Environmental Review Team Report

Coulter Property

Old Saybrook, Connecticut

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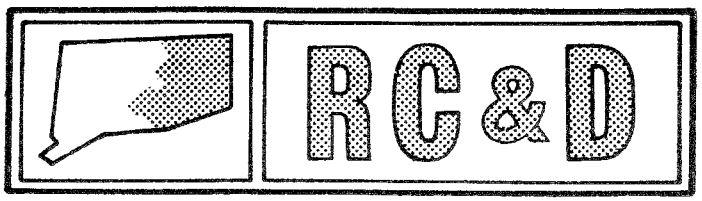
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team
Report

Coulter Property

Old Saybrook, Connecticut

July 1984

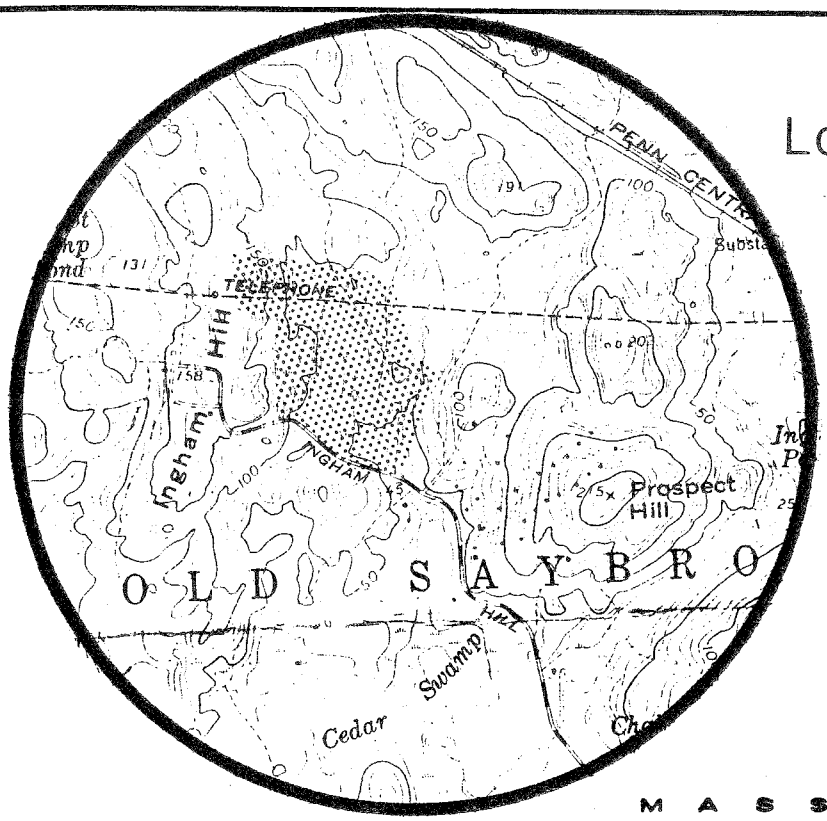


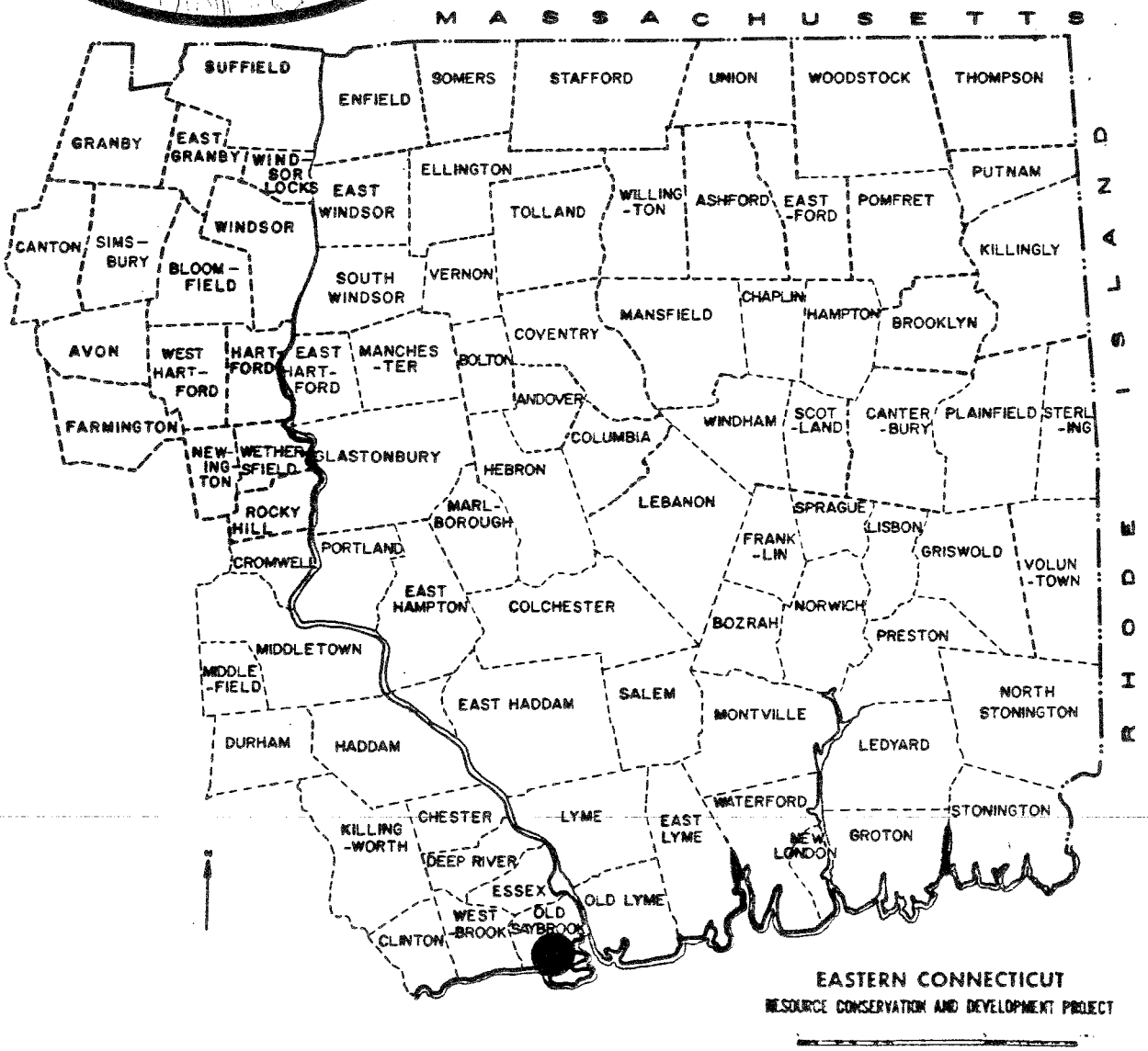
Eastern Connecticut Resource Conservation & Development Area

Environmental Review Team
PO Box 198
Brooklyn, Connecticut 06234

Location of Study Site

COULTER PROPERTY
OLD SAYBROOK, CONNECTICUT





EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
COULTER PROPERTY
OLD SAYBROOK, CONNECTICUT

This report is an outgrowth of a request from the Old Saybrook Planning and Zoning Commission, to the Middlesex 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 as a project measure. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist of the United States Department of Agriculture (USDA), Soil Conservation Service (SCS). Reproductions of the soil survey map as well as a topographic map of the site were distributed to all ERT participants prior to their field review of the site.

