level along Miller Road.

Although bedrock is less than 10 feet throughout the entire site, the greatest concentration of ledge exposures are visible on the crests and flanks of the hills in the northern and eastern parts.

TOPOGRAPHIC MAP

Scale 1" = 1000'

Approximate Site Boundary



4. Geology

The site is located entirely in the Jewett City topographic quadrangle. A bedrock geologic map (GQ-1575, by H. Roberta Dixon and J. Karen Felmlee, 1986) and a surficial geologic map (GQ-1434 by Byron Stone, 1978) for the quadrangle have been published by the U.S. Geological Survey.

Bedrock is inferred to be at or near ground surface (10 feet or less) throughout the site. The bedrock foundation for site and vicinity has been identified as Preston Gabbro, a Silurian aged (408-438 million years old), west dipping igneous (a rock type formed from magma) body that intruded the surrounding rock i.e., Quinebaug Formation. It is a dark, medium to coarse grained mafic (a rock comprised of dark colored minerals) that commonly is massive appearing and generally lacks the layering or banding which characterizes the surrounding rock types, i.e., gneisses and schists. Principal minerals in the gabbro include clinopyroxene and plagioclase. The texture and composition of the gabbro varies across the site.

A major regional fault, known as Lake Char Fault borders the site on the east. It is a north-south trending fault line in the area. Additionally, a northwest-southeast trending fault, which is younger in age than the Lake Char fault is aligned approximately with Miller Brook Valley and bisects the western parts of the site. Both faults are very old and are no longer believed to be active; however, they may be zones of fractured rock that would enhance groundwater flows especially in the upper few hundred feet of the bedrock surface.

The shallow depth to bedrock conditions that characterize the site will be a major obstacle for septic system siting. Well pollution is frequently a problem in areas of shallow ledge rock, particularly where there are a number of building lots involved, each served by an on-site sewage disposal system and water supply well. Additionally deep excavations such as road cuts, house foundations and utility trenches will likely require blasting when bedrock is encountered.(See **Blasting Concerns** section of this report)

Except for those areas served by community or public water supply companies, the majority of homes in North Stonington rely on the underlying bedrock as a source of drinking water. Bedrock is the principal water-bearing unit on the site and therefore each lot will likely be served by individual on-site wells that tap the underlying Preston Gabbro.

The unconsolidated material overlying bedrock on the site consists mainly of a thin blanket (probably not much more that 10 feet) of glacial sediment called till. Till was deposited directly from an ice sheet onto the bedrock surface. Because the ice indiscriminately collected and transported rock particles and fragments of widely ranging size as it advanced through the region, the till is a non-sorted mixture of sand, silt, gravel, clay and boulders. The texture of the till on most of the site is sandy and loose.

Overlying till and bedrock along Miller Road are small areas of stratified

4. Geology

The site is located entirely in the Jewett City topographic quadrangle. A bedrock geologic map (GQ-1575, by H. Roberta Dixon and J. Karen Felmlee, 1986) and a surficial geologic map (GQ-1434 by Byron Stone, 1978) for the quadrangle have been published by the U.S. Geological Survey.

Bedrock is inferred to be at or near ground surface (10 feet or less) throughout the site. The bedrock foundation for site and vicinity has been identified as Preston Gabbro, a Silurian aged (408-438 million years old), west dipping igneous (a rock type formed from magma) body that intruded the surrounding rock i.e., Quinebaug Formation. It is a dark, medium to coarse grained mafic (a rock comprised of dark colored minerals) that commonly is massive appearing and generally lacks the layering or banding which characterizes the surrounding rock types, i.e., gneisses and schists. Principal minerals in the gabbro include clinopyroxene and plagioclase. The texture and composition of the gabbro varies across the site.

A major regional fault, known as Lake Char Fault borders the site on the east. It is a north-south trending fault line in the area. Additionally, a northwest-southeast trending fault, which is younger in age than the Lake Char fault is aligned approximately with Miller Brook Valley and bisects the western parts of the site. Both faults are very old and are no longer believed to be active; however, they may be zones of fractured rock that would enhance groundwater flows especially in the upper few hundred feet of the bedrock surface.

The shallow depth to bedrock conditions that characterize the site will be a major obstacle for septic system siting. Well pollution is frequently a problem in areas of shallow ledge rock, particularly where there are a number of building lots involved, each served by an on-site sewage disposal system and water supply well. Additionally deep excavations such as road cuts, house foundations and utility trenches will likely require blasting when bedrock is encountered.(See **Blasting Concerns** section of this report)

Except for those areas served by community or public water supply companies, the majority of homes in North Stonington rely on the underlying bedrock as a source of drinking water. Bedrock is the principal water-bearing unit on the site and therefore each lot will likely be served by individual on-site wells that tap the underlying Preston Gabbro.

The unconsolidated material overlying bedrock on the site consists mainly of a thin blanket (probably not much more that 10 feet) of glacial sediment called till. Till was deposited directly from an ice sheet onto the bedrock surface. Because the ice indiscriminately collected and transported rock particles and fragments of widely ranging size as it advanced through the region, the till is a non-sorted mixture of sand, silt, gravel, clay and boulders. The texture of the till on most of the site is sandy and loose.

Overlying till and bedrock along Miller Road are small areas of stratified

drift deposits comprising gravel and sand. Stratified drift deposits, like till are glacially derived sediments that were deposited by melting blocks of glacier ice. As a result they contain rock particles and fragments that are water worn (rounded as opposed to angular) and deposited in well sorted to poorly sorted layers. The gravel and sand deposits are probably quite thin (10 feet or less) and cover a small areal extent.

According to Map GQ-1454 (Surficial Geologic Map of the Jewett City Quadrangle, New London County, Connecticut, B. Stone, 1978), post-glacially deposited sediments consisting of swamp deposits occur in the northern and southern parts of the site. They comprise muck and peat, and minor amounts of sand, silt and clay. The water table is at or near the surface throughout most of the year in these areas. In addition, the applicant's certified soil scientist has identified other regulated wetland soils which mainly parallel the intermittent watercourses on the site. Unlike the swamp deposits mentioned above the latter variety of wetland soils are more mineral in composition than organic (peats and mucks). It is understood that a certified soil scientist has flagged the regulated wetland soils on the site and that their boundaries have been superimposed onto the subdivision plan. A certification statement by the soil scientist which occurs on the subdivision plan should indicate that the wetland boundaries delineated on the plan is substantially correct should be included on the subdivision plan.

