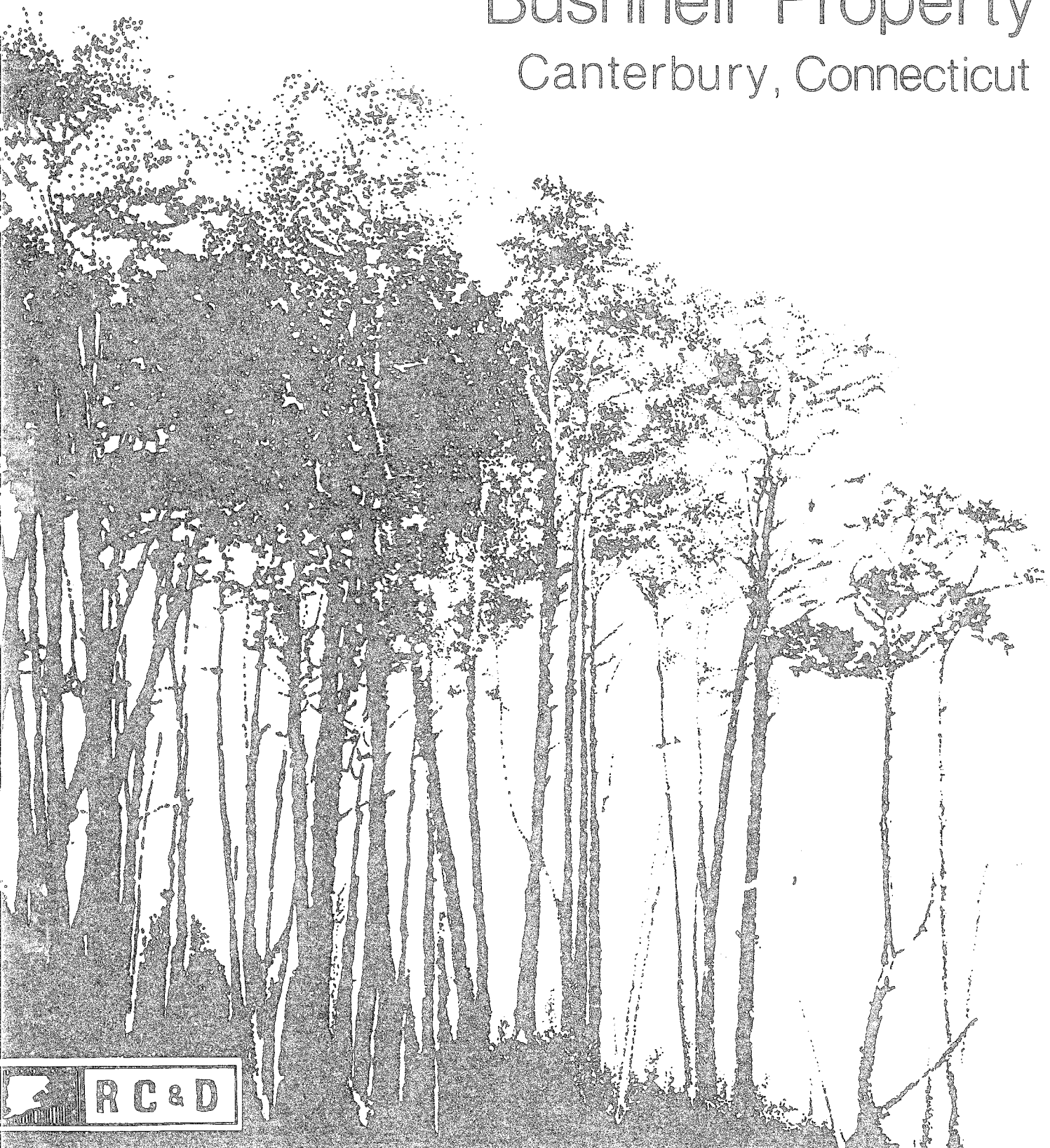
Environmental Review Team Report

Bushnell Property

Canterbury, Connecticut



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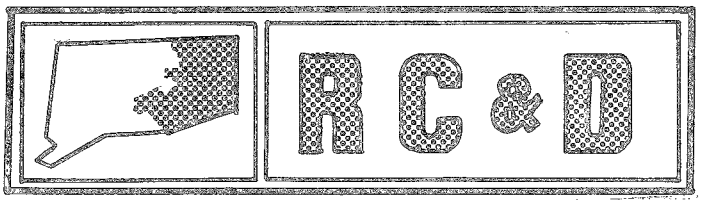
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team Report on

Bushnell Property

Canterbury, Connecticut

April 1982

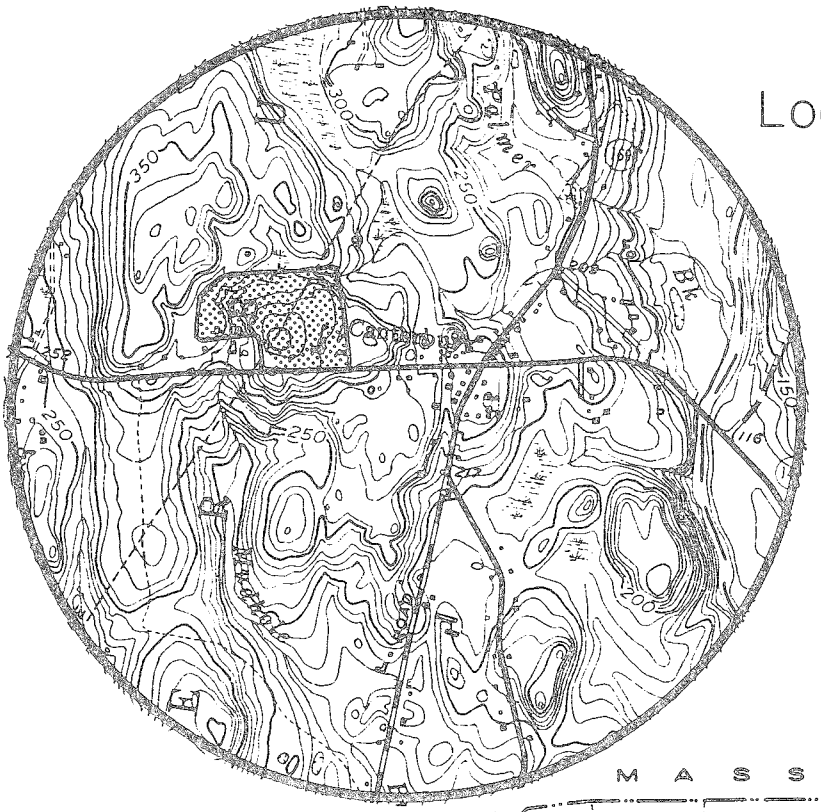


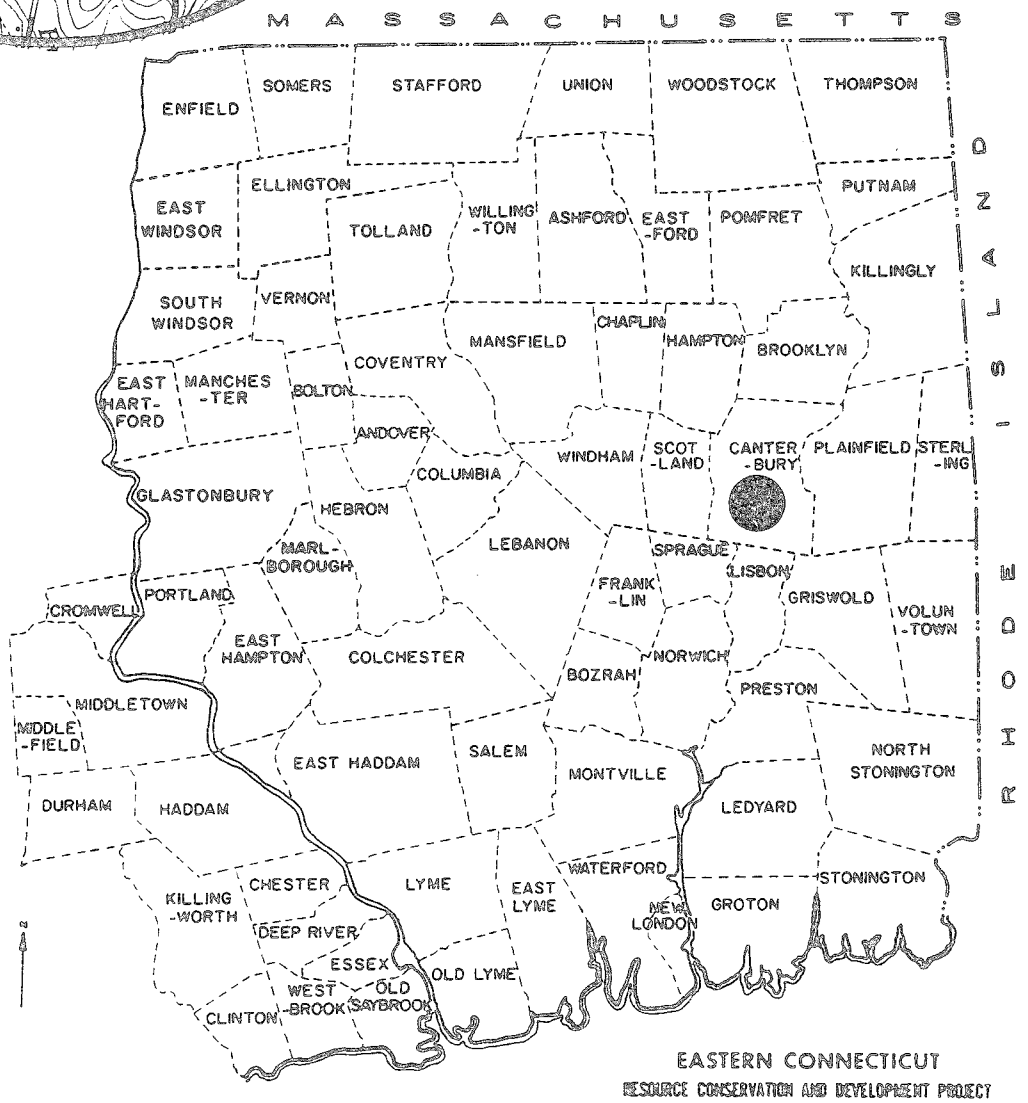
eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site

