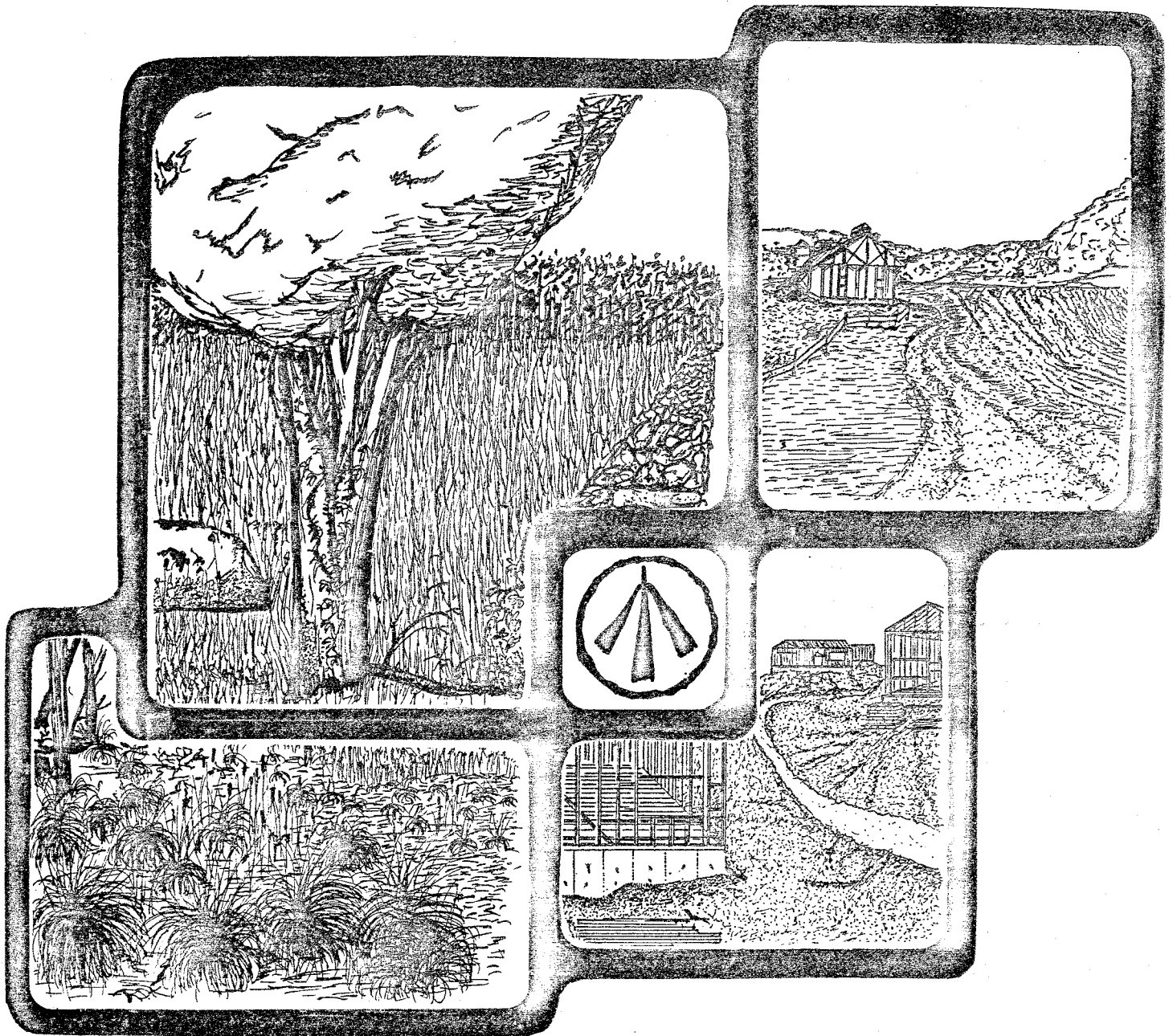


ENVIRONMENTAL REVIEW TEAM REPORT



NEW CANAAN LAND TRUST PROPERTIES NEW CANAAN, CONNECTICUT

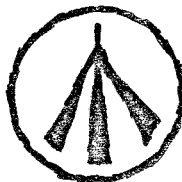
KING'S MARK
RESOURCE CONSERVATION & DEVELOPMENT AREA

KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT

NEW CANAAN LAND TRUST PROPERTIES

NEW CANAAN, CONNECTICUT

NOVEMBER, 1982



King's Mark Resource Conservation and Development Area
Environmental Review Team
Sackett Hill Road
Warren, Connecticut 06754

ACKNOWLEDGMENTS

The King's Mark Environmental Review Team operates through the cooperative effort of a number of agencies and organizations including:

Federal Agencies

U.S.D.A. Soil Conservation Service

State Agencies

Department of Environmental Protection

Department of Health

University of Connecticut Cooperative Extension Service

Local Groups and Agencies

Litchfield County Soil and Water Conservation District

New Haven County Soil and Water Conservation District

Hartford County Soil and Water Conservation District

Fairfield County Soil and Water Conservation District

Northwestern Connecticut Regional Planning Agency

Valley Regional Planning Agency

Central Naugatuck Valley Regional Planning Agency

Housatonic Valley Council of Elected Officials

Southwestern Regional Planning Agency

Greater Bridgeport Regional Planning Agency

Regional Planning Agency of South Central Connecticut

Central Connecticut Regional Planning Agency

Capitol Regional Council of Governments

American Indian Archaeological Institute

Housatonic Valley Association

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State of Connecticut

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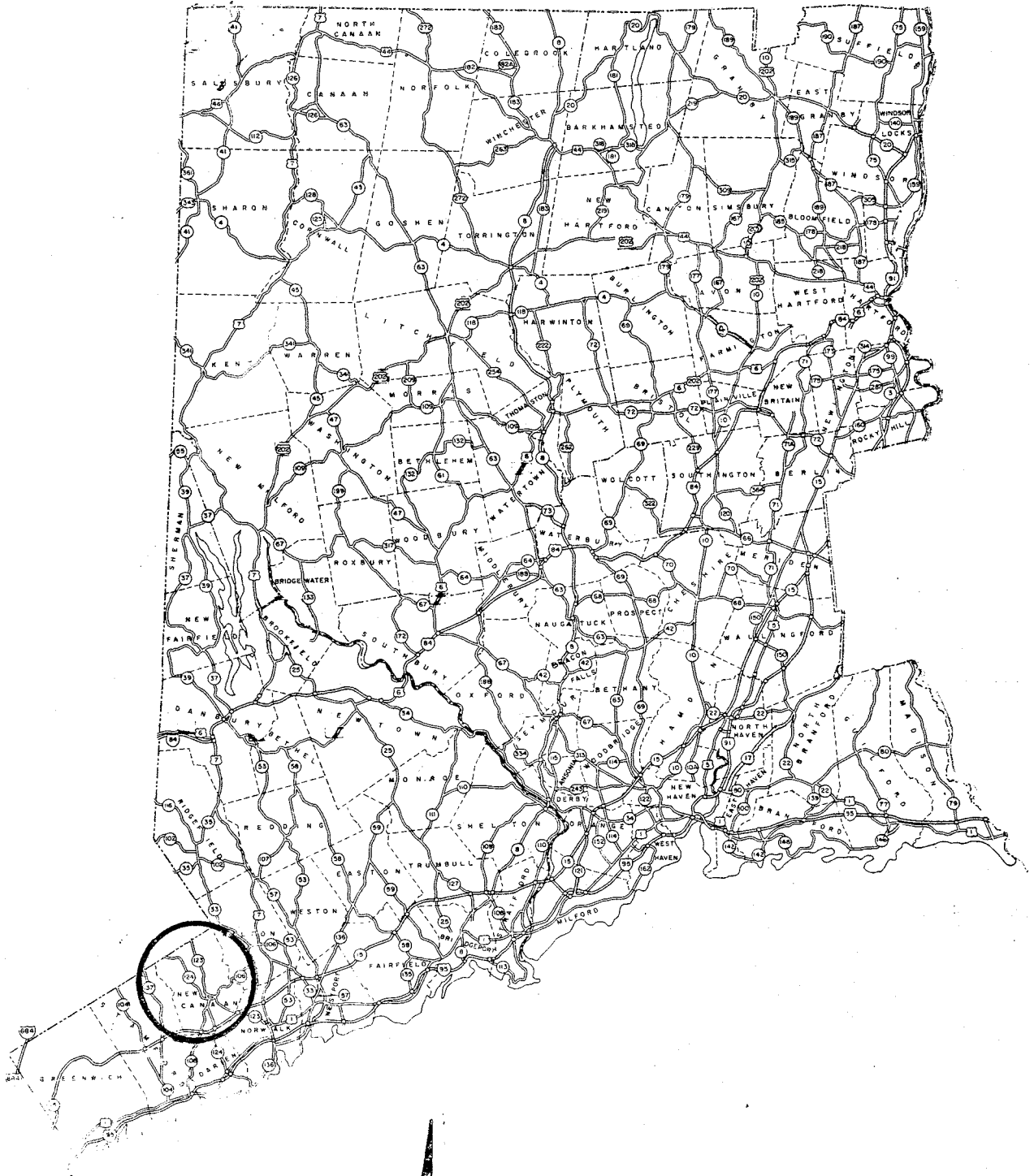
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LOCATION OF STUDY SITE



SCALE: 1" = 10 miles

10 0 5 10 miles

ENVIRONMENTAL REVIEW TEAM REPORT
ON
NEW CANAAN LAND TRUST PROPERTIES

I. INTRODUCTION

The New Canaan Land Trust, in cooperation with the New Canaan Environmental Commission, requested the King's Mark Environmental Review Team to perform an environmental review of four of the Trust's land holdings. The four properties include:

- 1) Colhoun Sanctuary, ± 24 acres, located in the southwestern quarter of town along the New Canaan-Stamford town line. Access to the site is available from the south off Davenport Ridge Road.
- 2) Turtle Back Road Sanctuary, ± 14 acres, located in the northwestern quarter of town. Access is available off Turtle Back Road South and Apple Tree Lane.
- 3) Noble Sanctuary, ± 12 acres, located about one mile northeast of the town center. Access is available from the east off Thayer Drive.
- 4) Browne Sanctuary, ± 10 acres, located just east of Grupes Reservoir in the northeastern quarter of town. Access is available from the east off Valley Road.

The following map shows the general location of the four sites.

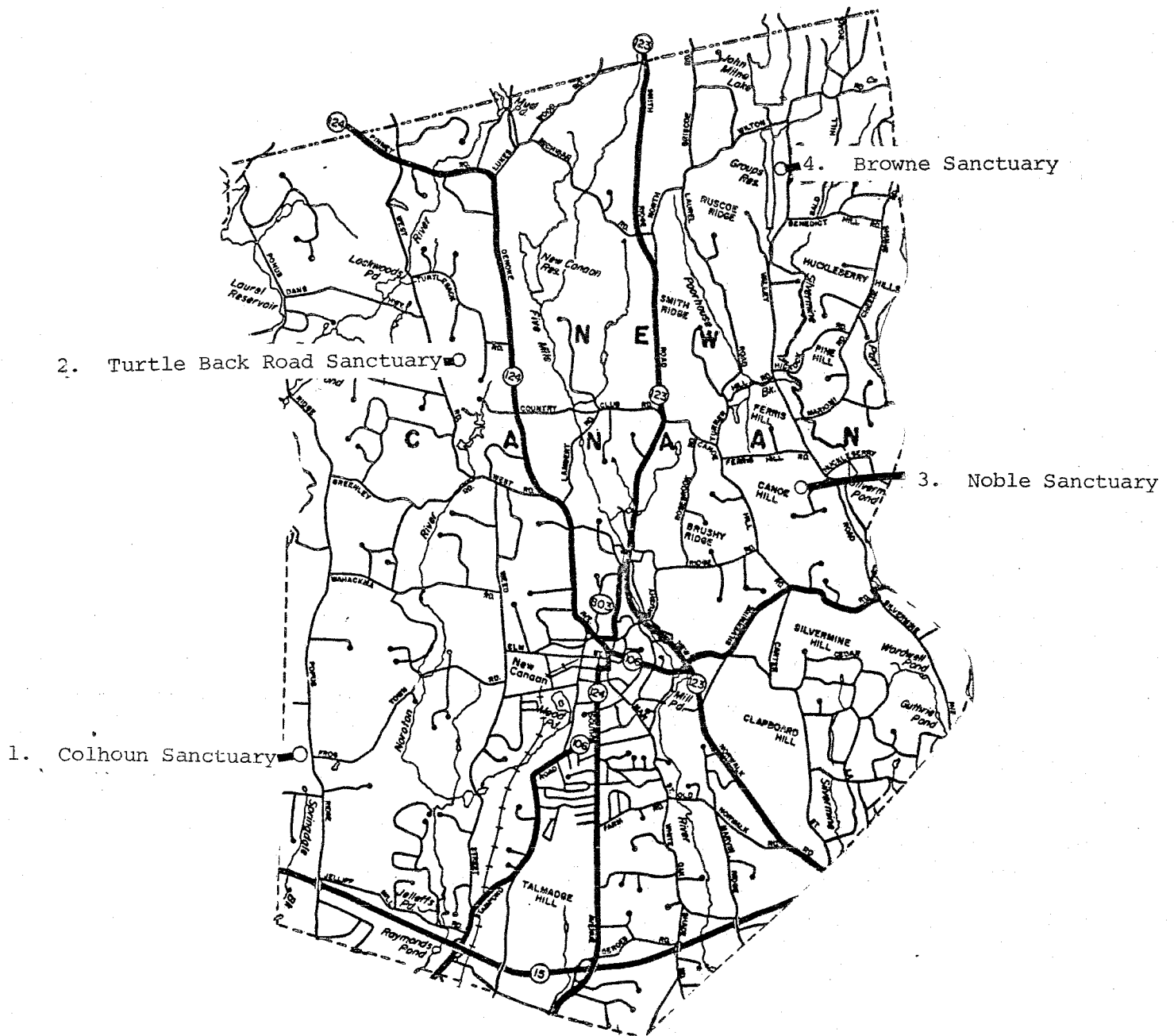
The New Canaan Land Trust initiated this review to better understand the environmental characteristics of the four properties. Specifically, the Team was requested to prepare a natural resource inventory of the sites and also to comment on the potential of the properties for forest management, wildlife management, and recreational use. The King's Mark Executive Committee considered the Trust's request, and approved the project for review by the Team.

The ERT met and field reviewed the sites on June 29 and July 7, 1982. Team members participating on this project included:

Tim Dodge.....	Wildlife Biologist.....	U.S.D.A. Soil Conservation Service
Andy Petracco.....	Recreation Specialist.....	Ct. Department of Environmental Protection
Don Smith.....	Forester.....	Ct. Department of Environmental Protection
Dave Thompson.....	District Conservationist.....	U.S.D.A. Soil Conservation Service
Mike Zizka.....	Geohydrologist.....	Ct. Department of Environmental Protection

a.