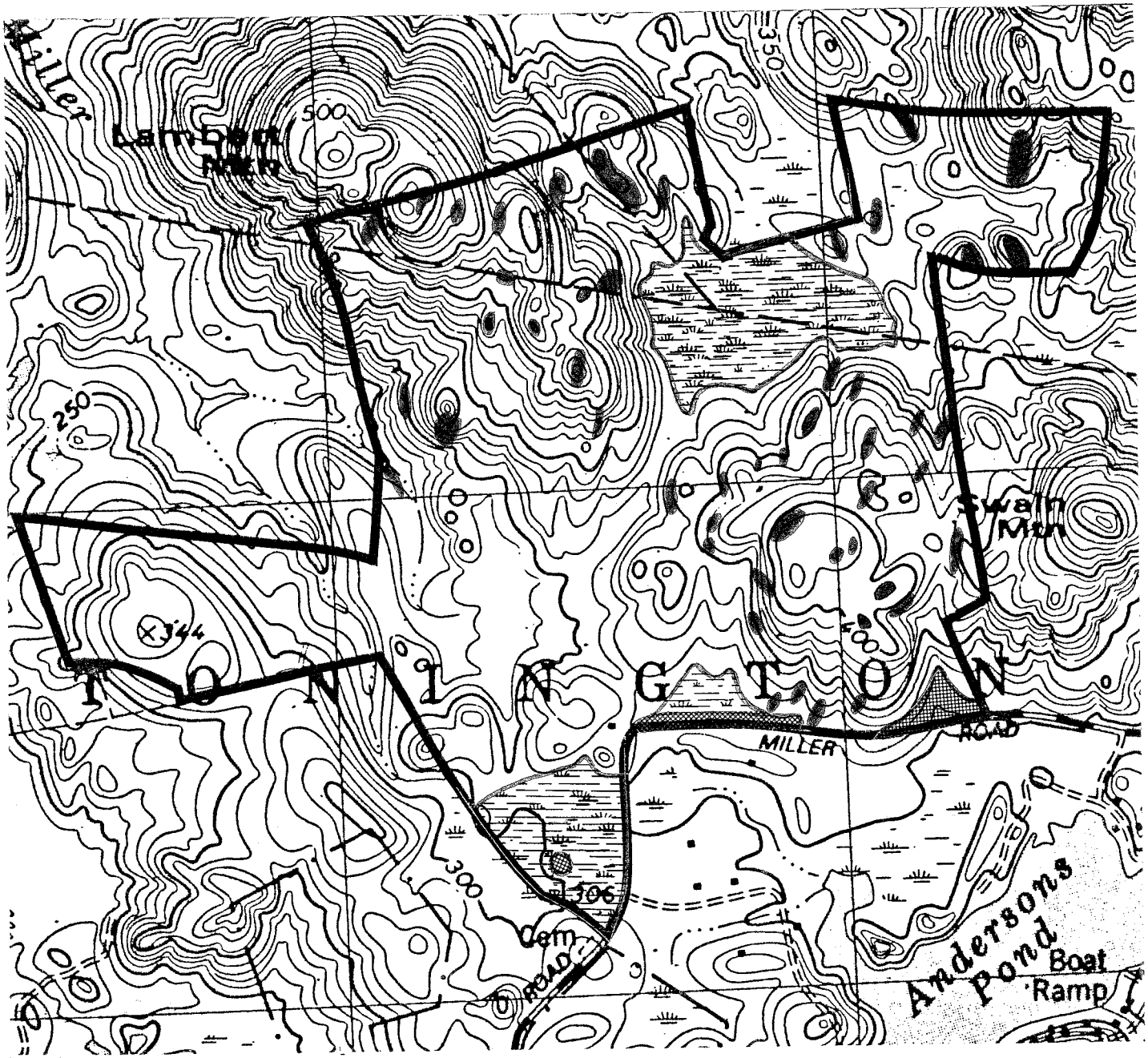
The certification statement should be similar to the following:

"The wetland soils on this site were identified in the field using the criteria required by Connecticut P.A. 72-155 as amended by Connecticut P.A. 73-571, Connecticut P.A. 87-338 and Connecticut P.A. 87-533. The boundaries of these soils and of identified watercourses are accurately represented on the plot plan."

GEOLOGIC MAP

Scale 1" = 1000'

Thin Till
Stratified Drift (sand & gravel)
Ledge Outcrops (approximate)
Swamp Deposits
*Entire site is underlain by Preston Gabbro



5. Soils Descriptions

*** Aa - Adrian and Palms mucks

These nearly level, very poorly drained soils are in pockets and depressions of stream terraces, outwash plains, and glacial till uplands. Slopes range from 0 to 2 percent. Adrian soils have a high water table which is at or near the surface for most of the year. Permeability is moderately rapid in the organic layers and rapid in the substratum. Palms soils have a high water table which is at or near the surface for most of the year. Permeability is moderately rapid in the organic layers and moderately slow in the substratum. The available water capacity is high for these soils. Runoff is very slow or ponded. These soils are strongly acid through slightly acid. These soils are not suited to cultivate crops. These soils are suited to trees. Windthrow is common because of shallow rooting depth above the water table. These soils are poorly suited to community development.

These soils are in capability subclass VIw.

* AfB - Agawam fine sandy loam, 3 - 8 percent slopes

This gently sloping, well drained soil is on stream terraces and outwash plains. Permeability of the Agawam soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. The available water capacity is moderate. Runoff is medium. This soil warms up and dries out rapidly in the spring. Unless limed, the soil is strongly acid or medium acid. This soil is well suited to cultivate crops. The hazard of erosion is moderate. This soil is suited to trees.

This soil is in capability class IIe.

CbD - Canton and Charlton fine sandy loams, 15 - 25 percent slopes

These moderately steep, well drained soils are on glacial till upland hills, plains, and ridges. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity of these soils is moderate. Runoff is very rapid. These soils warm up and dry out rapidly in the spring. Unless limed, the soil is strongly acid or medium acid. These soils are poorly suited to cultivated crops. The hazard of erosion is severe. These soils are suited to trees. The major limiting factor for community development is steepness of slope.

These soils are in capability subclass IVe.

CcB - Canton and Charlton very stony fine sandy loams, 3 - 8 percent slopes

These gently sloping, well drained soils are on glacial till upland hills, plains, and ridges. Stones and boulders cover 1 8 percent of the surface. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity of these soils is moderate. Runoff is medium. These soils warm up and dry out rapidly in the spring. The soil is strongly acid or medium acid. These soils are not suited to cultivated crops. These soils are suited to trees.

These soils are in capability subclass VIs.

CcC - Canton and Charlton very stony fine sandy loams, 8 - 15 percent slopes

These sloping, well drained soils are on glacial till upland hills, plains, and ridges. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity of these soils is moderate. Runoff is rapid. These soils warm up and dry out rapidly in the spring. It is strongly acid or medium acid. These soils are not suited to cultivated crops. These soils are suited to trees. Steepness of slope is a major limiting factor for community development.

These soils are in capability subclass VIs.

CdC - Canton and Charlton extremely stony fine sandy loams, 3 - 15 percent slopes

These gently sloping and sloping, well drained soils are on glacial till upland hills, plains, and ridges. Stones and boulders cover 8 - 25 percent of the surface. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity of these soils is moderate. Runoff is medium or rapid. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. These soils are not suited to cultivated crops. The hazard of erosion is moderate or severe. These soils are suited to trees.

These soils are in capability subclass VIIs.

CdD - Canton and Charlton extremely stony fine sandy loams, 15 - 35 percent slopes

These moderately steep to steep, well drained soils are on glacial till upland hills, plains, and ridges. Stones and boulders cover 8 - 25 percent of the surface. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity of these soils is moderate. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. These soils are not suited to cultivated crops. The hazard of erosion is severe. These soils are suited to trees. Steepness of slope is a major limitation for community development.

These soils are in capability subclass VIIs.

*** Ce - Carlisle muck

This nearly level, very poorly drained soil is in pockets and depressions of flood plains, stream terraces, outwash plains, and glacial till uplands. The Carlisle soil has a high water table near or above the surface for most of the year. Permeability is moderately rapid. The available water capacity is high. Runoff is slow. The soil is strongly acid through slightly acid. This soil is not suited to cultivated crops. This soil is poorly suited to trees. Windthrow is common because of the shallow rooting depth above the high water table. This soil is generally not suited to community development.

This soil is in capability subclass VIw.

CrC - Charlton-Hollis fine sandy loams, very rocky, 3 - 15 percent slope

This gently sloping to sloping complex consists of somewhat excessively drained and well drained soils on glacial till uplands. Rock outcrops cover up to 10 percent of the surface. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Charlton soil is moderate or moderately rapid, the available water capacity is moderate. Permeability of the Hollis soil is moderate or moderately rapid above the bedrock, the available water capacity is low. The runoff of this complex is medium or rapid. It warms up and dries out rapidly in the spring. It is strongly acid or medium acid. These soils are not suited to cultivated crops. The hazard of erosion is moderate to severe. These soils are suited to trees. Windthrow is common on the Hollis soil because of the shallow rooting depth. The major limiting factor for community development is the shallow depth to bedrock.

These soils are in capability subclass VIs.

CrD - Charlton-Hollis fine sandy loams, very rocky, 15 - 45 percent slopes

This moderately steep to steep complex consists of somewhat excessively drained and well drained soils on glacial till uplands. Rock outcrops cover up to 10 percent of the surface. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Charlton soil is moderate or moderately rapid, the available water capacity is moderate. Permeability of the Hollis soil is moderate or moderately rapid above the bedrock, the available water capacity is low. Runoff of these soils is rapid or very rapid. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. These soils are not suited to cultivated crops. The Hollis soil has a shallow rooting depth and is droughty. These soils are suited to trees. Windthrow is common on

the Hollis soil because of the shallow rooting depth. The major limiting factors for community development are steepness of slope, shallow depth to bedrock, and rock outcrops.

These soils are in capability subclass VIIs.

