

ENVIRONMENTAL REVIEW TEAM REPORT



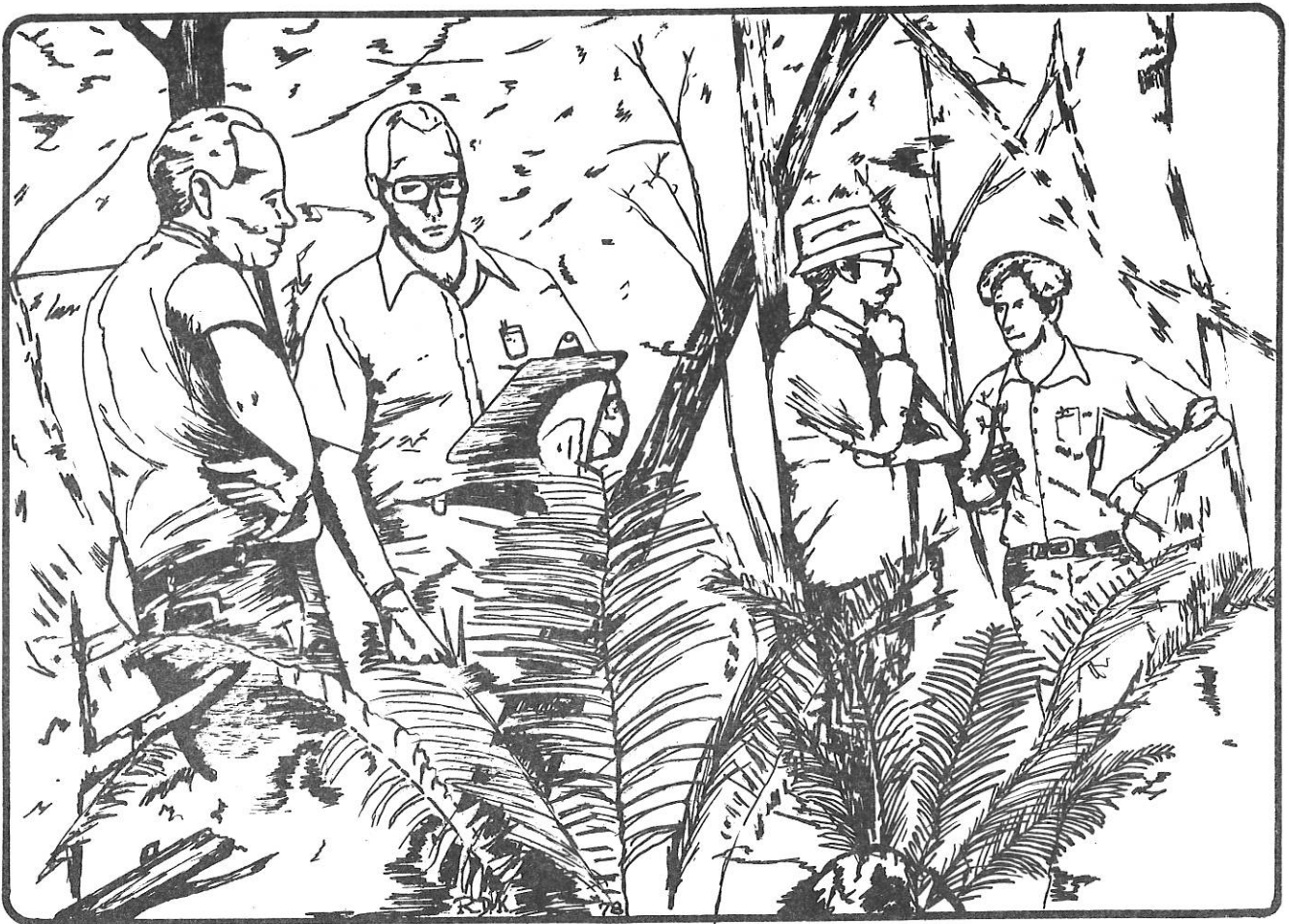
THISTLE ROCK PLANNED RESIDENTIAL DEVELOPMENT GUILFORD, CONNECTICUT

Ⓐ KING'S MARK
RESOURCE CONSERVATION AND DEVELOPMENT AREA

KING'S MARK ENVIRONMENTAL REVIEW TEAM REPORT

On

THISTLE ROCK PLANNED RESIDENTIAL DEVELOPMENT GUILFORD, CONNECTICUT



APRIL 1979

Kings Mark Resource Conservation & Development Area

Environmental Review Team

P.O. Box 30

Warren, Connecticut 06754

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

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U.S.D.A. SOIL CONSERVATION SERVICE

State Agencies

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEPARTMENT OF HEALTH

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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

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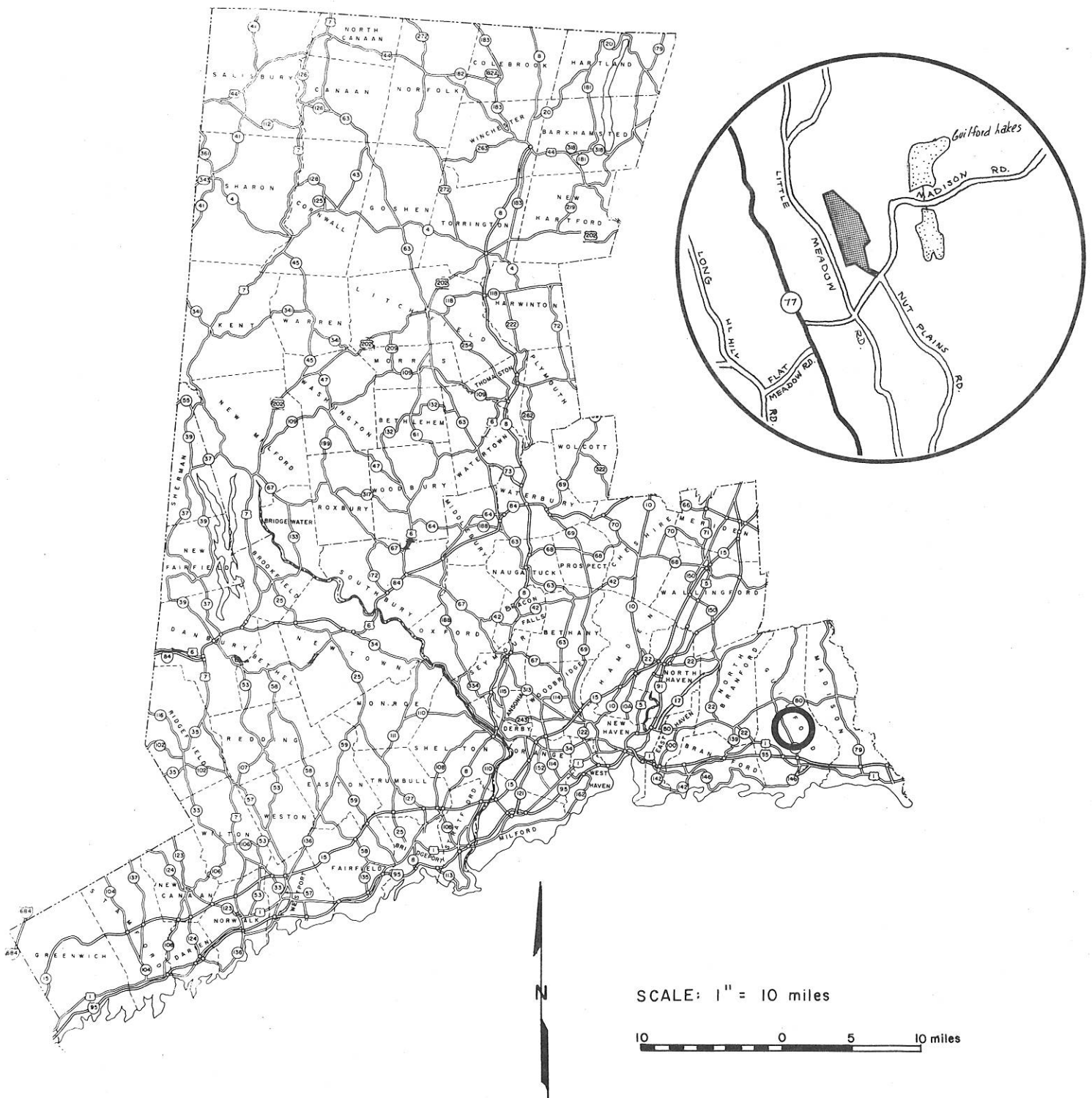
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LOCATION OF STUDY SITE