BUSHNELL PROPERTY
CANTERBURY, CONNECTICUT





EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
BUSHNELL PROPERTY
CANTERBURY, CONNECTICUT

This report is an outgrowth of a request from the First Selectman of Canterbury to the Windham County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Area Executive Committee for their consideration and approval. The request was approved by the RC&D Executive Committee and the measure was reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist from the United States Department of Agriculture, Soil Conservation Service (SCS). Reproductions of the soil survey map, a table of soils limitations for certain land uses and a topographic map showing property boundaries were distributed to all Team members prior to their review of the site.

The ERT that field-checked the site consisted of the following personnel: Ed Lukacovic, Soil Conservationist, Soil Conservation Service (SCS); Michael Zizka, Geologist, Connecticut Department of Environmental Protection (DEP); Dick Raymond, Forester, (DEP); Marsha Banach, Regional Planner, Northeast Regional Planning Agency; Frank Homiski, Sanitarian, State Department of Health; Andy Petracco, Recreation Specialist, (DEP); and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

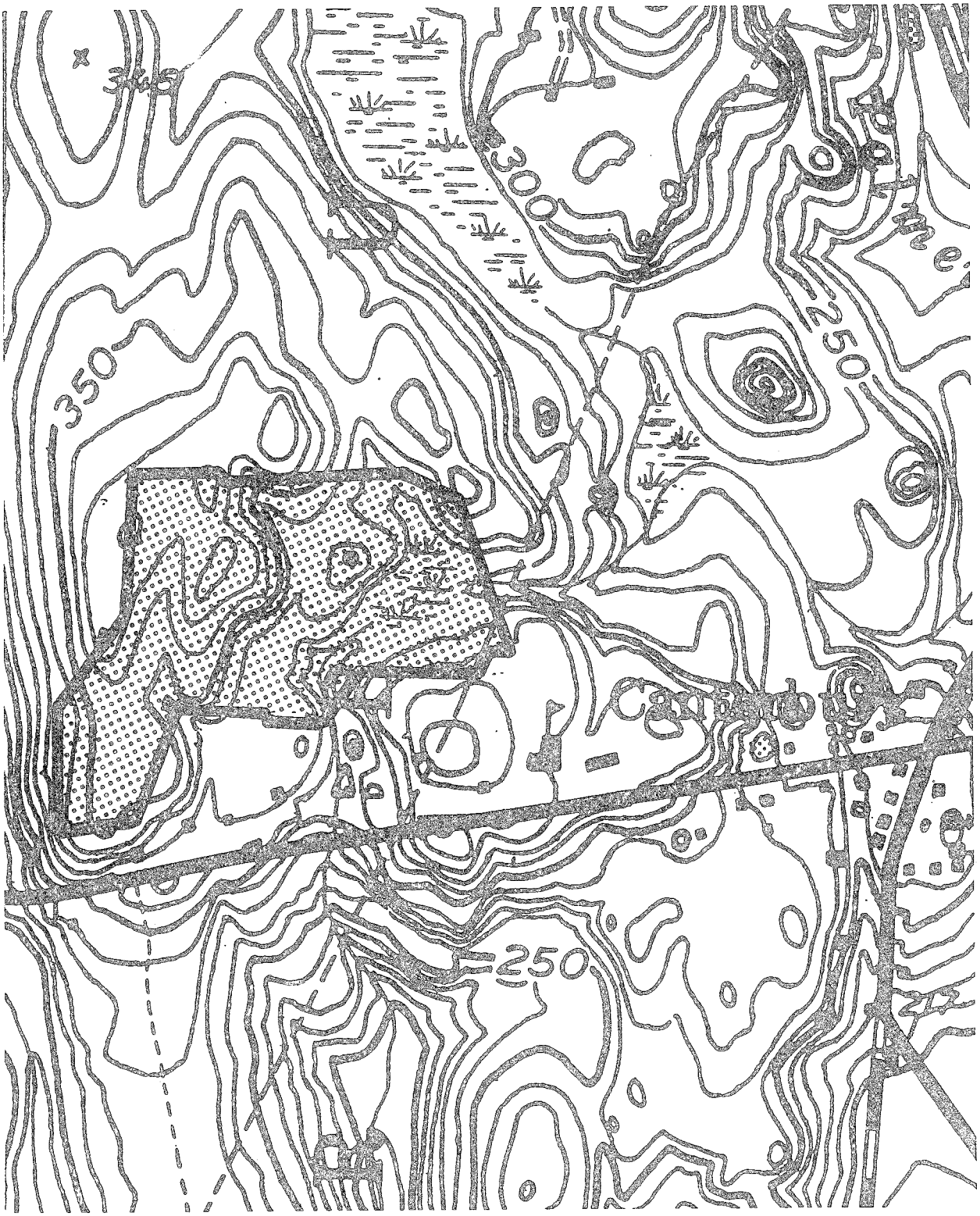
The Team met and field checked the site on Thursday, February 25, 1982. Reports from each contributing Team member were sent to the ERT Coordinator for review and summarization for the final report.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the developer and the Town of Canterbury. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

The Eastern Connecticut RC&D Area Committee hopes that this report will be of value and assistance in making any decisions regarding this particular site.

If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

Topography	Site Boundary	0 660' scale	N



INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for the Bushnell property, a proposed recreation area in the town of Canterbury. The 40± acre site is located northwest of the Dr. Helen Baldwin School on Route 14. The acquisition and development of this parcel is being undertaken by the Canterbury Lions Club for town use.

Although no preliminary plans for the property had been prepared at the time of the field review, the Lions Club had established a list of desirable features for the park. These included a full size baseball/softball field, a ten to fifteen bench picnic area, a parking area, a children's play area, a pavilion, toilet facilities, lighting and provision for temporary telephone service. Other features include a wooded nature trail, a boating, swimming or fishing area, an ice rink and a basketball court. The town would also like to use a five to seven acre portion of this site for a future town administrative building and/or educational facility.

The site is entirely forested at present. Topography of the site is variable, ranging from relatively flat to steeply sloping in some areas. A large wetland area crosses the central portion of the property.

The Team is concerned with the effect of this development on the natural resource base of the site. Although many severe limitations to development can be overcome with proper engineering techniques, these measures can become costly making a project financially unfeasible. The Bushnell property does not appear to be well suited to high intensity active recreation. Wetlands and steep slopes are the major limiting factors. It would, however, be well suited to most passive types of recreation, including nature trails, hiking paths and picnicking.