** HkC - Hinckley gravelly sandy loam, 3 - 15 percent slopes

This gently sloping and sloping, excessively drained soil is on stream terraces, outwash plains, kames, and eskers. Permeability of the Hinckley soil is rapid in the surface layer and subsoil and very rapid in the substratum. The available water capacity is low. Runoff is medium or rapid. Hinckley soil warms up and dries out rapidly in the spring. Unless limed, it is strongly acid or medium acid. This soil is suited to cultivated crops. Hinckley soil is droughty, and irrigation is needed. The hazard of erosion is moderate or severe. This soil is suited to trees.

This soil is in capability subclass IVs.

HkD - Hinckley gravelly sandy loam, 15 - 35 percent slopes

This moderately steep and steep, excessively drained soil is on stream terraces, outwash plains, kames, and eskers. Permeability of the Hinckley soil is rapid in the surface layer and subsoil and very rapid in the substratum. The available water capacity is low. Runoff is very rapid. Hinckley soil warms up and dries out rapidly in the spring. It is strongly acid or medium acid. This soil is poorly suited to cultivated crops because of the steep slopes. Hinckley soil is droughty. The hazard of erosion is severe. This soil is suited to trees. Steepness of slopes is the major limiting factor for community development.

This soil is in capability subclass VIIs.

HrC - Hollis-Charlton-Rock outcrop complex, 3 - 15 percent slopes

This gently sloping to sloping complex consists of somewhat excessively drained and well drained soils and rock outcrop on glacial till uplands. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Hollis soil is moderate or moderately rapid above the bedrock, the available water capacity is low. Permeability of the Charlton soil is moderate or moderately rapid, the available water capacity is moderate. Runoff of these soils is medium or rapid. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. These soils are not suited to cultivated crops. The hazard of erosion is moderate to severe. These soils is suited to trees. Windthrow is common on the Hollis soil because of the shallow rooting depth. The major limiting factors for community development are the shallow depth to bedrock in many places, and rock outcrop. The Hollis soil is droughty.

These soils are in capability subclass VIIs.

HrD - Hollis-Charlton-Rock outcrop complex, 15 - 45 percent slopes

This moderately steep to very steep complex consists of somewhat excessively drained and well drained soils and rock outcrop on glacial till uplands. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Hollis soil is moderate or moderately rapid above the bedrock, the available water capacity is low. Permeability of the Charlton soil is moderate or moderately rapid, the available water capacity is moderate. Runoff of these soils is rapid or very rapid. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. The soils in this complex are not suited to cultivated crops. The soils in this complex are suited to trees. Windthrow is common on the Hollis soil because of the shallow rooting depth. The major limiting factors for community development are the steep slopes, shallow depth to bedrock and rock outcrop.

The soils in this complex are in capability subclass VIIs.

*** Rn - Ridgebury, Leicester, and Whitman extremely stony fine sandy loams

These nearly level, poorly drained and very poorly drained soils are in drainageways and depressions of glacial till upland hills, ridges, plains, and drumloidal landforms. Stones and boulders cover 8 - 25 percent of the surface. The Ridgebury and Leicester soils have a seasonal high water table at a depth of about 6 inches. The Whitman soil has a high water table at or near the

surface for most of the year. Permeability of Ridgebury and Whitman soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The Ridgebury and Whitman soils are strongly acid through slightly acid. Permeability of Leicester soil is moderate or moderately rapid, it is very strongly acid through medium acid. Runoff for the Ridgebury and Leicester soil is very slow or slow. Whitman soil runoff is very slow, or the soil is ponded. The available water capacity for these soils is moderate. These soils are not suited to cultivated crops. The erosion hazard is slight. These soils are suited to trees. Windthrow is common because of the shallow rooting depth above the high water table. The major limiting factors for community development are the high water table and the slow or very slow permeability in the substratum.

These soils are in capability subclass VIIs.

/* Ro - Rippowam fine sandy loam

This nearly level, poorly drained soil is on flood plains of major streams, rivers, and their tributaries. The Rippowam soil has a seasonal high water table at a depth of about 6 inches. It is subject to frequent flooding. Permeability is moderate or moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum. The available water capacity is moderate. Runoff is slow. Rippowam soil warms up and dries out slowly in the spring. It is strongly acid or medium acid but has a medium acid layer within a depth of 40 inches. This soil is suited to cultivated crops. The hazard of erosion is slight. Areas that cannot be drained are poorly suited to crops. This soil is suited to trees. Windthrow is common because of the shallow rooting depth above the high water table. This soil is poorly suited to community development.

This soil is in capability subclass IIIw.

Rp - Rock outcrop-Hollis complex

This gently sloping to very steep complex consists of Rock outcrop and a somewhat excessively drained soil on glacial till uplands. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Hollis soil is moderate or moderately rapid above the bedrock. The available water capacity is low. Runoff is medium through very rapid. Hollis soil warms up and dries rapidly in the spring. It is strongly acid or medium acid. This complex is not suited to cultivated crops. The hazard of erosion is severe. This complex is poorly suited to trees, but is better suited to trees than to most other uses. Windthrow is common on the Hollis soil because of the shallow rooting depth. The major limiting factors for community development are the shallow depth to bedrock and rock outcrop.

This complex is in capability subclass VIIs.

SwB - Sutton very stony fine sandy loam, 0 - 8 percent slopes

This nearly level to gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Stones and boulders cover 1 - 8 percent of the surface. The Sutton soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate or moderately rapid. The available water capacity is moderate. Runoff is slow or medium. Sutton soil warms up and dries out slowly in the spring. It is strongly acid or medium acid in the surface layer and subsoil and strongly acid through slightly acid in the substratum. This soil is not suited to cultivated crops. The hazard of erosion is slight or moderate. This soil is suited to trees. The major limiting factor for community development is the seasonal high water table.

This soil is in capability subclass VIs.

SxB - Sutton extremely stony fine sandy loam, 0 - 8 percent slopes

This nearly level to gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Stones and boulders cover 8 - 25 percent of the surface. The Sutton soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate or moderately rapid. The available water capacity is moderate. Runoff is slow or medium. Sutton soil warms up and dries out slowly in the spring. It is strongly acid or medium acid in the surface layer and subsoil and strongly acid through slightly acid in the substratum. This soil is not suited to cultivated crops. The hazard of erosion is slight or moderate. This soil is suited to trees. The major limiting factor for community development is the seasonal high water table.

This soil is in capability subclass VIIs.

* Ts - Tisbury silt loam

This nearly level to gently sloping, moderately well drained soil is on stream terraces and outwash plains. The Tisbury soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. The available water capacity is moderate. Runoff is slow or medium. Tisbury soil warms up and dries out slowly in the spring. Unless limed, it is strongly acid or medium acid. This soil is well suited to cultivated crops. The hazard of erosion is slight. This soil is suited to trees. The major limiting factor for community development is the seasonal high water table.

This soil is in capability subclass IIw.

/* Wd - Walpole fine sandy loam

This nearly level, poorly drained soil is on stream terraces and outwash plains. The Walpole soil has a seasonal high water table at a depth of about 6 inches. Permeability is moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum. The available water capacity is moderate. Runoff is slow. Walpole soil warms up and dries out slowly in the spring. It is very strongly acid or medium acid. This soil is suited to cultivated crops. The hazard of erosion is slight. This soil is suited to trees. Windthrow is common because of the shallow rooting depth above the high water table. The major limiting factor for community development is the seasonal high water table.