LOCATION OF STUDY SITES



SCALE 1" = 1 mile

Prior to the field review day, each team member was provided with a summary of the proposed study, a checklist of concerns to address, a topographic map, a soils map, and a soils limitation chart. During the ERT's field review, team members met with representatives from the Land Trust and walked the four properties. Following the field review, individual reports were prepared by each team member and forwarded to the ERT Coordinator for compilation and editing into this final report.

This report presents the team's findings. The report identifies the natural resource base of the four properties and discusses opportunities and limitations for land management. All conclusions and final decisions with regard to future land use rest with the New Canaan Land Trust. It is hoped the information contained in this report will assist the Land Trust in making environmentally sound decisions. If any additional information is required, please contact Richard Lynn (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, Sackett Hill Road, Warren, Connecticut 06754.

* * * * *

II. GENERAL CONSIDERATIONS

A. Vegetation Management

The New Canaan Land Trust Properties discussed in this report vary in their potential for forest management. Forest management, as used in this report, refers to the manipulation of forest vegetation, usually through the cutting of trees or the planting of trees to bring about, maintain or improve certain desirable forest conditions.

When properly prescribed and executed, forest management practices will increase the production of forest products, improve wildlife habitat, improve forest aesthetics and enhance the overall condition of the woodland. Without sound management there is no control over the quality of these conditions. Specific management opportunities are outlined for each vegetation type within each parcel. For more detailed information a public service forester with DEP or a private forester should be contacted.

Thinning harvests are prescribed in stands where trees are declining in health and vigor due to over crowding. These thinnings are designed to reduce competition between residual trees for space, sunlight, water and nutrients. Only trees that are of poor quality, damaged, or in direct competition with high quality trees should be removed during these thinnings. Stands once thinned should become more stable, healthy and less susceptible to damage caused by insects, disease and adverse weather conditions.

Where no management practices are discussed, the vegetation is healthy as is. These areas should be reevaluated for future management needs at approximately 10 year intervals.

Areas such as the hardwood swamps which have little potential for forest management are also noted in the vegetation type description. These areas have little or no value for timber production, however their value for wildlife habitat and nature study is high.

Federal cost sharing may be available to help defray the costs of implementing some of the proposed management practices. For more specific details on cost sharing assistance, please contact the Fairfield County A.S.C.S. office in Bethel, Connecticut.

From a resource management and maintenance stand point, it would be advisable to have all of the boundaries of each of the parcels clearly marked.

To maintain the quality of the trails which are present, periodic maintenance is essential. At least once a year all the trails throughout these properties should be inventoried for erosion problems and dead or dying trees which represent a potential hazard. Erosion problem spots should be eliminated through the proper placement of water diversions, or relocation of the trails to avoid existing problem areas. Trees that are potentially hazardous should be promptly felled. For assistance in trail design and maintenance, the USDA SCS office in Bethel (743-5453) should be contacted.

B. Wildlife Management

From a regional wildlife habitat viewpoint, New Canaan contains much woodland. However, residential development (single family homes) exists under much of this woodland canopy. Little woodland management for seedling to pole size timber can be expected in this area. Most existing openland in the town consists of close grown turf lawns established and maintained by homeowners.

Most wildlife, both game and non-game, are produced in the "edge" where two or more vegetative elements such as woodland and grassland, come together. Many animals, including the white-tailed deer and ruffed grouse, require edge and woodland in the seedling to pole stage of growth. Collectively, these areas provide the greatest amounts of tender new growth at a height available to deer and small mammals. They also contain a variety of vegetation (trees, fruiting shrubs, vines, and herbaceous material), which provides food and cover to the greatest numbers of wildlife, and diversity of animal species. Land management which strives to provide this quality and distribution of plants would improve both the regional habitat, and the individual properties as well.

The Appendix of this report presents a chart of wildlife habitat potentials according to soil type. This chart identifies the general suitability of various lands for management for openland wildlife, woodland wildlife, and wetland wildlife. As shown in the chart, "good" opportunities exist for wildlife habitat management on each of the four properties.

III. COLHOUN SANCTUARY

As shown in Figure IIIa, the Colhoun Sanctuary abuts the Stratford/New Canaan town line and is generally long and narrow in shape. Access to the site is available from the south off Davenport Ridge Road, and also from the east off Ponus Ridge Road. Country Day School is located just east of the property. Elsewhere the property is surrounded by large lot residential development or undeveloped land.

A. Topography and Geology

The Colhoun property is located in a topographic saddle. To the east and west of the parcel, the land rises into low hills elongated in a northwest - southeast direction. The tract itself is narrow enough that it occupies only the axis of the saddle, and it is consequently relatively flat. A swale off the western boundary of the parcel carries seasonal drainage to the north; a watercourse off the eastern boundary carries drainage to the south, entering the southeastern "jog" of the parcel and flowing into the pond in the southeast corner of the tract. This watercourse originates in another small man-made pond in the northeast corner of the property.

The site is covered entirely by till. Till is a nonsorted sediment that was deposited directly from glacier ice. It consists of a complex mixture of clay, silt, sand, gravel, and boulders. Generally, the upper 3 to 5 feet of till are sandy, stony, and loose; below that, the till commonly becomes slightly finer grained and quite compact. Test hole data were not available for the property, but data recorded from nearby wells suggest that the thickness of the till (i.e. the depth to bedrock) on the site exceeds 20 feet. In the wetter areas of the parcel, the till is overlain by a thin layer of dark, fine-grained soil rich in decayed organic material.

The two hills flanking the site are probably drumlins. Drumlins are thick till deposits that were molded into streamline form by overriding glacial ice. The long axes of the drumlins point in the direction of ice movement; here, the movement was south-southeast.

B. Hydrology

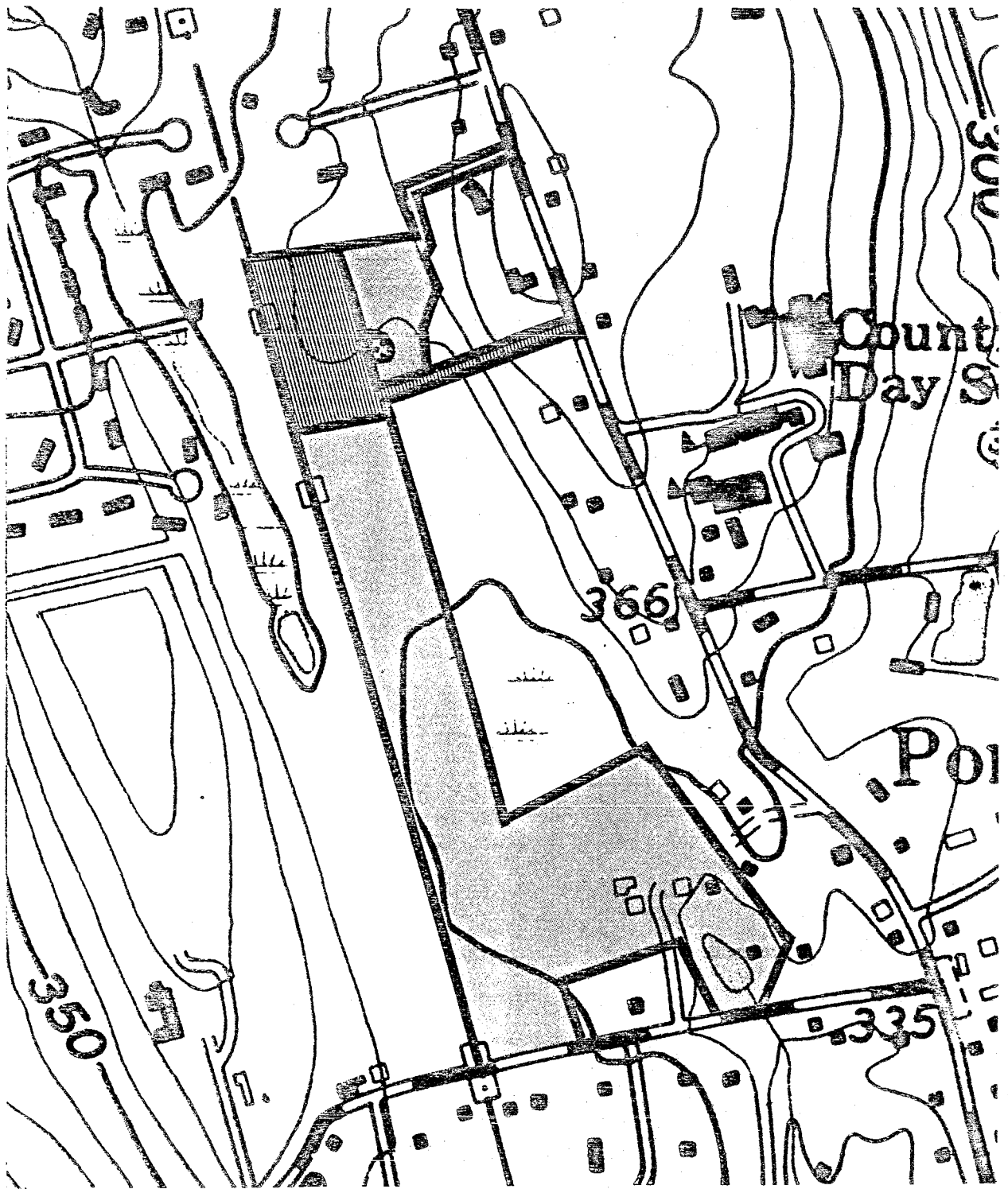
Two small streams flank the Colhoun Sanctuary. One originates in a pond in the northeastern corner of the property, flows southeastward just to the east of the parcel boundary, and then crosses back into the property where the latter expands eastward. This stream flows into a second small pond in the southeastern corner of the site, and then emerges to be given the name Springdale Brook. The brook is tributary to Noroton River.

The second stream begins in a pond just west of the property and flows northwestward, always remaining outside of the parcel proper. The stream curves westward to flow into North Stamford Reservoir, an impoundment of Ripowam River.

Because of the peculiar topographic and geologic conditions on the property, groundwater is relatively close to the surface, at least seasonally. This limits the potential for recreational development to some extent, but the narrowness of the parcel is likely to be a more restrictive limitation. The shallow wet

FIGURE III a.

TOPOGRAPHIC MAP



SCALE
1" = 50'



Parcel proposed for acquisition

area in the east-central portion of the site has some value in runoff retention and sediment storage, although its small size probably restricts this value to small magnitude storms.

No groundwater resources of particularly significant value are believed to underlie the site. The principal aquifer on the parcel is bedrock, which typically is capable of supplying only small yields to individual wells. Nevertheless, if a well should prove to be desirable on this site in the future, the bedrock should be an adequate water source.

C. Vegetation

As shown in Figure IIIb, there are 4 vegetative types present on the Colhoun sanctuary. They are discussed in the following paragraphs.

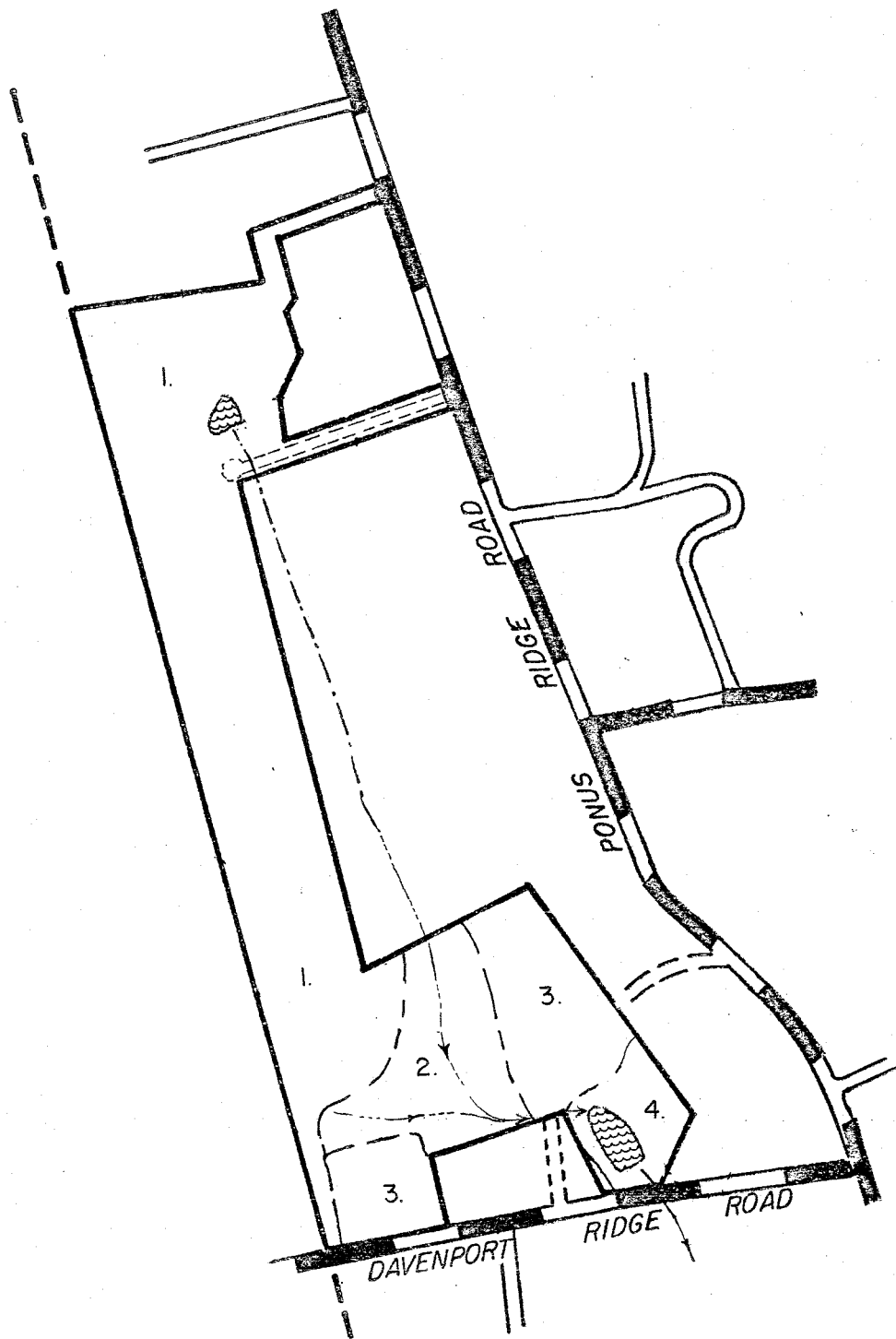
STAND 1. MIXED HARDWOOD. This 15.3 acre stand occupies the northern two-thirds of the property. The overstory is composed of good quality, pole size (5-11 inches in diameter) red oak, yellow poplar, yellow birch, black birch, and scattered shagbark hickory. White oak and American beech are found on the driest areas. Stocking levels are relatively constant throughout, with the area being fully stocked. The understory, somewhat dense in the wetter areas, is composed of spicebush, highbush blueberry, maple leaved viburnum, and an area of scattered hemlock saplings which have been introduced. Sweet pepperbush can be found in wet pockets along the eastern boundary. Ground cover here consists of wild lily of the valley, princess pine, poison ivy, Christmas fern, and limited hardwood reproduction of the same species as are in the overstory. Of note in this stand is the incidence of damage to black birch from nectria canker, and the presence of American chestnut saplings, which are root suckers from now defunct parents.