ENVIRONMENTAL ASSESSMENT

GEOLOGY

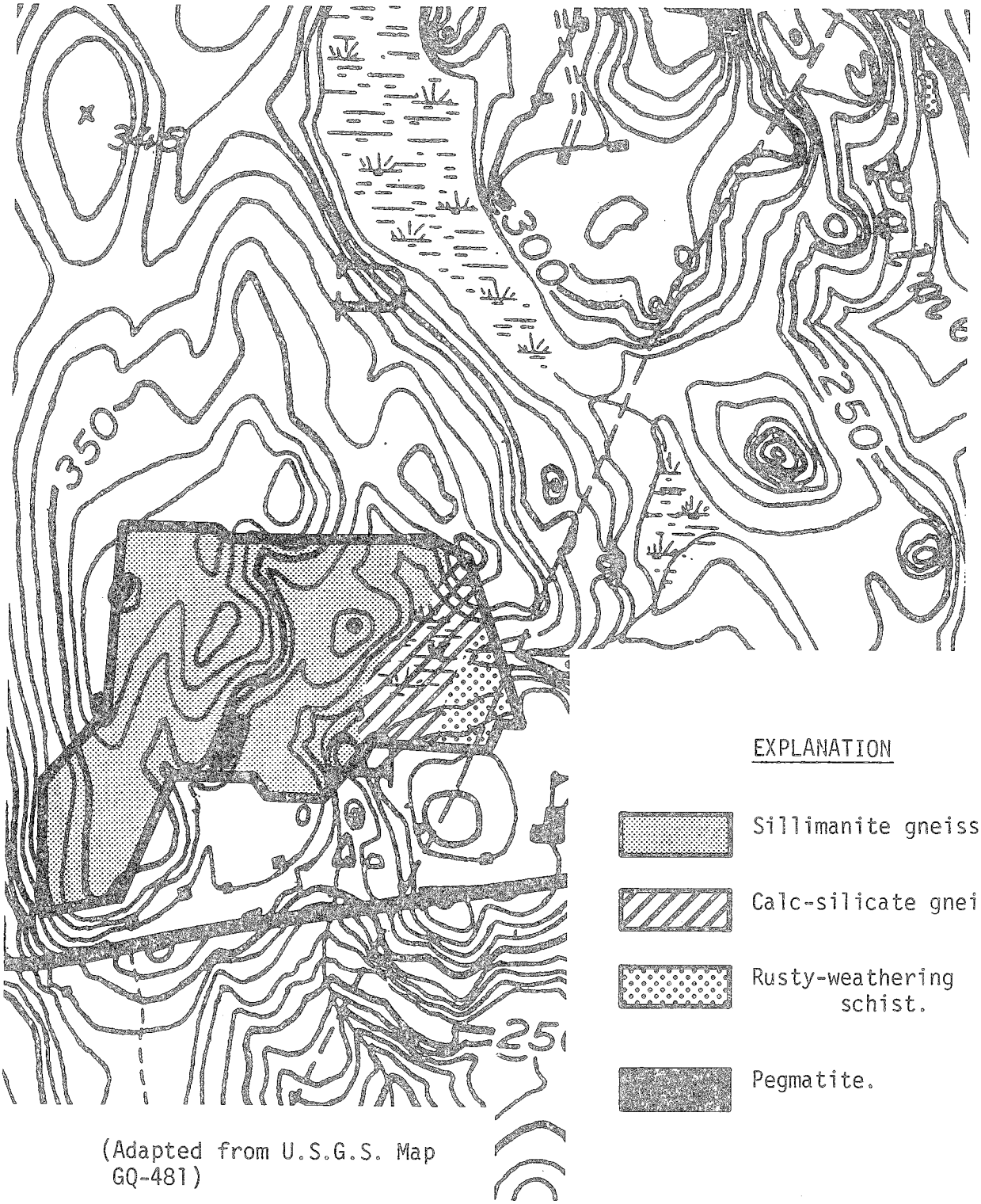
The Bushnell property is almost entirely rocky or shallow to bedrock. Numerous exposures of bedrock are present on the upland areas of the site. Lowland areas are wet, undoubtedly a result, at least in part, of the restrictions to groundwater movement created by the near-surface bedrock. The thinness of the soil has also maintained the knobby, very irregular topography of the bedrock surface.

The overburden (the unconsolidated materials overlying bedrock) consists mostly of till. Till is a glacial sediment that was deposited directly from a pre-existing ice sheet. The sediment is a variable mixture of clay, silt, sand, gravel, and boulders. Although there may be extreme local differences in texture, the till on the site is generally loose to moderately compact; pebbles and coarser particles are set in a sandy matrix, with silt and clay making up less than 25 percent of the matrix.

Bedrock Geology

0 660'
scale

N

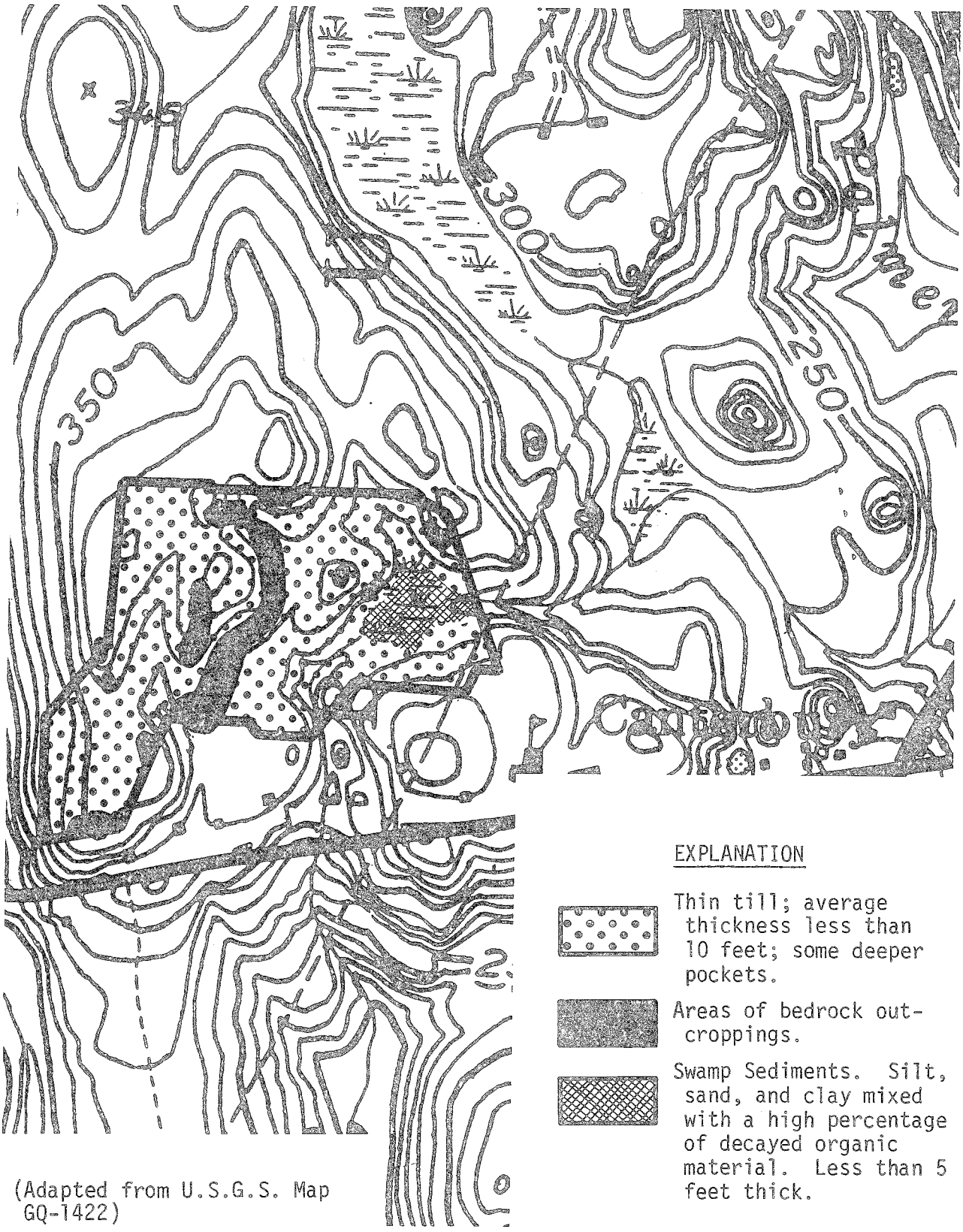


EXPLANATION

- Sillimanite gneiss.
- Calc-silicate gneiss.
- Rusty-weathering schist.
- Pegmatite.

(Adapted from U.S.G.S. Map GQ-481)

Surficial Geology



(Adapted from U.S.G.S. Map GQ-1422)

Development of the site for any purposes would be difficult and expensive. Presumably, some blasting, filling, and grading would be needed whether the desired result was a ball field, a municipal building, an elderly housing complex, or some other use. Septic systems would need to be engineered in most, if not all, parts of the site. Although there may be pockets of deep till, they might easily be smaller than the area needed for even a standard leaching field. If the town established a use requiring several individual subsurface sewage disposal systems or one or more community systems, the risk of groundwater or surface water pollution would be high. This is not to say that the risks could not be satisfactorily reduced by proper engineering, but the costs would be substantial and the entire design, installation, and maintenance process would have to be strictly monitored.

If this parcel is acquired, it would seem most desirable to maintain it for passive recreation. Active recreational uses might be established in one or more small areas at moderate cost. It would probably also be feasible to construct a modest municipal building on the site without too many problems, particularly since the engineering costs would be offset by the relatively low purchase price of the land. However, intensive development such as elderly housing is probably an impractical choice, both from an environmental and a financial standpoint.

The nature of the bedrock itself should have little effect on any type of development. Most of the rocks are gneisses, which are metamorphic (geologically altered) rocks with a granular texture and a banded or streaky appearance. The banding is caused by the alignment of platy, flaky, or elongated mineral grains into thin layers. Where these grains are particularly concentrated, the rock may develop a slabby structure. Rocks with this structure are called schists.