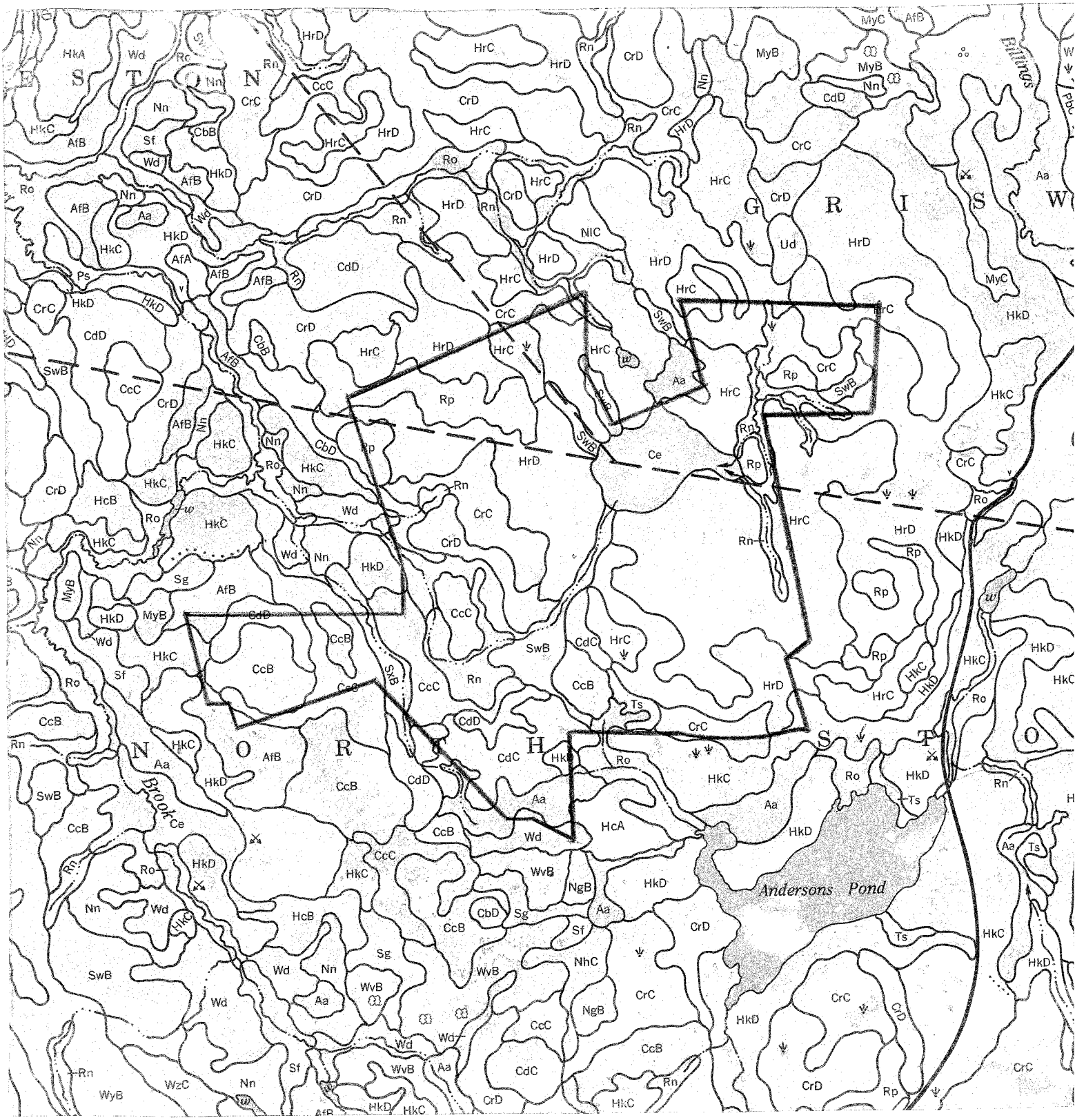
This soil is in capability subclass IIIw.

*** - Prime Agricultural Farmland**
**** - Farmland of Statewide Importance**
***** - Wetlands**

SOILS MAP

Scale 1" = 1320'

Approximate Site Boundary



6. Soil Resource Concerns

Storm Water Management System

A storm water management design was not included with the proposal. At the Environmental Review, the Engineer for the project stated that he would prepare a design and submit it to the Soil Conservation Service. That information was never received. It is recommended that a design be prepared using TR55 if the watershed for the project is 2,000 acres or less or TR20 if the watershed is in excess of 2,000 acres.

The following information will be necessary for a complete TR-55 design:

- Watershed Map at a scale of 1" = 500, or larger. Show watershed boundary, subarea boundaries, and subarea names or numbers. (Optional - show Tc, CN, and Drainage Area for each subarea on the map) Contour maps must include some additional area outside the property line boundaries.

- Large scale map showing different soils within each subarea and subarea boundaries. May also be used to measure drainage areas. Could also show Tc calculation path used for each subarea.

- Tabulation sheet or computer printout showing Curve Number and Time of Concentration calculations for each subarea. Drainage areas, Hydrologic Soils Groups, and Land Use areas should be documented from soils maps or other references.

- Tabulation sheet showing calculations and equations used for any storage estimates to design a detention basin or other misc. calculations.

- TR-55 printout showing graphical or tabular peak discharge calculations. Include printouts for both pre-development and post development conditions. The printout showing the design of a detention basin should be included. These printouts should document the zero discharge increase for all required storms.

- The written report should state the initial conditions and storm frequencies to be analyzed. Include a summary table showing the pre-development, post development, and designed system peak discharges for all design frequencies. Show a sketch of the structure outlet system with elevations and dimensions.

The following is required for a TR-20 review:

- TR-20 Watershed Map at a scale of 1" = 500, or larger. Show subarea boundaries, cross section locations and numbers, structure locations and numbers, and subarea names or numbers. (Optional - show Tc, CN, and Drainage Area for each subarea on the map) Contour maps must include some additional area outside the property line boundaries.

- Large scale map showing different soils within each subarea and subarea boundaries. May also be used to measure drainage areas. Could also show Tc calculation path used for each subarea.

- Tabulation sheet or computer printout showing Curve Number and Time of Concentration calculations for each subarea. Drainage areas, Hydrologic Soils Groups, and Land Use areas should be documented from soils maps or other references.

- Tabulation sheet showing calculations and equations used for structure stage-discharge-storage volumes and cross section elevation-discharge-area calculations.

- TR-20 printout showing input listing and a minimum output of the summary tables. The minimum required output is listings and summary tables for the pre-development, post development, and post development with control for all required storms. These runs must document the zero discharge increase for all required storms.

- The written report should state the initial conditions and storm frequencies to be analyzed. Include a summary table showing the pre-development, post development, and designed system peak discharges for all design frequencies. A "full print" printout of the TR-20 run is not needed in the report, only the input and summary tables. The full print output can be attached as extra material.

When the design is completed, the Soil Conservation Service working through the New London County Soil and Water Conservation District will be available to review it at the Towns request.

Erosion and Sediment Control Plan

The erosion and sediment control plan for the project was incomplete. It is recommended that the following information be provided with the plan:

A narrative describing:

1. the development;

2. the schedule for grading and construction activities including:
   a.start and completion dates;
   b.sequence of grading and construction activities;
   c.sequence for installation and/or application of soil erosion and sediment control measures;
   d.sequence for final stabilization of the project site.

3. the design criteria for proposed soil erosion and sediment control measures and storm water management facilities.

4. the construction details for proposed soil erosion and sediment control measures and storm water management facilities.

5. the installation and/or application procedures for proposed soil erosion and sediment control measures and storm water management facilities.

6.the operations and maintenance program for proposed soil erosion and sediment control measures and storm water management facilities.

A site plan map at a sufficient scale to show:

1. the location of and design details for all proposed soil erosion and sediment control measures and storm water management facilities;

2. the sequence for final stabilization of the development site.

7. Hydrology

Approximately 56 acres located in the southern parts of the site drains southward to Andersons Pond. The remainder of the site, about 353 acres drains to three unnamed northwesterly flowing streamcourses that are tributary to Miller Brook. Two of the three streamcourses mentioned in the preceding sentence occur in the western parts of the site, while the third is the outlet stream for the wetlands located in the northern parts of the property. Miller Brook, from its point of outflow at Lewis Pond (northwest of the site in Preston) drains an area of 8.23 square miles or about 5,300 acres.

Approximately 1/3 of the proposed lots or parts thereof are located in the drainage area that flows to Andersons Pond. The remaining ±50 lots lie within the Miller Brook drainage area.

The surface waters on the site have not been classified by the Department of Environmental Protection (DEP) Water Compliance Unit and are presumed Class A water resources, by default. Class A water resources may be suitable for drinking, recreational or other uses and may be subject to restrictions on the discharge of wastes, although certain discharges may be permitted.

Development of the site as proposed will lead to increases in the amount of runoff during periods of precipitation. These increases will result from soil compaction, removal of vegetation and placement of impervious surfaces such as roof tops, driveways and patios. The principal concerns with regard to increased runoff is the potential for flooding problems to downstream areas and streambank erosion and surface water degradation.

