

**PROPOSED
CULTURAL/ENVIRONMENTAL CENTER
GUNNTOWN ROAD**

NAUGATUCK, CONNECTICUT



**KING'S MARK
ENVIRONMENTAL REVIEW
TEAM REPORT**

King's Mark Resource Conservation and Development Area, Inc.

PROPOSED
CULTURAL/ENVIRONMENTAL CENTER
GUNTOWN ROAD

NAUGATUCK, CONNECTICUT



Environmental Review Team Report

Prepared by the
King's Mark Environmental Review Team
of the King's Mark
Resource Conservation and Development Area, Inc.

for the
Committee for a Cultural Environmental Center -
Guntown Road
Naugatuck, Connecticut

September 1996

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I would also like to thank Leonard Yannielli, Vaneza Gouveia, and Casey Knittel of the Committee for a Cultural/Environmental Center - Gunntown Road for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with a general location and soils map. During the field review Team members were able to view a slide show and were given additional information, with a more detailed site map and location map being mailed to them at a later date. 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 plans 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. 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 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 King's Mark RC&D Executive Council hopes you will find this report of value and assistance in making your decision concerning this proposed cultural/environmental center.

If you require additional information please contact:

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Introduction

Introduction

The Naugatuck Committee for a Cultural/Environmental Center - Gunntown Road have requested an environmental review and natural resource inventory for the borough owned property on Gunntown Road.

The 39.3 acre parcel is located in western Naugatuck on the northwest side of Andrews Mountain east of Gunntown Road (see Figure 1). Long Meadow Pond Brook traverses the property in a northeasterly direction. The property contains some open meadows and fields, wetlands and forested areas with steep slopes. An Algonquin gas pipeline also crosses the site.

The property was purchased by the Borough of Naugatuck several years ago for consideration as a site for a new school but these plans were dropped due to the large amount of wetlands on the site. More recently an active park plan was proposed for the site that included ballfields, basketball courts, etc. but this plan was also dropped due to the expense and citizen opposition (see Figure 2).

The Committee for a Cultural/Environmental Center - Gunntown Road, a local citizen's group, have as their aim the preservation of the town owned land as natural open space and to create a trail with an interpretive guide that will be used by the citizen's of Naugatuck. In addition to this goal they would like

to purchase the historic Gunn house which is adjacent to the town parcel to be used as a cultural/environmental center.

Objectives of the ERT Study

The Committee has requested assistance in conducting a natural resource inventory of the site and in providing information and recommendations for trail development and interpretive guides, maintenance and preservation of the land.

This report describes the natural/cultural resources present, discusses the significance of those resources, and addresses some planning and maintenance issues that should be of concern to the Committee and the Borough. Several of the Team members are available for further assistance as the planning, approval and implementation process proceeds.

The ERT Process

Through the efforts of the Committee this environmental review and report was prepared for the Committee for a Cultural/Environmental Center - Gunntown Road and the Town of Naugatuck.

The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources with regard to proposed plans;

3. Identification of possible resource problem areas and review of plans and other documentation;
4. Presentation of management and land use guidelines.

The data collection phase (inventory) involved both literature and field research. The field review was conducted on August 20, 1996. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

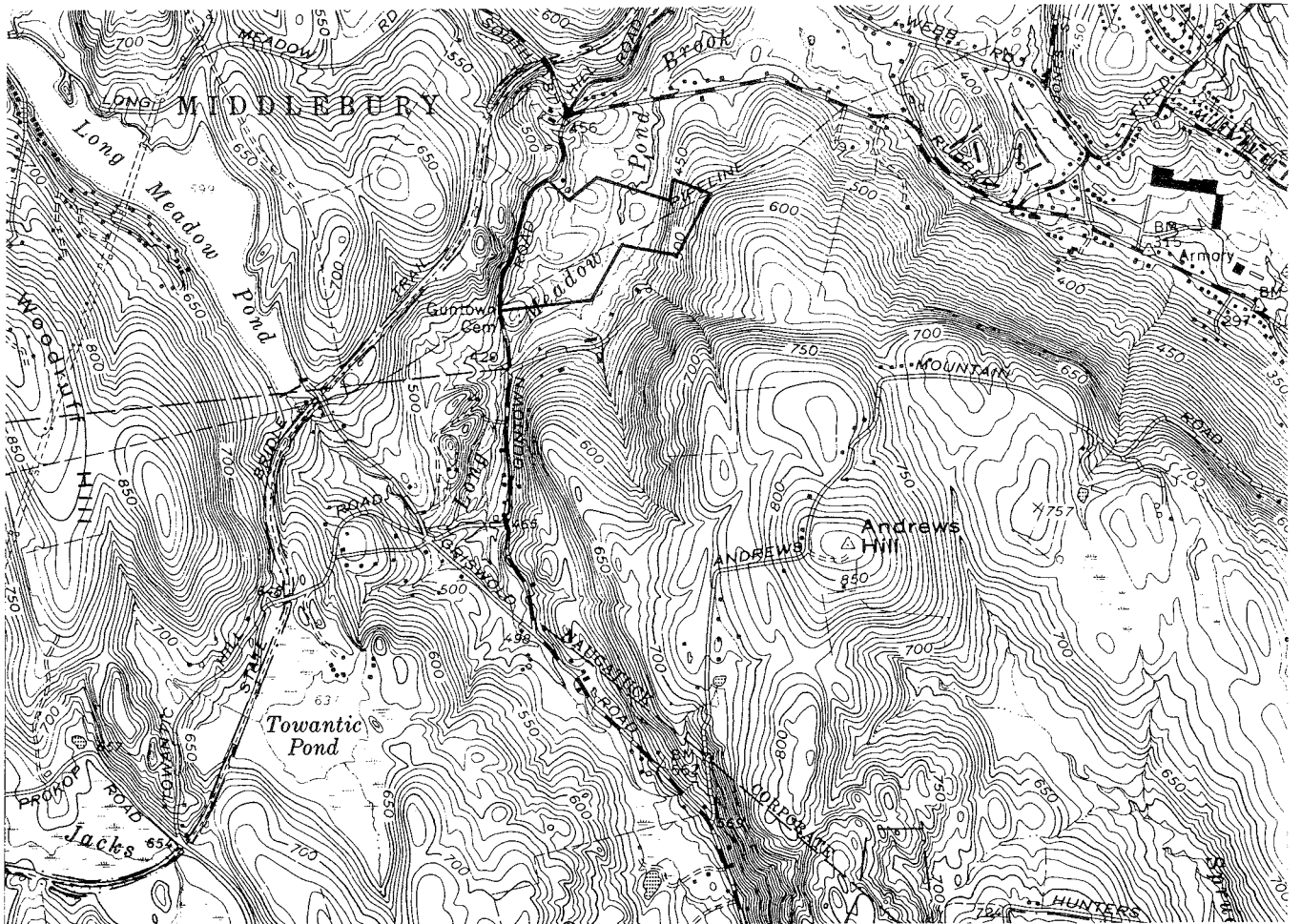
Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT Coordinator for compilation into this final ERT report.

Figure 1

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Site Location and Topographic Map

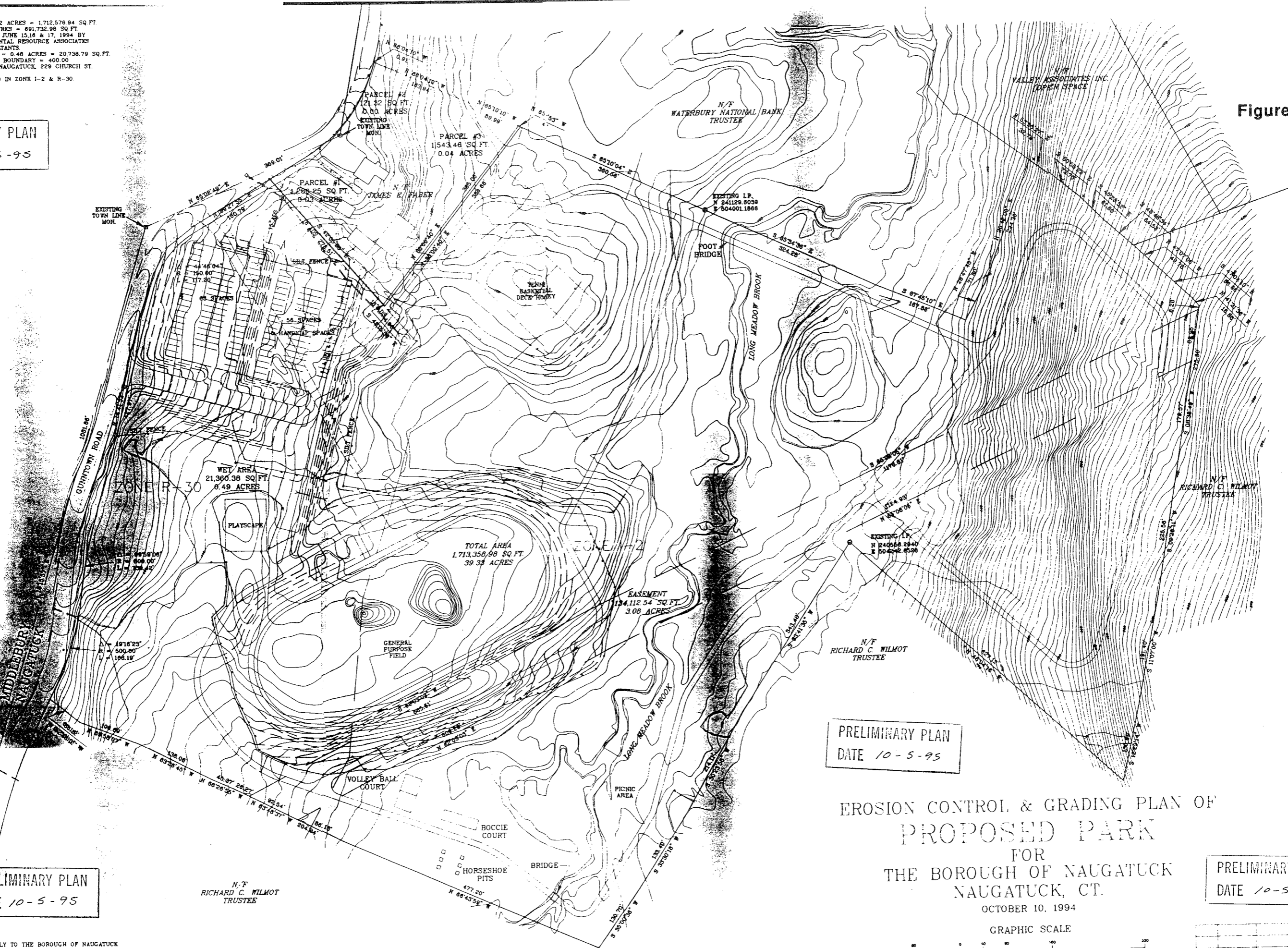
Scale 1" = 2000'



- NOTES
1. AREA OF TOTAL PARCEL = 39.32 ACRES = 1,712,576.94 SQ. FT.
 2. AREA OF WETLANDS = 15.86 ACRES = 691,732.98 SQ. FT.
 3. WETLANDS WERE DELINEATED ON JUNE 15, 16 & 17, 1994 BY MR. MARC BEROZ OF ENVIRONMENTAL RESOURCE ASSOCIATES SOIL & ENVIRONMENTAL CONSULTANTS.
 4. AREA OF THE PROPOSED POND = 0.48 ACRES = 20,738.79 SQ. FT.
 5. ELEVATION OF 100 YEAR FLOOD BOUNDARY = 400.00
 6. APPLICANT: THE BOROUGH OF NAUGATUCK, 229 CHURCH ST. NAUGATUCK, CT. 06470
 7. PARCEL IS CURRENTLY LOCATED IN ZONE 1-2 & R-30

PRELIMINARY PLAN
DATE 10-5-95

Figure 2



PRELIMINARY PLAN
DATE 10-5-95

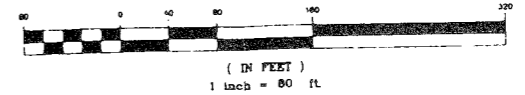
EROSION CONTROL & GRADING PLAN OF
PROPOSED PARK
FOR
THE BOROUGH OF NAUGATUCK
NAUGATUCK, CT.