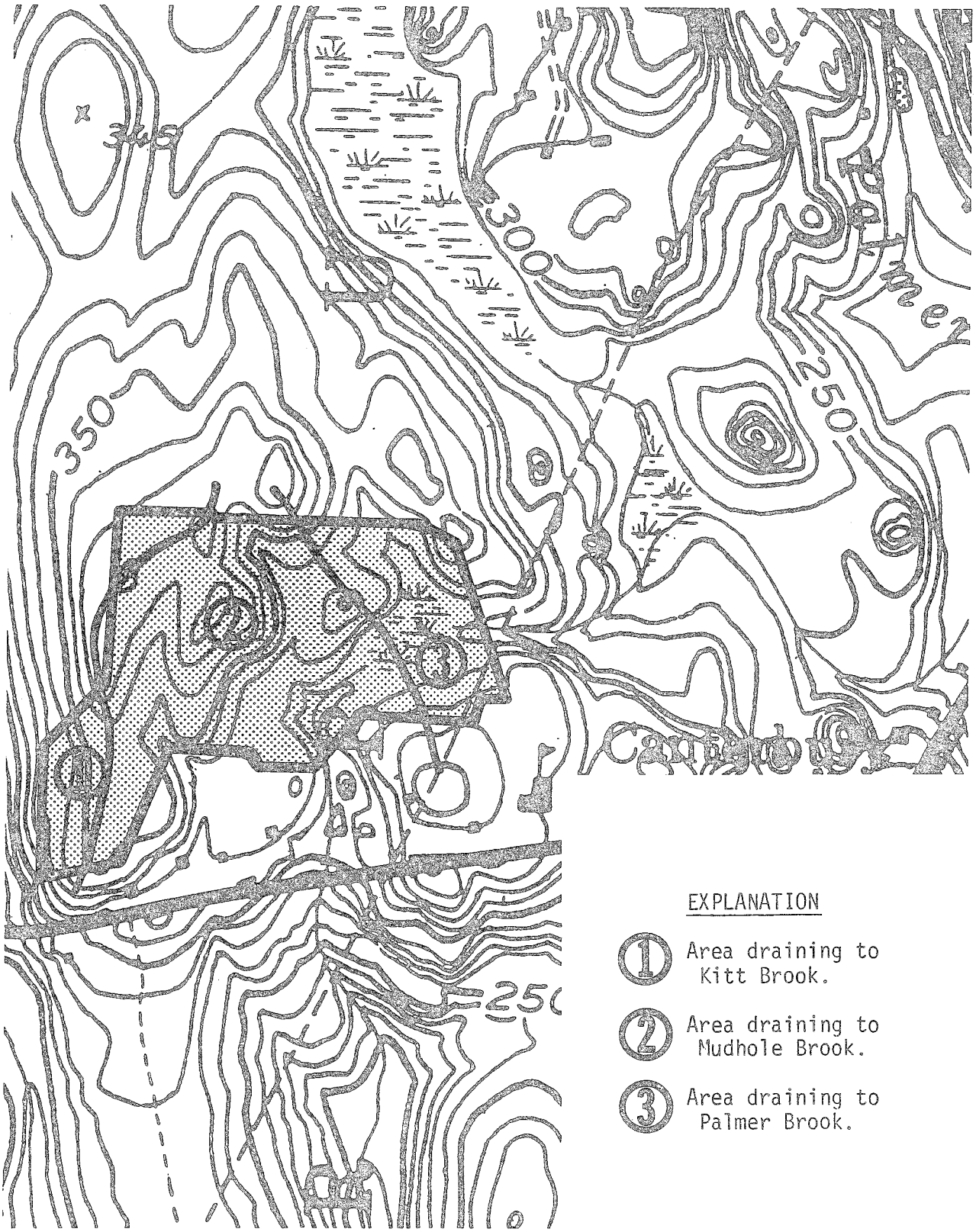
Three major types of gneisses are present: sillimanite gneiss, calc-silicate gneiss, and a rusty-weathering schist. The principal mineral components of the sillimanite gneiss are quartz, andesine, biotite, garnet, muscovite and sillimanite. Accessory minerals include zircon, apatite, opaque minerals, epidote, kyanite, and microcline. The principal components of the calc-silicate gneiss are andesine, hornblende, quartz, biotite, and diopside. The principal components of the rusty-weathering schist are oligoclase, quartz, muscovite, biotite, garnet, and sillimanite. Graphite and sulfides are common accessory minerals; other accessories are kyanite, rutile, zircon, and apatite. Secondary minerals include chlorite, sericite, and limonite. Amphibolites (rocks rich in amphibole minerals) constitute about 25 percent of the unit, and there are pods of gneiss of varying composition. Sills and dikes of pegmatite intrude the three major rock units. Pegmatite is a coarse-grained rock rich in quartz, potassium feldspar and mica.

Although not an important factor in development potential, the variety of rock and mineral types on the site may serve as an educational tool or could provide interesting background for a nature-trail brochure. A bedrock map of the site, adapted from U.S. Geological Survey Map, GQ-418, by H. R. Dixon, accompanies this report.

HYDROLOGY

The Bushnell property is located in the headwater drainage areas of three small streams: Palmer Brook, Mudhole Brook, and Kitt Brook. Most of the site's

Drainage Areas



EXPLANATION

① Area draining to Kitt Brook.

② Area draining to Mudhole Brook.

③ Area draining to Palmer Brook.

drainage flows through the Mudhole Brook drainage system. Kitt and Mudhole Brooks converge in a pond slightly more than a mile south of Canterbury center. The stream emerging from the pond is called Kitt Brook; it flows under Route 169 onto the floodplain of Quinebaug River. Palmer Brook flows into Quinebaug River less than one mile east of the property. The stream that drains the eastern portion of the property into Palmer Brook is unnamed.

Intensive development of the site would cause significant increases in runoff and could be a factor in increasing peak flood flows downstream. Such increases would also enhance the potential for erosion. For this reason, intensive development should be accompanied by a thoughtfully prepared erosion-and-runoff-control plan. As discussed in the Geology section, however, intensive development of this particular parcel seems impractical.

Mudhole and Kitt Brooks flow through an area of thick sands and gravels less than a mile downstream from the site. These deposits have the potential for yielding moderate to large quantities of groundwater to individual wells. The town should make every effort to protect this potential future water-supply source. Since the pollution of Kitt or Mudhole Brook could negatively affect the quality of well-water withdrawn from those deposits, the development, if any, of the Bushnell property should be planned to reduce the risks of such pollution as much as possible. For reasons discussed in the Geology section, the installation of numerous individual or one or more community subsurface sewage disposal systems on this site could present a serious threat to local groundwater and surface water quality.

The parcel offers no practical opportunities for the development of an outdoor swimming facility. Although an artificial pond could be created in the wetland in the eastern half of the site, there would be virtually no inflow to the pond throughout most of the summer because of the minuscule, till-covered drainage area. The water in the pond would stagnate in the summer, preventing the dilution of bacteria from the swimmers.

SOILS

A detailed soils map of this site is included in the Appendix to this report accompanied by a chart which indicates soil limitations for various urban uses. As the soil map is an enlargement from the original 1,320 feet/inch scale to 660 feet/inch, the soil boundary lines should not be viewed as absolute boundaries, but as guidelines to the distribution of soil types on the site. The soil limitation chart indicates the probable limitations for each of the soils for on-site sewerage, buildings with basements, buildings without basements, streets and parking, and landscaping. However, limitations, even though severe, do not preclude the use of the land for development. If economics permit large expenditures for land development and the intended objective is consistent with the objectives of local and regional development, many soils and sites with difficult problems can be used. The soils map, with the publication Soil Survey, Windham County, Connecticut, can aid in the identification and interpretation of soils and their uses on this site. Know Your Land: Natural Soil Groups for Connecticut can also give insight to the development potentials of the soils and their relationship to the surficial geology of the site.

Soils typical of this site include the Charlton-Hollis series, the Canton-Charlton series, the Adrian-Palms series, the Sutton series and the Ridgebury, Leicester and Whitman series. These soils are described in detail as follows:

Charlton-Hollis fine sandy loams, very rocky, 3 to 15 percent slopes. This unit consists of gently sloping to sloping, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. Stones cover 1 to 8 percent of the surface, with is marked by a few narrow intermittent drainageways and small, wet depressions. This 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.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam and sandy loam twenty inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of sixty inches or more.

Typically, the Hollis soils have a surface layer of dark grayish brown fine sandy loam two inches thick. The subsoil is yellowish brown gravelly fine sandy loam twelve inches thick. Hard, unweathered schist bedrock is at a depth of fourteen inches.

Included with this unit in mapping are small areas of somewhat excessively drained Brimfield soils, well drained Brookfield, Canton, and Paxton soils; moderately well drained Sutton and Woodbridge soils, and poorly drained Leicester soils.

The watertable in this unit is commonly at a depth of more than six 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. Both are very strongly acid to medium acid.

The stones on the surface and areas of exposed rock hinder the use of farm equipment and make the soils generally unsuitable for cultivation. Some cleared areas are suitable for pasture and some for hay.

This unit is suited to woodland production. However, the Hollis soils are droughty, and seedling mortality is high. Uprooting during windy periods is common on the Hollis soils because of the shallow rooting depth.

The areas of exposed rock and the depth to bedrock in the Hollis soils limit this unit for community development, especially as a building site or as a site for onsite septic systems. The stones on the surface restrict landscaping.

Canton and Charlton very stony fine sandy loams, 3 to 8 percent slopes. This unit consists of gently sloping, well drained soils on ridges, hills, and side slopes of glacial till uplands. Stones cover 1 to 8 percent of the surface. About 45 percent of the total acreage of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. Some areas of this unit consist almost entirely of Canton soils, some almost entirely of Charlton soils, and some of both. The soils were mapped together because they have no significant differences in use and management.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam two inches thick. The subsoil is yellowish brown fine sandy loam,

gravelly fine sandy loam, and gravelly sandy loam twenty-one inches thick. The substratum is pale brown gravelly loamy sand to a depth of sixty inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam five inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam twenty inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of sixty inches or more.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils. Also included are a few large, nearly level areas and a few areas that have a compact substratum at a depth of forty to fifty inches.