In order to thoroughly assess the potential changes in the overall drainage patterns, resulting from the proposed subdivision, pre- and post-development calculations need to be computed and submitted to the town for their review. The applicant's engineer should use one of the methodologies prescribed in the Connecticut Soil Erosion and Sediment Control Handbook (1985, as amended). Also, a town official noted during the fieldwalk that a 100 year frequency storm (post-development conditions) is required to analyze the runoff from the new road and to use this information in the sizing of the road drainage structures. The culvert(s) passing under Miller Road that drains the ±56 acre area in the southern parts should be analyzed to ensure they can adequately handle post-development runoff conditions from this section of the subdivision. None of the storm drainage calculations were made available to Team members on or following the field review.

Due to the site conditions (e.g., moderate to steep slopes), the amount of land disturbance anticipated and the proposed density of the development, the potential to degrade surface water on- and off-site during and following development is high. Therefore, it is imperative that erosion and sediment (E&S) control measures be properly installed and maintained. The town must police E&S control measures on a regular basis. E&S controls should be left in place until each phase of construction is stabilized through one growing season. A detailed E&S control plan that is properly enforced will minimize the

potential adverse impacts to water resources on- and off-site and reduce complaints from downstream neighbors.

During the construction period, control measures, including silt fences, haybales, temporary/permanent sediment basins which permit settling time for suspended solids, anti-tracking devices and minimizing land disturbance, should be used to minimize environmental damage to on- and off-site wetlands and watercourses. The Connecticut Guidelines for Soil Erosion and Sediment Control (1985, as amended) should be closely followed with respect to the E&S control plan.

There exists a potential for degrading surface water on- and off-site following development of the property by road and driveway runoff, floating solids, road salt, oils, greases and road sand. Best Management Practices (BMP's) should be developed and implemented to minimize this potential problem. Examples of such practices include: **(1)** using catch basins equipped with hooded outlets and sumps for trapping sediments and floatables; **(2)** implement a regular maintenance program that includes cleaning catch basins and road sweeping following the winter months; and **(3)** restrict de-icing salt application to a lean 7:1 sand-salt mix ratio. In order to protect surface and groundwater resources on and near the site, consideration should also be given to prohibiting the use of underground fuel storage tanks in the subdivision.

It is estimated that about 660 linear feet of the new subdivision road (not including potential driveways and open space access road) will need to cross regulated wetlands in 4 places. The proposed road layout appears to have been designed to minimize wetland impacts on the site.

It should be noted that no details for the road crossings were available to team members on the review day. Except for the most extensive wetland crossing, which is about 300 feet (near Lots 1 and 47). the remaining 3 wetland road crossings appear feasible, but only if they are properly engineered. They should be constructed adequately above the surface elevation of the wetland. This will allow for better drainage of the road and decrease the frost heaving potential. All wetland crossing construction activity should be done during the dry time of year and should include provisions for effective erosion and sediment control. Any unstable, or mucky material should be removed and replaced with a permeable road base material. The ±300 foot wetland crossing near Lots 1 and 47 will need to cross Aa soils (Adrian and Palms Mucks). Because of their mucky composition and because the water table is at or near the ground surface most of the year in this area, road construction through this area will be extremely difficult and as such should be avoided, if possible. It is suggested that an alternate road route be considered for this area. (Also see **Wetland Resource Concerns** section of this report)

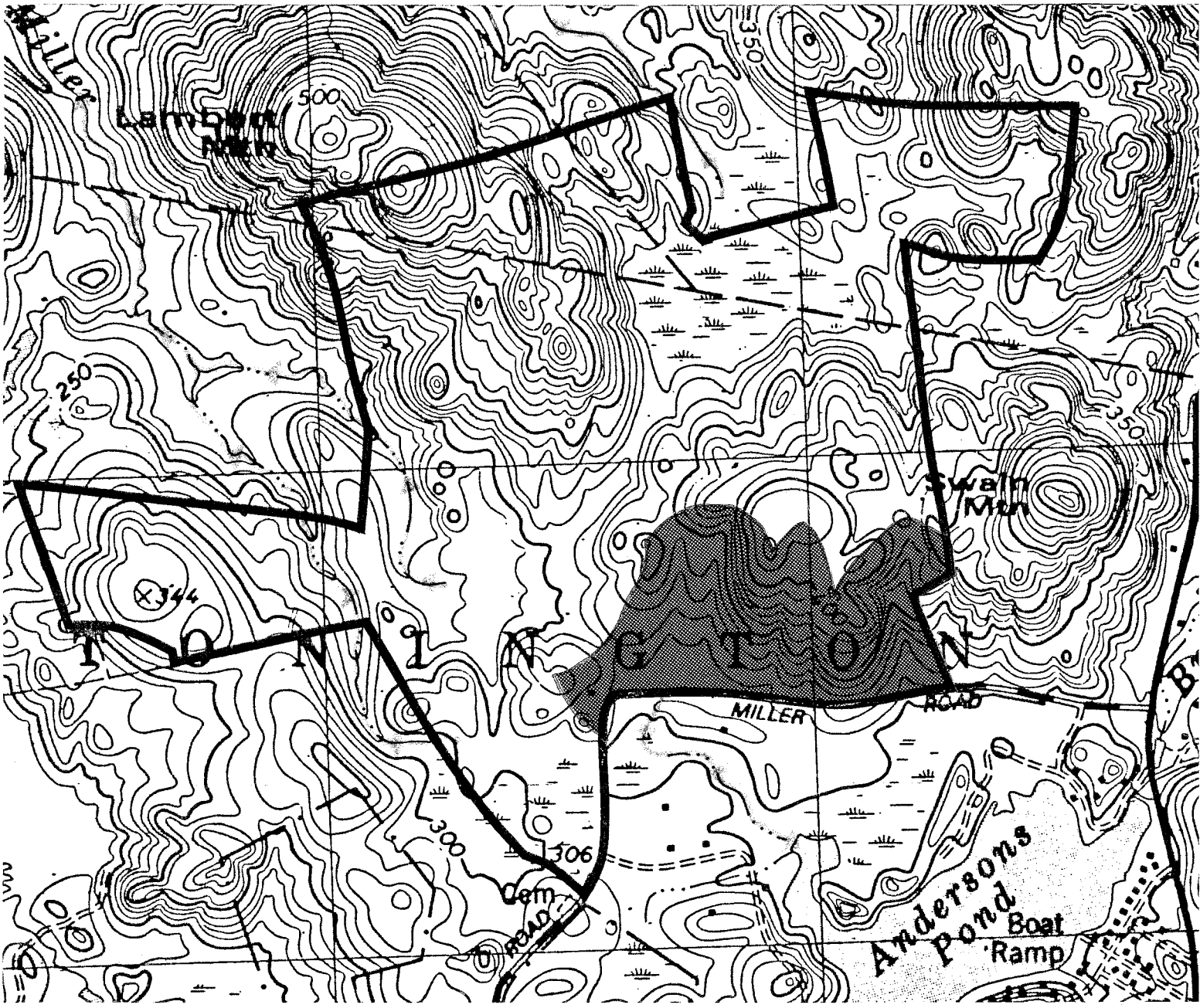
WATERSHED BOUNDARY

Scale 1" = 1000'

Portion of the site that drains to Miller Brook

Portion of the site that drains to Andersons Pond

Watercourses showing direction of flow



8. Wetland Resource Concerns

Site and Project Description

The site under review is a ±409 acre parcel of rolling hardwood forest, forested seepage swamps and several small watercourses. The wetlands and watercourses associated with the site are primarily headwater areas which flow in several directions. These wetlands are densely vegetated and are classified by the Fish and Wildlife Service National Wetlands Inventory as follows:

PFO1E Palustrine, forested, broad leaved deciduous, seasonally saturated.

PSS1E Palustrine, scrub/shrub, broad leaved deciduous, seasonally saturated.

The site has had little previous disturbance except for some past agricultural and logging activities.

The proposed development will consist of 75 single family residential house lots which will be served by on-site water and septic systems. These lots will be accessed by a looped roadway system with several cul-de-sac branches. Presently the lot sizes vary from 1.8 to 16.2 acres depending upon topography, presence of bedrock outcrops and wetlands. The roadway system will make four crossings of wetland or watercourse areas. The northern portions of the parcel which lie in the towns of Preston and Griswold are presently not proposed for development or designated as open space.