The ERT that field-checked the site consisted of the following personnel: Pat Scanlon, District Conservationist, SCS; Bill Warzecha, Geologist, Connecticut Department of Environmental Protection (DEP); Marc Beroz, Soil Specialist (SCS); Judy Wilson, Wildlife Biologist, (DEP); Emery Gluck, Forester, (DEP); Don Capellaro, Sanitarian, State Department of Health; Richard Joly, Planner, Connecticut River Estuary Regional Planning Agency; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

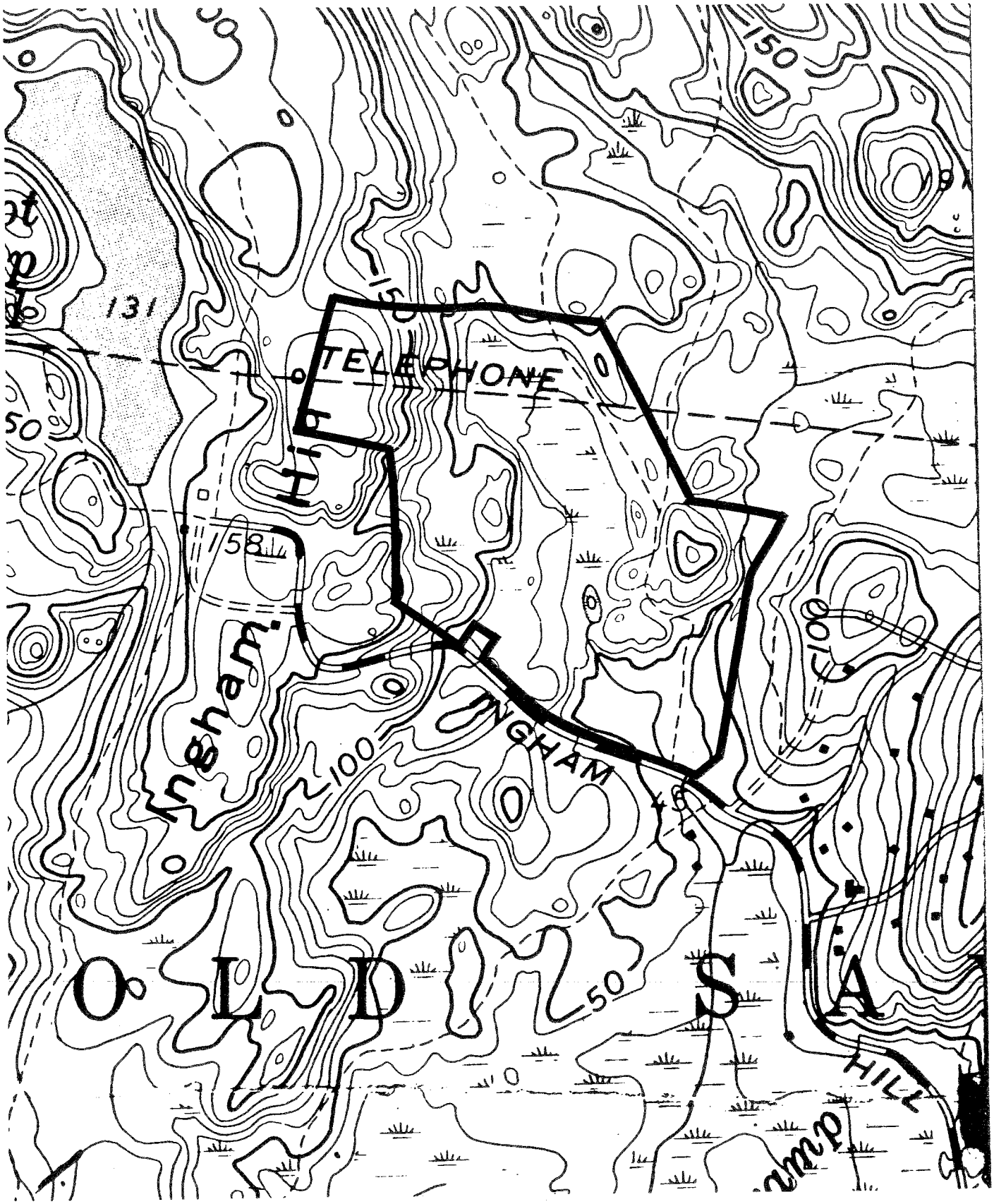
The team met and field-checked the site on Thursday, May 10, 1984. Reports from each Team member were sent to the ERT Coordinator for review and summarization for the final report.

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 Old Saybrook. 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 you will find this report of value and assistance in making your decisions on this particular site.

If you require any additional information, please contact Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, CT 06234, 774-1253.

Topography	Site Boundary	0 660' scale	N



INTRODUCTION

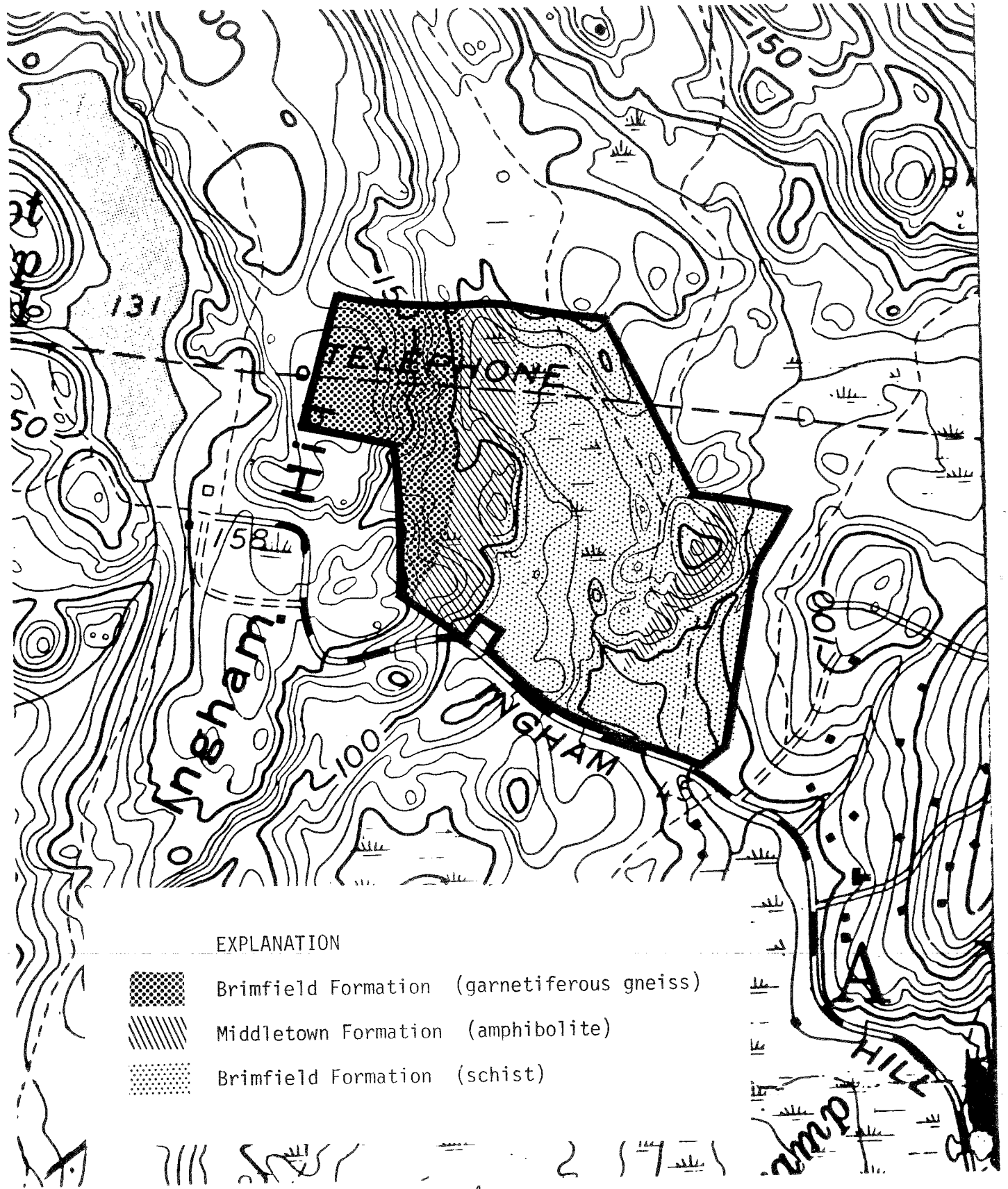
The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment for a proposed subdivision in the Town of Old Saybrook. The site is located on Ingham Hill Road in the northwestern section of the town. The property is approximately 62 acres in size and is presently owned by Robert K. Coulter. Angus McDonald and Associates have prepared preliminary plans for the site.