The watertable in these Canton and Charlton soils is commonly at a depth of more than six feet. The permeability of the Canton soils is moderately rapid in the surface layer and subsoil and rapid in the substratum. The permeability of the Charlton soils is moderate or moderately rapid. Both soils have moderate available water capacity and medium runoff, and both are very strongly acid to medium acid.

The soils of this unit generally are too stony for cultivation. Stone removal makes the soils well suited to cultivated crops but is difficult. The soils are well suited to use as woodland, but the Charlton soils have higher productivity than the Canton soils.

Some excavations in the Canton soils are unstable. The stones on the surface limit landscaping.

Adrian and Palms mucks. This unit consists of nearly level, very poorly drained organic soils in depressions and along streams of outwash plains and glacial till uplands. About 45 percent of the total acreage of this unit is Adrian soils, 35 percent is Palms soils, and 20 percent is other soils. Some areas of the unit consist almost entirely of Adrian soils, some almost entirely of Palms soils, and some of both. The Adrian and Palms soils were mapped together because there are no significant differences in their use and management.

Typically, the Adrian soils have a surface layer of black and very dark gray muck twelve inches thick. The subsurface layer is black muck twenty-one inches thick. The substratum is gray gravelly sand to a depth of sixty inches or more.

Typically, the Palms soils have a surface layer of black muck nine inches thick. The subsurface layer is very dark brown and black muck twenty-one inches thick. The substratum is gray and grayish brown silt loam and fine sandy loam to a depth of sixty inches or more.

Included with this unit in mapping are small areas of very poorly drained Carlisle, Saco, Scarboro, and Whitman soils. A few small areas have a thin, loamy surface layer.

These Adrian and Palms soils are wet most of the year. Water is on the surface for several weeks from fall through spring and after heavy summer rains. The soils have a high available water capacity. The Adrian soils have moderately rapid permeability in the organic layers and rapid permeability in the substratum. The Palms soils have moderately rapid permeability in the organic layers and moderate or moderately slow permeability in the substratum. Runoff is very slow on both soils. Both soils are strongly acid to medium acid in the organic layers

and medium acid to slightly acid in the substratum.

Wetness makes the soils of this unit generally unsuitable for cultivated crops. Most areas are difficult to drain, and subsidence is a hazard in areas that are drained.

Wetness also makes the soils poorly suited to trees. It severely limits the use of equipment and causes a high rate of seedling mortality. The high water table limits rooting, causing a hazard of uprooting during windy periods.

Wetness and low strength in the organic layers limit these soils for community development, especially for onsite septic systems.

Sutton extremely stony fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping and moderately well drained. It is at the base of slopes and in slight depressions in glacial till uplands. Stones cover 8 to 25 percent of the surface. Slopes are smooth and concave.

Typically, the surface layer is dark brown fine sandy loam five inches thick. The subsoil is mottled, yellowish brown fine sandy loam and sandy loam thirty inches thick. The substratum is mottled, light olive brown sandy loam to a depth of sixty inches or more.

Included with this soil in mapping are small areas of well drained Canton, Charlton, and Paxton soils; moderately well drained Woodbridge soils; and poorly drained Leicester soils. Also included are a few small areas where stones cover less than 8 percent of the surface or where slopes are more than 8 percent. Included areas make up about 15 percent of the unit.

This Sutton soil has a seasonal high water table at a depth of about twenty inches from fall to spring. This soil has moderate or moderately rapid permeability. Runoff is medium. The soil has moderate available water capacity and is very strongly acid to medium acid.

This soil generally is too stony for cultivation. The soil is well suited to woodland, but the stones hinder the use of some types of harvesting equipment.

The seasonal high water table is the main limitation of this soil for community development, especially for homesites and onsite septic systems. Lawns on this soil are soggy in autumn and spring.

Ridgebury, Leicester and Whitman extremely stony fine sandy loams. This unit consists of nearly level, poorly drained and very poorly drained soils in depressions and drainageways of glacial till uplands. About 40 percent of the total acreage of this unit is Ridgebury soils, 35 percent is Leicester soils, 15 percent is Whitman soils, and 10 percent is other soils. Some areas of this unit consist of one of these soils, and some others consist of two or three. The soils of this unit were mapped together because they have no significant differences in use and management.

Typically, the Ridgebury soils have a surface layer of very dark brown fine sandy loam eight inches thick. The subsoil is mottled, light brownish gray fine sandy loam eight inches thick. The substratum is very firm to firm, grayish brown and light brownish gray fine sandy loam and sandy loam to a depth of sixty inches or more.

Typically, the Leicester soils have a surface layer of very dark brown fine sandy loam seven inches thick. The subsoil is mottled, grayish brown and light olive brown fine sandy loam twenty-three inches thick. The substratum is mottled, light olive brown and grayish brown sandy loam to a depth of sixty inches or more.

Typically, the Whitman soils have a surface layer of very dark gray fine sandy loam nine inches thick. The subsoil is gray, mottled fine sandy loam five inches thick. The substratum is mottled, light olive gray fine sandy loam and sandy loam to a depth of sixty inches or more.

Included with this unit in mapping are small areas of moderately well drained Sutton and Woodbridge soils and very poorly drained Adrian and Palms soils. Also included are a few areas where stones cover less than 8 percent of the surface.

The Ridgebury soils have a seasonal high water table at a depth of about ten inches from fall through spring. The permeability of the soils is moderate to moderately rapid in the surface layer and subsoil and slow to very slow in the substratum. Runoff is slow. The Ridgebury soils have moderate available water capacity and are very strongly acid to medium acid.

The Leicester soils have a seasonal high water table at a depth of about ten inches from fall through spring. The permeability of the soils is moderate or moderately rapid. Runoff is slow. The Leicester soils have moderate available water capacity and are very strongly acid to medium acid.

The Whitman soils have a seasonal high water table at or near the surface from fall through spring. The permeability of the soils is moderate or moderately rapid in the surface layer and subsoil and slow to very slow in the substratum. Runoff is slow. The Whitman soils have moderate available water capacity and are very strongly acid to slightly acid.

The soils of this unit are too stony for cultivation. The unit is suited to woodland. However, the stones on the surface and the high water table hinder the use of harvesting equipment. The water table causes a high rate of seedling mortality and restricts rooting, causing a hazard of uprooting during windy periods.

The high water table and slow to very slow permeability are major limitations of the soils of this unit for community development. Steep slopes of excavations in these soils slump when saturated. The stones on the surface restrict landscaping, and lawns are soggy most of the year.

WILDLIFE

Woodland wildlife habitat dominates the Bushnell property. It is of good habitat value as long as the surrounding area around the property is considered. The diversity of land uses lends to the increase of a diverse cover and food supply.

The drier area of the site is of an upland oak-hickory habitat where the red oak, white oak, shagbark hickory and white ash are most common. Black birch, yellow birch, sassafras, mockernut hickory, white pine and hemlock are also found in the area. The understory vegetation is composed of sugar maple, beech, musclewood, blueberry, barberry, alder and viburnums. The wet areas are

dominated by red maple with undergrowth of spice bush and skunk cabbage.

The property was at one time a pasture before its present forest condition. Evidence of this is the dead or dying juniper and red cedar found throughout the property. Junipers and red cedars are pioneer species that establish themselves as pastures become idle.

While reviewing the property, signs of white-tailed deer, ruffed grouse, skunk, red squirrels, gray squirrels, chipmunk and cottontail rabbits were observed.

The area food production for wildlife are in the form of mast, winter browse and insects. Mast production was high and consisted of hickory nuts, acorns and maple seeds. Deer prefer acorns and hickory nuts while chipmunks and some birds like the black-capped chickadee prefer the smaller maple seeds. Gray squirrels are adapted to all mast forms. Winter browse in the form of twigs from red maple, yellow birch, black birch, sassafras, aspen and blueberry are consumed by deer and rabbit. Red maple make up the dominant part of the deer's diet during winter months.

Various stages of diseased, dead or decaying trees are found throughout the property. They supply a variety of insects and grubs to birds, skunks and other insect eating wildlife. These trees also provide shelter for nest cavity animals such as raccoon and birds. Leaving some of these den trees for the cavity nesters will also aid in the reduction of insect diseases of the forest stand. Other forms of cover such as stone walls and ledge outcrops found on the property provide shelter for red squirrels, chipmunks, opossum, skunk, mice, and other crevice nesting wildlife. Although not heavy, coniferous undergrowth of white pine or hemlock provide some protection for deer during winter months.

The soils and the topography of the site are best suited to woodland wildlife. Openland wildlife would be difficult to establish. Some wetland habitat may be created by constructing a pond in the Adrian and Palms soils. Although the water level of the pond would fluctuate, it would provide open water habitat that could attract waterfowl.

Fish habitat is non-existant and can be created only by pond construction. Due to the water fluctuation of the pond a bass-bluegill (warm water fish) stocking would seem to be best suited.