Project Impacts and Recommendations

Due to the preliminary nature of the project design at this time a thorough discussion of the overall project impacts is not possible. However, the following impacts can be anticipated from any project of a similar size and design as that being proposed. The crossings of the wetland and watercourse areas will require some degree of filling which will vary depending upon the type of crossing structure used, (pipe culverts, box culverts, bridges, etc.). During the field walk of the site the applicant's engineer indicated that they anticipated using pipe culverts for all of the crossings. This crossing technique would require a a relatively high degree of fill and would permanently obstruct the natural corridor of the wetland or watercourse for wildlife use. Given the size of the lots it is not anticipated that much, if any, filling will be necessary for the construction of house foundations and septic systems. Again, due to the limited resource information regarding soil suitability and presence of bedrock for parts of the site it is not possible to anticipate problems and impacts. The last area of significant concern is that of the water quality impacts which will by caused by the development. A planning and zoning requirement for curbing of all subdivision roads will force the applicant to install a gutter and piped

stormwater management system with point discharges. Such a system would be gravity driven and discharge at low points in the landscape such as wetland and watercourse areas. This situation could lead to long term impacts to the wetlands from the deposition of sediments, increase in nutrient loads and increases in velocities and volumes of water reaching the wetlands.

Based upon this brief discussion of some of the anticipated impacts from the proposed development and the acquired field information the following comments and recommendations are made for consideration in the design and evaluation of alternatives for the site.

1) The commission should request that the applicant complete the resource inventory and assessment for the site. Due to the presence of bedrock outcrops and shallow soils over much of the site some alternatives to house locations, roadway design and lot size may not be prudent or feasible. A thorough inventory of the existing conditions over the entire site will aid the commission in the evaluation of the project.

2) A reduction in the number of lots proposed should be examined as a feasible and prudent alternative for the site. The combination of topography, shallow soils and bedrock outcrops and expansive wetland and watercourse areas will make development of some of the lots in the preliminary design difficult. A design which combines some of the proposed lots adjacent to wetlands and watercourses to provide for larger buildable areas may be very prudent. Overall, a reduction of 10 to 15 lots could greatly reduce the potential for impacts to the wetlands found on site. Additionally, fewer lots will enable the design to maintain the Wetland Commission's desired 100 foot buffer from wetlands and watercourses.

3) In instances where the crossing of watercourses is necessary, (cul-de-sac to lots 7 & 8, roadway between lots 11 & 53), a box or arch culvert is recommended rather than the proposed pipe culvert crossings. The arch or box culverts, while requiring a comparable degree of construction disturbance, will provide a more open corridor for wildlife and maintain a greater amount of wetlands and habitat area.

4) Lastly, the applicant should petition the Planning and Zoning Commission for a variance to the requirement for curbing of all streets. If such a variance were granted the applicant would then be able to allow most of the stormwater to leave impervious areas via sheet flow rather than a gutter and pipe system. Overland sheet flow of stormwater provides better renovation, improved water quality, reduced water velocities in watercourses and reduced volumes of water within wetlands and watercourses due to infiltration. This modification combined with reduced numbers of lots and increased lot sizes could provide the greatest mitigation to the development of this site. The town's commissions should consider this factor during the evaluation of any proposed project on this site.

9. Water Supply

Since municipal water mains are not available to the site and vicinity, each of the proposed lots will need to develop individual on-site wells. The principal aquifer on the site is the underlying bedrock (Preston Gabbro). The surficial geologic materials, till and stratified drift, which are found on the site are sometimes capable of yielding usable amounts of water to a well. However, on the site the till appears to be too thin and generally has low permeabilities and seasonal water tables. As such, during the dry time of year (summer and fall) the water table may recede below the bottom of the well resulting in a dry well. Although their permeabilities and aquifer potential are usually higher, the stratified drift deposits on the site appear to be limited by thickness and areal extent and therefore would not be desirable for ground water development.

In light of the preceding discussion, the water supply for each lot would therefore need to be derived from 6 inch diameter drilled wells that are cased with steel pipe firmly into solid rock and completed as open bore holes in the Preston Gabbro.

Yields from bedrock wells depend upon the number and size of water-bearing fractures that are intersected by the well(s). Density and size of fractures in different bedrock zones vary widely, but in general, occur within the first few hundred feet of the bedrock surface. As such, it is usually not necessary to go much deeper than a few hundred feet for drilled wells. In fact, studies have shown that the chance for obtaining greater yields decrease with depth. The presence of fault zones on and in proximity to the site may, in places, result in higher than normal yielding wells since these (fault) zones tend to be groundwater conduits and zones of higher permeabilities. Because the distribution of fractures in bedrock is irregular, there is no practical way outside of expensive geophysical testing of predicting the yield of a well without drilling it first.

A review of well completion reports for domestic water supply wells serving three homes on Miller Road indicate yields of 1, 3, and 5.25 gallons per minute. All tap the Preston Gabbro. Their respective well depths were recorded at 500 feet, 300 feet, and 97 feet, respectively. The static water level in the wells measured from land surface ranged from 8-21 feet. This is important since the well casing provides water storage in addition to the water storage tank in the house. A general rule-of-thumb is that there is about 1.5 gallons of water per foot of well-casing for a 6 inch diameter well. For these 3 wells, water storage available in the well-casing ranges from about 100 gallons for the 97 foot well to 700 gallons for the 500 foot well. A yield of 3 gallons per minute of more is usually an adequate amount of water for residential demands.

The use of any well, or group of wells, can be expected to result in some lowering of the water table. Since the average recharge rates will exceed the water demands of the low density residential development (about 2 acres or greater), and since a portion of the renovated domestic wastewater will steadily percolate downward to recharge the bedrock, there is no reason to expect that the development of domestic wells on the "Mountain Laurel Estates" site will result in a progressive lowering of the water table.

Every effort should be made to locate wells on a relatively high portion of the lot properly separated from the on-site septic system or any other potential pollution sources such as road or yard drainage, curtain drains, and roof gutter leaders. Also, they should be located in a direction that is opposite the expected groundwater movement. Generally speaking, groundwater flow mimics surface flow on the site. All wells should be cased with steel pipe into the underlying bedrock and properly installed in accordance with all applicable State Public Health Codes and Connecticut Well Drilling Board regulations to provide adequate protection of the quality of bedrock water. The sanitarian must inspect and approve all well locations.

The shallow to bedrock conditions that characterizes the site underscores the need for proper well construction and septic system design, installation and maintenance.

The natural quality of well water should be satisfactory. A review of five water quality reports for existing residential wells on Miller Road that tap bedrock indicates satisfactory drinking water quality for chemical, physical and bacteriological parameters except one well which reported a low pH (5.5). The concern here is that the water may have a tendacy to be corrosive.

The Department of Environmental Protection's Water Quality Classification Map of Connecticut, J.E. Murphy, 1985, indicates that groundwater beneath the entire site is Class GA. A Class GA water resource means that it is suitable for private drinking water supplies without treatment.

10. Sewage Disposal Systems

Since municipal sewer mains are not available in the area, each lot in the proposed subdivision will need to be served by individual on-site septic systems.

Subsurface exploration for on-site sewage disposal feasibility, which included 191 deep test holes and 109 percolation tests were performed by Denis Miller and Associates, Consulting Engineers for the applicant. Deep test holes were excavated throughout the parcel and, in general, ranged between 1.75 feet and 8.3 feet. Generally speaking, the test holes encountered topsoil 5"-8" thick, a weathered or rooted subsoil zone, 18"-36" thick, then till or refusal (bedrock). Gravelly deposits were encountered in a handful of test holes that mainly occurred along Miller Road. These subsurface conditions coincide with soil and geologic mapping data for the site and vicinity. Ledge rock, which was encountered at depths 7 feet or less, was reported in 44% of the test holes excavated (84 out of 191). The widespread presence of shallow to bedrock soils across the site will be a very important design constraint with respect to onsite sewage disposal. As noted earlier, the potential for groundwater contamination is enhanced when septic systems are installed in areas of shallow bedrock.

Twelve and a half percent (12.5%) the deep test holes excavated on the site intercepted a shallow water table condition (36" or less to the ground water table). Additionally, soil mottling less than 36" from ground surface was commonly reported in the deep test holes. This indicates a potential seasonally high water table condition. The seasonally high water table is probably resulting from the thin soil coverage and undulating nature of the bedrock surface that creates shallow, depressional features which collect pockets of ground water following periods of precipitation. Seasonally high water table conditions will also be an important design constraint in terms of on site sewage disposal. The Public Health Code requires that at least eighteen inches of soil separate the bottom of the leaching system from the maximum ground water level, Lots indicating seasonally high water table conditions should be monitored through a wet season (spring months).