THISTLE ROCK PLANNED RESIDENTIAL DEVELOPMENT GUILFORD, CONNECTICUT



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GUILFORD, CONNECTICUT

I. INTRODUCTION

The Town of Guilford, Connecticut is presently reviewing a preliminary proposal for residential development of \pm 41 acres of land. The subject site is located in the central portion of Town just west of the Guilford Lakes Elementary School. The conceptual development plan calls for 140 town houses with a total of 210 bedrooms. The applicant is presently applying for approval of a special permit under the Town's planned residential development (PRD) procedures to enable construction of the proposed project. The land is currently zoned R-4, which requires a minimum lot area of 30,000 square feet.

All 140 dwelling units are proposed to be rental units with ownership retained by the developer. Community wells and septic systems are proposed to service the site. Access to the parcel would be provided by the construction of a dead-end road off Stepstone Hill Road (see Figure 1).

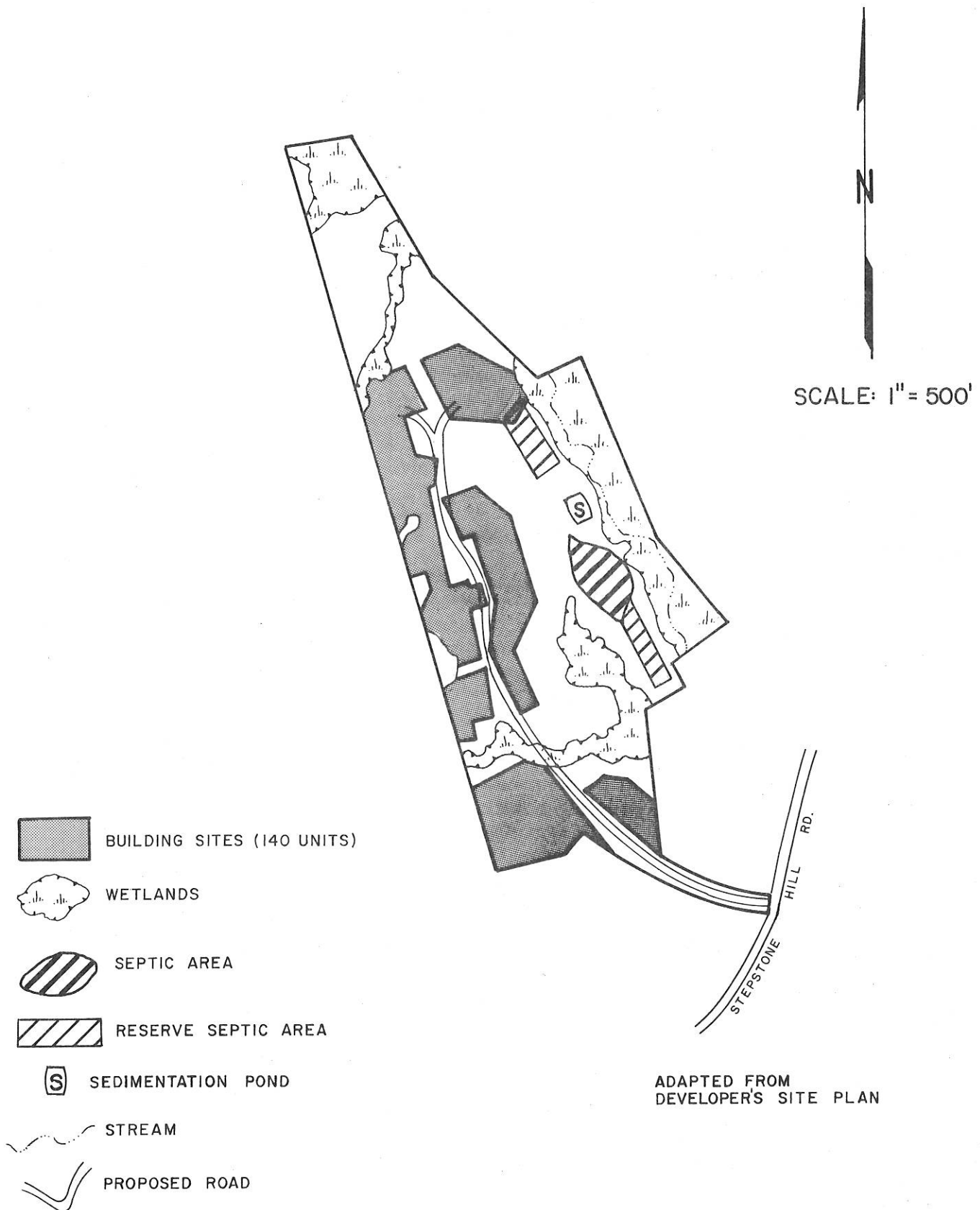
The Planning and Zoning Commission from the Town of Guilford requested the assistance of the King's Mark Environmental Review Team (ERT) to help the Town in analyzing the proposed development. Specifically, the ERT was asked to identify the natural resources of the site and to highlight opportunities and limitations for development of the land. Major concerns raised by the Town in requesting this review included the impact of the project on soils, vegetation, storm water drainage and transportation; and the suitability of the site for the proposed sewage disposal scheme.

The ERT met and field reviewed the site on March 14, 1979. Team members for this review consisted of the following:

Frank Indorf.....	District Conservationist.....	U.S.D.A. Soil Conservation Service
Dwight Southwick.....	Civil Engineer.....	U.S.D.A. Soil Conservation Service
Michael Zizka.....	Geohydrologist.....	State Department of Environmental Protection
Robert Rocks.....	Forester.....	State Department of Environmental Protection
Charles Phillips.....	Fishery Biologist.....	State Department of Environmental Protection
Greg Bonadies.....	Sanitarian.....	State Department of Health
Norris Andrews.....	Regional Planner.....	Southcentral Connecticut Regional Planning Agency

FIGURE 1.

SIMPLIFIED SITE PLAN



ADAPTED FROM
DEVELOPER'S SITE PLAN

Prior to the review day, each team member was provided with a summary of the proposed project, a checklist of concerns to address, a detailed soil survey map, a soils limitation chart, a topographic map, and a simplified site plan of the development proposal. Preliminary plans and documents prepared by the developer as part of his application were made available to the team the day of the field review. 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 and recommendations. It is important to understand that the ERT is not in competition with private consultants, and hence does not perform design work or provide detailed solutions to development problems. Nor does the team recommend what ultimate action should be taken on a proposed project. The ERT concept provides for the presentation of natural resources information and preliminary development considerations--all conclusions and final decisions rest with the Town and developer. It is hoped the information contained in this report will assist the Town of Guilford and the landowner/developer 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, P. O. Box 30, Warren, Connecticut 06754.