PRELIMINARY PLAN
DATE 10-5-95

PRELIMINARY PLAN
DATE 10-5-95

OCTOBER 10, 1994

GRAPHIC SCALE



I HEREBY DECLARE TO AND ONLY TO THE BOROUGH OF NAUGATUCK THAT THIS MAP IS SUBSTANTIALLY CORRECT. THIS MAP AND SURVEY WERE PREPARED IN ACCORDANCE WITH THE STANDARDS OF A CLASS A-2 SURVEY AS DEFINED IN THE RECOMMENDED STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT AS PREPARED AND ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 13, 1984.

GEOLOGY

The town owned property on Gunntown Road is underlain by 10 to 30 feet of layered sands and gravel deposited by glacial meltwaters. This took place 14,000 years ago during the waning stages of the last major continental ice sheet to cover Connecticut. At the peak of the so-called *ice-age*, several thousand feet of ice blanketed the Naugatuck area. The sands along Long Meadow Brook accumulated between irregular stagnant ice blocks which clogged the center portion of the valley. When all the ice melted the present stream took up residence at the lowest point in the valley where ice had prevented sands and gravel from accumulating. Such deposits are common along most Connecticut valleys and where they are relatively continuous they are referred to as *kame terraces*.

The major breaks in slope on both sides of the valley mark the boundary between the water deposited sediments (the sand and gravel) and the veneer of poorly sorted glacial till that thinly veneers the bedrock on the valley walls. Till is rock material plucked, dragged and ground-up at the base of actively flowing ice. Flowing water plays no role in its deposition or transport. As a result it is extremely poorly sorted (fine silt-sized particles are dragged along by ice as easily as house-sized boulders), the individual grains are angular (no bouncing around in the gentle turbulence of a gurgling stream), and well compacted (the weight of several thousand feet of ice will do that to any sediment). The few large (10 feet in diameter) angular boulders at the base of the till slope on the eastern side of the property are excellent local examples of *glacial erratics*; large

blocks of rocks plucked from hilltops away to the north and carried, not at the base but high up in the ice itself. When the ice melted these boulders were dumped unceremoniously onto the ground surface directly beneath them.

No exposures of bedrock were seen on the property itself, but outcrops of a banded gray-colored biotite-feldspar gneiss are plentiful along Gunntown Road and on the steep hillside west of the study area.

The glacial geology of the Naugatuck Quadrangle is detailed in the 1979 Connecticut Geological and Natural History Survey Quadrangle Report (QR-35) by R. Foster Flint. The bedrock geologic story is to be found in another Connecticut Quadrangle Report (QR-9, 1969) by Michael H. Carr. Both should be available in the town library.

SOIL RESOURCES

The landscape of the site is dominated by sloping, excessively drained to poorly drained loamy and sandy soils on glacial outwash plains and terraces. This site is represented by the Agawam-Hinckley-Walpole general soils map unit. These soils formed in glacial outwash underlain by gravel and sand.

Agawam soils within this general soil map unit are deep, well drained, loamy soils underlain by sand and gravel at a depth of about 22 inches. They are nearly level to sloping and occupy broad terraces.

Hinckley soils are deep, excessively drained, coarse textured soils formed in sand and gravel. They are nearly level to sloping and occupy terraces of the narrow stream valley.

Minor soils within this general map unit are mainly Charlton and Rumney soils. Charlton soils formed in loamy glacial till and occupy small glacial till hills. Rumney soils are poorly drained alluvial soils on flood plains adjacent to streams.

More detailed map unit descriptions for each individual soil map unit found on the parcel are in the attached Appendix A, "Nontechnical Soils Description Report".

Two hydric soil map units have been identified on the parcel, Rn (Ridgebury, Leicester and Whitman extremely stony fine sandy loam) and Ru (Rumney fine sandy loam). Both of these soils are listed as State of Connecticut regulated inland wetland soils. Inland Wetland Units are represented on the "Erosion Control and Grading Plan of Proposed Park for the Borough of Naugatuck, CT., dated October 10, 1995. These units were delineated by Soil Scientist Marc Beroz of Environmental Resource Associates. These limits presented appear to be correct at the scale mapped. It would be recommended that the professional soil scientist sign final plans as to the accuracy of the representation of delineation.

The most dominant soil features of this site are the depth to bedrock (> 60 inches), the steep and extreme slopes of the soils located on the eastern side of the parcel and the either excessive amount of water (low lying areas) or the lack of water (uplands).

Included in this report are general planning tables useful for providing background information. These tables include "Soil Features", "Water Management Report", "Recreational Development Report", "Woodland Management Report", "Wildlife Habitat Report", "Water Features Report" and "Physical Properties of Soils Report". Each of these reports are followed by end notes, explaining the terms and limitations listed in each report. (They may be found in Appendix A.)

Overall, the parcel offers a wide divergence in soil types and soil potentials. Historically, the site was apparently used for small crops, orchard and pasture. Remnants of each still exist, e.g., trees, fences and

fields. The site offers a wide range of potential uses, including recreational and agricultural endeavors. Due to the extensive wetland system and the steep, stony areas, the site offers limited usefulness for development of structures without extensive site modification.

Specific Recommendations

- Regrade existing stockpiles of sand over area (old hay field) located southwest on the property. Blend in this area with existing grades and spread the second, smaller pile of topsoil over this area. Reseed, lime and fertilize according to standard soil tests. Seed to a grass/hay mixture. More detailed information on plant species and soil preparation can be obtained from the local conservation district office in New Haven (203-269-7509).
- It would be useful to set up a periodic mowing schedule of the open fields. Some fields are beginning to overgrow and could use a yearly mowing (brush hog) while others will respond better to a monthly mowing during the growing season. This would be ideal for maintaining the property until more definitive plans are approved for the site.

THE NATURAL DIVERSITY DATA BASE

The Natural Diversity Data Base maps and files have been reviewed for the project area. According to our information, there are no known extant populations of Federal or State Endangered/ Threatened or Special Concern Species that occur at the site in question.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us 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. Consultations 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.

Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEP for the proposed site.

VEGETATION

The 39.3 acre Gunntown Road Town Open Space property has excellent potential for the development of an interpretive nature trail. This property has high vegetative diversity which is reflected by it's high level of species richness. Development of a nature trail which takes advantage of this diversity will take a considerable amount of planning. The sensitive nature of the wetland environments which are present will need special design considerations which may be found elsewhere in this report.

The vegetation present on this tract of land falls into six broad categories. These include Hardwood Swamp, Open Fields, Mixed Hardwoods, Old Field, Shrub Swamp/Flood Plain and the Utility R.O.W. which is a transect of several of the above mentioned vegetation types (see Figure 4). The location and acreage of these areas were obtained from aerial photographs and are only approximate.

A. Hardwood Swamp. There are approximately 8 acres of hardwood swamp present within this property. These wetland areas are somewhat variable with all size classes and age classes of trees represented. Each wetland is dominated by red maple with occasional black gum, white ash, American elm, yellow birch, black birch and tulip tree intermixed. Red oak, basswood, sugar maple and shagbark hickory are present in the transition zone between this vegetation type and the mixed hardwood type. Several huge sugar maple, white ash and tuliptree are present in this transition

zone and located on the Forest Vegetation Map. A few of the larger trees in these wetland areas have cavities which make excellent den sites for many species of wildlife. Understory vegetation includes spice bush, shadbush, speckled alder, blue beech, eastern red cedar, highbush blueberry, red osier dogwood, swamp azalea, arrowwood, winterberry, multiflora rose, swamp rose and barberry. Skunk cabbage, false hellebore, tussock sedge, club moss, horsetail, sphagnum moss, poison ivy, Virginia creeper, green briar, cinnamon fern, Christmas fern, sensitive fern, evergreen wood fern, steeplebush, meadowsweet, wild geranium, marsh marigold, penny royal, Canada mayflower, rue anemone, wood anemone, Solomon's-seal, false Solomon's-seal, spotted wintergreen, trillium, violets, cinquefoil, dew berry, cleavers, Jack in-the pulpit, aster spp. and other wild flower species are present as ground cover. Due to the sensitive nature of the soils found in these areas, trails will have to be planned and developed carefully.

B. Open Fields. The open field vegetation type occupies about 7 acres of this tract. The vegetation which is present in these areas is dominated by grasses, sedges, wild flower and weed species. Their distribution is fairly uniform except for areas that have been disturbed. Some wild flower and weed species which were observed include daisy fleabane, ox-eye daisy, black-eyed Susan, milkweed, Joe-Pye-weed, white clover, Queen Anne's lace, cleavers, goldenrod spp. and ragweed spp.

C. Mixed Hardwoods. This mixed hardwood type totals approximately 7 acres and is located on the steeply sloped eastern portion of the

property. The trees which are present are growing well and are reasonably healthy. They range in size from small seedlings to moderately sized sawtimber (11.1" in diameter at breast height (d.b.h.) and larger). The larger trees range between 60 and 100 years of age. Yellow birch, tuliptree, black birch, sugar maple, white ash, red maple and red oak are the dominant overstory tree species. Understory vegetation includes hardwood tree seedlings, maple leaved viburnum, spice bush, eastern hophornbeam, American hornbeam, barberry, witch-hazel and highbush blueberry. Ground cover vegetation includes poison ivy, Virginia creeper, green briar, raspberry, dewberry, Canada mayflower, Indian cucumber, false Solomon's-seal, wild sarsaparilla, club moss, evergreen wood fern, hayscented fern, cinnamon fern, Christmas fern, sensitive fern, ground nut and wood anemone.