Because of the shallow to bedrock conditions that include large areas of continuous ledge rock outcrops, there is always a concern for having a sufficiently large suitable area for sewage disposal installation. In order to accurately determine that such an area, in fact, would be available, a sufficient number of deep test holes are needed on individual lots for ledge profile. For a residential septic system, the depth to ledge rock should be determined at 3 or 4 locations within the area of the proposed leaching system; and at one or more locations down gradient from the system. There should be no ledge outcroppings within 50 feet downslope of the leaching system. Present plans include the mapping of ledge outcrops which will help to ensure that this separation distance is accomplished.

In the central and eastern parts where continuous ledge outcroppings are common, a greater number of deep test holes will probably be necessary. Also,

consideration should be given to digging a test hole in the area of the proposed septic tank, in order to avoid possible installation problems.

For the purposes of sewage disposal ledge rock would need to be at least 4 feet below the bottom area of any leaching system. The State Health Code prohibits the issuance of sewage disposal permits where there is less that 4 feet of existing soil over ledge rock. This does not mean that no sewage disposal system could ever be built at this location but that the necessary fill must be placed, compacted, and tested before the final sewage disposal plan is approved and a building permit issued. This puts the "burden of proof" on the applicant to demonstrate that the site improvements can be made. It should be noted that the State Health Code requires that there be at least 2 feet of natural soil over ledge.

Because of the likelihood of rock being encountered at varying depths, leaching systems no doubt would need to be kept shallow or spread out over a wider area. Ideally lots should be at least 200 feet wide. Depending on contours and septic system placement, it may be difficult at times to provide necessary lateral leaching area following natural contours while maintaining all required separating distances.

Because of the shallow to bedrock soils and ledge outcrops that characterize the site, any earth cuts for the access road or driveways are likely to encounter bedrock, quite possibly necessitating blasting. Where an exposed ledge face occurs down gradient from the rock cut the prescribed 15 foot embankment setback is insufficient. The concern here is that partially treated sewage effluent may break out at the rock cut creating a public health hazard condition. Therefore, it is recommended that a minimum setback of 75 feet be maintained from any rock cut area and any portion of a septic system (including reserve leaching areas) particularly if catch basins for road drainage are in the vicinity.

Due to change in elevations across the site, there is a chance some lots may require that septic tank effluent be pumped to a higher elevation on a particular lot. Every effort should be made to utilize gravity flow septic systems instead of pumped systems even if it means rearranging lot lines. However, if this is not possible, it is recommended that systems which require a pump be so noted on the subdivision plan.

Overall, the site is not well suited for on-site sewage disposal. This is mainly due to the shallow to bedrock soils and seasonally high ground water table conditions. Additional soil testing is always required when hostile conditions such as shallow to bedrock soils prevail in order to confirm subsurface conditions and site suitability for on site septic systems. Due to the shallow to bedrock soils that characterizes the central and eastern portions of the site, extreme caution needs to be exercised for this area with regard to septic.system placement and location of the ledge rock surface. Once all testing and ground water monitoring is completed, it seems likely that a number of lots may need to be eliminated or combined with adjacent ones to reduce the overall density and provide more assurance for proper sewage disposal and well protection. Because of the hostile subsurface conditions (shallow bedrock soils and seasonally high ground water levels), it is probable

that a very high percentage of the proposed lots will require detailed plans prepared by registered professional engineer.

According to the Department of Health Services' publication "Design of Subsurface Sewage Disposal Systems for Households and Small Commercial Buildings", all subdivisions containing 25 or more lots located in an area with underlying rock less than 7 feet deep should be served by a public community water supply. A review of deep test hole data with respect to the pre-lot layout indicates that a community water system will need to be considered for the development. Further soil testing and reconfiguration of present lot lines may result in the elimination of this consideration, but it is likely that a reduction in the number of lots would be necessary.

Under this type of arrangement (a community water supply system), the applicant must obtain a "Certificate of Public Convenience and Necessity" from the Department of Public Utility Control (DPUC) and Department of Health Services (DOHS). The applicant should contact Richard Albani, DPUC, at 827-1553 regarding this matter. The well or wells for the subdivision would be classified as a public water supply and would require approval for well locations by the DOHS, Public Water Supply Section in conjunction with the local health department. If this arrangement is considered, the DOHS should be contacted as soon as possible regarding the proposal. Water quality, yield and plans for pumpage, storage and distribution must be reviewed and approved by DOHS, Public Water Supply Section. Consideration will need to be given in advance to provide for proper operation and maintenance of the community water supply system (i.e., takeover by a private or municipal water supply company). Maintaining the pumping capacity of the well under 10 gallons per minute will require a 75 foot sanitary radius around the well. Pumping rates greater than 10 gallons per minute will require a sanitary radius of 150 feet or more.

As a precautionary measure, the septic system and well serving the Steinnagel property on Miller Road should be located and superimposed onto the subdivision plan relative to the siting of the proposed septic systems and wells serving Lots 47, 64, and 65 to ensure that all applicable Public Health Code separating distances are complied with.

11. Blasting Concerns

A major consideration with respect to the widespread presence of shallow to bedrock soils on the site is the potential for blasting. It seems likely that there is a good chance that where bedrock is encountered during excavation for roads, house foundations and/or driveways blasting will be necessary. Blasting requires great care and the strict supervision of persons experienced with modern blasting techniques to ensure no damage occurs to surrounding properties from undue seismic shock or airblast. A pre-blast survey should be implemented with the project, focusing on the homes closest to the site, mainly along Miller Road. A pre-blasting survey radius that ranges between 500 and 1,200 feet is generally used. The exact pre-blasting survey radius for the site will depend upon the blasting requirements for the site and the density of homes and other structures in the area. If there are any domestic wells nearby, background information concerning their water quality and quantity should be collected and documented in case there are post-development changes in surface or groundwater in the area. In addition to the aforementioned concerns, deep earth excavations that requires blasting will increase site development and engineering costs. As such, the road system should be designed to avoid deep earth cuts.

Since blasting can increase fracture porosity in the bedrock and rupture well casing or seals, every effort should be made to complete as much of the blasting prior to drilling new wells in the subdivision. This would include extensive driveway cuts and blasting required for house foundations. Development of a community well(s). remotely removed from blasting areas would minimize the potential for well pollution problems.

12. The Natural Diversity Data Base

The Natural Diversity Data Base maps and files have been reviewed regarding the "Mountain Laurel Estates Subdivision" in North Stonington, Connecticut. According to the information, there are no known extant populations of Connecticut "Species of Special Concern" or Federal Endangered and Threatened Species that occur at the site in question. Also, in regards to the concerns expressed by the town officials, our information indicates that there are no current or historic records of Timber Rattlesnakes from either North Stonington, Stonington, Preston or Griswold.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to the Data Base at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultation with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact the Natural Diversity Data Base if you have further questions (566-3540).

13. Vegetation

Most of the area designated as part of this subdivision received some sort of harvest in the late 1970's. It appears that is was a "diameter limited" harvest where all the trees over a certain diameter, probably 14 inches, of suitable timber quality were harvested. This was followed by a fuelwood harvest in all but the roughest areas that cleaned up the remaining "topwood" plus many of the broken and damaged trees. Because of these practices, the woods appear in good condition at this time.

Because of the type of harvest, many suppressed, slow growing trees were left behind which, although it was a poor silvicultural practice, the remaining stand is pretty healthy and wind firm. Because the oaks were the most desired timber species they made up the majority of the trees removed, and although oak is still the most common tree, the higher percentage of hickories, birches and maples that remain, make the area a little less susceptible to serious gypsy moth defoliation.

There are four general forest types in this area; swamp, poorly drained lowland hardwoods, upland mixed hardwoods and oak ridge tops.

Swamp - is associated with peat muck soils. Tree species are red maple with some American elm and yellow birch around the edges. Spicebush, sweet pepperbush and highbush blueberry are common in the understory.

Lowland hardwoods - this might also be called a red maple stand as red maple is the dominant species. Black gum, yellow birch and American elm are common with black birch, scarlet oak and white oak along the edges. The understory is mostly sweet pepperbush with some spicebush, highbush blueberry and various viburnum. Mountain Laurel is only found in a few secluded areas of this type and greenbrier, although scattered, is common.