The stand is in need of a thinning, as it is crowded and declining in health and vigor. A thinning following the "crop tree selection method" would reduce competition between residual trees, stimulate understory and reproductive growth, and would result in a healthier, more vigorous, and disease resistant stand. Under the "crop tree selection method", 100 of the highest quality trees in each acre should be identified (trees spaced about 20' x 20' will equal 100 trees per acre), and one, two, or three trees that are in direct competition with each of those identified should be removed. The 100 trees per acre that are selected as crop trees should be healthy, large crowned, and show little or no signs of damage. Trees which are not competing with the 100 selected trees should not be removed, unless they are severely damaged. This thinning, if implemented, will provide approximately 5 cords of fuelwood per acre.

STAND 2. HARDWOOD SWAMP. The fully stocked 3.1 acre stand consists of primarily pole to small sawtimber size (11 inch diameter and up) red maple, with scattered ash in the drier margins. The understory consists of heavy spicebush and sweet pepperbush. Ground cover here ranges from none in heavy shade to primarily skunk cabbage. The area has little management potential and would be best left as is.

STAND 3. OPEN FIELD. Four acres of this property are in open field and are not stocked with forest species. The fields are covered with grasses, common cinquefoil, and patches of goldenrod. Although retention of these fields is desirable from a wildlife standpoint, it would be feasible to establish a


FIGURE III b.
VEGETATION TYPE MAP



VEGETATION TYPES

- STAND 1. Mixed Hardwood, 15.3 acres
- STAND 2. Hardwood Swamp, 3.1 acres
- STAND 3. Open Field, 4 acres
- STAND 4. Pond and Vicinity, 1.6 acres

LEGEND

- ACCESS ROAD
- - - STAND BOUNDARY
- - - - INTERMITTENT WATERCOURSE
-  WATERBODY

plantation of white pine, European larch, and Douglas fir by planting them in rows of 6 feet apart and spread 8 feet apart within the row. Weed control by mowing between the rows will be necessary 2 - 3 times per year for 5 years after which the seedlings should be able to outdistance the weed growth. Thinnings would be necessary approximately every 15 years.

STAND 4. POND AND VICINITY. The pond and the surrounding area occupy 1.6 acres. This area was at one time well manicured and was an adjunct to the now dismantled residence and outbuildings. The stand is understocked with scattered saw-timber sized red maple, sugar maple, and red oak. The understory is occupied with clumps of gray stemmed dogwood and highbush blueberry with sapling hardwoods. Ground cover is primarily grasses with patches of goldenrod and poison ivy. Management here should be aesthetic, but a decision to allow the area to develop without further intervention might be prudent.

A number of wildflowers were observed on the property the day of the Team's field review. These included:

White Avens	Touch-me-not	Indian Cucumber Root
Barberry	Enchanter's Nightshade	Whorled Loosestrife
Bittersweet	Black Raspberry	Great Solomon's Seal
Blackberry	Garlic Mustard	False Solomon's Seal
Celandine	Smartweed	Sweet Pepperbush
Canada Mayflower	Wild Geranium	Swamp Dewberry
Pasture Thistle	Violets	Horse Balm
Hall's Honeysuckle	Partridgeberry	Jack-in-the-Pulpit
Tartarian Honeysuckle	Indian Pipe	Greenbriar

Ferns observed on the site included:

Sensitive fern	New York fern
Hayscented fern	Christmas fern
Cinnamon fern	Lady fern
Interrupted fern	

D. Wildlife

As noted above, the 24 acre Colhoun Sanctuary is wooded, with the exception of two small, two acre + fields located in the southwest and southeast corners of the property. Both fields contain a mix of native grasses and perennial weeds.

The woodland is unmanaged, the fields are mowed annually.

Collectively, the woodlands provide habitat of fair quality to the deer grouse association of wildlife, and good habitat for the gray squirrel. The mature mast producing trees (e.g. oak, hickory, beech) provide acorns, nuts, and living space for the squirrels. The fields provide at best, a fair quality "edge", which includes fruiting shrubs useful to seasonal songbirds, cottontail rabbits, and ruffed grouse. The grass and weed growth in the fields increases habitat diversity for cottontail rabbits and small mammals by providing food and cover. Mowing improves grass quality and keeps the brush from taking over.

The Colhoun property is long and narrow, which is desirable when managing for "edge", in that a larger adjacent woodland area is benefited when "edge" is developed.

Suggested management alternatives to maximize "edge" and young growth woodlands are as follows:

1. Keep the fields open by mowing. Lime and fertilize the grasses to improve their quality. Ideally, the fields should be reseeded to include legumes, such as birdsfoot trefoil on off-drainage areas, and alfalfa on the better drained areas. Including a grass such as timothy, or brome grass, would make good hay.

2. Develop a "cutback border" around the field edges to a depth of 25 feet. All stems larger than three inches should be removed. Brush should be stacked along the interface of field and woods. This allows added sunlight to reach the shrub layer and stimulate its growth. Pruning existing shrubs and planting other varieties, as well as fertilizing, will help develop the edge quality. As growth improves, maintenance, which keeps growth in the three to six foot level, will help provide food and cover for the greatest number of animals.

3. Within the woodland areas, management which favors removal and harvest of enough pole and mature trees to create an uneven aged woodland, would most benefit wildlife. Seedling and pole size trees should be favored while other sections in town, where little or no harvesting would occur, could provide needed mature timber for those wildlife needs, as well as for the aesthetics of a mature forest. Clear cutting one half to two acre areas would help provide this condition. Connecting these clear cuts by a woods road seeded to shade tolerant grasses will further enhance the woodlands and provide the additional vegetative element of grass. Within the woodland both living and dead den trees should be left when encountered (at least four per acre).

Desirable trees, such as apple, should have vegetation which overtops and shades them removed to a distance of ten feet beyond their crown. This will encourage growth and fruiting quality.

Some conifers benefit wildlife by providing added shelter and diversity of vegetation. Clump planting six or eight in openings or underplantings of hemlock in existing stands can be desirable, but not more than ten percent of the area should be in coniferous growth.

E. Soils

As shown in Figure III c, the Colhoun Property consists of four soil types. A brief description of each soil type is presented below.

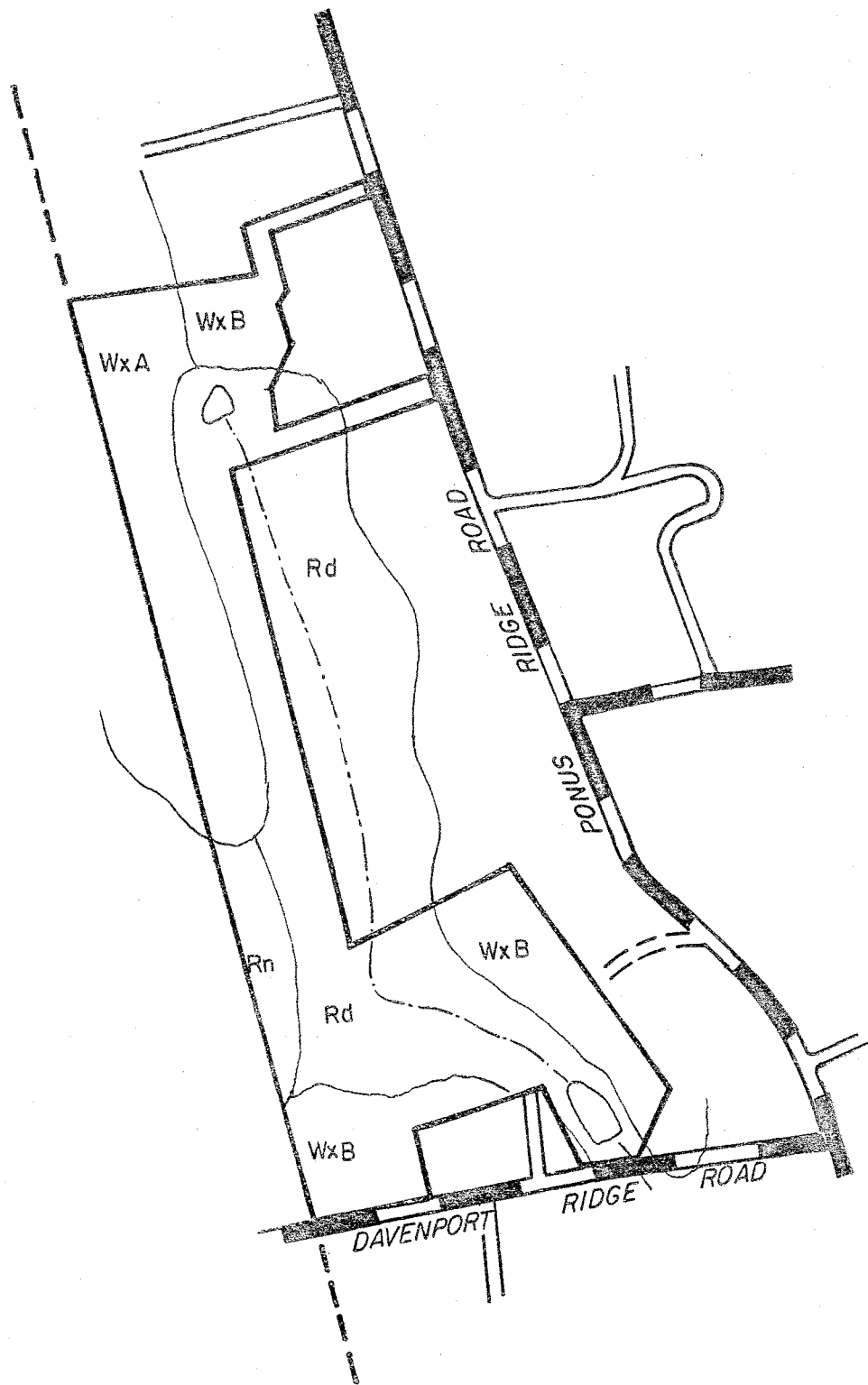
Rd - Ridgebury fine sandy loam. This nearly level to gently sloping, poorly drained soil occupies about 50% of the site.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 8 inches thick. The subsoil is brown and brownish gray, mottled fine sandy loam 10 inches thick. The substratum is grayish brown and dark yellowish brown, mottled fine sandy loam to a depth of 60 inches or more.

This Ridgebury soil has a high water table at a depth of about 6 inches from fall until late spring. The permeability of the soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the

FIGURE III c

SOILS MAP



SCALE
1" = 500'

Soil boundary lines derived from smaller scale map (1" = 1320') and should not be viewed as precise boundaries but rather as a guide to the distribution of soils on the property.

Adapted from Fairfield County Soil Survey, USDA-SCS

substratum. Available water capacity is moderate, and runoff is slow. The soil dries out and warms up slowly in spring. It is very strongly acid or medium acid.

The seasonal high water table and the slow or very slow permeability in the substratum limit this soil for community development including recreational use.

The soil is suitable for cultivated crops and trees. Artificial drainage is needed. Even when drained, however, the soil usually remains wet for several days after heavy rains, restricting the use of farming equipment. The high water table restricts the root growth of trees, and many trees are uprooted during windy periods.

Rn - Ridgebury, Leicester, and Whitman extremely stony fine sandy loams. This unit consists of poorly drained and very poorly drained soils. Stones and boulders cover 5 to 35 percent of the surface. Slopes are dominantly less than 3 percent.

The mapped acreage of this unit is about 35 percent Ridgebury soils, 30 percent Leicester soils, 20 percent Whitman soils, and 15 percent other soils. The soils were mapped together because they have no major differences in use and management.

The major soils in this unit have a seasonal high water table at or near the surface from fall through spring. The permeability of the Ridgebury and Whitman soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The permeability of the Leicester soils is moderate or moderately rapid throughout. Available water capacity is moderate in all three soils. Runoff is slow on all three, and water is ponded on the surface of some areas of the Whitman soils. The Ridgebury and Leicester soils are very strongly acid to medium acid and the Whitman soils are very strongly acid to slightly acid. These soils dry out and warm up slowly in the spring.

The high water table, ponding, and the stones and boulders on the surface limit these soils for community development, including recreational use.

The stones and boulders on the surface make the use of farming equipment impractical and make the soils generally unsuitable for cultivated crops. The soils are suitable for trees, but the stones and boulders also limit the use of woodland planting and harvesting equipment. The seasonal high water table in these soils restrict the rooting depth of trees and causes the uprooting of many trees during windy periods.

WxA - Woodbridge fine sandy loam, 0 to 3 percent slopes. This nearly level, moderately well drained soil is found in the northwestern corner of the site.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 8 inches thick. The subsoil is yellowish brown fine sandy loam 24 inches thick that is mottled in the lower part. The substratum is firm, grayish brown, mottled fine sandy loam to a depth of 60 inches or more.

This Woodbridge soil has a seasonal high water table at a depth of about 20 inches from fall until late spring. The permeability of the soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Runoff is slow, and available water capacity is moderate. The soil dries out and warms up slowly in spring. It is very strongly acid to medium acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum.

The slow or very slow permeability of the substratum and the seasonal high water table limit the soil for community development, including recreational use.

This soil is well suited to cultivated crops, but drainage is needed. Minimum tillage and the use of cover crops help to control erosion in cultivated areas. The soil is well suited to trees, and machine planting is practical.

WxB - Woodbridge fine sandy loam, 3 to 8 percent slopes. This soil is identical to WxA, only the slopes are steeper.

F. Recreation

The Colhoun Sanctuary is irregularly shaped in a form resembling a high back chair. Direct access is available from Davenport Ridge Road which forms the southern boundary of the property. As noted previously the greatest diversity of landform is also found at the southern end of the tract; this area includes hayfields, wooded land, and a small pond. The remainder of the property is wooded.

Parking would logically be located on site near Davenport Ridge Road. Provision for 10-12 cars should be adequate. If possible, the parking area should be located where little or no loss of hayfield would result. These fields and the woodland edge provide habitat for wildlife and opportunities for visitors to view it. The small pond may also provide habitat and viewing opportunities relative to migrating waterfowl. It may also provide limited ice-skating potential during severe winter cold spells. Two or three benches near the pond would afford people the opportunity to sit and view the wildlife, rest after walking the trail through the property and provide for ice skaters if the pond is put to that use.

A trail through the sanctuary could be used by hikers, joggers, birders, and wildlife watchers. With the tracts proximity to two schools, it offers good opportunities for outdoor classroom nature study. Such a trail should be routed so as to minimize the trail maintenance necessary but yet touch upon the various habitats on the property. Where wetland crossings are required, the application of corduroy (log segments) or gravel may be required to elevate the pathway a sufficient amount to enable passage on a year round basis. Pathways should not be so wide as to permit four wheel drives to use them. Vehicular use should be ruled out and an effort made to make motorcycle access to and use of the trail difficult. Walk-around barriers, of various types, can be employed to this end.