* * * * *

II. SUMMARY

- . The majority of the soils underlying areas proposed for homesite construction present moderate to severe limitations for development due to shallow to bed-rock conditions.
- . Due to the topography, complexity of soils, and close proximity to Little Meadow Brook, care must be taken to closely monitor any construction on this property so as to minimize the amount of erosion and sedimentation that occurs. With implementation of the proposed project, it is recommended that an erosion and sediment control plan for the entire development process be prepared and followed.
- . The wetland areas and streambelt on this property are valuable and fragile environments. Preservation as open space along with special care during development should help to protect these areas from being destroyed.
- . The trees in the western portion of the site are becoming crowded which is causing a decline in their health and vigor. A fuelwood thinning in this area will reduce crowding and eventually increase the health, vigor and stability of the residual trees.
- . The tract provides three wildlife habitat types: wetland, mixed hardwood forest, and old field. Development of the proposed project will certainly disrupt the quality of wildlife habitat present and species of wildlife intolerant of man can be expected to be driven from the site.
- . Little Meadow Brook is a valuable small stream. Its waters provide habitat for several species of fish including brook trout, dace, and shiners. The proposed sewage system represents a threat to Little Meadow Brook's water quality and fish population.
- . Increase in runoff from the site with implementation of the project would have a negligible impact upon peak flow in Little Meadow Brook.
- . The proposed sewage disposal scheme is an area of special concern due to the rapid permeability of the sand and gravel soil underlying the proposed leaching bed area. Because coarse grained deposits have a relatively poor potential for renovating effluent, a significant possibility exists of deterioration of the water quality in Little Meadow Brook. Moreover, the proposed septic system may severely limit the potential for establishing a high yield well within the sand and gravel deposits.
- . The proposed stream crossing at the southern portion of the site is one of the critical areas of the road system. The size of the culvert should be large enough to eliminate the road from overtopping and the outlet of the culvert should have a rock lined stilling basin to eliminate streambelt erosion at this point.
- . The proposed project appears to be consistent with the State of Connecticut's "Conservation and Development Policies Plan". The project is not consistent with the policies of the Southcentral Connecticut Regional Planning Agency which encourages increased densities in developed areas and decreasing density in the more outlying and less developed areas.

- . The proposed development indicates that single access is planned from Stepstone Hill Road. This access occurs at a difficult intersection. There are poor sight distances and even at this time, without any development, the area poses a traffic and safety problem. It is estimated that the project when fully occupied would generate an average of between 742 and 784 automobile trips per weekday.
- . According to demographic multipliers, the total school age population generated by the development when fully occupied would be thirteen children. Although this number alone won't have a significant impact on the Guilford School System's elementary and middle schools, the project may aggravate the overcapacity situation at the Senior High School.

III. SETTING, TOPOGRAPHY, LAND USE

The + 41 acre Thistle Rock site is an irregularly shaped parcel of land located just west of the Guilford Lakes Elementary School. The only access to the parcel at present is via a dirt road off Stepstone Hill Road which abuts the property to the south. Little Meadow Brook, a major stream in Guilford, runs from north to south along the eastern border of the property. With the exception of the Guilford Lakes School and a small commercial establishment just south of the property, surrounding land use is predominantly low-to-medium density residential.

The parcel is predominantly wooded and characterized by moderate to steep slopes on the western half of the property and slight to moderate slopes on the eastern half of the site (see Figure 2). Topography rises from east to west with a low elevation of about 50 feet along Little Meadow Brook and a high elevation of about 110 feet at the western border of the property. Two or three small intermittent streams traverse the property from west to east enroute to Little Meadow Brook. These streams are located within the wetland areas shown in Figure 1.

IV. GEOLOGY

The surficial geology of the Guilford topographic quadrangle has been mapped and described in Connecticut Geological and Natural History Survey Quadrangle Report No. 28, by R. F. Flint.

The Thistle Rock property may be separated into two distinctive topographic-surficial geologic units (see Figure 3). The western unit is a moderately to steeply sloping, somewhat knobby area in which a thin deposit of glacial till overlies bedrock. The bedrock is visible in several places in the form of small but prominent outcrops. Although it was not practical to include outcrop locations in Figure 3, the developer has prepared a large-scale site plan which indicates areas of exposed bedrock. The till deposit consists of round to angular rock fragments of widely varying sizes. Because of its stony, compact texture, groundwater movement through till is usually very slow and excavation with hand tools is difficult.

The eastern unit is a relatively flat area consisting of comparatively thick glacial sand and gravel deposits. Records from wells in the vicinity of the site indicate that the deposits are as much as 76 feet thick directly underneath Little Meadow Brook, thinning to 45 feet or less near the sides of the valley (the lines of contact with the till deposits).¹ In the area of the proposed leaching field (see Figure 1), the sand and gravel is estimated to be at least 20 feet thick.

The bedrock underlying and cropping out on the site has been identified as part of the Middletown Formation in an unpublished Ph.D. thesis by Stanley Bernold (The Bedrock Geology of the Guilford Quadrangle, Yale Univ., 1962). The thesis is available for inspection at Yale University and at the Natural Resources Center of the Department of Environmental Protection. The rock is well-layered, with sub-units of different mineral compositions forming the layers. On the site, the most characteristic sub-units are plagioclase-hornblende gneiss and/or biotite gneiss, and amphibolite. Quartz, sillimanite, and anthophyllite are prominent in other sub-units.

¹Source: Connecticut Water Resources Bulletin No. 30

FIGURE 2.