Upland mixed hardwoods - this is the most diverse type on the site in terms of both the tree species and the land form. This is the area where most of the harvesting took place and is also the area where most of the proposed building will take place. This is an area of skid trials and openings created by the harvest. There are truck logging roads criss-crossing the area giving good access.

Although oaks, hickory and maple were cut in the area, the overstory is still predominantly black/scarlet oak with many hickories, birches and maples. Less important species would include yellow birch, sassafras, American beech, tulip popular, American horn beam, large tooth Aspen and a few butternuts.

The forest understory, road sides and small forest openings include seedling-saplings of all the trees species plus blackberry, goldenrod, arrowwood and mapleleaf viburnum, Witch Hazel, American hazelnut, ironwood and horn beam. Wild carrot grasses, asters and other wild flowers were present along the road edges.

Associated with this type are a few acres of old field type on the side nearest to Miller Road. The tree species are mainly black-scarlet oak with some red maple, black and gray birch, sassafras and red cedar. Grasses and high bush blueberries are the main understory species.

Oak ridge - this type is typified by scarlet and white oaks growing on soils that are very shallow to bedrock. Some stunted black birch is also usual.

Because of the poor site the resulting trees are extremely slow growing and of little lumber value. Usually the sites are left uncut but are periodically rejuvenated as the result of a wildfire or mortality caused by insect attack. This type is prevalent near the tops of ridges such as the one west of Swain Mountain and the southeasterly ridges of Lambert Mountain. Even though the soils are shallow these trees are quite wind firm because:

1. They often anchor themselves to the rock and,
2. Because they seldom obtain very much height.

Although there were no house sites on the plans shown and Team members had only a sketchy perception of where the roads would be, it would appear that houses and house lot clearings would not infringe either on the wetland or the oak ridge type (shallow to bedrock). Therefore, the relatively small trees left following the harvesting are quite windfirm on most sites. Barring changes in water courses or water levels, the Team Forester feels that this should be quite a stable development in terms of tree loss or breakage. There are a few dead trees that could be potentially dangerous but they could be easily removed.

Many of the larger lots, if properly managed, could easily supplement the heating needs of the home owner. A ten acre lot usually can provide two or more cords of wood per year forever without ever depleting the lot.

14. Planning Review

The proposed subdivision would create 75 residential building lots and approximately 2 miles of residential street.

The Regional Development Plan (1987) depicts this area as being suitable for Low Density Uses, which are residential uses at less than one unit per 1.5 acres; agricultural; open space, recreational, and water supply uses. This classification includes the land area in all three towns (North Stonington, Preston, and Griswold).

The Town of North Stonington Plan of Development (1990) has this area classified into two categories. The western potion of the property is classified as suitable for Low Density Residential Uses. The eastern portion of this property is classified as a Wilderness Area which includes the prominent hill on the site and is due in part to the sites rugged and scenic features.

The Town zoning classification for this area is Residential requiring a minimum lot size of 80,000 square feet per dwelling unit. The southern edge of this property also includes a Aquifer Protection Overlay. The major impact of the Aquifer Protection Overlay on residential development is:

1) no underground fuel storage, **2)** no part of a subsurface sewage disposal system shall be located closer than 50 feet from a surface watercourse, **3)** residential domestic sewage shall not exceed 360 gallons per acre per day.

The Subdivision

The proposed subdivision includes an open space parcel of approximately 65 acres which is located in the northeastern corner of the parcel. The majority of this open space parcel is located within the Town of Griswold. The open space aspects of the proposal seem appropriate primarily due to the large average lot sizes. The open space area generally represents a sensitive area that would be conserved by the open space designation.

Additionally, their are approximately 60 acres of remaining lands located in the northwestern corner of the parcel which would have some potential for future development. The plan depicts access to this parcel from one of the proposed cul-de-sacs. An addition access point to this area would enhance the future development potential of this parcel.

The proposed road layout generally utilizes the least steep slope areas while providing overall access to the parcel interior. The potential emergency vehicle access problems of the numerous cul-de-sac spurs are off-set by their short length.

A major concern with the present road layout is at its intersection with Miller Road. At both of the proposed intersections sight clearance distance

seems inadequate looking toward the sharp curve in Miller Road (north or east).

At the intersection of Miller Road and the proposed Baldwin Road the sight distance south is adequate providing a sight distance of approximately 225 +/- feet. The sight distance north is more limited at approximately 100 +/- feet due to the curve in Miller Road. Miller Road also slopes downgrade from the curve towards this proposed intersection. As such, relocating the intersection further south will not be beneficial as the downgrade slope would further hamper sight clearance.

At the proposed intersection of Road A and Miller Road the sight distance east is adequate providing approximately 250 +/- feet of sight distance. The sight distance westerly is inadequate at approximately 75 +/- feet due to the same Miller Road curve. At this location the proposed road may be able to be relocated further east which would increase the sight distance making for a safer intersection.

Both of these sight distance concerns are more pronounced in the field than they are on the subdivision plan.

Additional concern exists due to the absence of test pits on every lot or test pits located within the area of proposed septic systems. Also a few of the lots such as numbers 5, 40, and 41 seem to have extensive wetland areas on them while the non-wetland areas are irregularly shaped to a degree which may create building problems. Such lots need special attention.

Traffic Concerns

The proposed 75 residential lots have the potential to generate approximately 698 trips* to and from the site each day. This would result in an A.M. peak hour flow of approximately 56 trips and a P.M. peak hour flow of approximately 75 trips.

It is generally expected that a majority of this traffic will travel east to access Route 201, although it is very possible that a significant percentage of the vehicles will travel south to access Northwest Corner Road and then west to Route 165.

In either situation the narrow width of Miller Road and the sharp curve which exists in the area of the proposed subdivision represent traffic flow concerns which should be addressed by the applicant. These concerns will be further expanded with any development of the 60 acres of remaining land in this subdivision.

A complete traffic study and evaluation of the proposed intersections and options should be submitted for the Commissions consideration.

**National Cooperative Highway Research Program Report 187.*

15. Archaeological Review

Onsite review of the project area revealed two historic features that should be considered within the development process. First, a two story chimney cape, ca. 1725, located on Miller Road may possibly be the Baldwin residence. The property appears to be of historic and architectural significance and would appear to qualify for the National Register of Historic Places. The house is nicely situated with mature tree species providing a remote rural ambience for the property. It is critical that this pristine rural character be maintained as part of any proposed development. The historic cemetery, also on Miller Road, borders the project area. However, an extensive wetland separates the cemetery and nearest proposed house site. As a result, there should be no impact on the cemetery or its surrounding rural character. As the cemetery appears to be relatively unkept, it is recommended that the town and adjacent property owners conduct some maintenance at the site. Overgrown grass and weeds may not only obscure the cemetery, but, may invite vandals.

Local folklore and town histories suggest that Native Americans utilized Swain Mountain. No known archaeological excavations have been conducted in the area so it becomes difficult to predict the archaeological visibility of the settlements and activities that occurred there in the past. As a result, we highly recommend that a professional archaeological reconniassance survey be undertaken to locate and identify any prehistoric and historic remains in the Swain Mountain area. In addition, the project area contains numerous outcroppings of bedrock that could have served as shelters for prehistoric human occupation. Under these natural ledges we often are able to locate temporary camp sites associated with various hunting and gathering activities. Their proximity to extensive wetlands would enhance to potential of finding archaeological evidence of these sites.

A professional archaeological survey is strongly recommended for Swain Mountain and all natural ledges surrounding the wetland areas in order to locate and identify all prehistoric and historic resources which might exist in the project area. All archaeological studies should be undertaken in accordances with the Connecticut Historical Commission's **Environmental Review Primer for Connecticut's Archaeological Resources.**

The Office of State Archaeology is prepared to offer the Town of North Stonington and the landowner/developer technical assistance in conducting the survey and reviewing the findings.

In summary, the project area has historic resources of possible significance in the Baldwin house and remains and the cemetery on Miller Road. It is recommended that the cemetery be maintained. A field survey should be conducted to locate all Indian sites. All feasible efforts should be undertaken to identify and ensure the preservation and conservation of the cultural resources in the project area.

ABOUT THE TEAM

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a varety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, soil 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 region.

The services of the Team are 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, landfills, commercial and industrial developments, sand and gravel excavations, 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 official 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 and the ERT Coordinator. A request form should be completely filled out and should include the required materials. 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 and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 203-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.