Regarding a nature trail, students can determine, by observation and reference material, the major features of the tract. Students can then begin to relate, in a basic way, how the geological processes which formed the land and man's intervention in the natural processes helped to determine the types of

habitat and wildlife found here. The dynamics of human intervention and natural processes, and how their interplay can alter a habitat, can thereby become more understandable.

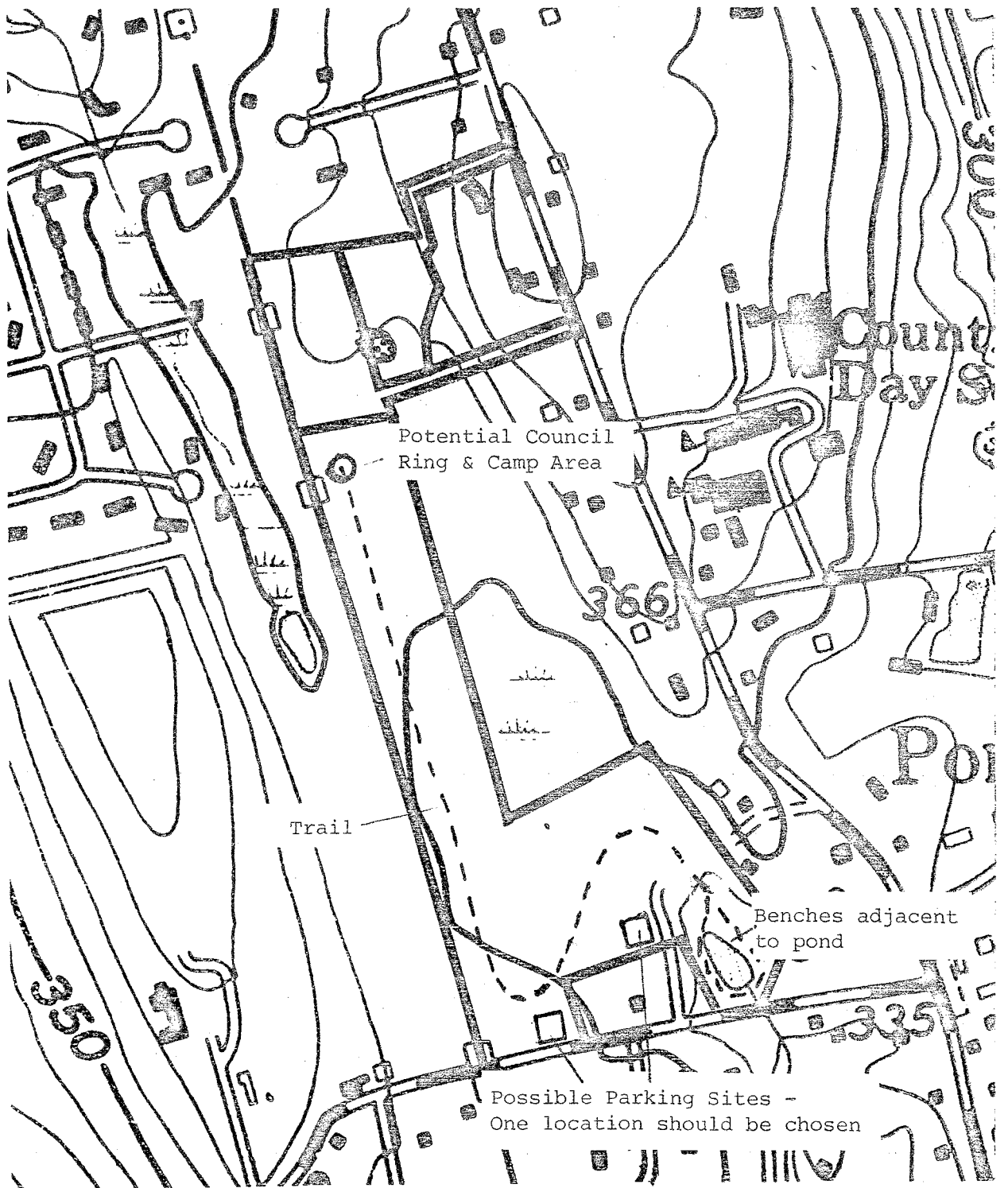
This learning experience can range from a general understanding of the concept of biological interdependence to the specific way that two life forms relate to each other. The range of variables which also serve to modify the habitats and their inhabitants (e.g. weather, climate, soil fertility, landform, water availability, etc.) can be studied in greater depth to learn how complex and fragile these interdependent relationships can be. Learning programs can be tailored to the various grade levels by altering content and specificity. A basic lesson for all the grades is that by observation and analysis, we are better able to understand nature and its processes.

Student help, through school programs, can possibly be utilized in building and maintaining a trail as well as helping to design an interpretive (teaching) program relative to the trail and sanctuary. Such a program can be ongoing to maximize student involvement and thereby, their learning experience as well. A dynamic and involving teaching/learning experience provides a more lasting lesson to both student and teacher.

While the hayfields offer good opportunities for active recreational use (e.g. ballfields), it is not advocated by the Team's recreation planner. It is assumed that the land trust wants to provide maximum human enjoyment while minimizing human intrusion and modification of the property. This rules out many active forms of recreation but does not preclude low density, passive recreational uses such as those related to non-motorized trail use (e.g. hiking, jogging, nature study, and in winter snowshoing and cross-country skiing). Ice-skating should not have a marked negative impact on wildlife in the area. Striking a balance which provides for human use and suitable wildlife habitat necessarily means restricted human use. Heavy public use would have a deleterious effect on the wildlife. A balanced plan for use of the property would help ensure its viability in meeting the community needs (including the wildlife components) of future generations. Any enlargement of the sanctuary by future acquisition would guarantee retention of a block of open space land which would not only benefit wildlife, but provide expanded, albeit limited recreation potential here. An extended trail could result.

Occasional backpack camping may be possible through a permit system for controlled use. Establishing a council ring with rustic benches could serve the dual role of outdoor classroom and camp area. A pack in, pack out system of area use should minimize maintenance chores. Those who do not abide by established guidelines for use of this area could be barred from future use. It is proposed that one or two pit type toilets be installed here. Cleaning them prior to departure should be a condition clearly stated to any users of the area. An honor system by these users may be adequate incentive for them to help weed out the undesirables. The area proposed for this council ring is on the north end of the tract in the woods near the existing one. Camping should be limited to groups, no larger than about 15 people. Permission for groups to camp could expand the learning experience by permitting exposure to the woods and its creatures at night. This permission could also be a reward for good work (possibly tied to conservation work) which benefits the sanctuary and its users.

Figure III d. SUGGESTED TRAIL LAYOUT



SCALE
1" = 5'

As with all land trust parcels, any features of historical interest or archaeological significance as well as any significant environmental features could be addressed in developing a program which conveys information on the properties. How much information is put forth depends on the site. It sometimes is inadvisable to do more than allude to a site's significance if that can invite unwanted activity (e.g. unsanctioned digs for Indian artifacts).

It is recommended that the boundaries of the land trust holdings be clearly marked, as noted previously.

Figure IIIId shows a conceptual trail layout for the property.

* * * * *

IV. TURTLEBACK ROAD SANCTUARY

The Turtleback Road Sanctuary is an irregularly shaped parcel of land located in the northwestern quarter of town. As shown in Figure IVa, access to the site is available from the north off Apple Tree Lane, and from the east off Turtleback Road south.

A. Topography and Geology

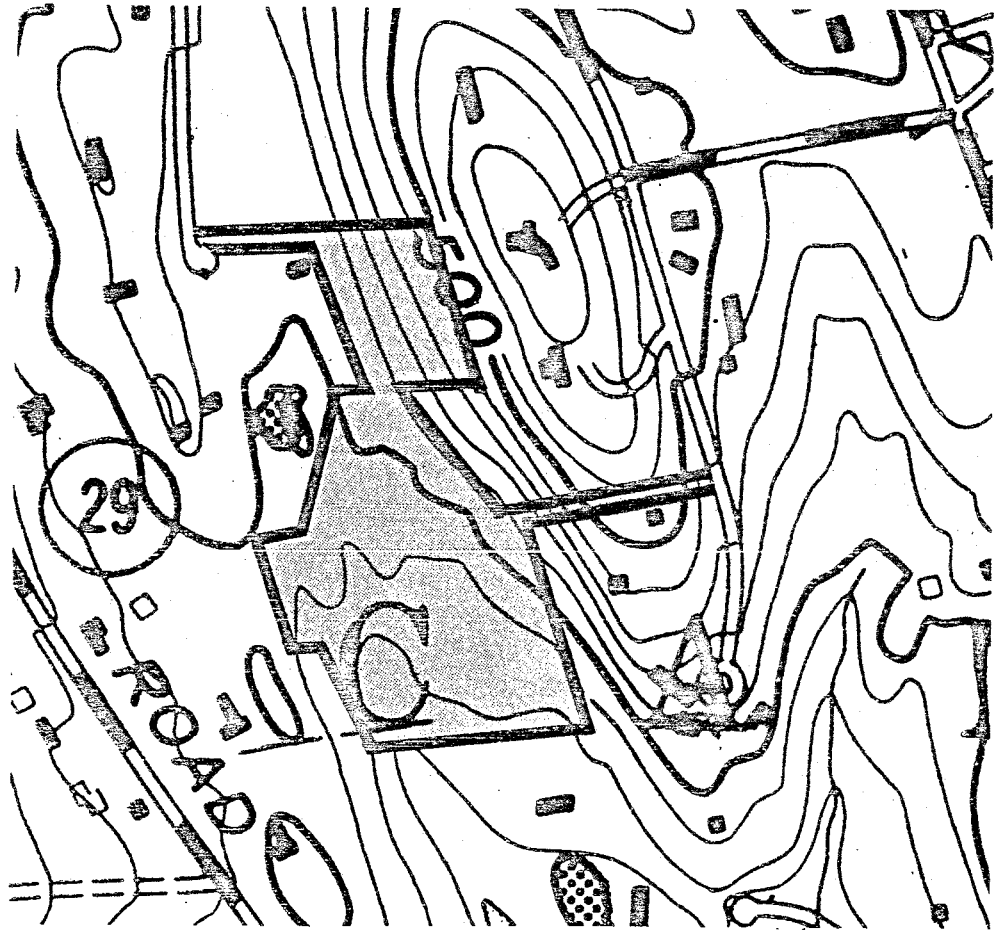
The Turtleback Road property is located along the western flank of a small, elliptical hill (see Figure IV a). Most of the land within the site slopes west to southwest, with the steeper slopes (no greater than 20 percent) in the northern section and very gentle slopes (5 percent or less) in the southern section.

The hill is composed of till, a nonsorted glacial sediment in which clay, silt, sand, gravel, and boulders are intimately mixed. The till deposit is thick; a well on the southern slope of the hill, just east of the site, recorded 60 feet of till over bedrock. This qualifies the hill as a drumlin. Drumlins are thick till deposits that were streamlined by the action of overriding glacier ice. The long axis of a drumlin is oriented in the direction of ice movement. The Turtleback Road drumlin indicates a movement of ice to the south-southeast, consistent with the ice movement suggested by the drumlins flanking the Colhoun Sanctuary.

The upper 3 to 5 feet of the till is probably sandy, stony, and loose. The remainder of the deposit is more likely to be finer-grained, less stony, and tightly compact. Seasonally high groundwater levels may be experienced in the till-based soils. These limitations (compact till, high groundwater) may be a hindrance, though not a severe one, to certain types of active recreational development, but they are unlikely to pose difficult problems for most types of passive recreation.

FIGURE IV a.

TOPOGRAPHIC MAP



SCALE:
1" = 500'

B. Hydrology

The Turtleback Road Sanctuary is located in the headwater region of the Noroton River watershed. All drainage from the site flows through that watershed. The river itself originates in a series of ponds, just south of the property.

There are no surface waters of significance on the site, but a seasonal watercourse originating in the southwest corner of the parcel carries intermittent drainage south to a small pond off the site. The geological materials on the property possess no special potential for yielding groundwater to wells. Bedrock is the most significant aquifer in this area. Bedrock transmits water by means of an interconnected system of fractures. The amount and natural quality of water withdrawn from a bedrock well depends upon the number and size of water-bearing fractures that the well intersects, and on the mineralogy of the rock formations through which the fractures pass. Most wells drilled in bedrock can achieve sustainable yields of 5 gallons per minutes or more without penetrating more than 300 feet of rock. A yield of 3 gpm would adequately serve the domestic needs of an average family. It is likely, then, that if a well for recreational water-supply purposes is desired for the Turtleback Road Sanctuary in the future, bedrock will prove to be a suitable water source.

Because of compact soil horizons and topographic positions, some portions of the site, particularly in the southern section, may experience seasonally high water tables. These conditions are not likely to have a significant adverse effect on passive recreational potential, and they can be overcome by proper engineering practices for active recreational facilities.

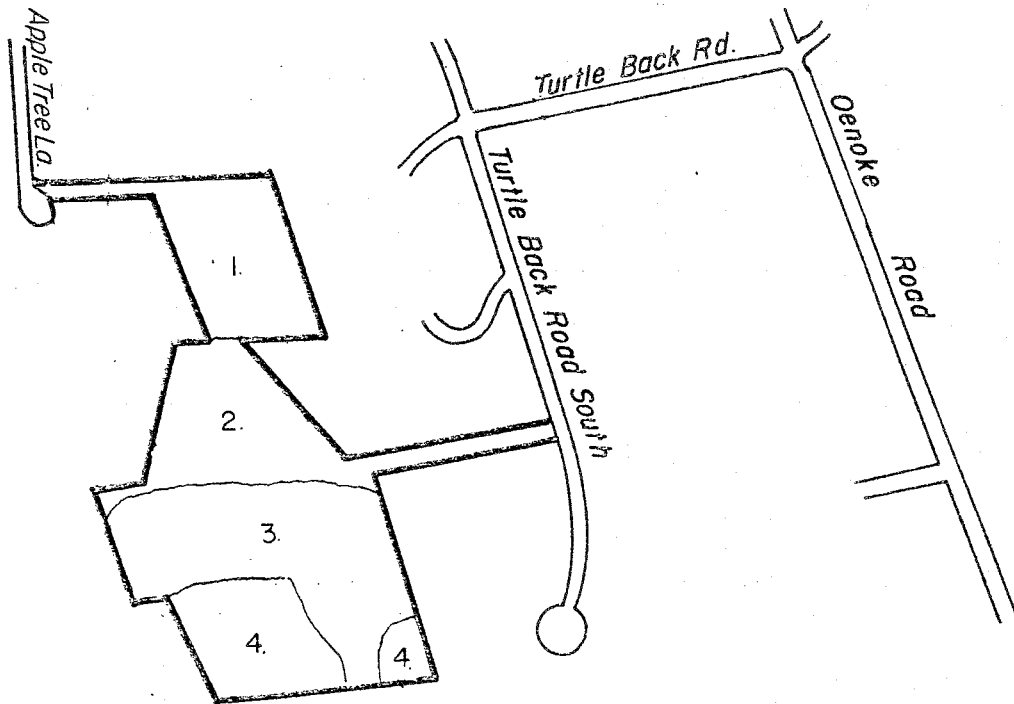
C. Vegetation

As shown in Figure IV b, there are four vegetative types present on the Turtleback Road Sanctuary. These are discussed in the following paragraphs.