D. Old Field. The old field vegetation type occupies about 6 acres of this tract. The vegetation which is present in these areas is extremely variable. This is primarily due to soil moisture differences and the timing of the establishment and spread of hardwood shrubs and trees. Flowering dogwood, eastern red cedar, red maple, speckled alder, quaking aspen, multiflora rose, highbush blueberry, autumn olive, arrowwood, alternate leaf dogwood, choke cherry, black cherry, crab apple, apple, Tartarian honeysuckle and staghorn sumac are present generally in clumps throughout this vegetation type. Ground cover is comprised of grasses, sedges, ragweed, goldenrod, self heal, raspberry, cinquefoil, crown vetch, poison ivy, Queen Anne's lace, Joe-Pye weed, elderberry, morning glory, spirea and meadowsweet.

E. Shrub Swamp/Flood Plain. The shrub swamp/flood plain which is associated with Meadow Pond Brook transects this property and totals approximately 4 acres. This site is extremely rich in nutrients due to the seasonal flooding of Meadow Pond Brook. Patches of red maple seedlings, red osier dogwood, multiflora rose, black willow, American elm, speckled alder and hawthorn have become established and very dense in some areas. Many species of grasses and sedges are also present along with goldenrod, ragweed, jewelweed, Queen Anne's lace, Joe-Pye-weed, elder berry, spirea, smartweed, selfheal, deer tongue and blue cohosh. Seasonal flooding of this area and the need for bridges to cross Meadow Pond Brook may limit trail development through this area.

F. Mixed Hardwoods. This 4 acre mixed hardwood type is located on the western side of the property along Gunntown Road. Pole and sawtimber size red oak, white oak, scarlet oak, shagbark hickory, white ash, sugar maple, red maple, black birch, black cherry, sassafras and scattered tree-of-heaven are present. Hardwood tree seedlings dominated by sugar maple, white ash and cherry are scattered throughout this area along with locally dense clumps of barberry, multiflora rose, highbush blueberry and Tartarian honeysuckle. Herbaceous and woody groundcover consists of poison ivy, Virginia creeper, grape, raspberry, bittersweet, violets, Jack-in-the Pulpit, sensitive fern, Christmas fern, hayscented fern, Canada mayflower and club moss.

G. Utility R.O.W. The utility right of way which transects this property totals approximately 3 acres. The vegetation which is present reflects the vegetation type which it cuts through (see the above vegetation descriptions). However, because hardwood vegetation is discouraged shrub and herbaceous vegetation has become dominant. The conspicuous species common to this area are distributed according to soil types and soil moisture levels. They include grasses, sedges, poison ivy, goldenrod spp., ragweed spp., smart weed, cattail, speckled alder, red maple seedlings, black willow, red osier dogwood, raspberry, grape and sensitive fern.

Use Considerations

As stated earlier this property has excellent potential for the development of an interpretive nature trail. If properly planned and constructed this trail network should have little negative impact on the integrity of the vegetation of this property. Wetland soils and Meadow Pond Brook will be difficult, but not impossible to cross.

Hazards

Potential hazards on this property relating to the vegetation include poison ivy and trees that have a high risk of injuring people that are utilizing the property. Trees with their roots exposed, dead trees, dead tree parts and those trees which have a high probability of falling due to excessive decay or lean would be considered hazardous, especially if

located near areas of high use such as the proposed interpretive nature trail.

Figure 4

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Forest Vegetation Map

Scale 1" = 500'



LEGEND

- PROPERTY BOUNDARY ————
- STAND BOUNDARY - - - - -
- UTILITY R.O.W. = = = = =
- EXISTING TRAIL
- STREAM ~~~~~
- SPECIMEN TREES * * *

Vegetation Types

- Type A. Hardwood swamp, 8+- acres.
- Type B. Open Fields, 7+- acres.
- Type C. Mixed Hardwoods, 7+- acres.
- Type D. Old field, 6+- acres.
- Type E. Shrub Swamp/Flood Plain, 4+- acres.
- Type F. Mixed Hardwoods, 4+- acres.
- Type G. Utility R.O.W. 3+- acres.

WILDLIFE RESOURCES

Planning for Wildlife

As urban areas become developed, natural areas are divided into smaller, isolated pieces. Land that is in public ownership can be managed for wildlife habitat for the long term. In contrast, private land, which consists of 88 percent of the land in Connecticut, usually changes ownership and is mostly not managed for wildlife for the long term. Wildlife habitat near urbanized areas can be places for citizens to enjoy wildlife in close proximity to where they live. In a survey of urban residents in five metropolitan areas of New York State, 96 percent of the respondents indicated that it was important for their children to learn about nature and 73 percent were interested in wildlife in the backyard or neighborhood area (Brown et. al. 1979).

Value of the Gunntown Road Property as Wildlife Habitat and an Outdoor Nature Trail

As Naugatuck's natural areas become smaller and more isolated, the value of natural areas that are 25 acres or larger will increase in value for wildlife. The remaining areas will be important as refugia for wildlife and places to observe natural vegetation and the associated wildlife.

During a recent site walk, the following wildlife were observed directly or evidence of their presence was confirmed by identifying tracks, scat, calls, or other sign: white-tailed deer, cottontail rabbit, gray squirrel, goldfinch, northern flicker, mockingbird, gray catbird, bluejay, American crow, and American robin. These are only a handful of potential wildlife that may frequent the habitats on the property.

Wildlife Habitat Components

The reverting fields on the property contain valuable habitat plants such as red cedar (*Juniperus virginiana*), gray dogwood (*Cornus racemosa*), silky dogwood (*Cornus amomum*), black cherry (*Prunus serotina*), red mulberry (*Morus rubra*), staghorn sumac (*Rhus typhina*), elderberry (*Sambucus canadensis*), spicebush (*Lindera benzoin*), alder (*Alnus spp.*), and wild grape (*Vitis spp.*) to mention a few. The surrounding mixed hardwood forest contained a mixture of red maple (*Acer rubrum*), white ash (*Fraxinus americana*), oaks (*Quercus spp.*), tulip tree (*Liriodendron tulipifera*), black birch (*Betula lenta*), and sugar maple (*Acer saccharum*). Some beneficial snags with cavities were observed in the trees.

There were some invasive exotic plant species observed in the reverting field areas. The following species were recorded: autumn olive (*Elaeagnus umbellata*), Tree of Heaven (*Ailanthus altissima*), Japanese Knotweed (*Polygonium cuspidatum*), and multiflora rose (*Rosa multiflora*). These plants are considered especially aggressive and of detriment to the quality of the habitat.

Habitat Management Needs and Potential

The wide variety of native plants that are naturally colonizing the property helps to diversify the available food sources. One missing habitat component that is evident is the lack of evergreen cover. Evergreen cover provides valuable wildlife cover and shelter especially during harsh winter weather. A clustered planting (5 feet by 5 feet spacing, an acre or more in size) of mixed evergreens such as white pine (*Pinus strobus*), white spruce (*Picea glauca*), and Norway spruce (*Picea abies*) is recommended for the property.

The invasive exotic plants that were aforementioned should be controlled through mechanical and/or herbicidal means. By managing against the invasive exotics, there will be more growing space for the native plants.

Cavity nesters can be aided through the placement of artificial nest boxes. The Eastern bluebird, tree swallows and great-crested flycatchers can benefit from nest boxes placed along the field edges. Technical assistance regarding nest box building specifications and placement is available upon request. Girdling unwanted or subordinate trees can create artificially induced snags and eventually they can develop cavities (technical specifications are available upon request).

Wildlife Habitat Education Potential

The nature trail needs to be carefully planned so that it allows many of the important habitat features to be included, however the trail size should be kept to a minimum so that not all the area is traversed. A portion of the property should be reserved as refugia and not have the trail through it. Too many trails and excessive pedestrian traffic through a small area can have a negative impact on the wildlife especially the ones nesting on the property. The mixed hardwood forest on the east side of the property should be considered as a refuge area. Also, the trail through wet areas needs to be carefully designed so as not to cause excessive erosion in the stream. A specially designed trail on the Gunntown Road property can bring hikers along various habitats and the habitat components can be pointed out using visual trail signs and/or a printed trail guide. A printed trail guide or signs should seek to point out valuable wildlife food plants and habitat improvements from which residents may be able to gain an appreciation for as well as something they may be able to implement on their own property.

The Department of Environmental Protection's wildlife division has developed a habitat demonstration area at its Sessions Woods property in Burlington. This area can be visited to view various habitat demonstrations and to obtain ideas about trail signage and how it was implemented.

The Team wildlife biologist is available for further consultation for the nature trail, habitat enhancement and trail guide information.

Literature Cited

Brown, T.L., C.P. Dawson, and R.L. Miller. 1979. Interests and attitudes of metropolitan New York residents about wildlife. *Tran. of North American Wildlife and Natural Resource Conference.* 44:289-297.

FISHERIES RESOURCES

Site Description

A reach of Long Meadow Pond Brook, approximately 900 feet in length, is found within the 39.3 acre Gunntown Road parcel. Through the parcel, Long Meadow Brook has a channel approximately 12 feet in top of bank width and normal flow depths of averaging 1 foot. A meandering, moderate to low grade stream channel produces surface flow predominated by moving pool interspersed with shallow riffle. Stream substrate is composed of cobble, gravel, coarse sand, and sand-silt fines. Dense growths of hardwoods and woody shrubs predominate as riparian vegetation and provide Long Meadow Pond Brook with a nearly complete canopy. Physical in-stream habitat is provided by undercut banks and fallen woody debris. A gas transmission pipeline crosses the open space parcel and passes beneath a section of Long Meadow Pond Brook. At the stream crossing, riparian vegetation is maintained primarily as grasses and shrubs. Natural stream substrate has been maintained or has reestablished within the channel at the crossing.

Aquatic Resources

The reach of Long Meadow Pond Brook within the open space parcel is a classic example of a low gradient, cold-water wetland stream. Limited development within the immediate watershed has provided a

means of maintaining the stream's water quality. The Department of Environmental Protection classifies this reach of Long Meadow Pond Brook as Class B/A surface waters. Surveys of Long Meadow Pond Brook aquatic resources have been conducted by the Fisheries Division. The most recent survey had been completed in 1991 and focused on a reach of stream approximately 2 miles downstream of the Gunntown Road parcel. Within this reach the stream was found to support brown trout, rainbow trout, blacknose dace, creek chub, tessellated darter, and white sucker. These fish species are commonly associated with cold-water streams in Connecticut. Most, if not all of these species, in addition to brook trout observed during site field review, are anticipated to be found within the reach of stream on the open space parcel.

Not native to Connecticut waters, the brown and rainbow trout found during the survey are likely to have originated from hatchery reared trout released annually into Long Meadow Pond Brook by the Fisheries Division to support recreational angling.

Impacts

As there are no proposals for significant land use change on the Gunntown parcel, existing stream habitats and resources will be preserved. There is ample area for incorporation of a trail into the open space area in a manner not impacting the stream's aquatic resources. The site offers an ideal opportunity to incorporate the stream into the trail system from both aesthetic and educational focal points.

Recommendations

Should the trail cross the stream it should be by span bridge. Areas for crossing should be carefully selected to minimize riparian wetland impacts.