The preliminary plan shows the property divided into 23 lots of 60,000 square feet or larger per lot. Two open space areas totalling approximately five acres are also shown on the plan. Each lot will be served by an on-site well and an on-site septic system. A Y-shaped roadway, extending from Ingham Hill Road will provide access to interior lots.

The site is fully vegetated at present. A large wetland and its associated watercourse flow through the center of the property. The western portion of the site has steeply sloping terrain. Bedrock also outcrops on the site in this area.

The Team is concerned with the effect of this proposed 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 often become costly, making a project financially unfeasible for a developer. This site has a number of natural limitations to development, including steep slopes, shallow depth of soils to bedrock, and wetland areas. These constraints often cause problems with the location and proper functioning of septic systems, location of house foundations and roadways. The following sections of this report discuss these limitations to development in detail and also suggest mitigating measures which may be of benefit to the Town and developer.

Bedrock Geology



ENVIRONMENTAL ASSESSMENT

TOPOGRAPHY

The subject parcel is located in the northwest part of town off Ingham Hill Road. It consists of ±62-acre parcel which is irregularly shaped. The western limits of the tract encompass a portion of Ingham Hill. An old telephone line right-of-way traverses the north central parts of the site in an east-west direction.

The site has a diverse but interesting topography. The eastern portion of the site is characterized by gentle to moderate slopes. Steepest slopes in this area are associated with the bedrock-controlled knob in the vicinity of Lots 16 and 17. There are also some moderate slopes at the rear portions of Lots 19 and 22. A wetland with its accompanying watercourse bisects the property in a north-south direction. Slopes are generally flat throughout. Abutting this wetland area on its western edge is moderately to steeply sloping land which rises to a plateau at the western boundary of the property. Bedrock is at or near ground surface throughout this area.

Minimum and maximum elevations on the property are ±40 feet and ±190 feet above mean sea level, respectively (Source: U.S. Geological Survey - Essex topographic quadrangle map).

The major watercourse on the site flows parallel to the eastern property line. The watercourse draining the wetlands in the central portions merges with an unnamed stream at a point just before it passes under Ingham Hill Pond.

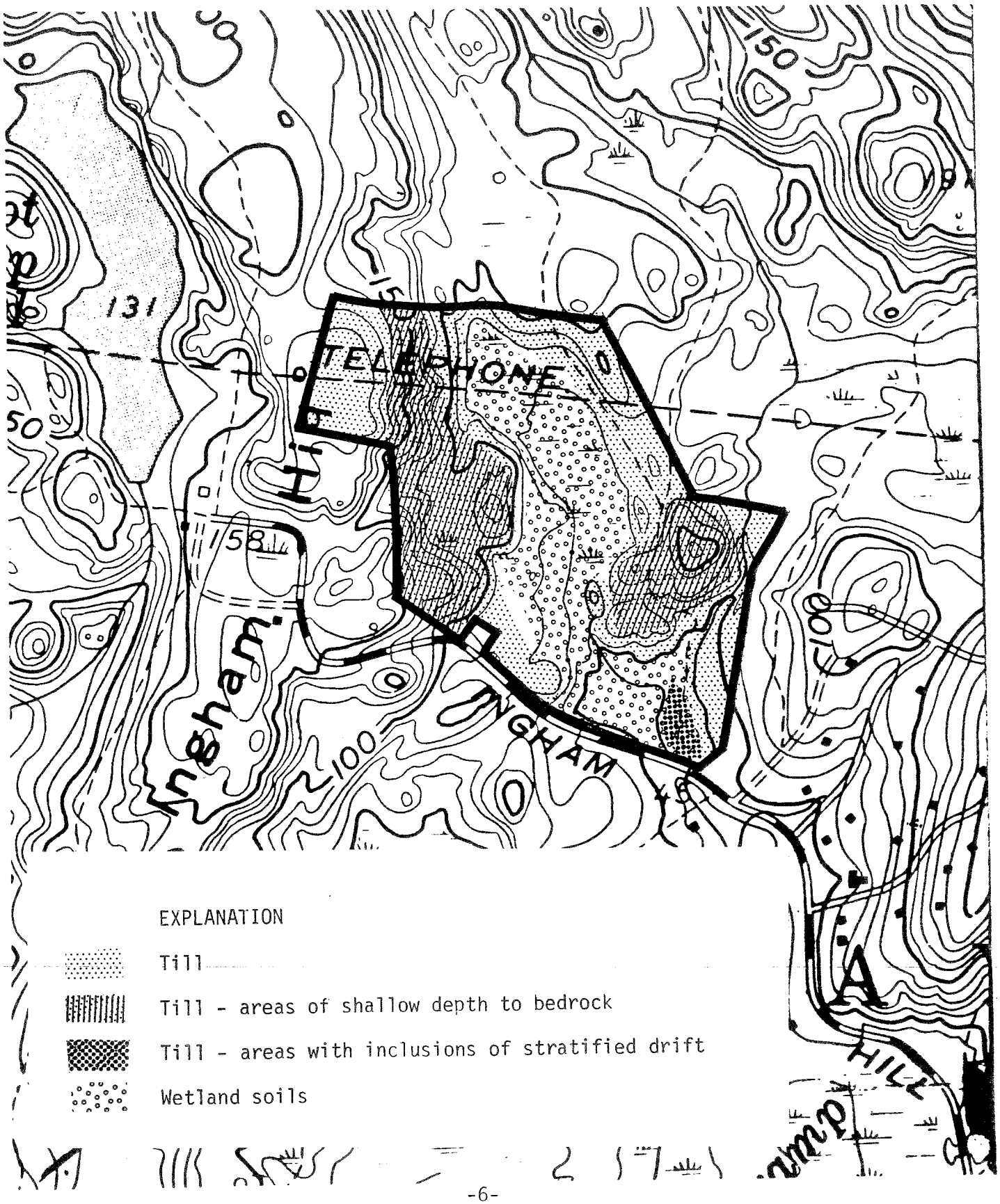
GEOLOGY

The property lies within the Essex topographic quadrangle. Bedrock and surficial geologic maps of the quadrangle have been published by the Connecticut Geological and Natural History Survey (respectively, Map QR-15 by Lawrence Lundgren, Jr., and QR-31 by Richard Foster Flint).