STAND 1. MIXED HARDWOODS. This stand of old field growth is 3.0 acres in size, well stocked, and composed of poor to medium quality pole sized ash, red maple, cherry, and red oak. Scattered apples can be found, but are in various states of decay. The understory is composed of winged euonymus, barberry, grey stemmed dogwood, honeysuckle, and sugar maple reproduction. Ground cover includes jewel weed, trillium, and occasional grasses. Vines here, as in the entire parcel, are a problem. Bittersweet, grape, Virginia creeper, greenbriar, and poison ivy twine and climb over many of the shrubs and trees. Throughout the parcel some attempt should be made to control the growth and spread of these vines. Failure to do so will doom many of the shrub and tree species to failure. A satisfactory control might be to cut as many vines as possible at ground level and pull them from the trees. The trees should provide enough shade thereafter to discourage rampant growth. Barring this control measure, consideration should be given to renaming the property "Bittersweet Sanctuary".

STAND 2. MIXED HARDWOOD. This 3.7 acre stand is similar to, but younger than, Stand 1. Fewer tree species exist here. A higher percentage of apple and red cedar are represented and, again, the vine problem exists, but to a higher degree. Some flowering dogwood and gray birch can be found here as well. The

FIGURE **IV** b.
VEGETATION TYPE MAP



SCALE:
1" = 500'

VEGETATION TYPES

- STAND 1. Mixed Hardwood, well-stocked, 3 acres
- STAND 2. Mixed Hardwood (younger), 3.7 acres
- STAND 3. Open Field, 4.7 acres
- STAND 4. Mixed Hardwood, under-stocked, 2.6 acres

understory is very similar to that in Stand 1, but is denser and also includes spirea and privet. Ground cover is limited to a few relatively open acres and consists of grasses and goldenrod.

STAND 3. OPEN FIELD. This area of 4.7 acres is sporadically mowed and occupied chiefly by grasses, milkweed, Queen Anne's lace, butterfly weed, goldenrod, raspberry, grape, white campion, steeplebush, and birdfoot trefoil. There are a few old, vine covered apples present in the fields and in the borders. The borders also contain a thick growth of sumac, ash, flowering dogwood, cherry, and shagbark hickory enveloped by greenbriar, tatarian honeysuckle, hall's honeysuckle, and bittersweet. Retention of this area as field will have the greatest benefit from a wildlife standpoint. Mowing once or twice a year will be necessary to discourage brush and vines.

STAND 4. MIXED HARDWOOD. These 2.6 understocked areas are composed of scattered poor quality pole size red maple, elm, ash, and occasional red cedar. The understory here is composed of maple leaved viburnum, winterberry, honeysuckle, and hardwood reproduction. The ground cover is composed of poison ivy, jewel weed, grasses, raspberry, and Virginia creeper. Vines are not as bad a problem here. The 0.4 acre section of the stand located in the southeastern corner of the parcel also contains a slightly heavier concentration of pole-sized ash with a few field growth small sawtimber size ash.

A wide variety of wildflowers were seen on this site including:

Wild madder	Black-eyed Susan	Queen Anne's Lace
White Beardtongue	Yarrow	Hop clover
White Avens	Grape	Bladder campion
Choke cherry	Deptford pink	Yellow wood sorrel
Enchanter's Nightshade	Butterfly weed	Common mullein
Bittersweet	Clover	St. Johnswort
Poison ivy	Indian hemp	Multiflora rose
Virginia creeper	Red osier dogwood	Hawkweed
Winged euonymus	Tartarian honeysuckle	Greenbriar
Daisy fleabane	Hall's honeysuckle	Burdock
Touch-me-not	Daisy	

D. Wildlife

The 14 acre Turtleback Sanctuary contains a mix of wooded land and openland vegetated to grasses and perennial weeds (see Figure IV b). Grasses in the open fields include: rye, timothy, orchardgrass, and deertongue. The fields are not mowed regularly; consequently, the quality of grass growth is poor to fair. Perennial weeds and wildflowers have invaded the fields and will dominate the fields if yearly mowing is not begun. An unusually high quality edge exists around the fields. A diverse growth of excellent quality fruiting shrubs, vines, and trees is present. Soft mast in the form of fleshy fruit is abundant. This area provides excellent quality habitat for seasonal songbirds, small mammals and other wildlife in the area.

The woodland contains numerous apple trees. The dense growth of vines has limited understory growth in many areas. The removal of vines and thinning of full size growth and pruning apple trees on the hillside areas will favor habitat conditions.

For the edge quality to remain high, maintenance which cuts back portions of the edge each year, will retain food at proper levels and avoid an understory which is completely shaded and lacking new growth.

The fields should be limed, fertilized, and mowed. If they were reseeded to an alfalfa-timothy mix, hay of high quality could be grown and sold as feed for horses. The proceeds could be used to help pay for maintenance and management of other lands as well as improve the quality of the fields. Hay with a market value of at least \$500 per acre could be grown.

The Turtleback Sanctuary, in its present condition, offers good quality habitat conditions to woodland wildlife, and excellent habitat for ruffed grouse, cottontail, songbirds, and white-tailed deer. Pheasant and quail, if in the area, would depend heavily on these lands to meet their habitat needs.

E. Soils

As shown in Figure IV c, the Turtleback Road property consists of four soil types. These include:

PbC - Paxton fine sandy loam, 8 to 15 percent slopes. This sloping, well drained soil is located on the eastern edge of the site. Typically, this soil has a surface layer of dark brown fine sandy loam 9 inches thick. The subsoil is brown fine sandy loam 22 inches thick. The substratum is very firm, grayish brown gravelly sandy loam to a depth of 60 inches or more.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Runoff is medium, and available water capacity is moderate. The soil dries out and warms up slowly in spring. It is very strongly acid to slightly acid.

The major limitations of this soil for recreational use are slope and the slow or very slow permeability of the substratum.

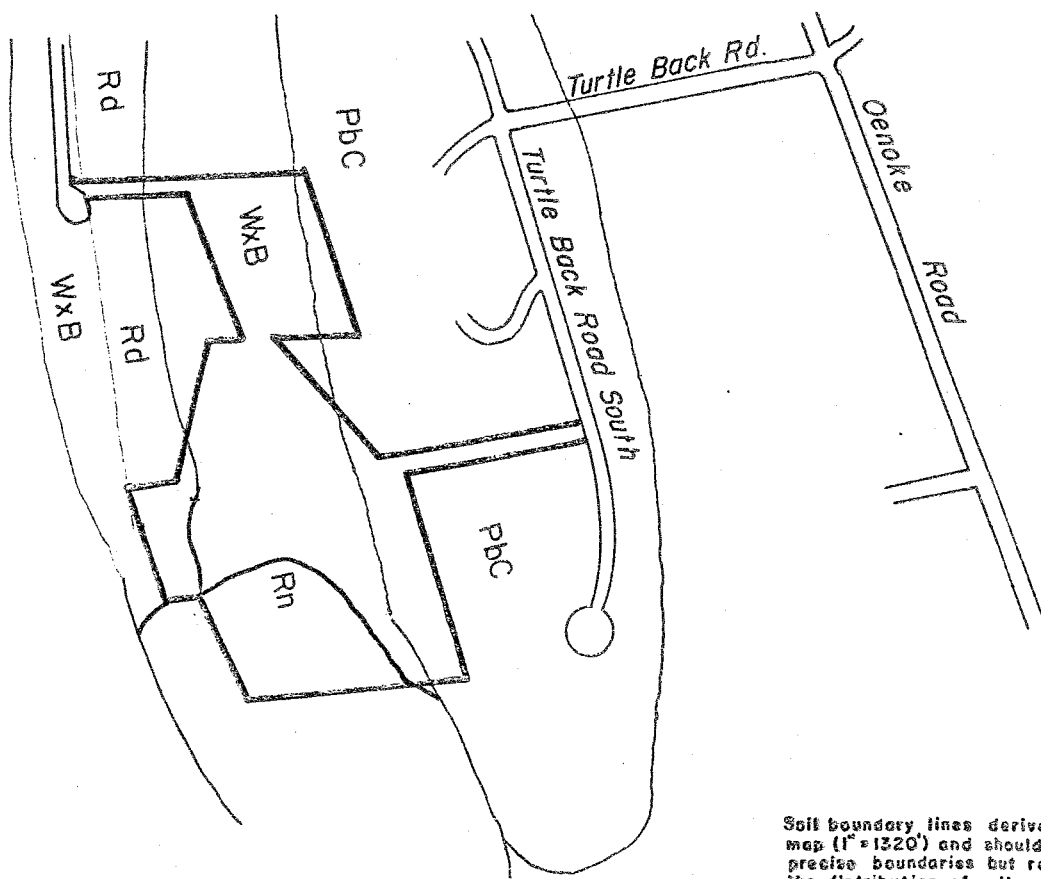
This soil is suitable for cultivated crops and well suited to trees. Slope limits the use of farming equipment. Machine planting is practical in areas used for trees.

Rd - Ridgebury fine sandy loam. This nearly level to gently sloping, poorly drained soil is found just at the entrance of the property off Apple Tree Lane.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 8 inches thick. The subsoil is brown and brownish gray, mottled fine sandy loam 10 inches thick. The substratum is grayish brown and dark yellowish brown, mottled fine sandy loam to a depth of 60 inches or more.

This Ridgebury soil has a high water table at a depth of about 6 inches from fall until late spring. The permeability of the soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Available water capacity is moderate, and runoff is slow. The soil dries out and warms up slowly in spring. It is very strongly acid to medium acid.

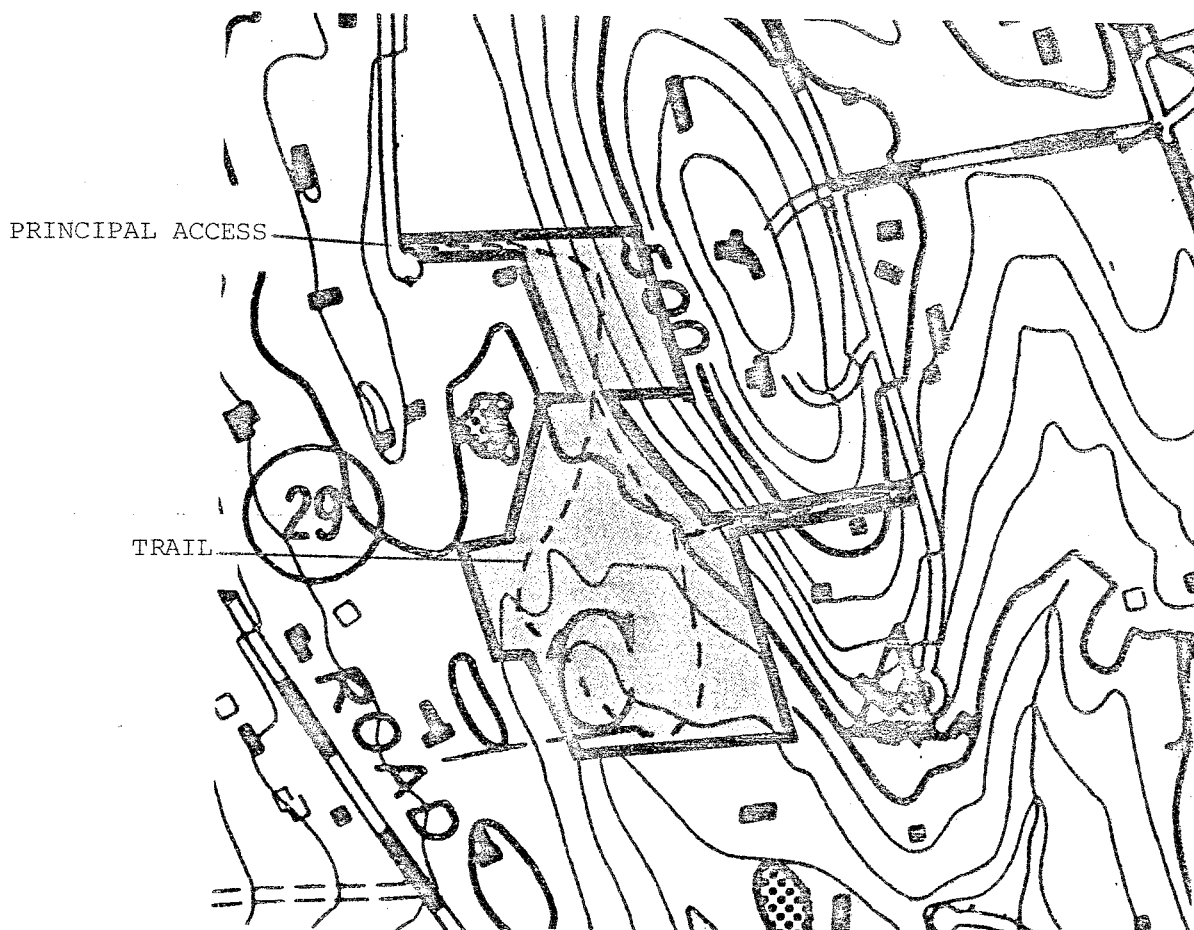
FIGURE IVc. SOILS MAP



Soil boundary lines derived from smaller scale map (1" = 1320') and should not be viewed as precise boundaries but rather as a guide to the distribution of soils on the property.

Adapted from Fairfield County Soil Survey, USDA - SCS

FIGURE IVd. SUGGESTED TRAIL LAYOUT



SCALE:
1" = 500'

The seasonal high water table and the slow or very slow permeability in the substratum limit this soil for community development including recreational use.

The soil is suitable for cultivated crops and trees. Artificial drainage is needed. Even when drained, however, the soil usually remains wet for several days after heavy rains, restricting the use of farming equipment. The high water table restricts the root growth of trees, and many trees are uprooted during windy periods.

Rn - Ridgebury, Leicester, and Whitman extremely stony fine sandy loams. This unit consists of poorly drained and very poorly drained soils. Stones and boulders cover 5 to 35 percent of the surface. Slopes range from 0 to 8 percent but are dominantly less than 3 percent. The southwestern corner of this site consists of this soil type.

The mapped acreage of this unit is about 35 percent Ridgebury soils, 30 percent Leicester soils, 20 percent Whitman soils, and 15 percent other soils. The soils were mapped together because they have no major differences in use and management.

The major soils in this unit have a seasonal high water table at or near the surface from fall through spring. The permeability of the Ridgebury and Whitman soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The permeability of the Leicester soils is moderate or moderately rapid throughout. Available water capacity is moderate in all three soils. Runoff is slow on all three, and water is ponded on the surface of some areas of the Whitman soils. The Ridgebury and Leicester soils are very strongly acid to medium acid, and the Whitman soils are very strongly acid to slightly acid. These soils dry out and warm up slowly in the spring.

The high water table, ponding, and the stones and boulders on the surface limit these soils for community development including recreational use.

The stones and boulders on the surface make the use of farming equipment impractical and make the soils generally unsuitable for cultivated crops. The soils are suitable for trees, but the stones and boulders also limit the use of woodland planting and harvesting equipment. The seasonal high water table in these soils restricts the rooting depth of trees and causes the uprooting of many trees during windy periods.