Topography of land adjacent to the stream lends itself well to a trail which can provide both a "birds-eye" view of the stream and controlled access points to the channel. Signage should be erected along the trail at select locations to describe the function of key physical features of the stream such as pools, riffles, riparian area, and the consequence of the gas transmission pipeline crossing.

Some initial suggestions for such signage include:

1. Stream habitat overview. A key characteristic of any productive in-stream habitat is diversity. It is imperative that the proper blend of water depths, water velocities, and substrate types be present together to form the necessary food production, spawning-incubation, and cover areas that combine to form complete stream habitat.

2. Pools. Loosely defined, a pool is a region of deeper, slower moving water with fine bed materials. With overhanging banks and vegetation, pools provide cover, shelter, and resting areas primarily for larger fish. During low flows pools can become isolated pockets of water which allow survival of fish and other aquatic organisms.

3. Riffle. Areas of shallower, faster moving water, with coarser bed materials. Riffles are most often associated with “whitewater” a turbulence which adds oxygen to water. Riffles tend to support higher densities of aquatic insects and are thus important food producing areas for fish. Riffles are also serve as a spawning area for most stream fish. Due to competition and predation, young fish and small fish tend to inhabit riffles.

4. Riparian area. The riparian area is the area of land that adjoins the stream. A well-vegetated riparian area is critical to the health of the stream ecosystem. Roots of trees, shrubs, and grasses bind stream bank soils and provide a resistance to the erosive forces of flowing water. Stems and leaves of stream bank vegetation provide shade which prevents high water temperatures. Leaves, stems, and other plant parts that fall into the stream provide food for aquatic insects. Large woody debris that falls into the stream enhances in-stream habitat. Abundant riparian vegetation softens rainfall and serves as a reservoir storing surplus runoff for gradual release during low stream flow periods of summer and early fall. The riparian area serves also as a natural filter removing nutrients, sediments, and other non-point source pollutants from overland runoff.

5. Pipeline crossing. In-stream activities such as pipeline crossings produce impacts to aquatic resources most commonly caused by sediment suspension and physical habitat disruption. Sediment suspension is a relatively short term impact which can be mitigated by the

installation of erosion and sediment control devices. Physical habitat disruption can produce long term impacts. Greatest impacts to aquatic insects are caused by the change in substrate from gravel to sand/silt fines and the removal of riffle habitat. Channel alterations influence the fishery population by eliminating spawning and nursery habitat found in riffles, changing substrate from gravel to sand/silt fines, and eliminating in-stream and streamside cover. Proper restoration of in-stream and riparian habitat is a critical mitigation measure to reduce long term impacts to aquatic resources.

STATE PARK PLANNER COMMENTS

The Gunntown Road property under review is an area of former farmland, crossed by Long Meadow Pond Brook, as well as a gas pipeline. Its main feature consists of the floodplain of the brook, bordered on the west by several areas of well-drained fluvial terraces. The property is edged by areas of moderately to steeply sloping upland glacial till soils.

Because of the high proportion of poorly-drained soils, the use potential of the property is quite limited. Therefore, the Borough made a wise decision in abandoning an earlier proposal to develop it intensively as a park and in considering passive open space involving development of a foot trail/nature trail only. Furthermore its location in town makes it unsuitable as a site for ball fields, etc., a type of facility normally located in a more central location providing easier access for park users.

However, even foot trail development may pose certain problems at least seasonally because of periodic flooding and/or high water table. Therefore sustained use in such soils can produce muddy conditions and a tendency for walkers to bypass such spots, causing a proliferation of trail routes and site degradation. To avoid this, some trail hardening in terms of a bog bridge, corduroy, etc. maybe necessary.

The proposal to purchase the adjoining Gunn house and to develop a cultural/environmental center at this location falls beyond the scope of this study. Nevertheless it deserves consideration, if the town is prepared

to address the substantial costs of acquisition followed by those of operation and maintenance which such a facility would entail.

REGIONAL PLANNING COMMENTS

Location

The property is located in western Naugatuck at the Middlebury townline and near the Oxford townline. It is situated on the northwest side of Andrews Mountain east of Gunntown Road. Long Meadow Pond Brook traverses the property in a northeasterly direction. West of the brook, the land is largely open meadow. To the east it is wooded with a steep grade. An Algonquin gas pipeline also crosses the site. Primary access to the property is Rubber Avenue Extension to Gunntown Rd.

Surrounding land uses are woods, pasture farmland, and low density residential. An old cemetery is located directly south of the property on Gunntown Road. The State Bridle Path in Middlebury is roughly 0.1 mile west of the site, but separated by a steep grade.

Relationship to Local and Regional Plans

Naugatuck's 1989 Plan of Development recommends "semi-rural residential" for the area. Local zoning maps show the area zoned for Industrial (I-2) and Residential (R-30 - 30,000 sq.ft. lot minimum). The 1977 COGCNV Plan of Regional Development calls for development at 2-4 housing units per acre.

The property was purchased by the Borough of Naugatuck several years ago. Initially the property was considered as a possible site for a new school, but wetlands precluded this option. More recently a park was proposed, and the Borough's Park, Land Use, and Engineering Departments worked together to develop plans. The proposal included a playing field (with a track) for sports, a basketball court, a pond with an adjacent picnic area, walking trails, and a parking area. The mayor opposed the expenditure of borough funds on the project, and the park plans were shelved.

A local group, The Committee for a Cultural/Environmental Center - Gunntown Road seeks to preserve the parcel as a natural open space area as well as purchase the adjacent 1792 Frank Gunn House. An immediate goal of the Committee is the cutting of a trail through the open space parcel to provide hiker/walker access to the land.

The CNVR Regional Plan draft notes that the Region has a shortage of open space/ recreational areas. Naugatuck's primary open space area is the Naugatuck State Forest in the south end of the town (992 acres). Municipal open space constitutes 216 acres, consisting mostly of school grounds, golf courses, and parks. Several Naugatuck residents commented that available open space areas are primarily used as playing fields for organized team sports. Naugatuck only had three acres of non-intensive municipal open space prior to the Gunntown property purchase, but this shortage is offset by the large tract of state forest land.

Comments and Recommendations

- Local road access to the property should not be a problem since traffic volumes generated by the site are likely to be light.
- A driveway and parking area will be necessary. Parking along Gunntown Road, which is narrow and has virtually no shoulders, would be hazardous.
- Given the State Bridle Path's close proximity, it would be worth considering a tie-in to the Gunntown open space as a long term objective.
- If there is general consensus on the borough's open space plan, any improvements made at this time should complement the plan — in the event funding becomes available for the park in the future. Certainly any improvement to the parcel needs to be closely coordinated with borough officials and follow borough procedures.

For advice on trail design and construction, the following organizations should be helpful:

Connecticut Forest and Park Association

Meriden Road

Middlefield, CT 06455

(860-346-2372)

- Responsible for CT's 400 mile Blue Trail system.

Appalachian Mountain Club (AMC)

5 Joy Street

Boston, MA 02108

(617-523-0636)

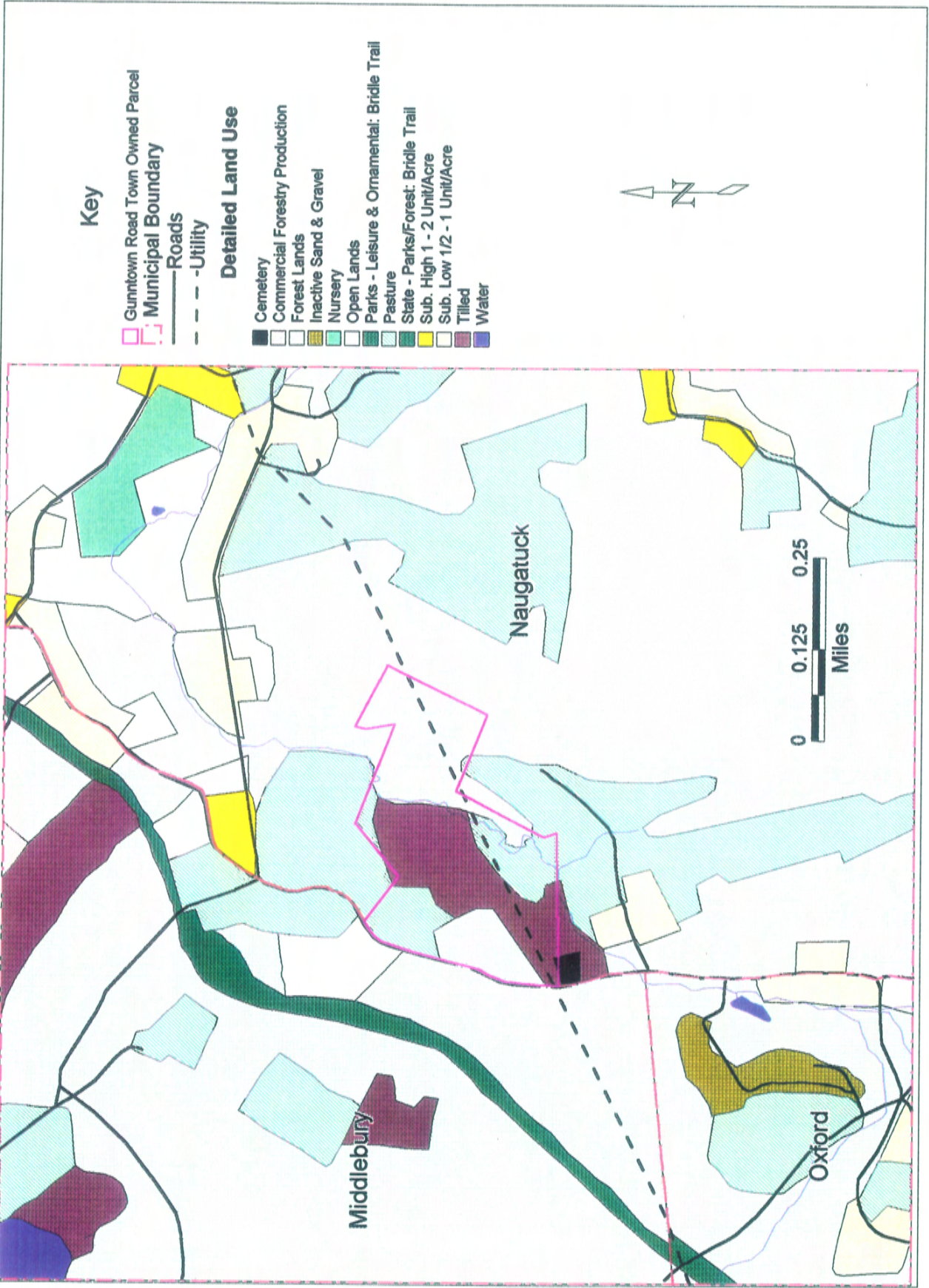
- Responsible for network of trails in the White Mountains as well as elsewhere.
- Good source of manuals on trail design and construction.