TOPOGRAPHIC MAP

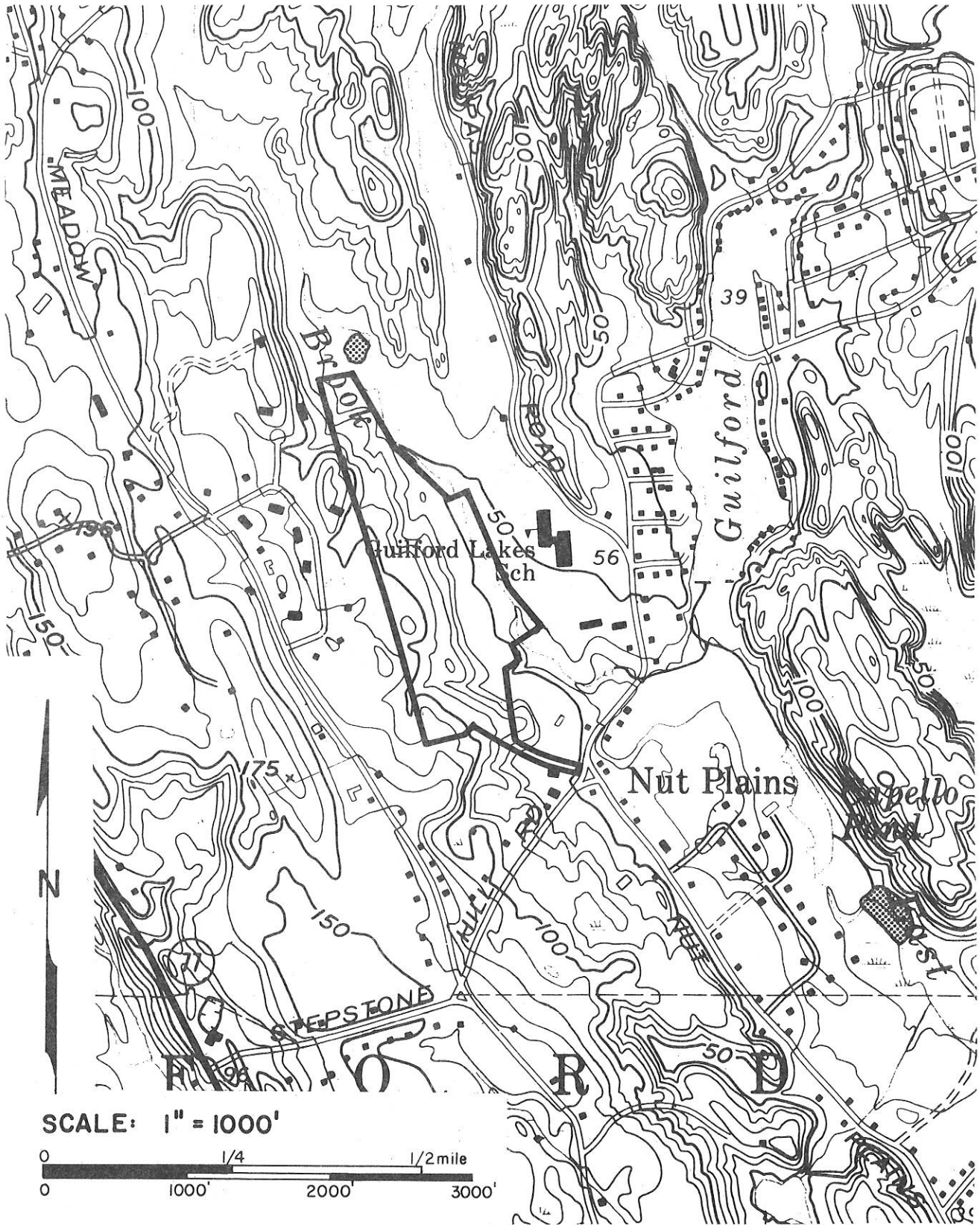
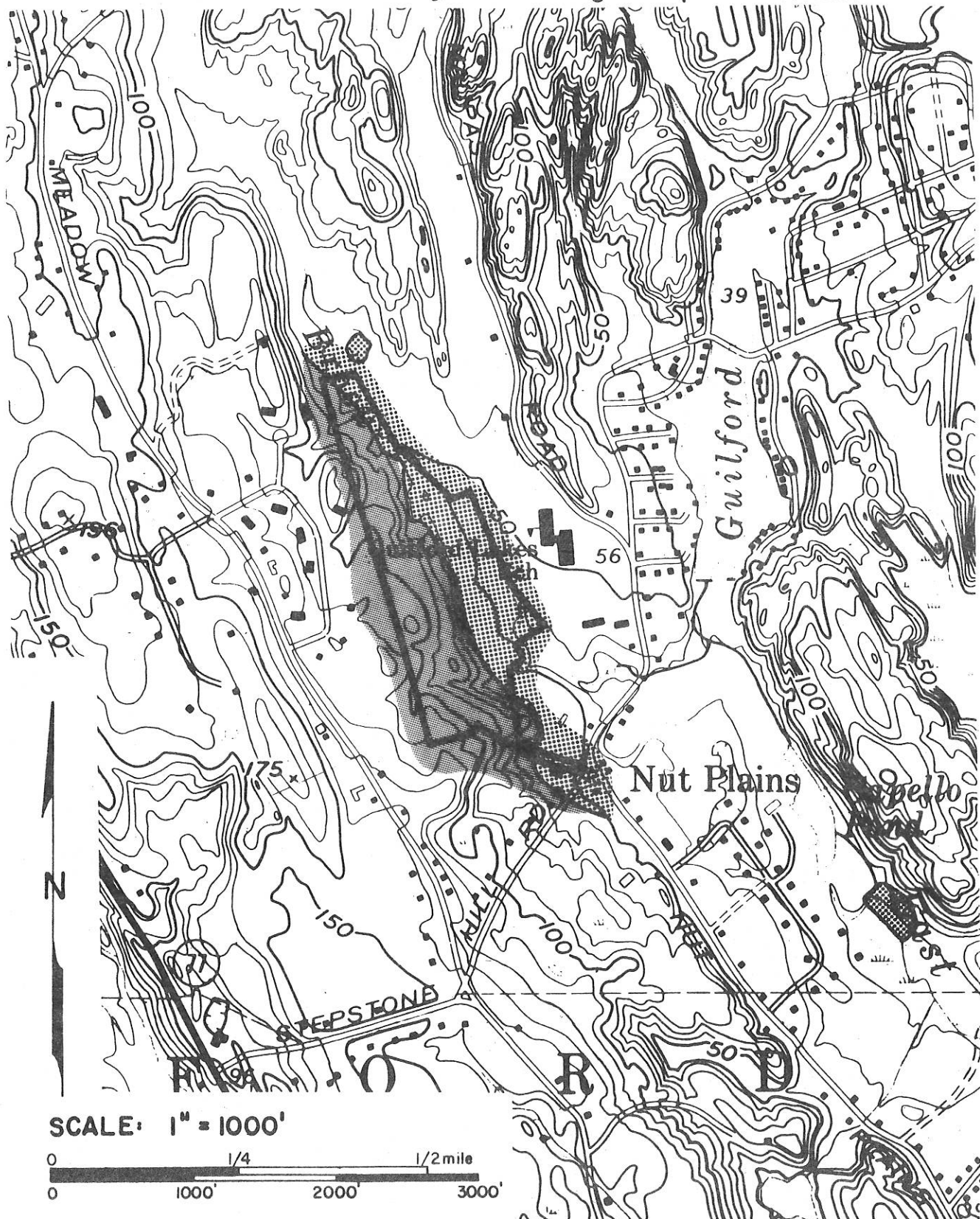


FIGURE 3.

SURFICIAL GEOLOGY - Adapted from Conn.
Geol. Nat. Hist. Survey Quadrangle Report No. 28.



EXPLANATION



THIN TILL AND SCATTERED BEDROCK OUTCROPS



DEEP SAND AND GRAVEL

V. SOILS

A detailed soil survey map and soils limitation chart of the tract is presented in the Appendix of this report. The soils map illustrates the geographic location of all soils identified on the property. The soils limitation chart identifies limiting factors for various land uses on individual soil types and also rates the severity of the limitations as determined by the U.S.D.A. Soil Conservation Service.

Soil Descriptions

Presented below is a brief description of the soils which have been identified on the tract (refer to Soils Map in Appendix).

Hollis-Charlton Complex (Map symbol 7LD): The Hollis-Charlton complex is interpreted as consisting of 60% Hollis soils and 40% Charlton soils. The Hollis soils consist of shallow to bedrock soils with Charlton soils being deep, well drained soils. Depth to bedrock varies from 10 to 20 inches for Hollis soils to greater than 60 inches for the Charlton. Thus, depth to bedrock for a Hollis-Charlton complex may be interpreted as being between 10 and 60+ inches with the majority of areas being between 10 and 20 inches. Slopes on this soil complex vary from 15 to 35%. Construction of homes and roads within the Hollis-Charlton area will prove costly due to the bedrock present.

Charlton-Hollis Complex (Map symbol 7LC): The Charlton-Hollis complex is interpreted as consisting of 60% Charlton soils and 40% Hollis soils. Here again, the depth to bedrock will range between 10 and 60+ inches. However, with this soil complex, most areas will have a depth to bedrock of greater than 60 inches. The Charlton-Hollis complex is interpreted as having moderate limitations for construction of dwellings without basements and roads. Limitations are posed by slope (3-15%) and inclusions of shallow to bedrock areas.

Hollis Rock Outcrop Complex (Map symbol 17MC): This Hollis soil has the presence of bedrock at the surface of the soil in some areas. The soil presents severe limitations for urban land development.

Hinckley Gravelly Sandy Loam (Map symbol 60A and 60B): This soil consists of deep, excessively drained soils formed in water sorted material. Typically the Hinckley soils have friable gravelly loamy sand underlain by gravelly and very gravelly sand. This soil has slight limitations for roads and dwellings without basement construction. Septic tank absorption fields may prove suitable, however there is a danger that the fast percolation rate of this soil may cause groundwater pollution problems.

Sutton Fine Sandy Loam (Map symbol 41XB): The Sutton soils consist of deep, moderately well drained soils with depth to bedrock being greater than 60" and a high water table at 1.5 to 3.5 feet. Construction of roads and dwellings without basements have moderate limitations due to wetness.

Ellington Fine Sandy Loam (Map symbol 76A): The Ellington soils consist of deep moderately well drained soils with a high water table at 1.5 to 3.5 feet. Wetness and high potential frost action may cause severe construction limitations.

Rumney Fine Sandy Loam (Map symbol 855): The Rumney soils consist of deep, poorly drained soils formed in recent alluvium on nearly level flood plains. The soils are unsuitable for construction and are classified as inland-wetlands under Public Act 155.