Bedrock outcrops observed on the site were located primarily in the western portions and on bedrock knobs in the eastern portions (near Lots 16, 17, 19, and 22). Three rock types are found on the site; they include: (1) two members of the Brimfield formation, and (2) a member of the Middletown formation.

The dominant bedrock type within the property is a member of the Brimfield formation. This unit is described as a coarse-grained, biotite-orthoclase-sillimanite-garnet schist. The term "schist" relates to the textural and

Surficial Geology



structural aspects of rocks in which platy, flaky and elogate minerals have become aligned into thin sheets or bands. As a result of the alignment, the rock is commonly slabby in appearance and parts relatively easily along surfaces of mineral alignment. It underlies or outcrops mostly in the central and eastern portions of the property. The western sections of the property are also underlain by rocks of the Brimfield formation. This unit includes a garnetiferous (garnet-rich) quartz-feldspar-biotite gneiss which is interbedded with thin beds of quartzite (rocks consisting wholly of quartz sand which is cemented with the mineral quartz), amphibolite (rocks consisting mainly of amphibolite and plagioclase minerals), and schist. A gneiss is a crystalline metamorphic rock (rocks changed by great heat and pressure within the earth's crust) in which very thin bands of elongate minerals alternate with bands of minerals having a rounder or blockier shape. As a result, the rock commonly has a banded appearance.

The final rock type, which outcrops or underlies the site in the eastern and the west central portions is an amphibolite (member of the Middletown formation) rock. The term "amphibole" refers to a rock which consists mainly of amphibolite minerals and plagioclase. Quartz is absent, or only present in small amounts. The most abundant mineral found in amphibolite rocks is hornblende, a dark green to black mineral.

As shown on the Surficial Geology Map (QR-31), a relatively thin blanket of glacial till covers the site. Till consists of rock particles and fragments derived from local bedrock that was accumulated by a moving sheet of glacial ice and later re-deposited directly from the ice without subsequent re-working by glacial meltwater. Because of its mode of deposition, till contains everything from clay sized particles to boulders. It is generally sandy, stony and fairly loose in the upper few feet but becomes finer-grained (siltier) and compact at depth. Thicknesses of till range between zero where bedrock is exposed, to probably not much more than 10 feet at various points in between outcrops.

According to mapped information, there are no stratified drift deposits (sorted sediments deposited by glacial meltwater) present on the site. However, based on deep test hole information supplied by the project engineer, as well as visual inspection of old test pits in the southern parts of the site, it appears there may be some accumulations of stratified drift (water-worked sands and gravels) interspersed throughout the area east of the proposed detention pond. Thicknesses are probably not greater than ten feet.

Overlying till, bedrock and/or stratified drift in the central portions of the site primarily along watercourses or in topographic low depressions are swamp sediments. These sediments, which are delineated by the symbol Aa (Adrian muck) and Lg (Ridgebury, Leicester, and Whitman soils) consist of silt, sand, and clay mixed with organic materials in poorly drained areas. Areas delineated by Aa soils are wet through most of the year and are predominantly made up of organic materials while the Lg soils are typically seasonally wet and are more mineralized.

In terms of the proposed residential subdivision, the major geological limitations found on the site include: (1) the moderate slopes in the eastern parts (on portions of Lots 15-19 and Lot 22) and moderate to steep slopes in the western part (portion of Lots 5-10); (2) the presence of till-based soils, which have a tendency to be stony, seasonally wet and/or have slow percolation rates;

(3) areas where bedrock is at or near ground surface primarily on Lots 6, 7, 14, 15, 16, and 22; and (4) the presence of wetlands which will limit the usefulness of some lots. These limitations will weigh heavily on the ability to provide adequate subsurface sewage disposal systems. However, there is a possibility that proper engineering can offer an effective solution to these limitations in some cases, but the design of the engineered system must be carefully evaluated and the installation process must be closely monitored.

According to the site plan (progress print), a portion of the access road, which will serve the western half of the site, will pass through an area where bedrock is at or near ground surface. This area is delineated by the symbol (HpE) on the soils map. As a result, there is a chance that blasting may be required. Also, blasting may be required in some areas in order to properly place house foundations.

Consideration should be given to installing building footing drains for homes in potentially wet areas, so that the possibility of flooded basements will be avoided.

The proposed plan calls for four wetland crossings totaling ±75 feet primarily in central portions of the property, as the soils are currently mapped. Additional crossing of wetland soils by driveways may also be required, depending on project designs. Although undesirable, wetland road crossings are feasible, provided they are properly engineered and constructed.

Provisions should be made for removing unstable material beneath the roadbed, backfilling with a permeable road base fill material, and installing culverts as necessary. Road construction through wetlands should preferably be done during the dry time of the year and should include provisions for effective erosion and sediment control. It is particularly important that culverts be properly sized and located so as not to alter the water levels in the wetland.