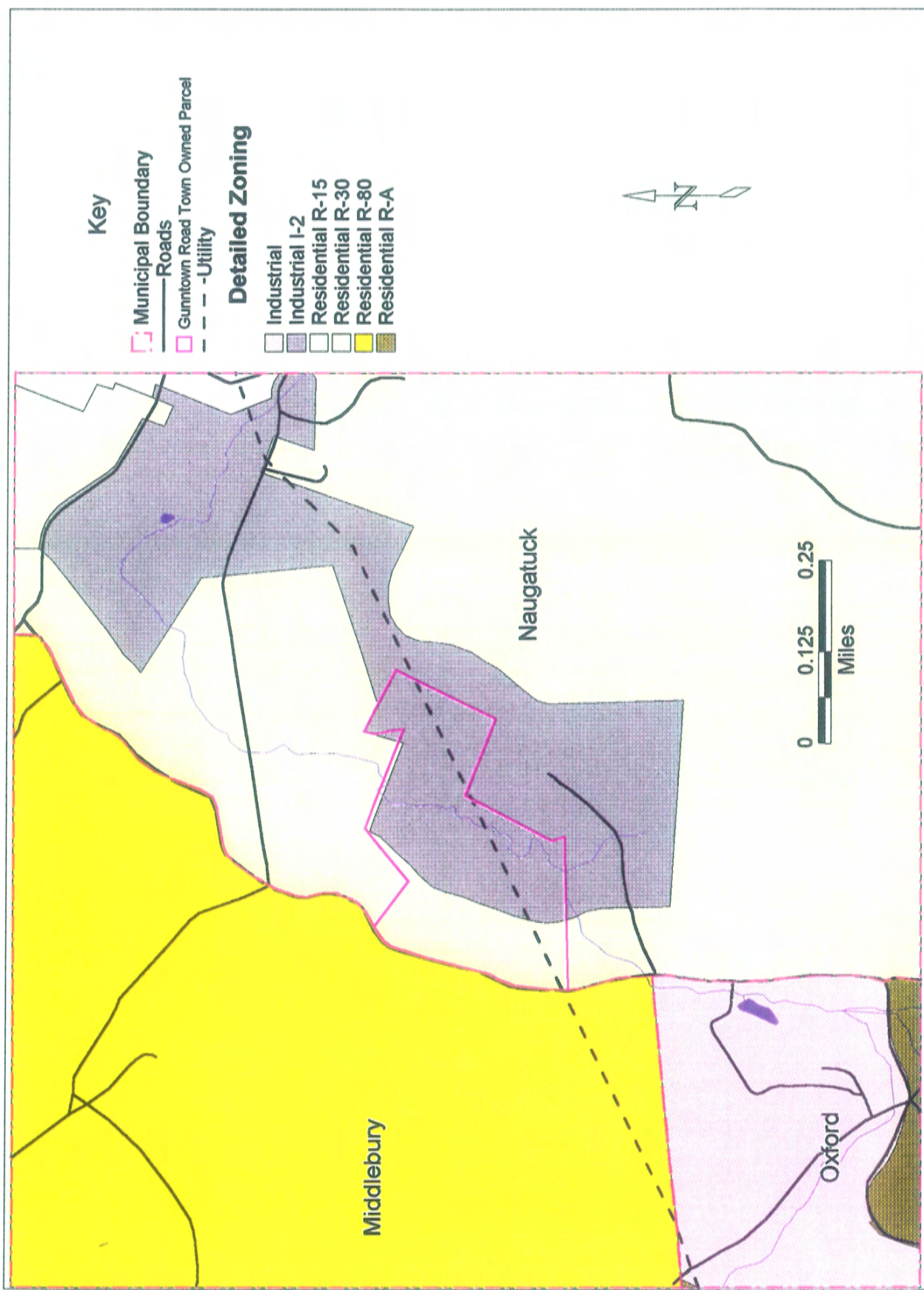
Connecticut Chapter of AMC

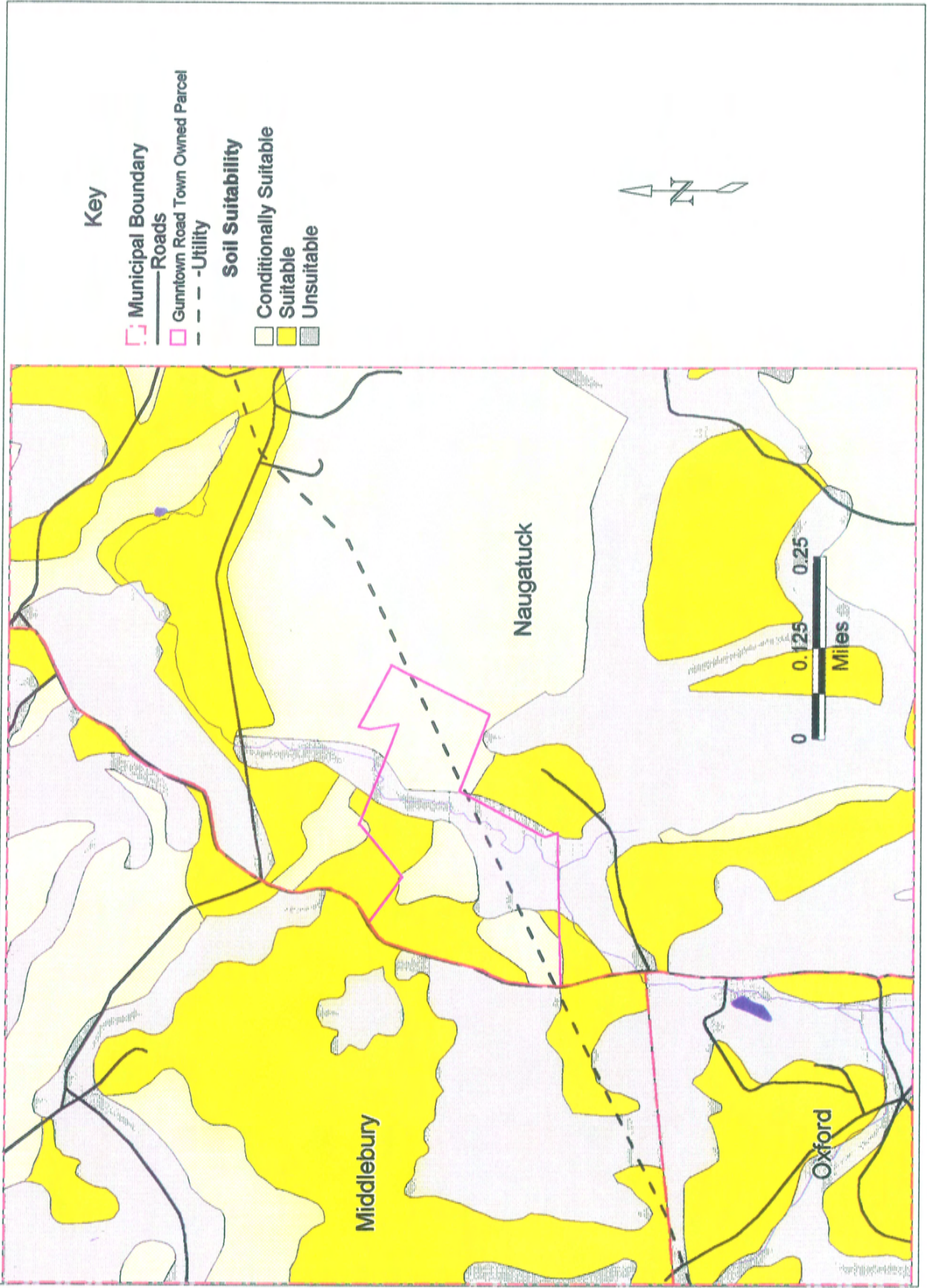
Birge Dayton, Trails Chair (860-742-8092)

Henry Edmonds, Trails Overseer (H: 203426-6459, W: 203-794-5376)

- Responsible for maintaining the Appalachian Trail in Connecticut.







ARCHAEOLOGICAL REVIEW

A review of the State of Connecticut Archaeological Site Files and Maps shows no known archaeological resource on the project area. However, the area is sensitive for the discovery of unidentified prehistoric sites. The project area has the potential to yield information on early Native American lifeways as well as being adjacent to an early historic Euro-American farmstead. These cultural resources may be represented in archaeological components having associated artifacts and features below-ground. As a result, any ground disturbance in the proposed cultural/environmental center plans should be reviewed for archeological resources. These resources can assist the Committee for a Cultural/Environmental Center by documenting the history of the property and providing artifacts for exhibit and educational opportunities.

The most sensitive area for Native American encampments is the knoll and slope west of Long Meadow Brook where the tennis/basketball deck was proposed on the Borough's plan for a park on this site. This area consists of well-drained soils adjacent to a wetland system. These are two important variables when the Office of State Archaeology determines site probability. In addition, this area is nearest the Gunn house property with its standing structures. Archaeological remnants of the historic farming activity may continue onto the study parcel.

Areas on the property that have been disturbed for the pipeline easement and stripping of soils will have no surviving archaeological resources and are not of concern. However, any other areas in which land use activities are proposed that will move soils should be archaeologically surveyed to ensure that no cultural resources will be adversely effected by the construction activities. Passive use of the property, such as, trail systems need not be surveyed.

The Office of State Archaeology is prepared to offer technical assistance to the Borough of Naugatuck to conduct any archaeological excavations deemed necessary. In addition, they are pleased to offer assistance in the construction of exhibits and other educational opportunities for students and the general public.

APPENDIX A

WATER FEATURES

Endnote -- WATER FEATURES--Continued

Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in this report are the depth to the seasonal high water table; the kind of water table, that is, "Apparent", "Artesian", or "Perched"; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in this report.

An "Apparent" water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

An "Artesian" water table exists under a hydrostatic beneath an impermeable layer. When the impermeable layer has been penetrated by a cased borehole, the water rises. The final level of the water in the cased borehole is characterized as an artesian water table.

A "Perched" water table is water standing above an unsaturated zone. In places an upper, or "Perched", water table is separated from a lower one by a dry zone. Only saturated zones within a depth of about 6 feet are indicated.

Ponding is standing water in a closed depression. The water is removed only by deep percolation, transpiration, evaporation, or a combination of these processes.

This report gives the depth and duration of ponding and the time of year when ponding is most likely. Depth, duration, and probable dates of occurrence are estimated.

Depth is expressed as the depth of ponded water in feet above the soil surface. Duration is expressed as "Very brief" if less than 2 days, "Brief" if 2 to 7 days, "Long" if 7 to 30 days, and "Very long" if more than 30 days. The information is based on the relation of each soil on the landscape to historic ponding and on local information about the extent and levels of ponding.

WATER FEATURES

Endnote -- WATER FEATURES

This report gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms. The four hydrologic soil groups are:

Group "A". Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group "B". Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group "C". Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group "D". Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in this report, the first letter is for drained areas and the second is for undrained areas. Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes. This report gives the frequency and duration of flooding and the time of year when flooding is most likely. Frequency, duration, and probable dates of occurrence are estimated.

Frequency is expressed as "None", "Rare", "Occasional", and "Frequent". "None" means that flooding is not probable; "Rare" that it is unlikely but possible under unusual weather conditions; "Occasional" that it occurs, on the average, once or less in 2 years; and "Frequent" that it occurs, on the average, more than once in 2 years.