The proposed recreational development would destroy some habitat. However, most wildlife would be pushed back further into the woodland. Some wildlife would benefit because of the increased diversity.

VEGETATION

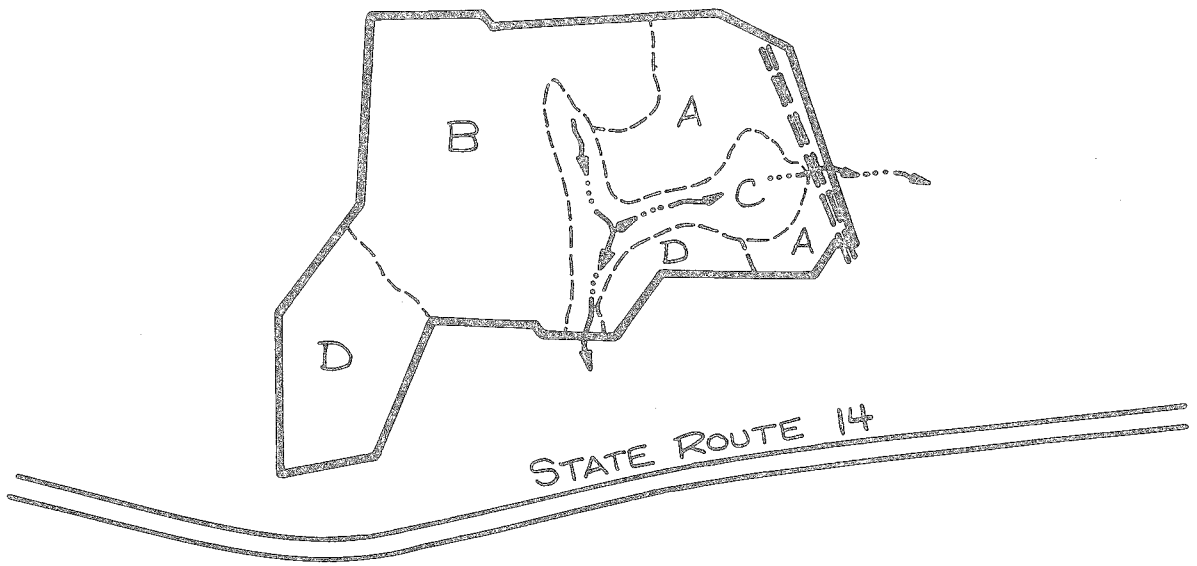
The property proposed for acquisition is approximately 37 acres in size. The parcel may be divided into four vegetation types. These include two mixed hardwood stands which total 20.1 acres, a hardwood swamp/streambelt of 7.2 acres and a softwood/hardwood stand of 9.7 acres.

Type A. (Mixed Hardwoods) This 6.5 acre fully to overstocked stand consists of medium quality sawtimber size red oak, white oak, and scarlet oak, red maple and

Vegetation

0 660
scale

N



LEGEND

- Road
- Property Boundary
- Vegetation Type Boundary
- Stream
- Access Road

VEGETATION TYPE DESCRIPTIONS*

TYPE A. Mixed hardwoods, 6.5± acres, fully to overstocked, small sawtimber-size.

TYPE B. Mixed hardwoods, 13.6± acres, overstocked, pole to small sawtimber-size.

TYPE C. Hardwood swamp/streambelt, 7.2± acres, overstocked, pole-size.

TYPE D. Softwoods-hardwoods, 9.7± acres, fully to overstocked, pole to sawtimber-size.

* Seedling-size = Trees less than 1 inch in diameter at 4 1/2 feet above the ground (d.b.h.)
Sapling-size = Trees 1 to 5 inches in d.b.h.
Pole-size = Trees 5 to 11 inches in d.b.h.
Sawtimber-size = Trees 11 inches and greater in d.b.h.

black birch. Overcrowding has killed many of the intermediate trees, especially the white oaks. Red maple is abundant in the understory with spice bush occurring in the wetter areas.

Type B. (Mixed Hardwoods) A 13.6 acre overstocked area of poor to medium quality poles and small sawtimber, this stand occupies the drier sites on the property. Species present include white oak, black oak, scarlet oak, hickory, red maple and eastern red cedar. Eastern white pine occurs as scattered individuals or in small groups. White pine and red cedar are common in the understory. Huckleberry, blueberry, barberry and green brier form the ground cover in this area.

Type C. (Hardwood Swamp/Streambelt) This 7.2 acre stand is overstocked with poor quality pole size red maple. Witch hazel and spice bush form the understory. The ground cover contains grasses, skunk cabbage and ferns.

Type D. (Softwoods/Hardwoods) Pole to sawtimber size eastern white pine, white oak, black oak, scarlet oak and eastern red cedar are present in this 9.7 acre fully to overstocked stand. Red cedar and white pine form the understory of this area. Ground cover consists of huckleberry, blueberry and ferns.

The proposed utilization of this forested property for park and recreation development together with the possible development of a municipal building site will impact the vegetative cover negatively dependent upon the extent of clearing.

The extent of vegetative losses due to clearing will depend upon the magnitude of the development. Removal of all woody vegetation from the access road, baseball field, basketball court, pond site, parking areas and building site will be necessary. Removal of some vegetation to open up picnic areas and trails to increase sunlight and air flow must be considered. Clearing operations should remove only the lowest quality trees and those which are a direct hazard to area users. The healthier, more vigorous trees should be retained where possible for their high shade and aesthetic value.

Later, some loss of vegetation may occur due to soil compaction, mechanical root injury, direct trampling and vandalism along trails and in picnic areas. Such vegetation losses will reduce the aesthetic quality of the area and potentially cause accelerated erosion in some areas. These disturbances will also accelerate mortality of low vigor unhealthy trees. Dead and dying trees in areas of use are hazardous and should be removed to reduce the risk of injury.

Mitigating Measures/Management Practices

The trees which are removed during clearing operations for development of the proposed trails, picnic and recreational areas should be utilized for sawtimber, fuelwood and woodchips. Trees that are to be removed should be marked to lessen the likelihood of removing desirable trees, especially in the picnic area.

Dead and dying trees, which have the potential to become hazardous to users of the facilities, should also be removed and, where possible, utilized for the highest value use.

The trails and picnic areas should be well defined and clearly marked. This should limit extensive soil compaction, mechanical root injury and trampling of

herbaceous vegetation outside the trail system and picnic areas. Detrimental soil compaction may be reduced by spreading woodchips several inches deep along heavily used foot trails and picnic sites. As woodchips rot, they lose their effectiveness and must be replaced. Crushed stone or cinders spread over these areas also reduce soil compaction and while more permanent, they are usually more costly.

Eventual loss of some trees caused by soil compaction, even with the addition of woodchips, crushed stone or cinders, is unavoidable. As these trees die, they should be removed to present a possible hazard.

As the trees in Vegetation Type A are overcrowded, a light thinning of the poles, removing the culls and undesirably formed trees, would reduce competition for space, sunlight and nutrients. A healthier stand would result. This thinning would yield approximately six cords of fuelwood per acre.

The effects of overcrowding are more noticeable in Vegetation Type B due to the drier site. The thinning in this stand should be slightly heavier, removing the cull sawtimber-sized trees together with cull and undesirable poles. Approximately eight cords of fuelwood per acre could be harvested. The dead red cedar should be removed and utilized for posts and poles. If any large openings are created by removal of the culls, white pine seedlings, available from the State Forest Tree Nursery should be planted to diversify the stand.

Long term management of this stand should be aimed at increasing the percentage of softwoods in the stand. Softwoods are preferred on a dry site because, unlike hardwoods, their growth is completed before the occurrence of a late summer drought.

Vegetation Type C would also benefit from a thinning, however, due to the high water table, care must be taken to not disturb the root mat, thus causing windthrow. Removal of the culls and some undesirables will improve the stand without greatly increasing the windthrow hazard. The expected fuelwood yield is five-six cords per acre.

As in Vegetation Type B, Vegetation Type D should contain a greater mixture of softwoods and hardwoods. The recommendation for Vegetation Type B, as outlined above, should be followed here. In this stand, however, planting should not be necessary as a white pine seed source presently exists in this stand.

A public service forester or private consultant forester should be contacted to help select the trees to be removed in the thinnings if they are agreed upon. Revenue from these thinnings will more than cover consultant costs.

WATER SUPPLY

Water for any facilities developed on this site would have to be provided by on-site wells or by extension of the supply lines from the Baldwin School. The only on-site source suitable for water-supply purposes is the underlying bedrock. Groundwater travels through bedrock via a system of interconnected fractures. The fractures developed over millions of years as a result of the natural stresses and strains experienced during movement of the earth's crust. Because of local variations in stress and in the composition of the bedrock, the rock fractured irregularly. Consequently, a well drilled in one area may

penetrate several large water-bearing fractures and be a high producer, while a well drilled 100 feet away may fail to penetrate any significant fractures, and, therefore, turn out to be dry.

Most wells drilled 150 to 200 feet into the bedrock can yield at least 2-5 gallons per minute, enough for most single-family residential needs or for uses associated with limited active recreational development. Few bedrock wells yield more than twenty gallons per minute. Bedrock well spaced less than 300 feet apart may interfere with one another during pumping, as they may be drawing from the same group of fractures.