WxB - Woodbridge fine sandy loam, 3 to 8 percent slopes. This gently sloping, moderately well drained soil occupies the majority of this property.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 8 inches thick. The subsoil is yellowish brown fine sandy loam 24 inches thick that is mottled in the lower part. The substratum is firm, grayish brown, mottled fine sandy loam to a depth of 60 inches or more.

This Woodbridge soil has a seasonal high water table at a depth of about 20 inches from fall until late spring. The permeability of the soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Runoff is medium, and available water capacity is moderate. The soil dries out and warms up slowly in spring. It is very strongly acid to medium acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum.

The slow or very slow permeability of the substratum and the seasonal high water table limit this soil for recreational use.

This soil is well suited to cultivated crops, but drainage is needed. Minimum tillage, stripcropping, and using cover crops help to control a moderate erosion hazard in cultivated areas. This soil is well suited to trees, and machine planting is practical.

F. Recreation

As previously discussed, the Turtleback Road Sanctuary is irregularly shaped and contains woodland and two hayfields. Access is via two approximately 50 foot wide rights-of-way (R.O.W.) entering from Turtleback Road South and Apple Tree Lane, each a cul-de-sac. With the volume of use anticipated, parking along the terminus of Apple Tree Lane (where one R.O.W. begins) should be adequate to meet user needs. If roadside parking at this turnaround presents a problem to area residents, on site parking should then be considered.

The pathway followed by the team to walk the property is partly on private land and should be relocated, beyond the stone fence, to where it is entirely on land trust property. This could be done in conjunction with implementation of the proposed expansion of the trail system (see Figure IVd).

The hayfields on this site are adjacent, but separated by a stone fence and hedgerow. The smaller field is being used by horseback riders as is the trail coming in from Apple Tree Lane. Horses are quartered on a small farm located near these fields. Continued use of the property by horsemen is anticipated. If horseback use of trails necessitates some repairs, a cooperative agreement for trail maintenance can possibly be reached between those users and the land trust.

The trail related uses envisioned for the tract are: hiking, jogging, nature study, bird watching, equestrian use, and limited (since trail length is insufficient) cross-country skiing and snowshoing during periods of snow cover. Posting the area as closed to motor vehicles may be necessary to deter motorcyclists and snowmobilers. No evidence of motorcycle use of the trail was noted. The cutting in of new trail legs should be combined with the brushing off of existing legs. There should be good opportunities for plant identification and wildlife observation because of the variety of vegetation found on site. Biological studies of the sanctuary, possibly by area schools, can provide additional inventory data on what may be found here. The property appears to have good potential for initiating a nature study program.

* * * * *

V. NOBLE SANCTUARY

As shown in figure Va, the Noble Sanctuary is ± 12 acres and located just west of Thayer Road.

A. Topography and Geology

The Noble Sanctuary is located on the eastern flank of Canoe Hill. The site slopes moderately (about 12 percent) northeastward to a watercourse which flows along or just inside of the northeastern boundary of the site (see Figure Va). The slope is fairly smooth, broken only by the several intermittent streamcourses on the parcel.

The site is entirely covered by till, a nonsorted glacial sediment composed of silt, sand, clay, gravel, and boulders. The upper 3 to 5 feet of the till may be sandy, very stony, and loose, but the remainder is generally finer-grained, less stony, and tightly compact. No test-hole data were available for the site, but the local topography and the records of two nearby wells suggest that there is at least 10 feet of till overlying bedrock on the property. The shallowest depths to rock probably exist along the northeastern boundary of the parcel.

Seasonally high water tables are probably the most significant geological limitations on the use of the site. Even a trail network might be troublesome to create and maintain since much of the land is likely to become very muddy during the normally wet times of the year. The presence of several streamcourses on the parcel indicates that precipitation tends to flow as surface runoff rather than to infiltrate the ground. Clearing of vegetation for recreational or other development might therefore lead to serious erosion problems on these moderate slopes. Passive recreation seems to be the most appropriate use of the property from a geological standpoint.

B. Hydrology

Canoe Hill is situated along the drainage divide between the Norwalk River and Fivemile River Basins. The Noble Sanctuary, on the eastern flank of the hill, lies entirely within the Norwalk River Basin. Three or four seasonal streamcourses flow northeastward through the property, merging into a principal channel that curves along the northeastern boundary and exists at the easternmost point of the site (at Thayer Drive). The stream then crosses Thayer Drive and Valley Road to enter Silvermine River. The river flows south approximately four miles from that point to join Norwalk River. Norwalk River continues south, entering Norwalk Harbor in slightly over three miles.

The streamcourses are attractive features of the parcel, although they are not always easy to approach because of the thick underbrush. They are also indicative of high-groundwater conditions, which are likely to limit the recreational potential of the property as explained in more detail in the Geology and Soils sections of this report. Perhaps narrow paths could be established along sections of the streamcourses to improve access without creating a significant risk of erosion.

Bedrock is the site's principal groundwater-supply resource, but it has no more recognizable potential on the parcel than it does in other areas of the town. Bedrock is commonly capable of supplying small but sustainable yields

FIGURE V a.

TOPOGRAPHIC MAP

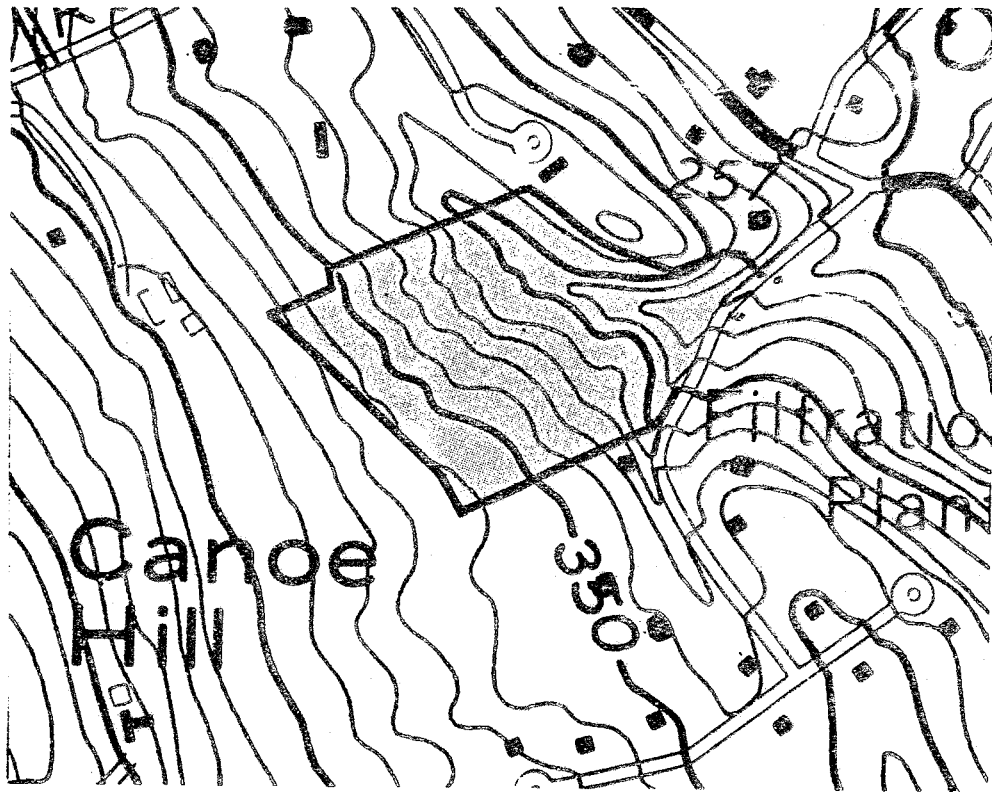
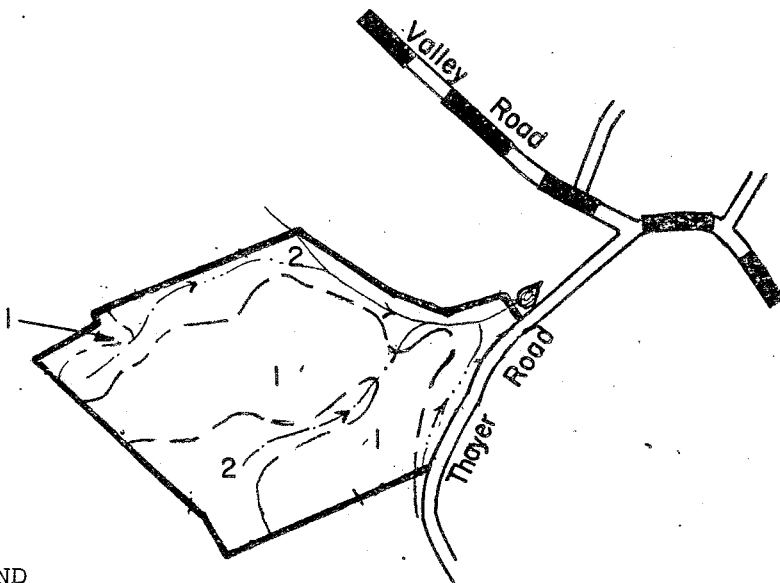


FIGURE V b.

VEGETATION TYPE MAP



LEGEND

— — STAND BOUNDARY

⊙ WATERBODY

- · - · - INTERMITTENT STREAM

— STREAM

VEGETATION TYPE DESCRIPTION

STAND 1 Mixed Hardwood, 6.2 acres

STAND 2 Hardwood Swamp & Wetlands, 5.8 acres

SCALE
1" = 500'

of groundwater to individual wells. It rarely provides high yields (i.e. yields greater than 50 gallons per minute), but it equally rarely produces a dry well.

C. Vegetation

As noted in the forest stand map, there are two vegetative types on the Noble Sanctuary. They are discussed below.

STAND 1. MIXED HARDWOOD. This stand is 6.2 acres in size, is variably stocked, and is characterized by medium quality sawtimber sized hickory and ash on the driest sites with good quality pole size red maple, sugar maple, and black birch on the majority of the stand. Stocking is variable. The understory varies due to degrees in wetness and openings created by scattered windfalls. Maple leaved viburnum, sugar maple reproduction, barberry, and winged euonymus are present with spicebush presenting a thick tangle in some areas. Ground cover is sparse due to heavy shading, but poison ivy, wild geranium, and various ferns can be found. A patch of wild leek can be found here. With poor access into the parcel, management is not practical at this time. Should vehicular access be developed, the stand should be thinned lightly, removing cull trees, windfalls, and the poorest quality material. Care should be taken to avoid opening the forest canopy too much as windfalls, caused by a high watertable, will become a problem.

STAND 2. HARDWOOD SWAMP & WETLANDS. The stand is 5.8 acres in size and is composed of poor quality pole and sawlog size red maple and ash scattered over an understory of thick spicebush and highbush blueberry which tends to be impenetrable in areas. Under this the ground cover consists of skunk cabbage, jewel weed and various ferns. Management here is restricted due to fragile, poorly drained soils.

Wildflowers observed on the site included:

Greenbriar	Virginia Creeper	Bloodroot
Poison Ivy	Violets	Jack-in-the-pulpit
Winged Euonymus	Garlic Mustard	Privet
Bittersweet	Touch-me-not	Trillium
False Solomon's Seal	Wild Geranium	

D. Wildlife

As shown in Figure Vb, the Noble Property contains two basic vegetation types: mixed hardwood forest and hardwood swamp. These vegetation types correspond to the wildlife habitat types found at the site.

Presently, the Noble Property offers fair habitat for wildlife. The wooded land and wetland together provide food and cover for grey squirrels, raccoons, skunk, and a variety of songbirds, reptiles, and amphibians. The wooded land surrounding the property enhances the wildlife value of the site.

The potential for wildlife management of the site is limited. Access is poor and the wetness of the site limits management opportunities. Consideration should be given to leaving this site "as is" with the possible exception of creating a hiking trail.

E. Soils

Three soil types have been mapped on this property. These include:

PeD - Paxton extremely stony fine sandy loam, 15 to 35 percent slopes. This moderately steep to steep, well drained soil is found along the eastern edge of the property. Stones and boulders cover 5 to 35 percent of the surface.

Typically, this soil has a surface layer of dark brown fine sandy loam 3 inches thick. The subsoil is brown fine sandy loam 22 inches thick. The substratum is very firm, brittle, grayish brown gravelly sandy loam to a depth of 60 inches or more.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Runoff is rapid. This soil is very strongly acid to slightly acid.

Slope, the slow or very slow permeability of the substratum, the stones and boulders on the surface limit this soil for recreational use.

The stones and boulders on the surface and the slope make the use of farm machinery impractical and make the soil unsuitable for cultivated crops. The soil is well suited to trees, but slope and the stones and boulders also restrict the use of woodland planting and harvesting equipment.

Rn - Ridgebury, Leicester, and Whitman extremely stony fine sandy loams. This unit consists of poorly drained and very poorly drained soils. Stones and boulders cover 5 to 35 percent of the surface. Slopes range from 0 to 8 percent but are dominantly less than 3 percent. This soil type occupies the majority of the Noble Sanctuary.

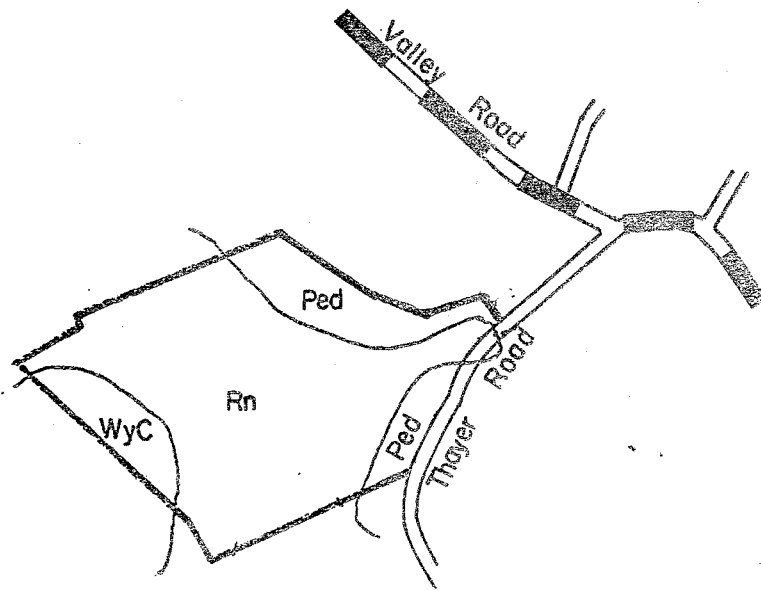
The mapped acreage of this unit is about 35 percent Ridgebury soils, 30 percent Leicester soils, 20 percent Whitman soils, and 15 percent other soils. The soils were mapped together because they have no major differences in use and management.