Soils vs. Proposed Land Use

The majority of the soils underlying areas proposed for homesite construction present moderate to severe limitations, although about seven buildings are proposed on Hinckley soils which have slight limitations. The remaining twenty-eight buildings are proposed to be constructed on Hollis-Charlton complex soils and Charlton-Hollis complex soils. These soils present moderate to severe limitations for homesite construction due to shallow to bedrock conditions. It is important to note however, that within these complexes, occasional pockets of deeper soils may be found which are more favorable for homesite construction. Upon field checking the site the day of the ERT field review, it was found that bedrock depths varied greatly from area to area. This suggests the need for extensive on-site investigation to locate homesites in the most favorable areas. It is anticipated that with implementation of the proposed plan, extensive and costly measures will be required to overcome the soil limitations posed by these shallow to bedrock soil complexes.

The suitability of the Hinckley soils for the proposed sewage disposal system needs to be very carefully addressed. The major concern here is with the fast percolation rate of the Hinckley soils and the possible pollution of Little Meadow Brook, which runs directly adjacent to the area proposed for sewage disposal. Another concern is that some effluent may filter into the proposed sediment pond which is also in close proximity to the area proposed for sewage disposal.

Soil Loss and Sedimentation

Due to the topography, complexity of soils, and close proximity to Little Meadow Brook, care must be taken to closely monitor any construction on this property so as to minimize the amount of erosion and sedimentation that occurs. With implementation of the proposed project, it is recommended that an erosion and sediment control plan for the entire development process be prepared and followed. Erosion and sediment control practices are described in the "Erosion and Sediment Control Handbook--Connecticut" (U.S.D.A. Soil Conservation Service, 1976). Additional assistance in the preparation and review of erosion and sediment control plans is available from the New Haven County Conservation District.

It is difficult at this time to make specific recommendations for erosion and sediment control due to the preliminary nature of the planned residential development proposal. Some basic principles which should be followed however include:

- . Complete each section of the proposed road (with all erosion and sediment control practices in place) before the buildings along that section are developed.
- . Keep soil disturbance during construction to a minimum.
- . Note, respect, and use natural drainage where possible.

- . Regrade and vegetate exposed areas as soon as possible.
- . Protect stockpiled soil with mulch and/or vegetation.
- . Attempt to keep cuts and fills at a 2:1 slope (3:1 for gravelly and sandy soils).
- . Use erosion and sediment controls such as haybale check dams at strategic points in close proximity to easily eroded or disturbed areas (particularly needed to protect inland wetlands on-site).
- . Consider utilizing sediment traps and energy dissipators where appropriate in the stormwater management system to supplement the proposed sediment pond.

VI. FORESTRY

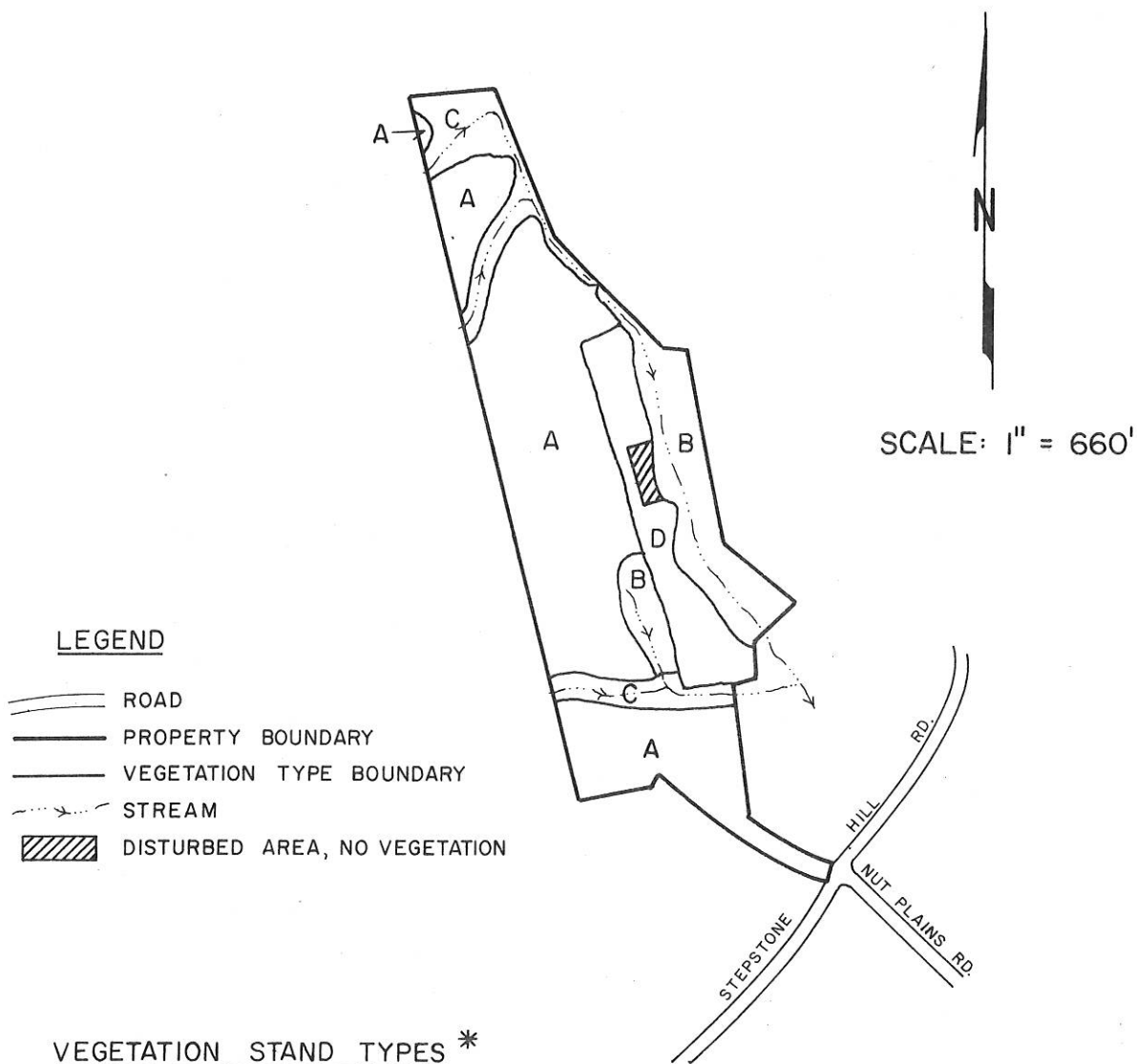
Twenty-eight acres of the property proposed for the "Thistle Rock Planned Residential Development" are forested. The remaining 13 acres are flood plain (7 acres), old field (5 acres), and disturbed land with no vegetation (see Figure 4). Vegetation type descriptions and recommendations for management are presented below.

Vegetation Type Descriptions (refer to Figure 4)

- STAND A. Mixed hardwoods. Forty to fifty year old pole-size black oak, white oak, red maple, hickory and American beech are present in this 23 acre fully-stocked stand. Sawlog-size white oak which are approximately 70 years old are also scattered over this site. The understory vegetation consists of hardwood tree seedlings, dogwood, blue beech, witchhazel, maple leaf viburnum and patches of mountain laurel. Christmas fern, club moss and grasses make up the spotty ground cover present.
- STAND B. Streambelt/flood plain. The 7 acre wetland associated with Little Meadow Brook and one of its' tributaries is vegetated with red maple seedlings, speckled alder, dogwood, highbush blueberry, arrowwood, willow, apple trees, phragmites, marsh grasses, sedges and assorted herbaceous vegetation. White pine, larch, hemlock and white cedar have been introduced on the west side of Little Meadow Brook. Grapevines, honeysuckle and greenbrier are competing with the tree and shrub species for dominance of this site.
- STAND C. Hardwood swamp. This 5 acre fully-stocked stand closely resembles Stand A (mixed hardwoods), however, the poorly drained soils associated with the brooks limit the dominant tree species to red maple with black oak, black birch and willow, as minor components. Highbush blueberry, sweetpepper bush and spice bush form the understory with dogwood, witchhazel and blue beech in the drier areas. Ferns and club mosses are the principle ground cover species present.