Duration is expressed as "Very brief" if less than 2 days, "Brief" if 2 to 7 days, "Long" if 7 to 30 days, and "Very long" if more than 30 days. The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding. Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods.

WATER FEATURES

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Freq	Duration	Months	Depth	Kind	Months
					(Ft)		
AfB AGAWAM	B	NONE	-	-	6.0- 6.0	-	-
CrC CHARLTON	B	NONE	-	-	6.0- 6.0	-	-
	C/D	NONE	-	-	6.0- 6.0	-	-
HkC HINCKLEY	A	NONE	-	-	6.0- 6.0	-	-
PbC PAXTON	C	NONE	-	-	1.5- 2.5	PERCH	FEB-APR
PeC PAXTON	C	NONE	-	-	1.5- 2.5	PERCH	FEB-APR
PeD PAXTON	C	NONE	-	-	1.5- 2.5	PERCH	FEB-APR
Rn RIDGEBURY	C	NONE	-	-	0- 1.5	PERCH	NOV-MAY
	C	NONE	-	-	0- 1.5	APPAR	NOV-MAY
	D	NONE	-	-	-	PERCH	-
Ru RIPPONAM	C	FREQ	OCT-MAY	-	0- 1.5	APPAR	SEP-JUN
SxC SUTTON	B	NONE	-	-	1.5- 2.5	APPAR	NOV-APR
WzC WOODBRIDGE	C	NONE	-	-	1.5- 2.5	PERCH	NOV-MAY

PHYSICAL PROPERTIES OF SOILS

Endnote -- PHYSICAL PROPERTIES OF SOILS--Continued

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

The WIND ERODIBILITY INDEX is used in the wind erosion equation (WEQ). The index number indicates the amount of soil lost in tons per acre per year. The range of wind erodibility index numbers is 0 to 300.

PHYSICAL PROPERTIES OF SOILS

Endnote -- PHYSICAL PROPERTIES OF SOILS--Continued

ORGANIC MATTER is the plant and animal residue in the soil at various stages of decomposition. In report J, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

EROSION FACTOR K indicates the susceptibility of the whole soil (including rocks and rock fragments) to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

EROSION FACTOR K_f is like EROSION FACTOR K but it is for the fine-earth fraction of the soil. Rocks and rock fragments are not considered.

EROSION FACTOR T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

WIND ERODIBILITY GROUPS are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

PHYSICAL PROPERTIES OF SOILS

Endnote -- PHYSICAL PROPERTIES OF SOILS

This report shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

CLAY as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this report, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

MOIST BULK DENSITY is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this report, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

PERMEABILITY refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

AVAILABLE WATER CAPACITY refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

SHRINK-SWELL POTENTIAL is the potential for volume change in a soil with a loss or gain of moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils. If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed. Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are "Low," a change of less than 3 percent; "Moderate," 3 to 6 percent; and "High," more than 6 percent. "Very high," greater than 9 percent, is sometimes used.

PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map Symbol	Soil Name	Depth (In)	Clay (pct)	Moist Blk Density (g/cm ³)	Permeability (In/hr)	Available water cap (In/in)	Soil React (ph)	Salinity (mmhos/cm)	Shrink Swell Pot.	Erosion Factor K T	Wind Erod. Group	Organ Matter (pct)
AfB	AGAWAM	0- 8	4-10	1.10-1.20	2.0- 6.0	0.15-0.21	4.5-6.5	-	LOW	.28 3	1.-	5
		8-19	1-10	1.20-1.40	2.0- 6.0	0.11-0.21	4.5-6.5	-	LOW	.37	-	-
		19-32	1- 6	1.30-1.40	2.0- 6.0	0.11-0.18	4.5-6.5	-	LOW	.28	-	-
		32-60	1- 2	1.30-1.40	6.0- 20	0.02-0.12	4.5-6.5	-	LOW	.17	-	-
CrC	CHARLTON	0- 2	3- 8	1.00-1.25	0.6- 6.0	0.08-0.23	4.5-6.0	-	LOW	.20 3	0.-	-
		2-26	3- 8	1.40-1.65	0.6- 6.0	0.07-0.20	4.5-6.0	-	LOW	.24	-	-
		26-65	1- 8	1.45-1.70	0.6- 6.0	0.05-0.16	4.5-6.0	-	LOW	.24	-	-
	HOLLIS	0- 2	3-10	1.10-1.40	0.6- 6.0	0.08-0.17	4.5-6.0	-	LOW	.20 1	0.-	-
		2-18	1- 8	1.30-1.55	0.6- 6.0	0.06-0.18	4.5-6.0	-	LOW	.32	-	-
		18-22	-	-	-	-	-	-	-	-	-	-
HkC	HINCKLEY	0- 8	4- 8	0.90-1.10	6.0- 20	0.08-0.14	3.6-6.0	-	LOW	.20 3	2.-	7
		8-16	1- 5	1.20-1.40	6.0- 20	0.01-0.10	3.6-6.0	-	LOW	.17	-	-
		16-60	0- 3	1.30-1.50	20- 20.0	0.01-0.06	3.6-6.0	-	LOW	.10	-	-
PbC	PAXTON	0- 8	3-12	1.00-1.25	0.6- 2.0	0.10-0.20	4.5-6.0	-	LOW	.24 3	2.-	5
		8-26	3-12	1.35-1.60	0.6- 2.0	0.08-0.18	4.5-6.0	-	LOW	.32	-	-
		26-65	3-12	1.70-2.00	0.0- 0.2	0.05-0.10	4.5-6.0	-	LOW	.24	-	-
PeC	PAXTON	0- 2	3-12	1.00-1.25	0.6- 2.0	0.08-0.18	4.5-6.0	-	LOW	.20 3	0.-	-
		2-26	3-12	1.35-1.60	0.6- 2.0	0.08-0.18	4.5-6.0	-	LOW	.32	-	-
		26-65	3-12	1.70-2.00	0.0- 0.2	0.05-0.10	4.5-6.0	-	LOW	.24	-	-
PeD	PAXTON	0- 2	3-12	1.00-1.25	0.6- 2.0	0.08-0.18	4.5-6.0	-	LOW	.20 3	0.-	-
		2-26	3-12	1.35-1.60	0.6- 2.0	0.08-0.18	4.5-6.0	-	LOW	.32	-	-
		26-65	3-12	1.70-2.00	0.0- 0.2	0.05-0.10	4.5-6.0	-	LOW	.24	-	-
Rn	RIDGEBURY	0- 6	3-10	1.00-1.30	0.6- 6.0	0.06-0.21	4.5-6.5	-	LOW	.20 3	0.-	-
		6-19	2- 8	1.60-1.90	0.6- 6.0	0.04-0.20	4.5-6.5	-	LOW	.32	-	-
		19-60	2- 8	1.80-2.00	0.0- 0.2	0.01-0.05	4.5-6.5	-	LOW	.24	-	-
	LEICESTER	0- 6	3-10	1.00-1.25	0.6- 6.0	0.12-0.18	4.5-5.5	-	LOW	.24 3	0.-	-
		6-23	3-10	1.35-1.60	0.6- 6.0	0.10-0.20	4.5-5.5	-	LOW	.28	-	-
		23-65	2- 7	1.45-1.70	0.6- 20.0	0.08-0.16	4.5-5.5	-	LOW	.24	-	-
	WHITMAN	0- 6	5- 8	1.10-1.30	0.6- 6.0	0.12-0.26	4.5-6.5	-	LOW	.20 3	0.-	-
		6-22	2- 4	1.60-1.85	0.6- 6.0	0.10-0.17	4.5-6.5	-	LOW	.32	-	-
		22-60	1- 3	1.85-2.00	0.0- 0.2	0.03-0.04	4.5-6.5	-	LOW	.24	-	-
Ru	RIPPOWAM	0- 6	2- 6	1.10-1.35	0.6- 6.0	0.11-0.21	4.5-7.3	-	LOW	.20 5	3.-	8
		6-28	1- 6	1.20-1.45	0.6- 6.0	0.09-0.18	4.5-7.3	-	LOW	.20	-	-
		28-65	0- 2	1.25-1.50	6.0- 20.0	0.01-0.10	4.5-7.3	-	LOW	.17	-	-
SxC	SUTTON	0- 6	3-10	1.00-1.25	0.6- 6.0	0.09-0.18	4.5-6.0	-	LOW	.20 3	7.-	15
		6-28	3-10	1.35-1.60	0.6- 6.0	0.08-0.18	4.5-6.0	-	LOW	.28	-	-
		28-65	2- 6	1.45-1.70	0.6- 6.0	0.06-0.16	4.5-6.0	-	LOW	.24	-	-
WzC	WOODBRIIDGE	0- 3	3-12	1.00-1.25	0.6- 2.0	0.08-0.18	4.5-6.0	-	LOW	.20 3	0.-	-
		3-25	3-12	1.35-1.60	0.6- 2.0	0.08-0.18	4.5-6.0	-	LOW	.32	-	-
		25-65	3-12	1.70-2.00	0.0- 0.2	0.05-0.10	4.5-6.0	-	LOW	.24	-	-

WILDLIFE HABITAT

Endnote -- WILDLIFE HABITAT--Continued

WETLAND PLANTS are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

SHALLOW WATER AREAS have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds. The habitat for various kinds of wildlife is described in the following paragraphs.

HABITAT FOR OPENLAND WILDLIFE consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

HABITAT FOR WOODLAND WILDLIFE consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

HABITAT FOR WETLAND WILDLIFE consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

HABITAT FOR RANGELAND WILDLIFE consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

WILDLIFE HABITAT

Endnote -- WILDLIFE HABITAT

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In this report the soils are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat. The potential of the soil is rated "Good," "Fair," "Poor," or "Very poor." A rating of "Good" indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of "Fair" indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of "Poor" indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of "Very poor" indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible. The elements of wildlife habitat are described in the following paragraphs.

GRAIN AND SEED CROPS are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

GRASSES AND LEGUMES are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

WILD HERBACEOUS PLANTS are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

HARDWOOD TREES and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated are Russian-olive, autumn-olive, and crabapple.

CONIFEROUS PLANTS furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

SHRUBS are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountainmahogany, bitterbrush, snowberry, and big sagebrush.