The natural groundwater quality should be generally good. The rusty-weathering schist may cause undesirably high concentrations of iron, manganese, or sulfides in the groundwater. Various filters are available to treat these problems. Because the overburden on the site is thin, development will pose a potentially serious risk to groundwater quality. For limited active recreational development or the construction of a modest municipal building, proper engineering can reduce the risk to acceptable levels. Intensive development, such as elderly housing, would not be advisable.

SANITARY/WASTE CONCERNS

The parcel consists of forty wooded acres which varies in topographical features from moderate to steep slopes, wetlands and areas of large stones and rock outcroppings. The tract does not have frontage to any town or state roads and, if the property was purchased, the only access would be from the Dr. Helen Baldwin School Property.

It appears that of the facilities intended for the property, only the wooded nature trail and limited picnic areas could be developed without excessive cost.

The parcel's use as an outdoor classroom could be expanded upon by clearing trails throughout the property.

If picnic areas were to be developed, site selection should be based upon accessibility, soil drainage and slope. The only area which may meet all of these requirements is the southeastern portion of the property.

Provisions would have to be made for some type of sanitary facility near the picnic area. This could best be accomplished by the installation of non-water carriage type facilities such as pit privies or chemical type toilets.

Location of the toilet facilities should be on level well drained soil and accessible for easy cleaning on a daily basis.

The amount and source of water for any potential water recreation on this property is extremely limited. There are two small watercourses which flow in a southerly direction and join near the center of the property. The streams and associated wetlands are laced with large stones while the terrain slopes steeply towards these watercourses.

Even if the cost to develop water recreation on this parcel was not a factor, there does not appear to be enough dilution water from the streams (which may be seasonal) to meet the minimum requirements of 1,000 gallons per day per bather for a swimming area.

Because of low dilution water and a terrain which does not lend itself to this type of recreational activity, swimming or boating should not be considered for this property.

PLANNING CONCERNS

The population of Canterbury has increased by over 28% from 1970 to 1980. This might seem to indicate that there would be a need to expand municipal facilities and schools. The population of school-age children (under thirteen years of age), however, has increased by only 4% in that same time.

The Bushnell property is in an ideal location for school expansion, town municipal buildings, a community center, and/or housing developments. Unfortunately, the limitations of the property prohibit such development without costly site improvements.

The steep slopes and stoniness of the property would present severe limitations for septic system installations. It may be possible to install engineered septic systems that will comply with health code requirements, but that does not guarantee that they will not fail. Health department personnel must approve any system that meets the requirements of the health code, but the site constraints are such that even engineered systems may fail unless frequent maintenance is practiced.

The limitations that exist that would restrict development for the town would also present problems for any other developers. There does not seem, then, to be any immediate threat to the town that development will spring up in this area if the town does not purchase this property.

The Bushnell property is certainly in a desirable location and offers potential of expansion or development for the town, but the limitations of the property make such development prohibitively expensive. It might be worthwhile for the town to acquire the property to retain it for a nature trail and outdoor classroom and limited recreational use, but it would be unrealistic to expect to build an extensive recreation facility or town center without incurring major expenses for site improvement.

TRAFFIC CONSIDERATIONS

The Bushnell property is located right off of Route 14 just beyond the intersection of Routes 14 and 169. The area is included in the Canterbury Green section of town which is one of the more developed areas of the town. The area is centrally located within the town and has been designated in the Canterbury Plan of Development (1976) as a desirable location for a town center. The area is served by State Highways, is readily accessible to residents and is already in the focus of community activity.

While the property is conveniently located in the center of town, the site itself presents problems of very limited accessibility. The only existing access to the property is along the side of the school property. This limited access would result in increased traffic through the school driveway and parking lots. Safety precautions would have to be taken to ensure that this increased traffic load would not present a danger to the school children. Expanded parking facilities would have to be provided if the property were developed since existing parking facilities are already very limited and at times inadequate.

The existing roadway through the property is very narrow and would have to be expanded and improved if the site were used by the town. The road would have to be widened to allow for two-way traffic and for passage of emergency vehicles if necessary.

RECREATION POTENTIAL

The town of Canterbury has a very limited number of public recreation facilities. There are two tennis courts, a basketball court and a playing field located at the school and a ball field located in a subdivision. These are the only active recreation areas in the town and these are certainly inadequate to meet the demands of nearly 3,500 residents. The Open Space and Recreation Report (NECRPA, 1972) includes a guide to Standards for Recreation Activities which indicates a recommended space requirement for various recreation activities. Using these guidelines supports the contention that Canterbury is lacking in recreational facilities.

The site has a mixture of small hills with ledge outcrops and wetland areas. This landform is difficult to develop in an economical way. Substantial site modifications may be necessary to accommodate structures and associated sewerage, level areas for ballfields with proper percolation and drainage, and establish an access road. Since active recreation facilities, such as basketball courts and playgrounds with associated structures (e.g. toilet building), are demanding in their site requirements, it can be anticipated that developing the property for such recreational uses and for buildings would be expensive.

With the exception of the access limitation imposed on visitors having to gain entry to the property through the schoolgrounds (since there is no road frontage), the Bushnell tract does lend itself to passive recreation and outdoor classroom use. Little, if any, site modifications are necessary for such activities as hiking, jogging, birdwatching, nature study, cross country skiing, etc., which utilize existing pathways. Expansion of the existing network of foot trails could be accomplished rather easily and would largely be a matter of selecting the proper route over terrain having low erosion potential.

The site demands for picnic use are somewhat greater than for trail related use but will not require extensive site modification. Routing public access/egress through the schoolgrounds is an undesirable feature in the plan for use of the Bushnell tract. Increased vehicular traffic in an area where children are clustered is undesirable from a safety standpoint. Establishment of town offices on the property would commensurately increase traffic volume. An access road separated from the school property would be desirable, but only possible if another right-of-way (R.O.W.) were secured. The possibility of obtaining a R.O.W. to provide a separate access corridor should be thoroughly explored before serious thought is given to extensive development of the property for the programs indicated.

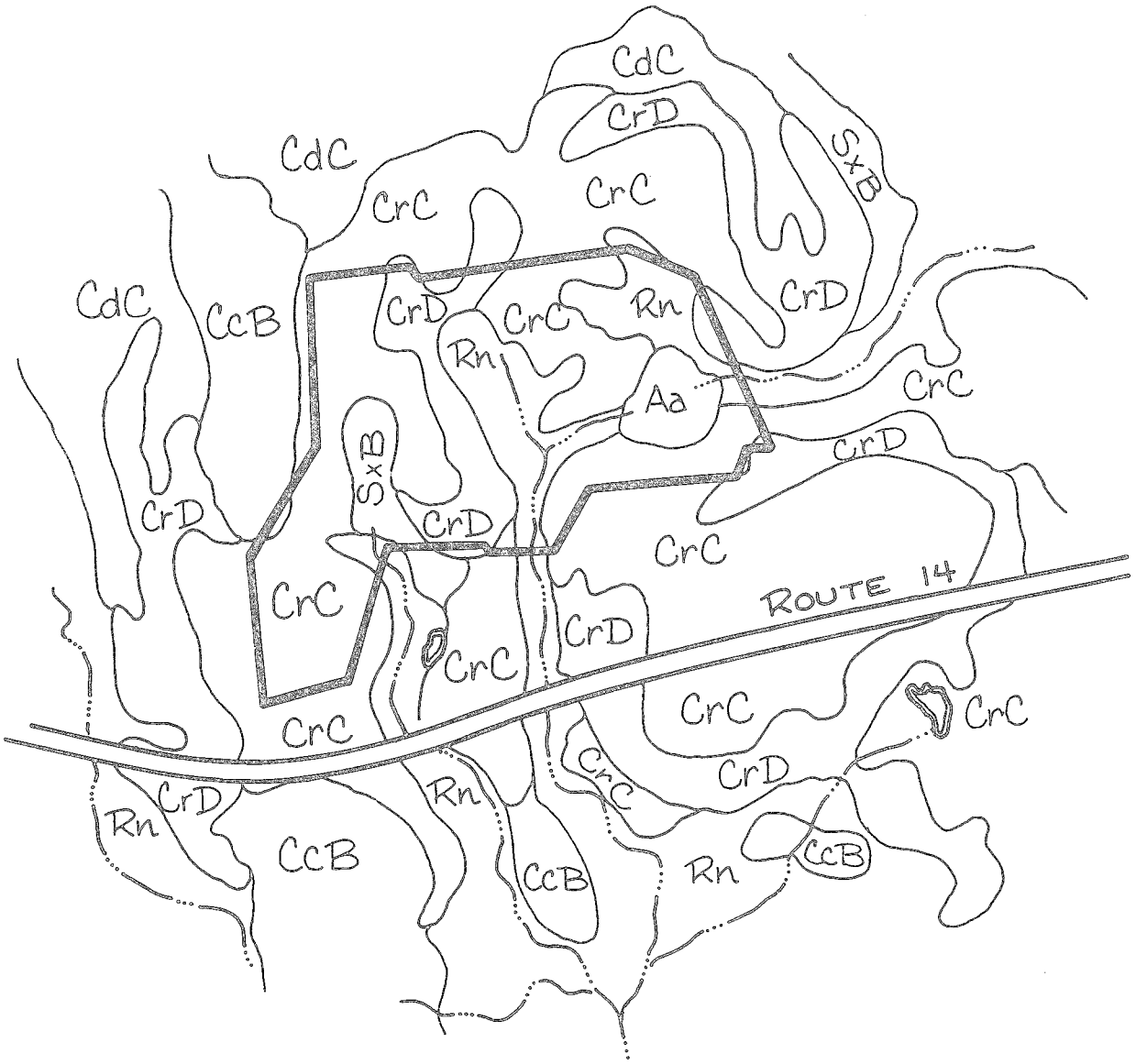
The Bushnell property would provide an ideal location for additional recreational facilities, but the limitations of the property would restrict such development. As discussed in the Soils section of the report, the soils on the property have numerous limitations for recreational development. The steep slopes and the numerous large stones obviously restrict suitability for playing fields or courts unless a great deal of costly blasting and filling is done. The swampy areas that exist now are too small and rocky to be used for swimming or boating and areas would have to be leveled and cleared of trees and stones before they would be suitable for skating.