FIGURE 4.

VEGETATION TYPE MAP



STAND A - MIXED HARDWOODS, POLE SIZE, FULLY STOCKED, 23 ACRES

STAND B - STREAMBELT/FLOODPLAINS, WETLAND BRUSH SPECIES, 7 ACRES

STAND C - HARDWOOD SWAMP, POLE SIZE, FULLY STOCKED, 5 ACRES

STAND D - OLD FIELD, OLD FIELD BRUSH SPECIES, 5 ACRES

*

SEEDLING SIZE - UP TO 1" IN DIAMETER AT BREAST HEIGHT

SAPLING SIZE - 1" - 5" IN D.B.H.

POLE SIZE - 5" - 11" IN D.B.H.

SAWLOG SIZE - 11" AND GREATER IN D.B.H.

STAND D. Old field. Sapling-size red cedar, red maple and gray birch dominate this 5 acre stand. Seedling-size white oak, cherry, black birch, and blue beech are becoming established. Sweet fern, smooth sumac, autumn olive, silky dogwood, spreading dogbane, goldenrod and milkweed are also present.

Aesthetics and Preservation

The wetland areas present on this property have been designated and will not be developed under the current proposal. As open space, these wetlands will continue to provide habitat for wildlife, regulate water discharge flow rates and provide environmental variety. Special design measures will have to be taken during and after development to assure that the quality of these wetlands will not be lowered.

Several large healthy specimen trees are located in stand A. These trees would have aesthetic value if they could be incorporated into the landscape design of the area. Special care should be taken not to injure these trees or disturb the soil under their crowns during construction.

Limiting Condition

The permanent high water table and seasonal flooding which occur in the wetland area associated with Little Meadow Brook (stand B) limits vegetation growth to mostly shrub species which are tolerant of excessive moisture. Management of the tree species that are present for timber production is not feasible.

Potential Hazards and Mitigating Practices

Trees which are in danger of falling may become hazardous when they are near buildings, utility lines, roadways or recreation areas. With development of this land, these trees should be identified and removed.

Construction in parts of stand A may require intensive excavating, filling and grading. These activities change the natural balance between soil aeration, moisture level and physical constitution. Tree survival depends upon the relationship between these soil factors. Soil alteration under a tree's canopy or direct mechanical injury by construction equipment may cause the affected tree to die within three to five years. In light of this, great care should be taken not to disrupt the soil under the crown of trees to be preserved for aesthetic or shade purposes.

It is desirable to save trees that are healthy and full crowned, as these trees are usually more stable and better able to withstand environmental changes. It should also be noted that trees saved in undisturbed small groups tend to survive better than individual trees, because soil disturbances and mechanical injuries are less likely.

Windthrow of the shallow rooted trees such as red maple may be increased if openings are created in or near the hardwood swamp (stand C). Such openings would allow wind to flow through rather than over this stand. This new factor, together with the saturated soils and shallow rooted trees already present, would increase the potential for windthrow in this area. Non-developed buffer zones of at least 50 feet around these wetland areas would help reduce changes in windflow patterns, reducing increased windthrow hazards.

Suggested Management Techniques

A fuelwood thinning in both stands A and C, removing approximately one-third of the trees, would result in a more stable forest that would be better able to withstand the environmental changes brought on by development of this property. Dead, unhealthy, damaged and undesirable trees should be removed leaving the healthier, higher quality trees in the residual stand. This thinning will reduce competition between trees for space, nutrients, water and sunlight. In stand C (hardwood swamp) this thinning will give the trees opportunity to become more wind firm through enlargement of root systems and crowns. In sections of stand A where development would be intense, an effort should be made to utilize the wood products being removed.

Several rows of a mixture of white pine, hemlock and larch could be planted 8' to 10' apart, along the eastern and perhaps western side of the old field (stand D). This planting would eventually provide a visual barrier, help to reduce noise levels in the area and provide wildlife with cover.

A consultant forester could be hired to mark the trees to be removed for the thinning, provide lists of wholesale fuelwood operators and carry out the planting operation.

VII. WILDLIFE

Although small in size, this tract provides three wildlife habitat types: wetland, mixed hardwood forest (woodland) and old field (open land) (see Figure 4).

The wetland areas and streambelts offer high quality wildlife habitat to many species. These areas are vegetated with many fruiting shrubs and vines which provide excellent food, cover and nesting areas for many species of song birds and small mammals. Frogs, toads and salamanders come to these wetland areas in spring to breed. Snakes and many nocturnal animals such as raccoons, skunks and shrews frequently use these areas as hunting grounds and migration routes. White tailed deer and perhaps foxes may come from surrounding areas to find water.

The mixed hardwood woodland provides medium quality habitat for many wildlife species, including gray squirrel, mice, raccoons, song birds, woodpeckers, creepers, ruffed grouse, woodcock and white tailed deer. At present the oak trees provide ample mast (acorns) which is utilized primarily by gray squirrel and white tailed deer. The dead trees harbor insects which are fed upon by many bird species, especially woodpeckers and creepers.

The open land or old field on this property is vegetated with grass and weed species that attract insects and produce abundant seed which song birds and small rodents feed upon. The shrub species present also provide food, cover and nesting areas for the above mentioned wildlife. Many animals (chipmunks, mice and snakes) find homes among the stone walls which divide this area from the mixed hardwood stand.

Many wildlife species range between these habitat types. Some feed in one area, rest in another, breed in another and escape from predators into

another. The range may change daily or seasonally, depending on the needs of the species in question and the ability of the environment to satisfy those needs.

Development of the proposed project will certainly disrupt the quality of wildlife habitat present. Effluent reaching the wetland area from the proposed septic leaching fields may change the quality of the wetland and potentially pollute Little Meadow Brook. Much of the woodland habitat will be eliminated by the addition of the 140 town houses. The open land will have to be cleared of vegetation to provide an area for the septic leaching fields.

The species of wildlife which are intolerant of man will move from this area into the surrounding areas which are less developed.

Landscape planting of the proposed development area with shrub species that offer food and/or cover to wildlife (such as autumn olive, silky dogwood, flowering dogwood, hemlock and white pine), will attract song birds and small mammals. Planting these same species around the border of the open area to be used as a septic and reserve septic area will improve wildlife habitat and in time provide a buffer zone that will screen out some noise and become a visual barrier.

Once the septic leaching fields are in place, this area should be revegetated. Proposed use of this area will determine the best form of vegetative cover to use.

VIII. FISHERIES

Little Meadow Brook is a valuable small stream. Its waters provide habitat for several fish species including brook trout, dace and shiners. Also to be considered is the State's stocking program in the East River to which Little Meadow Brook is a tributary.

While the stream has been channelized downstream of the proposed project area, the greater part of it still flows naturally from its origin above Route 80 to the project area.

The proposed sewage system represents a threat to Little Meadow Brook's water quality and fish population. The soil in the area proposed for dispersion of septic wastes appears highly permeable. If poorly renovated septic effluent were to enter the brook, higher B.O.D. (biological oxygen demand) and lower oxygen levels would certainly result. Higher nutrient load would foster luxuriant growth of aquatic vegetation and intensify rank odors in the wetland area immediately adjacent to the proposed septic field. The short downstream distance to the East River presents a threat to the trout stocking program.

In light of the potential impact to an important fisheries resource, it is recommended that the probable effects of the proposed sewage system be very carefully investigated. Alternative waste disposal technologies should also be explored.

IX. HYDROLOGY

All runoff from the site flows eastward into Little Meadow Brook. At its point of confluence with East River, the drainage area (watershed) of Little Meadow Brook is approximately 3.85 square miles. The area to be intensively developed represents only about one percent of the watershed; hence, the increase in runoff from the site itself would have a negligible impact upon peak flow in Little Meadow Brook. As a policy matter, however, runoff from the site should be controlled in some manner since a series of developments in the watershed, each producing small peak flow increases, ultimately could add up to a substantial change in the flow characteristics of the brook.