WILDLIFE HABITAT REPORT

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map Symbol	Soil Name	Seq Num	Grain & Seed	Grass & Legume	Wild Herb. Plants	Hard-wood Trees	Coniferous Plants	Wetland Plants	Shallow Water Plants	Open Land	Wood Land	Wetland Wildlife
AfB	AGAWAM	1	FAIR	GOOD	GOOD	GOOD	GOOD	POOR	VERY POOR	GOOD	GOOD	VERY POOR
CrC	CHARLTON	1	VERY POOR	VERY POOR	GOOD	GOOD	GOOD	VERY POOR	VERY POOR	POOR	FAIR	VERY POOR
CrC	HOLLIS	2	VERY POOR	VERY POOR	FAIR	POOR	POOR	VERY POOR	VERY POOR	VERY POOR	POOR	VERY POOR
HkC	HINCKLEY	1	POOR	POOR	POOR	POOR	POOR	VERY POOR	VERY POOR	POOR	POOR	VERY POOR
PbC	PAXTON	1	FAIR	GOOD	GOOD	GOOD	GOOD	VERY POOR	VERY POOR	GOOD	GOOD	VERY POOR
PeC	PAXTON	1	VERY POOR	VERY POOR	GOOD	GOOD	GOOD	VERY POOR	VERY POOR	POOR	FAIR	VERY POOR
PeD	PAXTON	1	VERY POOR	VERY POOR	GOOD	GOOD	GOOD	VERY POOR	VERY POOR	POOR	FAIR	VERY POOR
Rn	RIDGEBURY	1	VERY POOR	VERY POOR	FAIR	FAIR	FAIR	GOOD	FAIR	POOR	FAIR	FAIR
Rn	LEICESTER	2	VERY POOR	VERY POOR	FAIR	FAIR	FAIR	GOOD	FAIR	POOR	FAIR	FAIR
Rn	WHITMAN	3	VERY POOR	VERY POOR	POOR	POOR	POOR	GOOD	FAIR	VERY POOR	POOR	FAIR
Ru	RIPPOWAM	1	POOR	FAIR	FAIR	FAIR	FAIR	GOOD	FAIR	FAIR	FAIR	FAIR
SxC	SUTTON	1	VERY POOR	VERY POOR	GOOD	GOOD	GOOD	VERY POOR	VERY POOR	POOR	FAIR	VERY POOR
WzC	WOODBRIIDGE	1	VERY POOR	VERY POOR	GOOD	GOOD	GOOD	VERY POOR	VERY POOR	POOR	FAIR	VERY POOR

WOODLAND MANAGEMENT AND PRODUCTIVITY

Endnote -- WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of "Moderate" indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of "Severe" indicates that many trees can be blown down during these periods.

PLANT COMPETITION ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are the depth to the water table and the available water capacity. A rating of "Slight" indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of "Moderate" indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of "Severe" indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The potential productivity of merchantable or COMMON TREES on a soil is expressed as a site index and as a volume number.

The SITE INDEX is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The VOLUME OF WOOD FIBER, a number, is the yield likely to be produced by the most important trees. This number is expressed as cubic meters per hectare per year, indicates the amount of wood fiber produced in a fully stocked, even-aged stand. Cubic meters per hectare converts to cubic feet per acre per year as follows: (1 m³/ha = 14.3 ft³/ac). The 14.3 number is rounded up from 14.2999.

The TREES COMMONLY MANAGED FOR to plant are those that are suitable for commercial wood production.

WOODLAND MANAGEMENT AND PRODUCTIVITY

Endnote -- WOODLAND MANAGEMENT AND PRODUCTIVITY

This report can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The report lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the ORDINATION SYMBOL, a number, indicates the potential productivity of the soils for an indicator tree species. The first species listed under common trees for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter "Rn" indicates steep slopes; "X", stoniness or rockiness; "W", excess water in or on the soil; "T", toxic substances in the soil; "D", restricted rooting depth; "C", clay in the upper part of the soil; "S", sandy texture; "F", a high content of rock fragments in the soil; and "N", snowpack. The letter "An" indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and N.

In this report, "Slight", "Moderate", and "Severe" indicate the degree of the major soil limitations to be considered in management.

EROSION HAZARD is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Woodlands that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of "Slight" indicates that no particular prevention measures are needed under ordinary conditions. A rating of "Moderate" indicates that erosion-control measures are needed in certain silvicultural activities. A rating of "Severe" indicates that special precautions are needed to control erosion in most silvicultural activities.

EQUIPMENT LIMITATION reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of "Slight" indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of "Moderate" indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of "Severe" indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

SEEDLING MORTALITY refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of "Slight" indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of "Moderate" indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of "Severe" indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

WINDTHROW HAZARD is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of "Slight" indicates that under normal conditions no trees are

WOODLAND MANAGEMENT AND PRODUCTIVITY

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map Symbol and soil name	Ordi- nation symbol	Management concerns					Potential productivity			
		Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index	Prod class	Trees to pla
PeD PAXTON	3R	MODERATE	MODERATE	SLIGHT	MODERATE	MODERATE	sugar maple	75	3	red pine
							northern red oak	65	3	eastern whi pine
							red pine	67	8	European la
							eastern white pine	66	8	Norway spru
Rn RIDGEBURY	3X	SLIGHT	SEVERE	SEVERE	SEVERE	SEVERE	sugar maple	52	2	eastern whi pine
							red spruce	47	7	white spruce
							northern red oak	57	3	
							eastern white pine	63	8	
LEICESTER	3X	SLIGHT	SEVERE	MODERATE	SEVERE	SEVERE	red maple	70	3	eastern whi pine
							northern red oak	56	3	white spruce
							eastern white pine	69	9	eastern hem
WHITMAN	7X	SLIGHT	SEVERE	SEVERE	SEVERE	SEVERE	red maple	55	2	
							red spruce	44	6	
							eastern white pine	56	7	
Ru RIPPOWAM	3W	SLIGHT	SEVERE	SEVERE	SEVERE	SEVERE	red maple	75	3	eastern whi pine
							eastern white pine	65	8	white spruce
SxC SUTTON	3X	SLIGHT	MODERATE	SLIGHT	SLIGHT	MODERATE	sugar maple	54	2	eastern whi pine
							red spruce	50	8	European lar
							black cherry	72	3	Norway spruce
							northern red oak	62	3	white spruce
							eastern white pine	62	8	
WzC WOODBRIDGE	4X	MODERATE	MODERATE	SLIGHT	MODERATE	MODERATE	sugar maple	65	3	red pine
							red spruce	50	8	eastern whi pine
							northern red oak	72	4	European lar
							red pine	65	8	
							eastern white pine	67	8	

WOODLAND MANAGEMENT AND PRODUCTIVITY

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map Symbol and soil name	Ordi- nation symbol	Management concerns					Potential productivity				
		Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index	Prod class	Trees to plant	
AfB AGAWAM	9A	SLIGHT	SLIGHT	SLIGHT	SLIGHT	MODERATE	sugar maple				eastern white pine
							red pine	70	3		Norway spruce
							northern red oak	65	3		white spruce
							eastern white pine	70	9		
CrC CHARLTON	3X	SLIGHT	MODERATE	SLIGHT	SLIGHT	SLIGHT	red maple	55	2		red pine
							sugar maple	55	2		eastern white pine
							shagbark hickory				European larc
							red spruce	50	8		white spruce
							northern red oak	65	3		eastern hemlo
							red pine	70	9		
							eastern white pine	65	8		
HOLLIS	2X	SLIGHT	MODERATE	MODERATE	SEVERE	SLIGHT	sugar maple	56	2		eastern white pine
							northern red oak	47	2		
							eastern white pine	55	6		
HkC HINCKLEY	7S	SLIGHT	SLIGHT	SEVERE	SLIGHT	SLIGHT	sugar maple	57	2		eastern white pine
							red pine	58	6		European larc
							northern red oak	49	2		
							eastern white pine	60	7		
PbC PAXTON	3D	SLIGHT	SLIGHT	MODERATE	SLIGHT	MODERATE	sugar maple	75	3		red pine
							northern red oak	65	3		eastern white pine
							red pine	67	8		European larc
							eastern white pine	66	8		Norway spruce
PeC PAXTON	3X	SLIGHT	MODERATE	SLIGHT	MODERATE	MODERATE	sugar maple	75	3		red pine
							northern red oak	65	3		eastern white pine
							red pine	67	8		European larc
							eastern white pine	66	8		Norway spruce

RECREATIONAL DEVELOPMENT REPORT

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map symbol, soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
SxC SUTTON	Severe large stones	Severe large stones	Severe large stones slope	Moderate wetness
WzC WOODBRIDGE	Severe large stones	Severe large stones	Severe large stones slope	Moderate wetness

RECREATIONAL DEVELOPMENT REPORT

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map symbol, soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
AfB AGAWAM	Slight	Slight	Moderate slope	Slight
CrC CHARLTON	Severe large stones	Severe large stones	Severe large stones slope	Slight
	HOLLIS	Severe large stones depth to rock	Severe large stones depth to rock	Slight
MkC HINCKLEY	Moderate slope small stones	Moderate slope small stones	Severe slope small stones	Slight
PbC PAXTON	Moderate slope percs slowly	Moderate slope percs slowly	Severe slope	Slight
PeC PAXTON	Severe large stones	Severe large stones	Severe large stones slope	Slight
PeD PAXTON	Severe slope large stones	Severe slope large stones	Severe large stones slope	Severe slope
Rn RIDGEBURY	Severe large stones wetness percs slowly	Severe large stones wetness percs slowly	Severe wetness large stones small stones	Severe wetness
	LEICESTER	Severe large stones wetness	Severe wetness large stones wetness	Severe wetness
	WHITMAN	Severe large stones ponding	Severe large stones ponding	Severe ponding large stones
Ru RIPPOWAM	Severe flooding wetness	Severe wetness	Severe wetness flooding	Severe wetness

WATER MANAGEMENT

Endnote -- WATER MANAGEMENT--Continued

IRRIGATION is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

TERRACES AND DIVERSIONS are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

GRASSED WATERWAYS are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

WATER MANAGEMENT

Endnote -- WATER MANAGEMENT

This report gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes and levees; and aquifer-fed excavated ponds. The limitations are considered "Slight" if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; "Moderate" if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and "Severe" if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. This report also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

POND RESERVOIR AREAS hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

EMBANKMENTS, DIKES, AND LEVEES are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this report, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction. The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties. Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

AQUIFER-FED excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

DRAINAGE is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

WATER MANAGEMENT REPORT

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map symbol, soil name	-----Limitations for-----				-----Features affecting-----			
	Pond reservoir area	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways	
WHITMAN	Slight	Severe piping ponding	Severe no water	Limitation percs slowly frost action	Limitation ponding percs slowly rooting depth	Limitation wetness percs slowly large stones	Limitation large stones wetness percs slowly	
Ru RIPPOMAM	Severe seepage	Severe seepage piping wetness	Severe cutbanks cave	Limitation flooding frost action cutbanks cave	Limitation wetness flooding	Limitation wetness too sandy poor outlets	Limitation wetness	
SxC SUTTON	Severe slope seepage	Severe piping wetness	Moderate slow refill	Limitation frost action slope	Limitation slope wetness	Limitation slope wetness	Limitation slope	
WzC WOODBRIDGE	Severe slope	Severe piping	Severe no water	Limitation percs slowly frost action slope	Limitation slope wetness percs slowly	Limitation slope wetness percs slowly	Limitation slope rooting depth percs slowly	

WATER MANAGEMENT REPORT

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map symbol, soil name	-----Limitations for-----				-----Features affecting-----			
	Pond reservoir area	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways	
AfB AGAWAM	Severe seepage	Severe seepage	Severe no water	Limitation deep to water	Limitation slope	Limitation too sandy	Favorable	
CrC CHARLTON	Severe slope seepage	Moderate seepage piping	Severe no water	Limitation deep to water	Limitation slope	Limitation slope	Limitation slope	
								HOLLIS
HkC HINCKLEY	Severe seepage slope	Severe seepage	Severe no water	Limitation deep to water	Limitation slope droughty	Limitation slope large stones too sandy	Limitation large stones slope droughty	
PbC PAXTON	Severe slope	Severe piping	Severe no water	Limitation deep to water	Limitation slope percs slowly rooting depth	Limitation slope percs slowly	Limitation slope rooting depth percs slowly	
PeC PAXTON	Severe slope	Severe piping	Severe no water	Limitation deep to water	Limitation slope percs slowly rooting depth	Limitation slope percs slowly	Limitation slope rooting depth percs slowly	
PeD PAXTON	Severe slope	Severe piping	Severe no water	Limitation deep to water	Limitation slope percs slowly rooting depth	Limitation slope percs slowly	Limitation slope rooting depth percs slowly	
Rn RIDGEBURY	Slight	Severe piping wetness	Severe no water	Limitation percs slowly frost action	Limitation wetness percs slowly rooting depth	Limitation wetness percs slowly	Limitation wetness percs slowly rooting depth	
								LEICESTER

SOIL FEATURES

Endnote -- SOIL FEATURES

This report gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either "Soft" or "Hard". If the rock is "Soft" or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is "Hard" or massive, blasting or special equipment generally is needed for excavation.