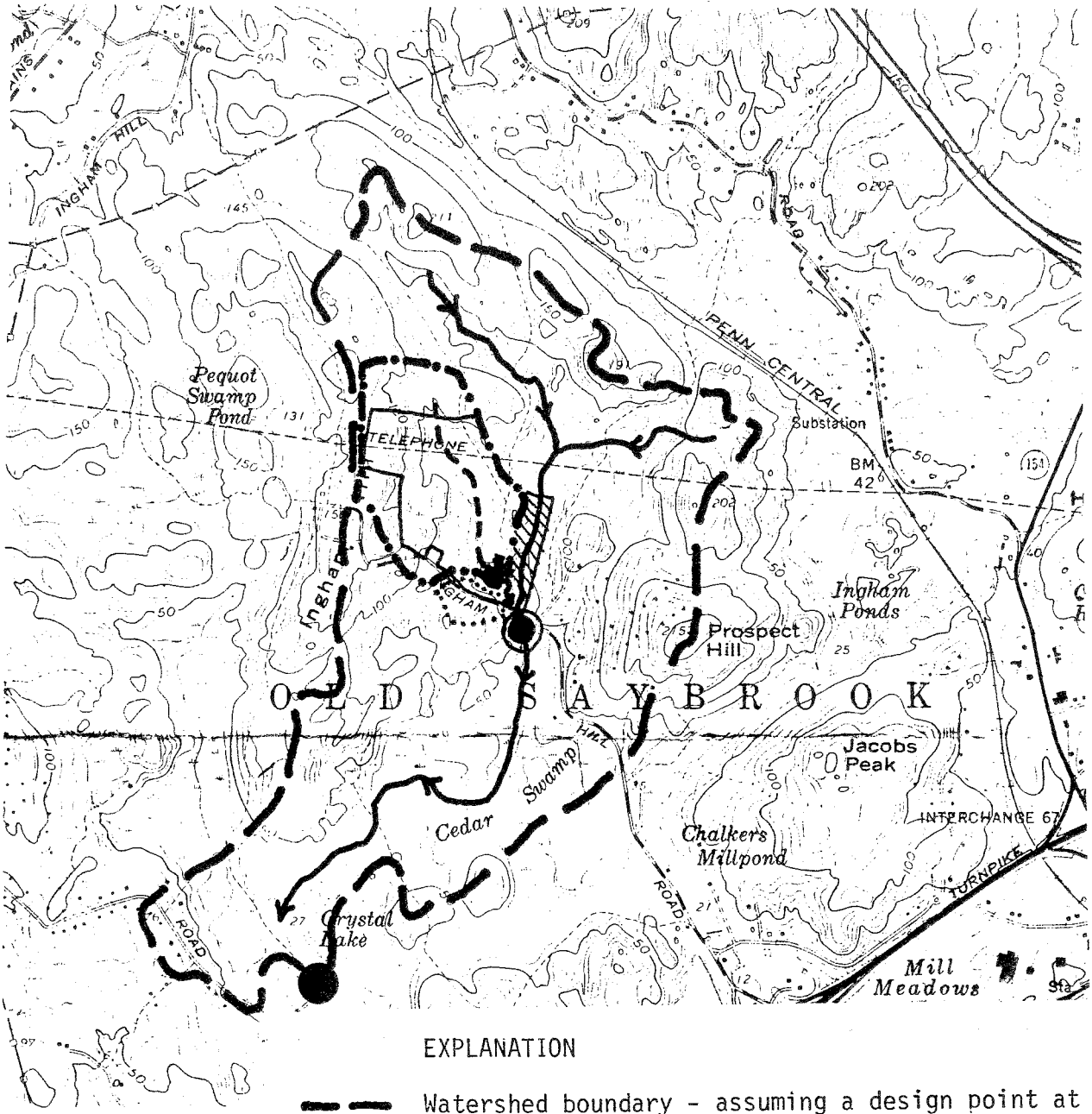
HYDROLOGY

The parcel is located within the watershed of an unnamed stream, which flows through Cedar Swamp, ultimately discharging into Crystal Pond, south of the site. Approximately 12 acres in the eastern part of the site drains to this watercourse. A tributary of this stream, with its accompanying wetland bisects the central portion of the property. Surface runoff from approximately 80 percent of the site in the central and western portions drains into this perennial watercourse. It merges with the unnamed stream which drains the above mentioned watershed at the southern tip of the property close to where the stream passes under Ingham Hill Road. Several intermittent drainage channels are visible throughout the parcel (see Watershed Boundary Map).

A stormwater detention basin is proposed in the southern portion of the site. The purpose of the detention basin will be to control post-development flows from the site so they don't exceed existing flows.

Drainage Areas

0 2000'
scale



EXPLANATION

- Watershed boundary - assuming a design point at the outlet of Crystal Pond
- Watercourse traversing the eastern part of the site
- Watercourse bisecting the central portion of the site
- Drainage Area 1
- Design Point
- Drainage Area 2
- Design Point
- Twelve acres draining to eastern watercourse

Development of the property as planned would cause increases in the flow rates of both watercourses on the site. These increases will arise mainly from the creation of impervious surfaces which will cover otherwise permeable soils. Because the ±12 acres in the eastern limits of the site represents only about 5 percent of the watershed at the point where both streams meet on the parcel (north of the culvert passing under Ingham Hill Road), it is likely that development in this area should have little or no effect on flow rates to the stream.

The applicant's engineer has provided the Team with preliminary runoff and flow calculations based on the Soil Conservation Service runoff curve number method of runoff determination. This method involves an analysis of the drainage areas of the watercourses on the site, including such factors as size, slopes, land use, and soil types. It is an accepted procedure for estimating peak flood flows of small watersheds. The Team has reviewed these preliminary calculations and generally concur with them. It should be pointed out that the project engineer did not address runoff calculations for the ±12 acres in the eastern portions of the site.

For the purpose of the study, two drainage areas of concern along with their respective design points (points of discharge) are shown in the Watershed/ Boundary Map. Drainage area I covers an area of ±85 acres, while drainage area II covers an area of ±14 acres.

It is estimated development in drainage area I would increase the curve number of the property by 4 (from 63 to 67). Under these conditions, runoff depth for a 25-year storm event would increase from 1.51" to 1.81", an increase of about 20 percent. For drainage area II, it is estimated development on the property will increase the curve number by 8 (from 60 to 68). Under these conditions, runoff depth for a 25-year storm would increase from 1.30" to 1.88", an increase of about 45 percent. These increases are significant and underscore the importance of judicious stormwater management on the site.

Prior to subdivision approval, it is recommended the applicant be required to submit detailed hydrological information on pre- and post-development runoff volumes and peak flows from the site for review by appropriate town officials, i.e., town engineers, Public Works Director, etc. Estimates should be provided for a 10-, 25-, 50-, and 100-year design storm. As mentioned earlier, the project engineer is proposing a detention basin in the southern portion of the site. This basin, which will be designed to accommodate runoff from a 50-year storm may also serve a sediment retention function. If sediment does accumulate in the pond, material should be removed periodically. Proper maintenance of the retention pond will assure that the runoff storage capacity of the pond is not diminished. Detailed design specifications for all stormwater control facilities (including detention basin) should be submitted for review.

SOILS

The soil survey map shown on the subdivision plan dated May 2, 1984, revised May 14, 1984, and the narrative which follows is an update of the data contained in the Soil Survey of Middlesex County, Connecticut. The symbols on the map identify map units. Each map unit has a unique composition of soils. Areas with the same symbol have the same composition.

WETLAND SOILS

The wetlands occur on nearly level surfaces of 0 to 3 percent slope. They provide natural flood protection to downstream areas. During large storms floodwaters are detained in the wetlands and are slowly metered out. Extensive disturbance of the wetlands may result in downstream flooding.

Map Units Aa and Lg

The soils in these map units are very deep and poorly to very poorly drained. They have water tables at or near the surface for most of the year.

Map unit Aa is dominantly Adrian soils. These soils have organic surface layers 16 to 50 inches thick overlying sands and gravels to a depth of 60 inches or ore.

Map unit Lg is dominantly Leicester soils. These soils are loamy throughout. Varying amounts of gravel may also be present.

These map units are poorly suited to homesite development. Septic systems will require extensive engineering and fill. Road crossings require careful planning.

NON-WETLAND AREAS

Map Unit CdC

This map unit is composed of Canton and Charlton soils on 3 to 15 percent slopes. These soils are very deep and well drained. The Canton soils have fine sandy loam textures 18 to 36 inches thick overlying sandy and gravelly materials to a depth of 60 inches or more. The Charlton soils have fine sandy loam or gravelly fine sandy loam textures to a depth of 60 inches or more. These two soils occur in an intermingled pattern on the ground and cannot be separated on the map.