The level of the water table in sand and gravel deposits bordering streams typically is closely related to the level of the stream itself. If the bottom of the septic leaching trenches were placed at least 10 feet above the elevation of the bed of Little Meadow Brook within the adjoining gravelly deposits, it is unlikely that the proposed system would ever be flooded by seasonally high water levels. As a check, however, it would be useful to place test holes in the leaching area in order to compare the groundwater levels in that area with the current stream levels.

From a chart found in Connecticut Water Resources Bulletin No. 15, it may be estimated that the lowest sustained flow that is statistically likely to occur in Little Meadow Brook for a 30-day period is about 115,000 gallons per day (assuming 10 percent of the watershed contains sand and gravel deposits). Wastewater would be discharged through the proposed septic system at a rate of approximately 32,000 gallons per day. Hence, during such a dry season, septic effluent would account for approximately 28 percent of the flow in Little Meadow Brook. Because coarse-grained deposits have a relatively poor potential for renovating effluent, a significant possibility exists of deterioration of the water quality in the brook. Moreover, the proposed septic system may severely limit the potential for establishing a high-yield well within the sand and gravel deposits and could preclude the use of the proposed retention basin for swimming purposes.

X. SEWAGE DISPOSAL AND WATER SUPPLY

The proposed project indicates that 140 town house having a total of 210 bedrooms are to be situated on this site. An existing community water supply and a community subsurface sewage disposal system are being proposed to service the buildings, which are designed to accommodate four to six rental units, each unit consisting of one or two bedrooms.

Sewage Disposal

Most of the proposed parcel of land has severe limitations for individual on-site subsurface sewage disposal systems due to outcrops of ledge rock, shallow bedrock, steep slopes or wetness. There is a limited area, shown as 60B on the Soils Map in Appendix, that consists mostly of sand and gravel with some silt. A soil survey conducted in January 1979 by Eric G. Anderson, Land Surveyor, confirms that this subsoil is to a depth of at least 12 feet. Within this sand and gravel area has been proposed a leaching field for the sewage disposal system which is to service the town houses.

As mentioned several times earlier in this report (see pages 10, 15,16), sewage disposal in this portion of the site is an area of special concern due to the rapid permeability of this type of soil. Subsurface sewage disposal in this area could deteriorate the quality of Little Meadow Brook and possibly cause groundwater pollution problems.

The estimated sewage discharge from the proposed units is approximately 32,000 gallons per day, which is about the minimum that may be used for the basis of design for the sewage disposal system. The discharge of such a large volume must be approved by the Department of Environmental Protection (DEP) prior to any construction. Before the DEP could act on a permit application, the developer would have to provide detailed technical information on the hydrogeologic conditions in the disposal area, the design of the sewage disposal system, a thorough hydraulic analysis of the disposal area (including, most likely, a Three Dimensional Flow Analysis), and an analysis of the probable impact on any nearby water resources (in this case, Little Meadow Brook). This last requirement should include an analysis of bacterial travel, virus removal, and nutrient (nitrogen and phosphorous) transport. The "burden of proof" is clearly upon the developer here to show that the proposed sewage disposal system will function properly and not pose a threat to environmental or public health. The DEP also requires, prior to acting on a permit application, that suitable arrangements be made for ownership, operation, and maintenance of community sewage disposal systems.

It should be recognized that while the proposed sewage disposal area may have the capacity to accept the quantity of sewage that may be generated from the number of dwelling units presently under consideration, it is also possible that it has the capacity to accept only a small fraction of that quantity. A great deal of additional technical information would have to be provided to the DEP before a permit application could be acted upon.

Water Supply

The two existing wells on site, with a total yield of 20 gpm (gallons per minute), are not adequate to supply the necessary quantity of water which would be required by the proposed project. The area which would likely be most suitable for a high yield gravel packed well would be within the same sand and gravel area proposed for subsurface sewage disposal. Separating distances (between wells and sewage disposal areas) which are greater than specified in the Public Health Code may be required and this may limit the area proposed for the subsurface leaching field and reserve area. Naturally, every consideration should be given to insure the protection of the aquifer in question.

Prior to approval of the development plans, a new source or sources of water must be explored, designed, and approved by the State Department of Health Services. Plans for the sewage disposal system should also be submitted to the Department of Health Services for review since the proposed new source of water supply may be located nearby the proposed leaching field.

XI. FOUNDATION DEVELOPMENT, STORMWATER CONTROL, AND INTERIOR ROADS

The proposed sedimentation pond (see Figure 1) is located in an area that has been mined of sand and gravel. Construction of this pond would require a Corps of Engineers 404 permit and specific details regarding pond design should be checked with permit requirements as established by the Corps.

The existing contour at the pond site is about the elevation of the wetland area abutting Little Meadow Brook. Any dam built to create a pond in this area should have the outside toe protected from eroding velocities of Little Meadow Brook. Little Meadow Brook appears to be about 25 feet away from the downstream toe of any embankment in this area. It is also recommended that the pipes discharging storm water into the proposed pond be provided with some type of energy dissipators to slow water velocities and dissipate energy.

As discussed earlier in this report, most of the proposed development (buildings, parking lots, and roads) is located on shallow to bedrock soils. Bedrock outcrops are scattered throughout the higher elevations where the development is proposed. This could cause pockets of high water table and it would be advisable to include foundation drains around the buildings.

The topography over which the road is to be built ranges up to 12 to 15 percent. There will be places of cuts and fills which will cause no real problems if concentrated surface water is kept off them. The stream crossing at the southern portion of the site is one of the critical areas of the road system. The size of the culvet should be large enough to eliminate the road from overtopping and washing the roadfill downstream. The outlet of the culvet should have a rock-lined stilling basin to eliminate streambed erosion at this point.

The road and a parking lot are planned accross a defined drainageway east of lot number 9 N/F William and Ann O'Grady. It is recommended that this drainageway be kept open or another satisfactory means of drainageway provided.

Increased runoff from the buildings west of the roadway will be intercepted by the road and flow into the storm drainage system or over the parking lots and lawn area onto the steep slope east of the road. Wherever the increased runoff is allowed to concentrate, erosion will undoubtedly result. Even with the strictest of erosion control measures, there will be much sediment washed from the upper slopes where the planned development is to be constructed. This underscores the need for preparing and strictly following a thorough erosion and sediment control plan.

XII. PLANNING CONSIDERATIONS

Consistency of Proposed Project With State Plans

A review of the "State of Connecticut - Conservation and Development Policies Plan - Proposed Revision of 1979 - locational Guide Map - Land Area Classification, March 1978" indicates that the proposed project is within the "Rural" designation. The proposed State Action Strategy for rural areas is "Avoiding support of structural development forms and intensities which exceed on-site carrying capacity for water supply and sewage disposal on a permanent basis, which are inconsistent with open rural character or conservation values of adjacent areas, and which are more appropriately located in Rural Community Centers".

The development as proposed would appear to be consistent with the State Action Strategy for rural areas providing the site can support the proposed water supply and sewage disposal facilities on a permanent basis.

Consistency of Proposed Project With Regional Planning Agency Philosophy

The Southcentral Connecticut Regional Planning Agency has been most supportive in past years of applications for planned residential development. However; recent changes in policy and strategy for future land use in the region have indicated a need to revise this earlier policy. The Regional Planning Agency's efforts are now directed towards encouraging increased densities in developed or immediately adjacent development areas and decreasing density in the more outlying and less developed areas. The proposed Thistle Rock Planned Residential Development is a proposal that causes considerable concern because of the proposed substantial increase in density removed from the center of Guilford.