The major soils in this unit have a seasonal high water table at or near the surface from fall through spring. The permeability of the Ridgebury and Whitman soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The permeability of the Leicester soils is moderate or moderately rapid throughout. Available water capacity is moderate in all three soils. Runoff is slow on all three, and water is ponded on the surface of some areas of the Whitman soils. The Ridgebury and Leicester soils are very strongly acid to medium acid, and the Whitman soils are very strongly acid to slightly acid. These soils dry out and warm up slowly in the spring.

The high water table, ponding, and the stones and boulders on the surface limit these soils for recreational development.

The stones and boulders on the surface make the use of farming equipment impractical and make the soils generally unsuitable for cultivated crops. The soils are suitable for trees, but the stones and boulders also limit the use of woodland planting and harvesting equipment. The seasonal high water table in these soils restricts the rooting depth of trees and causes the uprooting of many trees during windy periods.

FIGURE Vc. SOILS MAP



Soil boundary lines derived from smaller scale map (1"=1320') and should not be viewed as precise boundaries but rather as a guide to the distribution of soils on the property.

Adopted from Fairfield County Soil Survey, USDA-SCS

WyC - Woodbridge very stony fine sandy loam, 8 to 15 percent slopes. This sloping, moderately well drained soil is found along the western border of the property. Stones and boulders cover 1 to 5 percent of the surface.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 6 inches thick. The subsoil is yellowish brown fine sandy loam 24 inches thick that is mottled in the lower part. The substratum is firm and brittle, grayish brown, mottled fine sandy loam.

This Woodbridge soil has a seasonal high water table at a depth of about 20 inches from fall until late spring. The permeability of the soil is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. Runoff is rapid, and available water capacity is moderate. The soil is very strongly acid to medium acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum. The hazard of erosion is severe.

Slope, the slow or very slow permeability of the substratum, and the seasonal high water table limit this soil for recreational development.

The stones and boulders of the surface make the use of farming equipment impractical and, along with slope and wetness, make the soil unsuitable for cultivated crops. Although the stones and boulders limit machine planting, the soil is well suited to trees, and machine planting is practical in most areas.

F. Recreation

As previously discussed, this parcel is made up of mostly wet soils. These soils pose severe limitations to most activities. There is a footpath which provides access to the rear of the property from its starting point on Thayer Road. A loop trail appears impractical because of the soil limitations. The extensive use of corduroy path and possibly some streambed bridging may be necessary to expand on the existing linear trail. The added expense and maintenance necessary are probably not justifiable. Clearly marking the boundaries and allowing people to explore the tract without the benefit of an elaborate trail system seems a practical alternative. Adequate parking area is a problem along Thayer Road which forms the sanctuary's easterly bound. Thayer Road is narrow and winding. On-site parking opportunities are limited due to a stream channel which roughly parallels the road nearby. It should be possible, however, to locate a shallow parking area by grading a flat area (some fill may be required) along Thayer Road and on the Noble tract. It is recommended that railroad tie stairs and a small rustic bridge be installed to provide suitable access to the tract from the parking area. In this manner, the streambank and streambed could be crossed without causing further erosion and siltation of the stream channel.

As with other land trust parcels, it would be helpful if a map and text describing the sanctuary features were available. If inventoried, a list of the flora and fauna contained may attract interested persons willing to explore without the benefit of a formal trail system. Handout maps and descriptive texts may possibly be funded by a trust benefactor and should in any case, be given to interested persons only. The availability of such information should be well received by persons who appreciate what the land trust is doing.

* * * * *

VI. BROWNE SANCTUARY

As shown in the following figure, the Browne Sanctuary is located just east of Grupes Reservoir. Access to the ± 10 acre site is available from the east off Valley Road.

A. Topography and Geology

The Browne Sanctuary has a varied, interesting topography (see Figure VIa). The northern third of the site is dominated by a rocky knoll with a precipitous western flank. A clearing at or just north of the northern boundary of the parcel affords a fine view of the adjoining Grupes (Norwalk) Reservoir. A swampy depression, approximately 40 feet lower in elevation than the summit of the knoll, is located in the northeastern corner of the property.

The second, lower knoll occupies the center of the remaining two-thirds of the site. This knoll, which is wooded and moderately steep, is surrounded by both wooded and open land that slopes gently or moderately to the west, toward the reservoir.

Bedrock crops out extensively in the higher knoll (see Figure VIb). Quadrangle Report No. 34 of the Connecticut Geological and Natural History Survey classifies the rock as a massive felsic gneiss. A "gneiss" is a metamorphic rock (a rock altered by high temperatures or pressures) in which thin bands of elongate or flaky minerals alternate with layers of more granular minerals. The term "felsic" indicates that light-colored silicate minerals are predominant. In the rock on the Browne Sanctuary, the major mineral components are plagioclase, quartz, microcline, muscovite, and biotite. Accessory minerals include opaques (generally iron or manganese oxide), chlorite, apatite, garnet, zircon, and sillimanite. This rock type is presumed to underlie the entire site.

A discontinuous, thin layer of till overlies bedrock on the high knoll. Till is a nonsorted, unconsolidated sediment that was deposited directly from glacier ice. Sand is the principal textural component of the local till, but silt, clay, gravel, and boulders are present in various proportions. The upper 3 to 5 feet of till are usually very stony and loose, but where the till is thicker, a tightly compact, finer-grained till variety may be found below the looser variety.

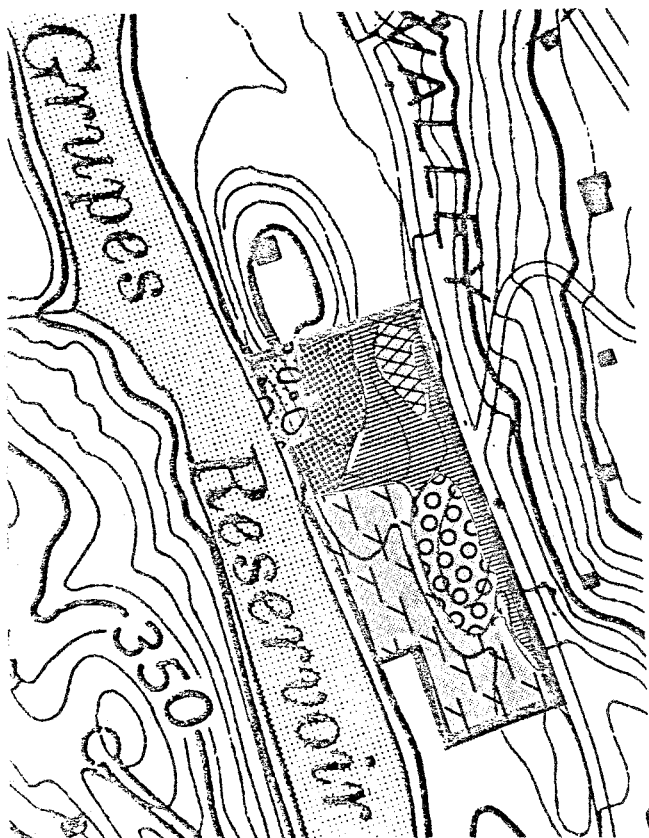
The geological composition of the lower knoll is uncertain. No bedrock outcrops were seen in this knoll. The soils survey describes the parent material of the knoll's soils as stratified drift, a sorted sediment deposited by glacial meltwater streams. On the other hand, a preliminary surficial geologic map of the Norwalk North topographic quadrangle (map prepared by E. H. Lond) shows the knoll as a till deposit. Till and stratified drift are not always totally distinct from one another; they are really end-members of a continuum of deposits whose characteristics vary according to the amount of reworking they have received by meltwater. It is possible, then, that the lower knoll is an intermediate deposit, coarser than most tills but more poorly sorted than most stratified drift. If bedrock is within five feet of the surface, a question the Team was unable to resolve with present data, the texture of the sediments in the knoll is particularly likely to be intermediate.

FIGURE VI a.








TOPOGRAPHIC MAP



FIGURE VI b. SURFICIAL GEOLOGY



EXPLANATION

-  Bedrock outcrop area.
-  Till, generally less than 5 feet thick.
-  Till.
-  Swampy area; thin, organic-rich layer overlying till.
-  Stratified drift.
-  Knoll of indeterminate composition; probably poorly sorted, coarse-grained sediments.
-  Large boulder.

SCALE:
1" = 500'

The flatter areas of the site contain true stratified drift. Test holes drilled in the vicinity of the parcel suggest that the deposit consists largely of sand and gravel, and that the depth to bedrock is 10 to 20 feet.

The geological characteristics of the stratified-drift areas of the property are well-suited to both passive and active recreational development. Drainage should not be a significant problem except along the intermittent drainage swale in the center of the site. The rocky, high knoll is unsuited for active recreational development and would best be left in its attractive natural state.

B. Hydrology

There are no permanent streamcourses or water bodies on the site. A wet depression in the northeastern corner of the parcel is the headwater area for seasonal drainage through a swale running north to south in the center of the site. The swale empties into Grupes (Norwalk) Reservoir; all other surface drainage from the property also flows into the reservoir. The preservation of the Browne Sanctuary as a natural area will be beneficial to the water quality in the reservoir.

No groundwater resources of particular significance are believed to exist on the site. Although coarse-grained stratified drift is often capable of affording high yields to individual wells, the thickness of the stratified drift in the Browne Sanctuary seems inadequate for more than a small, and perhaps unreliable, yield. The underlying bedrock would probably be more suitable as a water source. Bedrock wells generally produce only small to moderate yields, but these yields are usually reliable.

C. Vegetation

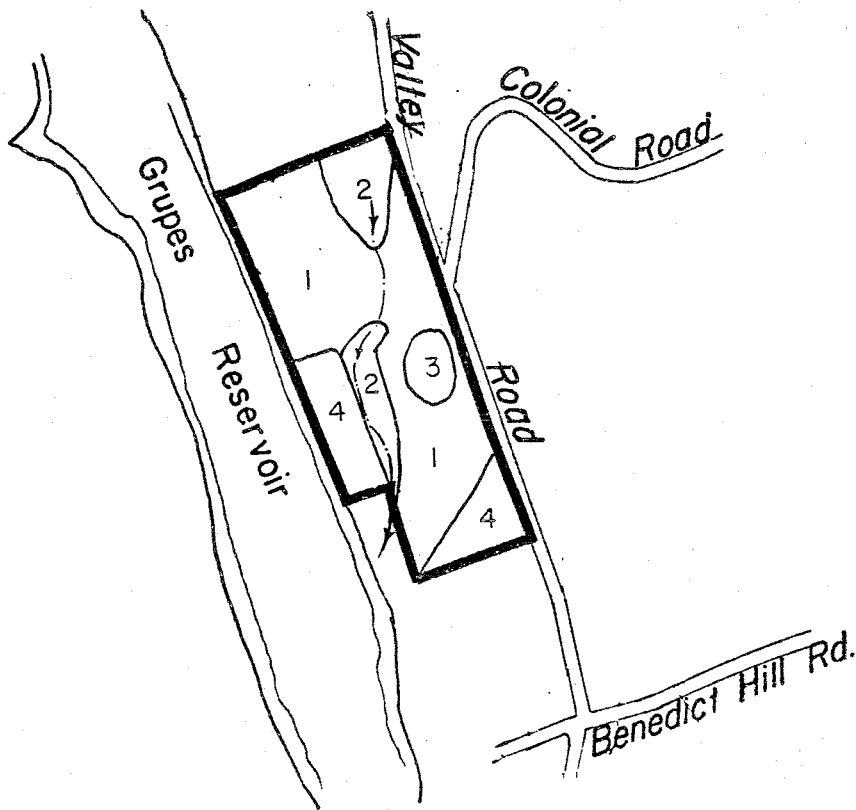
As noted in the forest stand map, there are four vegetation types present on the Browne Sanctuary. These include:

STAND 1. MIXED HARDWOODS. The stand is 6.4 acres in size and is a relatively young, well stocked, medium quality, pole size stand of red maple, black birch, and hickory, with red oak, white oak, sassafras, and American beech present. Gray birch and red cedar can be found in more open areas. The understory is composed of sapling size regeneration of the above species along with maple leaved viburnum, witchhazel, and mountain laurel. Highbush blueberry and spicebush can be found in the wetter areas. Ground cover is composed of the reproduction at the above hardwoods, plus grasses, huckleberry, loosestrife, cinquefoil and poison ivy.

STAND 2. HARDWOOD SWAMP. This area is 1.5 acres in size and consists of medium quality pole to small sawlog size red maple. Stocking is full for the site. The understory consists primarily of spicebush, butighbush blueberry was found in the more open area. Ground cover ranges from non-existent in heavy shade to skunk cabbage and jewel weed in the open areas. Management for forest products is not feasible due to the wet nature of the soils here.

STAND 3. RED CEDAR. This is a 0.5 acre patch of sapling to pole size red cedar in varying degrees of vitality and density. Scattered good quality

FIGURE VI c.
VEGETATION TYPE MAP



SCALE:
1" = 500'

LEGEND

- STAND BOUNDARY
- ← WATERCOURSE

VEGETATION TYPE DESCRIPTION

- STAND 1. Mixed Hardwoods, 6.4 acres
- STAND 2. Hardwood Swamp, 1.5 acres
- STAND 3. Red Cedar, .5 acres
- STAND 4. Old Field, 1.6 acres

saplings of red oak, white oak, red maple, and black birch overtop the red cedar. The understory is sparse and consists of smaller red cedars with scattered viburnum. Ground cover consists of poison ivy, huckleberry, and grasses. A light thinning, removing the poorest quality red cedar would release residual cedars and result in increased growth and vigor.

STAND 4. OLD FIELD. This stand is 1.6 acres in size and consists of overgrown fields. Poor quality saplings of red oak, white oak, hickory, grey birch, cherry, and sassafras have invaded from the margins, along with shrub species such as flowering dogwood, grey stemmed dogwood, highbush blueberry, smooth sumac, staghorn sumac, and sweet fern. Ground cover consists of grasses, goldenrod, raspberry, sedge, yarrow, grape and greenbriar.

Wildflowers observed the day of the ERT's field review included:

Wild grape	Hawkweed	Partridgeberry
Daisy	Black-eyed Susan	Canada Mayflower
Yarrow	Deptford pink	White Beardtongue
Steeplebush	Whorled loosetrife	Violets
Bouncing Bet	Fleabane	Indian Cucumber Root
Tiger Lily	Yellow clover	Greenbriar
Common mullein	Mountain laurel	Touch-me-not
		Virginia Creeper

D. Wildlife

The Browne Sanctuary offers excellent wildlife habitat. The diversity of vegetation types at the site provides good quality "edge" which is attractive to a variety of wildlife species. The presence of Grupes Reservoir, directly adjacent to the site, further enhances the wildlife value of the area.

Wildlife would benefit by keeping the old fields open by mowing. The brush growth within the field areas should be removed to facilitate maintenance of the open field condition. Around the border of the open fields however, a "cutback border" of about 25 feet would be desirable. All stems larger than three inches should be removed. New growth should be maintained within this border at the three to six foot level to provide food and cover for the greatest number of animals.

Within the woodland area, consideration should be given to planting a few small clumps of hemlock. Conifers such as hemlock benefit wildlife by providing added shelter and diversity of vegetation.