There are many soils within this map unit that are an intergrade between Canton and Charlton. That is, sands and gravels may be found between the depths of 40 and 60 inches.

Coarse soil material is a poor filter for septic system effluent. If a leaching field is built in sands and gravels, groundwater contamination may occur. Sands and gravels become an increasing concern the closer they occur to the soil surface. Soils with sands and gravels within 40 inches of the surface are considered poorly suited for septic tank absorption fields.

Based on this criteria, Charlton soils have slight limitations for septic tank absorption fields and Canton soils are rated severe.

The steeper slopes and surface stones within this map unit may increase the costs of homesite development.

Map Unit CrC

This map unit is composed primarily of two very different kinds of soils that are so intermingled on the ground that they cannot be separated on the map. Both soils are on 3 to 15 percent slopes and have stones and boulders covering up to 3 percent of the surface. One soil is named Charlton. It is very deep and well drained. It is dominantly fine sandy loam or gravelly fine sandy loam throughout its depth though sands and gravels may be found below 40 inches.

The other major soil in this map unit is Hollis. Hollis soils are shallow and somewhat excessively drained. Typically they are fine sandy loam and are 10 to 20 inches deep over hard bedrock. Hollis is associated with rock outcrops on the slope breaks. Together the Hollis and rock outcrops comprise about 20 percent of this map unit.

The Charlton soils have slight limitations for septic tank absorption fields. However, as described above in map unit CdC the suitability of these soils for septic tank absorption fields decreases where the underlying sands and gravel occur closer to the surface. Stones and boulders which may be found below the soil surface and slope may also increase the costs of homesite development.

The Hollis soils in this map unit are poorly suited for septic tank absorption fields because of depth to bedrock.

Some areas within this map unit have slopes of 15 to 25 percent. In these locations the costs of homesite development will be significantly higher.

Map Unit HpE

This map unit consists dominantly of Hollis and Charlton soils on 15 to 40 percent slopes. These soils are so intermingled on the ground that they cannot be separated on the map. The description of these soils is outlined above in the CrC narrative.

The map unit is poorly suited for septic tank absorption fields because of steep slopes, and the shallow depth to bedrock of the Hollis soils.

Map Unit HrC

This map unit is composed dominantly of Hollis soils and bedrock exposures on 3 to 15 percent slopes. The Hollis soils are shallow and somewhat excessively drained. Typically they are fine sandy loam and are 10 to 20 inches deep over hard bedrock.

This map unit has severe limitations for septic tank absorption fields because of depth to bedrock. Systems planned within areas of HrC will require extensive fill.

A sediment and erosion control plan should be prepared and implemented during construction. Guidelines for plan preparation and specifications for both structural and vegetative practices are contained in Connecticut's Erosion and Sediment Control Handbook published by the Soil Conservation Service. The handbook is available at the Middlesex County Soil & Water Conservation District office in Haddam.

Critical areas on the site which should receive special attention with respect to sediment and erosion control include stream crossings, cut and fill slopes, and steep sections of roadways. During pond construction, sediment should be contained and prevented from entering downstream areas. A procedure for proper disposal and stabilization of excavated materials from the pond site should also be included in the sediment and erosion control plan.

VEGETATION

The vegetation of the Coulter property is representative of the central hardwood zone that occurs in southern Connecticut. The woodland tract can be divided into five vegetation types. These include a mixed hardwood type, two oak ridge types, a hardwood swamp type, and an open area (telephone right-of-way).

VEGETATION TYPE DESCRIPTION

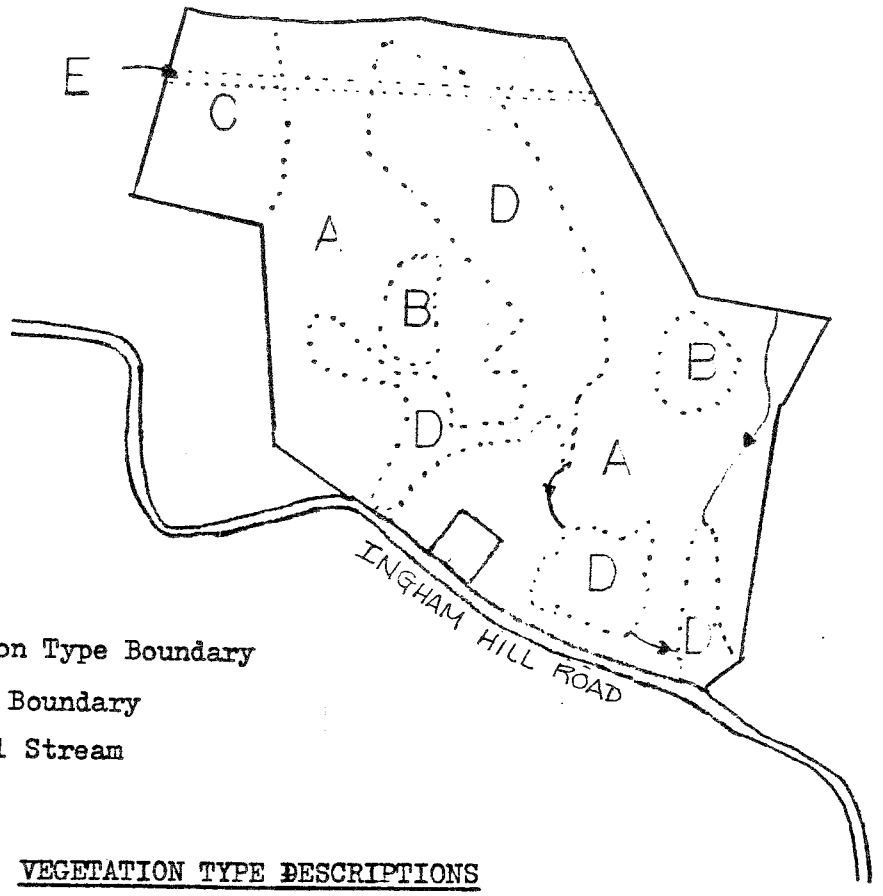
Type A (Mixed Hardwood) This 36 acre fully stocked stand is composed of medium quality sawtimber (trees 11.1" dbh [diameter breast height] and larger) and poles (trees 6.1" to 11" dbh). Black oak, American beech, red oak, white oak, red maple, pignut hickory, black birch, tulip poplar, yellow birch, black cherry, sassafras, and American chestnut are the tree species present. The understory is composed of mountain laurel, flowering dogwood, eastern hop hornbeam, highbush blueberry, spice bush and barberry. The ground cover includes smooth solomon seal, Canada mayflower, partridgeberry, Jack-in-the-pulpit, club moss and striped pipsissewa. The stand is located on an average growing site for growing quality hardwoods. Most of the understory trees in type A are mature (age 80 to 120). The overstory trees in the southwestern and southeastern corners of the vegetation type are younger than the rest of the stand (age 60-80).