Planned residential development is based on the logic of utilizing the site and its physical characteristics in a more appropriate and well-designed manner than would be possible under the conventional zoning and subdivision standards. The determination of the soundness of such a proposal must be based not only on the preservation of the character of the site and the unusual and significant areas within the site, but also to insure that such a proposal is in harmony with the surrounding area. It may certainly be questioned whether the proposed project meets these objectives. The development proposal is clearly an attempt to maximize the use of the land by clustering at much greater density than would be permitted by conventional zoning and subdivision standards. In addition, it would appear that the proposed project has potential for severely impacting the surrounding area and adjacent public facilities.

Traffic Impact

The proposed development indicates that single access is planned from Stepstone Hill Road. This access occurs at a difficult intersection. There are poor sight distances and even at this time, without any development, the area poses a traffic and safety problem.

No data was available to the ERT on average daily traffic counts or the design capacity of Stepstone Hill Road. It is possible, however, to estimate the average traffic generated by the project through the use of traffic planning

standards. Two sources of traffic generation rates¹ indicate that about 5.3 to 5.6 average weekday trips could be expected per unit for a development of this type. (A trip is a one-way traffic movement either into or out of a development.) Given the number of units in the development at 140, it is calculated that the project when fully occupied would generate an average of between 742 and 784 trips per weekday.

The above referenced Department of Transportation study indicates that the peak morning and afternoon traffic flows would likely occur between 8 - 9 a.m. and 5 - 6 p.m. respectively. Given that morning and afternoon peak flows amount to 8.8% and 9.6% of the average weekday trips, it is anticipated that the project will generate between 65 and 69 vehicle trips during the morning peak hours and between 71 and 75 vehicle trips during the evening peak hour.

Impact on Schools

It is very difficult to gauge the impact of the proposed development on the Guilford School System. The project as proposed calls for a total of 210 bedrooms in 140 one and two bedroom town houses which would translate into 70 one bedroom units and 70 two bedroom units. Using criteria developed in The Fiscal Impact Handbook, Center for Urban Policy Research, it is estimated that a development with this bedroom mix would have a final population of about 276 persons. School age population should equal approximately thirteen students. It must be noted that these estimates are general and that the actual population may vary considerably. However, given that the unit mix is only for one and two bedroom units, the project will have a significantly lesser impact on the school system than if it included three and four bedroom units.

Given the fact that this development will generate approximately 13 school age children, it appears that this project by itself, will not have a significant impact on the Guilford School System's elementary and middle schools. However, according to school enrollment figures provided to the ERT by the Town Planner, it appears that the Senior High School is presently over capacity by approximately 130 students. Therefore, this project may add a small number of students to this school, aggravating the overcapacity situation.

* * * * *

¹
Trip Generation - An Informational Report, Institute of Transportation Engineers.

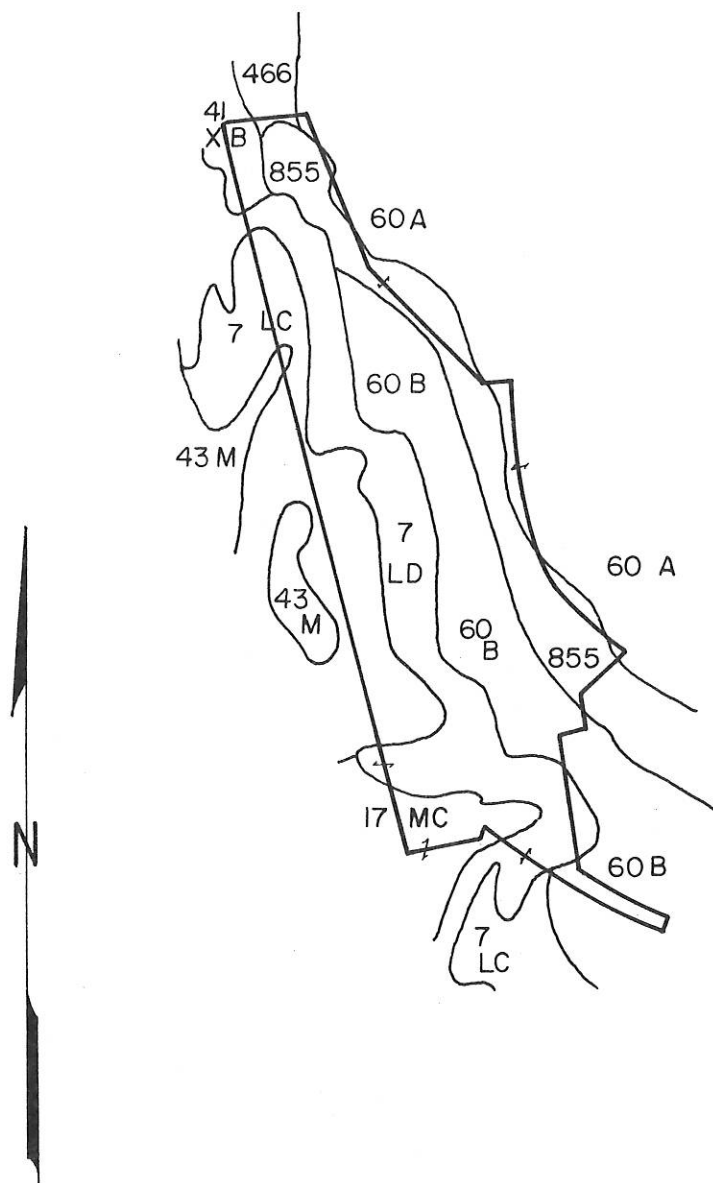
Trip Generation Study of Various Land Uses, Supplement A, Traffic Statistics Unit, Connecticut Department of Transportation.

APPENDIX

SOILS MAP

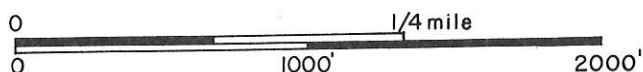
NOTE • SOIL BOUNDARY LINES WERE DERIVED FROM A SMALLER SCALE MAP (1" = 1320' SCALE) AND HENCE SHOULD NOT BE VIEWED AS PRECISE BOUNDARIES BUT RATHER AS A GUIDE TO THE DISTRIBUTION OF SOILS ON THE PROPERTY.

• MORE DETAILED SOILS MAPPING BY THE APPLICANT HAS IDENTIFIED SEVERAL WETLAND AREAS NOT SHOWN ON THIS MAP (SEE FIGURE 1).



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SCALE: 1" = 660'



SUITABILITY & LIMITATIONS OF THE SOILS FOR URBAN USES

MAP SYMBOLS & SOILS SERIES NAME	SUITABILITY AS A SOURCE OF		SUSCEPTIBILITY TO FROST ACTION	LIMITATIONS FOR:				
	Top Soil	Sand & Road Gravel Fill		Septic tank Filter field	Homesite with Basement	Homesite Landscaping	Streets & Parking Lots	
7LD Hollis- Charlton	poor	unsuit- ed	poor moderate	severe; depth to rock	severe; depth to rock	severe; depth to rock	severe; depth to rock	
7LC Charlton- Hollis	poor	unsuit- ed	poor moderate	mod-severe; depth to rock	mod-severe; depth to rock	mod-severe; depth to rock	mod-severe; depth to rock	
17MC Hollis- Rock outcrop complex	poor	unsuit- ed	poor moderate	severe; depth to rock	severe; depth to rock	severe; depth to rock	severe; depth to rock	
60A 60B Hinckly	poor too sandy	good	good low	slight	slight	slight	slight	
41XB Sutton	poor, unsuit- stony ed	good	moderate	severe; wetness	severe; wetness	moderate; stones	moderate; frost action	
76A Ellington	fair	good	fair high	severe; wetness	severe; wetness	slight	severe; frost action	
855 Rumney	poor, fair wet	poor, high wet	high	severe; floods, wetness	severe; floods, wetness	severe; floods, wetness	severe; floods, wetness, frost action	

- 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: Limitation Ratings Based Upon U.S.D.A. Soil Conservation Service Criteria.

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.