Cemented pans are cemented or indurated subsurface layers within a depth of 5 feet. Such pans cause difficulty in excavation. Pans are classified as "Thin" or "Thick". A "Thin" pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A "Thick" pan is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. This report shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which usually is a result of oxidation. Not shown in the report is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer. For uncoated steel, the risk of corrosion, expressed as "Low", "Moderate", or "High", is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as "Low", "Moderate", or "High". It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

SOIL FEATURES

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map symbol and soil name	-----Bedrock-----		-----Cemented-----		-----Subsidence-----		Potential frost action	-----Risk of corrosion-----	
	Depth	Hardness	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In		In	In			
	--		--		--	--			
AfB AGAWAM	60- 60		-		-	-	LOW	LOW	HIGH
CrC CHARLTON	60- 60		-		-	-	LOW	LOW	HIGH
	10- 20	HARD	-		-	-	MODERATE	LOW	HIGH
HkC HINCKLEY	60- 60		-		-	-	LOW	LOW	HIGH
PbC PAXTON	60- 60		-		-	-	MODERATE	LOW	MODERATE
PeC PAXTON	60- 60		-		-	-	MODERATE	LOW	MODERATE
PeD PAXTON	60- 60		-		-	-	MODERATE	LOW	MODERATE
Rn RIDGEBURY	60- 60		-		-	-	HIGH	HIGH	HIGH
	60- 60		-		-	-	HIGH	LOW	HIGH
	60- 60		-		-	-	HIGH	HIGH	HIGH
Ru RIPPOWAM	60- 60		-		-	-	HIGH	HIGH	HIGH
SxC SUTTON	60- 60		-		-	-	HIGH	MODERATE	HIGH
WzC WOODBRIDGE	60- 60		-		-	-	HIGH	LOW	MODERATE

NONTECHNICAL SOILS DESCRIPTION REPORT
FOR DESCRIPTION CATEGORY - SOI

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map Symbol	Description
WzC	WOODBRIDGE EXTREMELY STONY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES This nearly level to sloping, moderately well drained soil formed in compact glacial till. It is on the top and side slopes of large drumlins and hills on glacial till uplands. Depth to bedrock is commonly more than 60 inches below the surface. From 1 to 8 percent of the soil surface is covered with stones and boulders. The soil has a seasonal high water table at a depth of about 20 inches from fall to spring. Permeability is moderate in the surface layer and subsoil and slow to very slow in the substratum. Surface runoff is medium to rapid and the available water capacity is moderate.

NONTECHNICAL SOILS DESCRIPTION REPORT
FOR DESCRIPTION CATEGORY - SOI

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map Symbol	Description
	<p>of glacial till uplands. Depth to bedrock is commonly more than 60 inches below the surface. From 8 to 25 percent of the surface of these soils are covered with stones and boulders. The soils were mapped together because they have no significant differences in use and management. These soils have a seasonal high water table at or near the surface from fall through spring. Permeability is moderate or moderately rapid in the surface layer and subsoil of these soils. The permeability is slow to very slow in the substratum of the Ridgebury and Whitman soils and moderately rapid in the substratum of the Leicester soils. Runoff is slow. The available water capacity is moderate in these soils.</p>
Ru	<p>RUMNEY FINE SANDY LOAM</p> <p>This nearly level, poorly drained soil formed in recent alluvial deposits. It is on the lowest parts of the flood plains of major streams and tributaries. Depth to bedrock is commonly more than 60 inches below the surface. The soil has a seasonal high water table at a depth of about 10 inches and is subject to frequent flooding, mainly from fall to spring. Permeability is moderate or moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum. Surface runoff is slow and the available water capacity is moderate.</p>
SxC	<p>SUTTON EXTREMELY STONY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES</p> <p>This nearly level to sloping, moderately well drained soil formed in loamy glacial till. It is at the base of slopes, in slight depressions and on side slopes in glacial till uplands. Depth to bedrock is commonly more than 60 inches below the surface. From 8 to 25 percent of the soil surface is covered with stones and boulders. The soil has a seasonal high water table at a depth of about 20 inches from fall to spring. Permeability is moderate in the surface layers and subsoil and moderately rapid in the substratum. Surface runoff is medium to rapid and the available water capacity is moderate.</p>

NONTECHNICAL SOILS DESCRIPTION REPORT
FOR DESCRIPTION CATEGORY - SOI

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map Symbol	Description
AfB	<p>AGAWAM FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES</p> <p>This gently sloping, well drained soil formed in sandy water deposited materials. It is on outwash plains and stream terraces. Depth to bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of 6 feet. Permeability is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid or rapid in the lower part of the subsoil, and rapid in the substratum. Surface runoff is medium and the available water capacity is moderate.</p>
Crc	<p>CHARLTON-HOLLIS FINE SANDY LOAMS, 3 TO 15 PERCENT SLOPES</p> <p>This map unit consists of very deep and shallow gently sloping to sloping, well drained and somewhat excessively drained soils on hills and ridges of glacial till uplands. The areas of this map unit are mostly irregular in shape. Slopes are mostly complex and 100 to 200 feet long. Stones cover 1 to 8 percent of the surface, which is marked by a few narrow, intermittent drainageways and small, wet depressions. This map unit is about 55 percent Charlton soils, 20 percent Hollis soils, 15 percent other soils, and 10 percent exposed bedrock. The Charlton and Hollis soils are in such a complex pattern that it was not practical to map them separately. The water table in this unit is commonly at a depth of more than 6 feet. The available water capacity is moderate in the Charlton soils and very low or low in the Hollis soils. Both soils have moderate or moderately rapid permeability and medium to rapid runoff. Hard unweathered schist bedrock is at a depth of 14 inches in some areas.</p>
HkC	<p>HINCKLEY GRAVELLY SANDY LOAM, 8 TO 15 PERCENT SLOPES</p> <p>This rolling, excessively drained soil formed in sandy and gravelly water-sorted materials. It is on terraces of stream valleys, outwash plains, kames and eskers. Bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of six feet. Permeability is rapid in the surface layer and subsoil, and very rapid in the substratum. Surface</p>

NONTECHNICAL SOILS DESCRIPTION REPORT
FOR DESCRIPTION CATEGORY - SOI

Survey Area- NEW HAVEN COUNTY, CONNECTICUT

Map Symbol	Description
	runoff is slow and the available water capacity is low.
PeC	<p>PAXTON EXTREMELY STONY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES</p> <p>These gently sloping to sloping and well drained soils formed in compact glacial till. They are on tops and side slopes of drumlins and large hills of glacial tills uplands. Depth to bedrock is commonly more than 60 inches below the surface. Stones and boulders cover 8 to 25 percent of the surface. These soils have a seasonal high water table perched at a depth of about 2 feet for several weeks in the spring. Permeability in the Paxton soil is moderate in the surface layer and subsoil and slow to very slow in the substratum. Permeability in the Montauk soil is moderate or moderately rapid in the surface layer and subsoil and moderately slow or slow in the substratum. Surface runoff is medium to rapid and the available water capacity is moderate.</p>
PeD	<p>PAXTON EXTREMELY STONY FINE SANDY LOAM, 15 TO 35 PERCENT SLOPES</p> <p>These moderately to steep, well drained soils formed in compact glacial till. They are on tops and side slopes of drumlins and large hills of glacial tills uplands. Depth to bedrock is commonly more than 60 inches below the surface. Stones and boulders cover 8 to 25 percent of the surface. These soils have a seasonal high water table perched at a depth of about 2 feet for several weeks in the spring. Permeability in the Paxton soil is moderate in the surface layer and subsoil and slow to very slow in the substratum. Permeability in the Montauk soil is moderate or moderately rapid in the surface layer and subsoil and moderately slow or slow in the substratum. Surface runoff is rapid and the available water capacity is moderate.</p>
Rn	<p>RIDGEBURY, LEICESTER AND WHITMAN EXTREMELY STONY FINE SANDY LOAMS</p> <p>These nearly level, poorly drained and very poorly drained soils formed in compact and friable loamy glacial till. They are in depressions and drainageways</p>

ABOUT THE TEAM

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, soil scientists, foresters, climatologists and landscape architects, recreational specialists, engineers and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - an 83 town area serving western Connecticut.

As a public service activity, the Team is available to serve towns within the King's Mark RC&D Area - **free of charge**.

Purpose of the Environmental Review Team

The Environmental Review Team is available to assist towns in the review of sites proposed for major land use activities or natural resource inventories for critical areas. For example, the ERT has been involved in the review of a wide range of significant land use activities including subdivisions, sanitary landfills, commercial and industrial developments and recreation/open space projects.

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 site and highlighting opportunities and limitations for the proposed land use.

Requesting an Environmental Review

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of an administrative agency such as planning and zoning, conservation or inland wetlands. Environmental Review Request Forms are available at your local Soil and Water Conservation District and through the King's Mark ERT Coordinator. This request form must include a summary of the proposed project, a location map of the project site, written permission from the landowner/developer allowing the Team to enter the property for the purposes of a review and a statement identifying the specific areas of concern the Team members should investigate. When this request is reviewed by the local Soil and Water Conservation District and approved by the King's Mark RC&D Executive Council, the Team will undertake the review. At present, the ERT can undertake approximately two reviews per month depending on scheduling and Team member availability.

For additional information regarding the Environmental Review Team, please contact the King's Mark ERT Coordinator, Connecticut Environmental Review Team, P.O. Box 70, Haddam, CT 06438. The telephone number is 860-345-3977.