Type B (Oak ridge) This is a poor quality pole stand (3 acre) that is fully stocked. Black oak, white oak and black birch are the tree species present. The understory vegetation includes mountain laurel, lowbush blueberry and Canada mayflower. The stand is approximately 80 to 100 years old and should be considered mature. The shallow soils make this area a poor hardwood growing site.

Type C (Oak ridge) This understocked stand (6 acres) consists of poor quality poles and sawtimber sized trees. Scarlet oak, black oak, white oak, pignut hickory, red cedar, black birch, sassafras, hard maple, and American beech comprise the tree species. The lower vegetation includes Canada mayflower, lowbush blueberry, huckleberry, hop hornbeam, partridgeberry and greenbriars. This vegetation type consists of two distinct age groups. The larger poles and sawtimber sized trees are approximately 120 years old and mature while most of the smaller pole sized trees (6" and 8" dbh) are around 40 to 60 years in age. The soils in this area are shallow to bedrock. The shallow soils are the primary reason that this area is a poor growing site.

Type D (Hardwood swamp) This 15 acre poor quality pole stand is composed of red maple, black gum, white ash, yellow birch, green ash, and swamp white oak. The lesser vegetation includes spicebush, sweet pepperbush, skunk cabbage, false hellabore, club moss, and marsh marigold.

Vegetation



Road

Vegetation Type Boundary

Property Boundary

Perennial Stream

VEGETATION TYPE DESCRIPTIONS

Type A	Mixed hardwoods, fully stocked, pole and sawtimber size	36 acres
Type B	Oak ridge, fully stocked, pole size	3 acres
Type C	Oak ridge, understocked, poles and sawtimber	6 acres
Type D	Hardwood swamp, fully stocked, poles	15 acres
Type E	Open Area (telephone right of way)	2 acres

Type E (Open area/telephone right-of-way) (2 acres).

Aesthetic Considerations

This forested parcel of land offers many of the rural amenities that prospective homeowners are interested in. The large size of the proposed houselots will allow the possibility of leaving much of the forest intact. A continuous forest would offer good screening effect and privacy between houselots. Also, a forested parcel gives the appearance of being larger than an open lot of the same size.

Large, healthy trees are usually considered aesthetically pleasing. The retention of these trees could add a considerable amount of aesthetic and shade value to the residential area. Black oak, red oak, white oak, American beech, and tulip poplar would be the best species to retain since they are the dominant trees in the forest. Vegetation Type A contains the healthiest tree species. This area has the potential to grow the largest trees. A good portion of the dominant trees in Type A should be able to grow 20" to 26" in diameter.

The streams are an excellent asset to the aesthetic quality of the property. Much of the area surrounding the stream should be left in its forested state.

Construction activities should be planned and conducted to minimize disturbances around the trees and in sections of the forest that are to be saved. Road building, filling, excavation and soil compaction (from heavy machine uses) may adversely affect the moisture and aeration balance within the soil (a considerable amount of cut and fill activity may be needed to put driveways that traverse the steep slope in the northwestern corner of the property). This could lead to the decline in tree health and vigor and may eventually lead to the death of the tree within three to five years. Physical damage to the root system and trunk of the tree by machinery may also result in the decline of individual trees.

The removal of a large percent of the trees may have an adverse effect on the remaining trees. The sudden shock of being left in the open may be too much for a tree grown in the forest all its life. White oak, in particular, has a high mortality rate once it suddenly experiences total exposure. Oak will sprout unsightly epicormic branches along its trunk when the trunk is exposed to direct sunlight. Trees in the open are also more susceptible to damage from ice storms that may cause considerable crown breakage. Windthrow is also more prevalent in areas where a larger percent of the trees have been removed.

Most of this woodland tract is particularly susceptible to infestation by gypsy moth because of its large component of oak and location of a dry ridge. Favouring trees that the gypsy moth does not like to feed upon would make the area less susceptible to defoliation. Black birch, sugar maple, pignut hickory, red maple and tulip are some of these species that are not readily defoliated.

Flowering dogwood and mountain laurel are the major flowering shrubs. These species should be retained for their aesthetic value. Where these species are present, some of the overtopping trees should be removed to allow more sunlight to reach the understory. This will stimulate the flowering of these shrubs.

Limiting Conditions/Potential Hazards

The overall condition of the trees on this property is acceptable. There are only a few trees that have advanced decay or other signs of potential hazard. Some of the black birch is affected with nectria canker. The formation of cankers on the trunk of these trees structurally weakens the trees and makes them more susceptible to breakage. Some of the larger trees located in the western end of vegetation Type A have been partially uprooted by previous storms. Although these leaners appear to have been around a long time, they still represent a high risk tree. Besides the possibility of windthrows, their partially exposed roots make them more susceptible to drought.

Windthrow is a potential hazard in vegetation Type D. Tree root depth is restricted by saturated soils. Saturated soils are more pliable. Shallow root systems and saturated soils make wetlands very susceptible to windthrow. Heavy harvesting of trees that produce openings in the forest canopy should be avoided in areas with saturated soils since trees rely on each other for support.

Construction activities within wetlands which impede the natural drainage and raise water tables may have adverse effects on the forest vegetation. Trees will decline in health and may eventually die if the water table is raised substantially. Adequately sized and placed culverts should be installed where the proposed road and driveways cross any drainage.

Management Considerations

The maintenance of healthy and vigorous trees should be a major concern in the development of the tract. Unhealthy trees are more susceptible to insects and problems.

All the vegetation types are understocked with healthy trees. The shallow droughty soils in vegetation Type B and C make for a poor growing site for hardwoods. These soils are not able to meet the water and nutrient requirements of the hardwoods, and therefore the trees are under stress. Conifers, which have lower requirements than hardwoods, would do better than hardwoods in vegetation Types B and C. Planting conifers at a 10' spacing, after the hardwoods are harvested, would produce a healthy conifer stand. Larch or white pine would be the most suitable conifers to plant. Underplanting white pine on a 20' spacing would help fill out the understocked stand in vegetation Type C and get replacements started for the mature trees that will probably start to die in the near future.

None of the vegetation types are experiencing any excessive crowding and do not need any treatment at this time. Management in the near future should include fuelwood thinning in vegetation Types A and B. The thinning should concentrate on removing most of the understory trees and up to a third of the poorest overstory trees. Ideally, forty of the healthiest overstory trees per acre should be retained.

WILDLIFE CONSIDERATIONS

Wetlands cover a major portion of the proposed project site. Wetlands are absolutely essential areas for many species of wildlife and important to all, because they provide the habitat requirements needed for survival. Not only are they important to wildlife, they are important to man also. They act as water storage and absorption areas that help prevent flooding. There is usually severe inherent limitations in developing wetlands due to poorly drained unstable soil types.

Wetland habitat provides a rich variety of food, cover, nesting and brood rearing sites for a great number of wildlife species. They provide breeding and nesting sites for waterfowl. More than 50 species of game and non-game species including beaver, bobcat, fox, mink, muskrat, opposum, white-tailed deer, snowshoe hare, woodcock, great blue herons, geese, ducks, songbirds and warblers use wetland habitat. Because of previous development, there are fewer wetland areas available for use by wildlife. Developing any small area by building on it will leave the majority of the area unavailable for wildlife to use.