Wildlife which can be expected to utilize the Browne Sanctuary property include: cottontail rabbit, white tail deer, ruffed grouse, American woodcock, gray squirrel, and a variety of additional small mammals, songbirds, water fowl, reptiles and amphibians.

E. Soils

Five soil types have been mapped on the Browne Sanctuary. These include:

AfC - Agawam fine sandy loam, 8 to 15 percent slopes. This sloping, well drained soil is found in the northwestern corner and along the eastern edge of the site..

Typically, the surface layer is dark brown fine sandy loam 9 inches thick. The subsoil is brown fine sandy loam 20 inches thick. The substratum is light yellowish brown and pale olive sand to a depth of 60 inches or more.

The permeability of this Agawam soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Runoff is medium, and available water capacity is moderate. The soil dries out and warms up early in spring. It is very strongly acid to slight acid.

Slope is the major limitation of this soil for recreational development.

This soil is suitable for cultivated crops and trees. The hazard of erosion is severe; minimum tillage and the use of cover crops help to control erosion in cultivated areas. Machine planting is practical in areas used for trees.

Nn - Ninigret fine sandy loam. This nearly level to gently sloping, moderately well drained soil is found in the northeastern and southeastern corners of the site. Slopes range from 0 to 5 percent.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 10 inches thick. The subsoil is brown fine sandy loam 16 inches thick and is mottled in the lower part. The substratum is light yellowish brown, mottled gravelly loamy sand to a depth of 60 inches or more.

This Ninigret soil has a seasonal high water table at a depth of about 20 inches from late fall until midspring. Permeability is moderately rapid in the surface layer and subsoil and rapid in the substratum. Runoff is slow, and available water capacity is moderate. The soil dries out and warms up slowly in spring. It is very strongly acid to medium acid.

The seasonal high water table is the main limitation of this soil for recreational development.

This soil is well suited to cultivated crops and trees, but drainage is needed in some of the farmed areas. Minimum tillage and the use of cover crops help to control a moderate hazard of erosion in cultivated areas. Machine planting is practical in areas used for woodland.

CrE - Charlton-Hollis fine sandy loams, very rocky, 15 to 45 percent slopes. This complex consists of moderately steep to very steep, well drained and somewhat excessively drained soils on hills and ridges. Stones and boulders cover 1 to 5 percent of the surface and exposed bedrock up to 10 percent of the surface.

The complex is about 50 percent Charlton soils, 30 percent Hollis soils, and 20 percent other soils and exposed bedrock. The Charlton and Hollis soils are so intermingled that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of very dark brown fine sandy loam 3 inches thick. The subsoil is strong brown and yellowish brown fine sandy loam 26 inches thick. The substratum is light olive brown gravelly sandy loam to a depth of 60 inches or more.

Typically, the Hollis soils have a surface layer of very dark grayish brown fine sandy loam 3 inches thick. The subsoil is dark brown and dark yellowish brown fine sandy loam that extends to bedrock at a depth of 17 inches.

These Charlton and Hollis soils have moderate or moderately rapid permeability. Runoff is rapid. Available water capacity is moderate in the Charlton soils and low in the Hollis soils. Both soils are very strongly acid to medium acid.

The major limitations of this complex for recreational development are slope, the stones and boulders on the surface, the areas of exposed bedrock, and the shallow depth to bedrock in the Hollis soils.

Slope, the stones and boulders, and the exposed bedrock make the use of farming equipment impractical and make the soils generally unsuitable for farming. The complex is suitable for trees, but the same limitations that restrict the use of farming equipment also limit machine planting. Slope and the shallow rooting depth in the Hollis soils result in the uprooting of many trees during windy periods.

HcB - Haven silt loam, 3 to 8 percent slopes. This gently sloping, well drained soil is found along the western edge of the site.

Typically, the surface layer is very dark brown silt loam 7 inches thick. The subsoil is 17 inches thick. The upper 13 inches is dark brown and dark yellowish brown silt loam. The lower 4 inches is strong brown fine sandy loam. The substratum is yellowish brown gravelly sand to a depth of 60 inches or more.

The permeability of this Haven soil is moderate in the surface layer and subsoil and very rapid in the substratum. Runoff is medium, and available water capacity is moderate. The soil dries out and warms up early in spring. It is very strongly acid to medium acid.

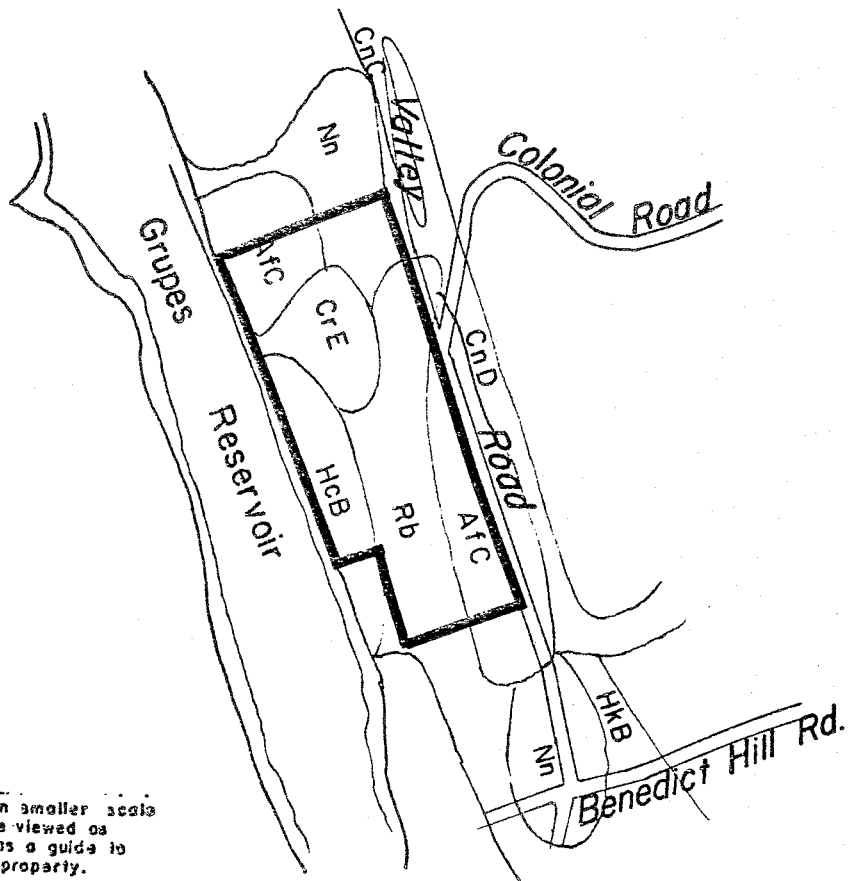
This soil is suitable for passive and active recreational development.

This soil is well suited to cultivated crops and trees. Minimum tillage and the use of cover crops help to control a moderate erosion hazard in cultivated areas. Machine planting is practical in areas used for woodland.

Rb - Raypol silt loam. This nearly level, poorly drained soil is located in the central portion of the site.

Typically, this soil has a surface layer of black silt loam 6 inches thick. The subsoil is grayish brown and light brownish gray, mottled silt loam and very fine sandy loam 13 inches thick. The substratum extends to a depth of 60 inches or more. It is 3 inches of brown, mottled loamy sandy underlain by mottled sand.

FIGURE VI d. SOILS MAP



Soil boundary lines derived from smaller scale map (1"=1320') and should not be viewed as precise boundaries but rather as a guide to the distribution of soils on the property.

Adapted from Fairfield County Soil Survey, USDA-SCS

FIGURE VI e. SUGGESTED TRAIL LAYOUT



This Raypol soil has a seasonal high water table at a depth of about 6 inches from fall until late spring. The permeability of the soil is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. Runoff is slow, and available water capacity is moderate. The soil dries out and warms up slowly in spring. It is very strongly acid or strongly acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum.

The seasonal high water table and the rapid permeability in the substratum limit this soil for recreational development.

The soil is suitable for cultivated crops. Many areas need drainage, but a lack of suitable outlets makes the soil difficult to drain. The soil is poorly suited to trees. The high water table restricts root growth, and many trees are uprooted during windy periods.

F. Recreation

Access to the Browne tract is from Valley Road which comprises the easterly boundary and via an opening through a stone fence at the southeast corner of the property. The parcel offers the possibility of on-site parking although removal of some of the stone fence and some cutting and filling may be necessary to provide adequate sight lines and a safe entrance. Relocating the entrance 50-75 feet north of the present one may reduce the excavation necessary and still provide access to the reverting field which lends itself to establishing a parking area for 6-10 cars.

The abandoned fields on the Browne tract will, if periodically mowed, enhance the diversity of land form and wildlife habitat potential. They would also provide open corridors for hikers, bird watchers, naturalists, etc. to amble through. Since these fields are adjacent to the water company owned gravel road and nearby reservoir which that road parallels, locating a pathway through them and the woods and high ground to the north would keep it entirely on the Browne tract. This would provide a desirable alternative to using the road along the reservoir.

The high ground at the northwest corner of the property is a point of interest with some interesting rock formations and a limited vantage point. An informal pathway has been established to this point. The high ground marks the turnaround point for the path's return leg as shown in Figure VI e. At one area, the trail crosses some wet ground. Elevation of the trail here by either using gravel (which would probably have to be wheelbarrowed in) or corduroy (a log segment path) would enable year round passage. If there is lateral flow of water in this area, provision should be made to permit its passage toward lower ground. An elevated path could otherwise act as a small dam impeding that flow and altering the existing characteristics of the wetland.

The proposed parking area is a reverting field which has potential as a limited picnic facility. It may not be the intent of the land trust to provide such a facility but it is mentioned for consideration since the area lends itself to that use. If two or three tables or rustic benches were installed, it would provide a rest stop for hikers and joggers who came in on foot as well as a spot for all users to have a picnic lunch. The resources available to the land

trust would, of course, dictate what can be done in the way of improvements and how such improvements might be maintained. Periodic cleanup of refuse and litter would be a necessary chore if on-site parking is provided.

* * * * *

VII. APPENDIX

Soils Limitation Chart
Wildlife Habitat Potential

SOILS LIMITATION CHART

Limitation Rating For:

MAP SYMBOL	SOIL NAME	CAMP AREAS	PICNIC AREAS	PLAYGROUNDS	PATHS AND TRAILS
	Colhoun Sanctuary				
WXA	Woodbridge fine sandy loam, 0-3% slopes	Moderate; Percs slowly	Slight --	Moderate; Percs slowly, Wetness	Slight --
WXB	Woodbridge fine sandy loam, 3-8% slopes	Moderate; Percs slowly	Slight	Moderate; Percs slowly, Wetness	Slight --
Rd	Ridgebury fine sandy loam	Severe; Wetness	Severe; Wetness	Severe; Wetness	Severe; Wetness
Rn	Ridgebury, Leicester, and Whitman extremely stony fine sandy loam	Severe; Wetness, Large stones	Severe; Wetness	Severe; Large stones, Wetness	Severe; Large stones, Wetness
	Turtleback Road Sanctuary				
WXB	Woodbridge fine sandy loam, 3-8% slopes		See Above		
Rn	Ridgebury, Leicester, and Whitman extremely stony fine sandy loam		See Above		
Rd	Ridgebury fine sandy loam		See Above		
PbC	Paxton fine sandy loam, 8-15% slopes	Moderate; Slopes, Percs slowly	Moderate; Slope	Severe; Slope	Slight --
	Browne Sanctuary				
AfC	Agawam fine sandy loam, 8-15% slopes	Moderate; Slope	Moderate; Slope	Severe; Slope	Slight --
Nn	Ninigret fine sandy loam	Slight --	Slight --	Moderate; Wetness	Slight --
CrE	Charlton-Hollis fine sandy loams, very rocky, 15-45% slopes	Severe; Slope	Severe; Slope	Severe; Slope	Severe; Slope

MAP SYMBOL SOIL NAME CAMP AREAS PICNIC AREAS PLAYGROUNDS PATHS AND TRAILS

HcB	Haven silt loam, 3-8% slopes	Slight	Slight	Moderate; Slope	Slight
Rb	Raypol silt loam	Severe; Wetness	Severe; Wetness	Severe; Wetness	Severe; Wetness
Noble Sanctuary					
Rn	Ridgebury, Leicester, and Whitman extremely stony fine sandy loam	Severe; Wetness, Large stones	Severe; Wetness	Severe; Large stones, Wetness	Severe; Large stones, Wetness
PeD	Paxton extremely stony fine sandy loam, 15-35% slopes	Severe; Slope, Large stones	Severe; Slope	Severe; Slope, Large stones	Severe; Large stones
WyC	Woodbridge very stony fine sandy loam, 8-15% slopes	Moderate; Slope, Percs slowly, Large stones	Moderate; Slope	Severe; Slope	Moderate Large stones

- EXPLANATION OF RATING SYSTEM:
1. SLIGHT LIMITATION: indicates that any property of the soil affecting use of the soil is relatively unimportant and can be overcome at little expense.
 2. MODERATE LIMITATION: indicates that any property of the soil affecting use can be overcome at a somewhat higher expense.
 3. SEVERE LIMITATION: indicates that the use of the soil is seriously limited by hazards or restrictions that require extensive and costly measures to overcome.

NOTE: Limitations Ratings Based Upon U.S.D.A. Soil Conservation Service.

WILDLIFE HABITAT POTENTIAL

Potential As Habitat For:

MAF SYMBOL	Potential As Habitat For: OPENLAND WILDLIFE	WOODLAND WILDLIFE	WETLAND WILDLIFE
Colhoun Sanctuary			
WxA	Good	Good	Poor
WxB	Good	Good	Very Poor
Rd	Fair	Fair	Fair
Rn	Fair	Fair	Fair
Turtleback Road Sanctuary			
WxB	Good	Good	Very Poor
Rn	Fair	Fair	Fair
Rd	Fair	Fair	Fair
PbC	Good	Good	Very Poor
Browne Sanctuary			
AfC	Good	Good	Very Poor
Nn	Good	Good	Poor
CrE	Poor	Poor-Good	Very Poor
HcB	Good	Good	Very Poor
Rb	Fair	Fair	Fair
Noble Sanctuary			
PeD	Poor	Fair	Very Poor
WyC	Poor	Good	Very Poor
Rn	Fair	Fair	Fair

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, foresters, climatologists, soil scientists, landscape architects, recreation 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 - a 47 town area in western Connecticut.

As a public service activity, the team is available to serve towns and developers within the King's Mark Area --- free of charge.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in the review of a wide range of significant 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 project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental Reviews may be requested by the chief elected official of a municipality or the chairman of an administration agency such as planning and zoning, conservation, or inland wetlands. Requests for reviews should be directed to the Chairman of your local Soil and Water Conservation District. This request letter 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 purposes of review, and a statement identifying the specific areas of concern the team should address. When this request is approved by the local Soil and Water Conservation District and the King's Mark RC&D Executive Committee, the team will undertake the review. At present, the ERT can undertake two reviews per month.

For additional information regarding the Environmental Review Team, please contact your local Soil Conservation District Office or Richard Lynn (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, P.O. Box 30, Warren, Connecticut 06754.