If the town's list of needed facilities closely matches those proposed for the Bushnell property, it should consider purchasing another tract having less restrictive site conditions. Such a property will likely cost more on a per acre basis, but that extra cost for land purchase may be greatly offset by decreased site modification costs. Non-conflicting access, made possible by a tract having road frontage, would be an added bonus and is sufficient reason to at least consider other parcels of land, if town priorities include the need for new town offices and a wide range of recreation facilities.

The decision to buy or not buy the Bushnell tract rests with the town and Lions Club. If the decision is made to buy, the town should be aware that in its present state, the property has limited usability and would require a sizable expenditure to enhance and expand that usability. If the town is unwilling to accept limited use of the tract and unable to expend large amounts of money for site work, it should probably begin looking at other pieces of land which may be more suitable for meeting the town's needs.

Appendix

Soils



United States Department of Agriculture
Soil Conservation Service
Agricultural Center
Brooklyn, Connecticut
06234-0327

774-0224

Assisting the Windham County Soil and Water Conservation District

Bushnell Property
Route 14
Canterbury, Connecticut 06331

Atlas Sheet #55

SOILS

CcB	Canton and Charlton very stony fine sandy loam, 3 to 8 percent slopes.
CrC	Charlton-Hollis fine sandy loams, very rocky, 3 to 15 percent slopes.
CrD	Charlton-Hollis fine sandy loams, very rocky, 15 to 35 percent slopes.
SxB	Sutton extremely stony fine sandy loam, 3 to 8 percent slopes.
*Aa	Adrian and Palms mucks.
*Rn	Ridgebury, Leicester and Whitman extremely stony fine sandy loams.

* Designated wetland soil by P.A. 155

Bushnell Property

Route 14

Canterbury, Conn.

Principal Limitations and Ratings of Soils For:

Soil Symbol and Series	SANITARY FACILITIES: Septic Tank Absorption Fields	WATER MANAGEMENT: Drainage
CcB Canton	Severe: poor filter	Deep to water
Charlton	Slight	Deep to water
CrC Charlton	Moderate: slope	Deep to water
Hollis	Severe: depth to rock	Deep to water
CrD Charlton	Severe: slope	Deep to water
Hollis	Severe: slope, depth to rock	Deep to water
SxB Sutton	Severe: wetness, large stones	Slope
*Aa Adrian	Severe: ponding, poor filter, flooding	Ponding, subsides, flooding
Palms	Severe: flooding, subsides, ponding	Flooding, ponding, subsides
*Rn Ridgebury	Severe: percs slowly, wetness	Percs slowly, frost action
Leicester	Severe: wetness	Frost action
Whitman	Severe: percs slowly, ponding	Percs slowly, frost action

* Designated Wetland Soil by P.A. 155

Bushnell Property

Route 14

Canterbury, Conn.

Principal Limitations and Ratings of Soils For:

BUILDING SITE DEVELOPMENT

Soil Symbol and Series	Dwellings without Basements	Dwellings with Basements	Small Commercial Buildings	Local Roads and Streets	Lawns and Landscaping
CcB Canton	Slight	Slight	Moderate:slope	Slight	Moderate:large stones
Charlton	Slight	Slight	Moderate:slope	Slight	Moderate:large stones
CrC Charlton	Moderate:slope	Moderate:slope	Severe:slope	Moderate:slope	Moderate:slope, large stones
Hollis	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: depth to rock	Severe: depth to rock, thin layer
CrD Charlton	Severe:slope	Severe:slope	Severe:slope	Severe:slope	Severe:slope
Hollis	Severe:slope, depth to rock	Severe:slope, depth to rock	Severe:slope, depth to rock	Severe:slope, depth to rock	Severe:slope, depth to rock, thin layer
SxB Sutton	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate:frost action, large stones	Moderate:large stones
*Aa Adrian	Severe:ponding, low strength, flooding	Severe:ponding, flooding	Severe:ponding, low strength, flooding	Severe:ponding, low strength, frost action	Severe:excess humus, ponding, flooding

Bushnell Property

Route 14

Canterbury, Conn.

Principal Limitations and Ratings of Soils For:

BUILDING SITE DEVELOPMENT

Soil Symbol and Series	Dwellings without Basements	Dwellings with Basements	Small Commercial Buildings	Local Roads and Streets	Lawns and Landscaping
*Aa Palms	Severe:ponding, low strength, flooding	Severe:ponding, flooding	Severe:ponding, flooding, low strength	Severe:ponding, frost action, low strength	Severe:ponding, flooding, excess humus
*Rn Ridgebury	Severe: wetness	Severe: wetness	Severe: wetness	Severe:wetness, frost action	Severe: wetness
Leicester	Severe: wetness	Severe: wetness	Severe: wetness	Severe:wetness, frost action	Severe: wetness
Whitman	Severe: ponding	Severe: ponding	Severe: ponding	Severe:frost action, ponding	Severe: ponding

* Designated Wetland Soil by P.A. 155

Bushnell Property

Route 14

Canterbury, Conn.

Principal Limitations and Ratings of Soils For:

RECREATIONAL DEVELOPMENT

Soil Symbol and Series	Picnic Areas	Playgrounds	Parks and Trails
CcB Canton	Moderate: large stones	Severe: large stones	Slight
Charlton	Moderate: large stones	Severe: large stones	Slight
CrC Charlton	Moderate: slope, large stones	Severe: slope, large stones	Slight
Hollis	Severe: depth to rock	Severe: slope, depth to rock, large stones	Slight
CrD Charlton	Severe: slope	Severe: slope, large stones	Moderate: slope
Hollis	Severe: slope, depth to rock	Severe: slope, depth to rock, large stones	Moderate: slope
SxB Sutton	Severe: large stones	Severe: large stones	Moderate: wetness
*Aa Adrian	Severe: ponding, excess humus	Severe: ponding, excess humus	Severe: ponding, excess humus
Palms	Severe: ponding, excess humus	Severe: ponding, excess humus	Severe: ponding, excess humus

Bushnell Property

Route 14

Canterbury, Conn.

Principal Limitations and Ratings of Soils For:

RECREATIONAL DEVELOPMENT

Soil Symbol and Series	Picnic Areas	Playgrounds	Parks and Trails
*Rn Ridgebury	Severe: large stones, wetness, percs slowly	Severe: wetness, large stones, percs slowly	Severe: wetness
Leicester	Severe: large stones, wetness	Severe: wetness, large stones	Severe: wetness
Whitman	Severe: large stones, ponding	Severe: ponding, large stones	Severe: ponding

* Designated Wetland Soil by P.A. 155

Bushnell Property

Route 14

Canterbury, Conn.

Principal Limitations and Ratings of Soils For:

Soil Name and Map Symbol		Potential as habitat for -- Openland Wildlife	Woodland Wildlife	Wetland Wildlife	Water Management -- Pond Reservoir Areas
CcB	Canton	Poor	Good	Very poor	Severe: seepage
	Charlton	Poor	Good	Very poor	Severe: seepage
CrC	Charlton	Poor	Good	Very poor	Severe: slope, seepage
	Hollis	Poor	Poor	Very poor	Severe: depth to rock, slope
CrD	Charlton	Poor	Good	Very poor	Severe: slope, seepage
	Hollis	Poor	Poor	Very poor	Severe: slope, depth to rock
SxB	Sutton	Poor	Fair	Very poor	Severe: seepage
*Aa	Adrian	Very poor	Poor	Good	Severe: seepage
	Palms	Very poor	Poor	Good	Severe: seepage
*Rn	Ridgebury	Poor	Fair	Fair	Slight
	Leicester	Poor	Fair	Fair	Severe: seepage
	Whitman	Very poor	Poor	Fair	Slight

* Designated wetland soil by P.A. 155

SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations:" slight or no limitations; moderate limitations; and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. On-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

Slight Limitations

Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

Moderate Limitations

In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations.

Severe Limitations

Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.

About the Team

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

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

PURPOSE OF THE TEAM

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

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

REQUESTING A REVIEW

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

For additional information regarding the Environmental Review Team, please contact Jeanne Shelburn (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360.