Development will decrease the amount of habitat simply because the land will be occupied by physical buildings. The quality of the habitat will be decreased because an undeveloped area of land will be broken up with buildings and human activity. Some species which require larger undeveloped areas will probably be forced out or will reduce their use of the area. They may be able to move into adjacent undeveloped areas if there is suitable habitat available and the competition with other species already occupying the area is not too great. Other species which are more adaptable to man's presence will probably remain. Some new species may even be attracted to the area.

If carried out, the following wildlife recommendations can help lessen the impact to some species using the area. Some animals will leave the area, but others may find it even more attractive after development.

Design of Development/Wetlands

The impact on wildlife of the area can be lessened to some degree if some thought is given to the design of the development. Housing developments can be designed in two basic ways. Houses can be built on larger house lots or they can be built on small lots or in clusters, leaving open space areas. Both designs leave more open space for wildlife as opposed to having small lots and developing the entire acreage.

As proposed, two 5-acre open space areas are to remain. Probably none of the wetland areas should be developed due to the severe limitations caused by soil capabilities and the regulations governing their development. The wetland should be left as the open space areas if possible.

A buffer area of uncut vegetation should be left along the entire length of the stream. This will provide food, cover and nesting sites for many species. Because the brook will remain shaded, water temperatures will not rise, making the brook uninhabitable for some species.

Clearing

When the initial clearing for building is done, try to leave as many trees and shrubs as possible, especially those useful to wildlife. Some useful species include:

white oak (Quercus alba)
red oak (Quercus rubra)
black cherry (Prunus serotina)
quaking aspen (Populus tremuloides)
red-osier dogwood (Cornus stolonifera)
apple (Malus spp.)

Landscaping

On a small acreage with many buildings, landscaping can do a great deal to provide habitat and make an area attractive to wildlife. First, leave as many trees as possible around the buildings. This will not only benefit wildlife by providing food, cover and nesting sites (especially for songbirds), but will also be more aesthetically pleasing for the residents of the development.

Leave as many snag trees (standing dead trees) and den trees (trees with holes) as possible. These trees are used by insect eating birds and cavity nesting birds and mammals.

Plant trees and shrubs which are useful to wildlife and landscaping such as:

Japanese barberry (Berberis vulgaris)
flowering dogwood (Cornus florida)
honeysuckle (Lonicera spp.)
juniper (Juniperus spp.)
bayberry (Myrica pensylvanica)
maple-leaved virburnum (Viburnum acerifolium)
red-osier dogwood (Cornus stolonifera)
alternate-leaf dogwood (Cornus alternifolia)
American holly (Ilex opaca)
American mountain ash (Sorbus americana)
autumn-olive (Elaegnus umbellata)
winterberry (Ilex verticillata)
American cranberrybush (Viburnum trilobum)
red maple (Acer rubrum)
chockcherry (Prunus virginiana)

A variety of trees and shrubs should be used. Most species of wildlife need to have cover when they move from place to place. By leaving corridors of vegetation this will allow wildlife to utilize the area and also have access to adjacent areas. Large expanses of lawn with no trees or shrubs present should be discouraged. These factors will allow wildlife to better utilize the area and thus make it more attractive to wildlife.

WATER SUPPLY

Water supply for the proposed subdivision will be provided by individual on-site wells. It would be expected that such wells would be of the drilled type which, in general, should allow for more flexibility in location and also afford greater protection for water quality. Each well should be located on a relatively high portion of a lot and be properly separated from any area containing a subsurface sewage disposal system or other possible sources of pollution, such as buried fuel oil tanks, in-ground disposal facilities from water softening equipment or filter back wash water from swimming pools.

An assessment of presently installed bedrock based wells has been conducted for the lower Connecticut River Basin, which includes the subject site (Source: Connecticut Resources Bulletin No. 10, Lower Connecticut River Basin). This assessment allows one to predict the chances for any new well to achieve certain minimum yields. According to Connecticut Water Resources Bulletin No. 10, 314 bedrock based wells were analyzed in the basin area. Based on this study, results indicate that 80 percent of the wells tapping crystalline rock produced 3 gallons per minute or more; 50 percent yielded just over 6 gallons per minute and only 10 percent yielded 18 gallons per minute or more. A well yielding 3 gpm should adequately meet the needs of most domestic households.

The water quality of the groundwater may be expected to be good. However, there is a chance that water produced from wells tapping the underlying bedrock may be mineralized with elevated levels of iron and manganese. Elevated levels of iron in water is objectionable because it imparts a brownish color to laundered goods and may affect the taste of the water or beverages such as tea and coffee. For the most part, elevated manganese levels are objectionable for the same reasons as iron. There are several types of methods or treatment filters used to eliminate or remove iron and/or manganese levels.

WASTE DISPOSAL

The Town of Old Saybrook does not have a municipal sewerage system and at the present time is part of a larger inter-municipal sewer avoidance area. Therefore, sewage disposal for the proposed development is to attained by means of private on-site subsurface sewage disposal facilities.

The site, based on visual observations, Soil Conservation Service mapping information and review of the engineer's deep test hole data, has several severe limitations for sewage disposal which would appear to present considerable difficulty for some of the proposed lots. Among the chief limitations are wetland areas and areas having shallow depth of soils to bedrock and steep slopes. It is noted by the deep test hole data that most of the underlying deeper soils consist of sand and gravel. In some cases relatively shallow (4') groundwater was encountered.

While these are relatively large size lots, there is an apparent need for having large building sites to compensate for adverse or restrictive factors which would limit possible usable areas where a house and necessary facilities might be located.

The Public Health Code requires the bottom area of a sewage disposal system to be at least 4 feet above bedrock. The depth to bedrock can be quite variable over a relatively short distance. Therefore, it is most important to know that there will be an area of sufficient size to accommodate the necessary size leaching system.

Where there is less than 6 to 7 feet of existing soil over ledge, the placement of suitable fill material also becomes necessary. The depth of soil overlying bedrock downslope from a leaching system must also be considered in order to prevent the possible breakout of effluent which has not received adequate treatment. Proper placement and construction of wells in areas of shallow bedrock in order to prevent possible well pollution is also of utmost importance.

Areas having seasonal wetness, primarily along intermittent drainage channels or defined watercourse and several of the proposed lots (18, 20 and possible others) could affect the operation of leaching systems unless adequately assessed and satisfactory elevations of the sewage disposal systems above the maximum groundwater level are maintained.

In areas where the ground slope is quite steep (exceeding 15-20 percent), it becomes physically more difficult for sewage installation equipment to operate and the need for erosion and sedimentation control more pronounced.

Where soil conditions indicate sewage disposal systems are to be located in areas of special concern, detailed site testing and engineered design plans should be prepared for review and approval purposes. In some cases, test holes made in certain areas of proposed lots of the subdivision indicate unsuitable soil conditions for sewage disposal (example: less than 4 feet of suitable soil overlying bedrock). No approval for sewage disposal or permits for such areas can be issued until it can be shown that improvements have been made and satisfactory conditions are in existence. In general, where there is less than 2-4 feet of naturally occurring soil over bedrock, the area or lot should not be approved unless there is a tested, suitable and sufficient location on a proposed lot.

PLANNING CONCERNS

Plans of Development

Both the town and regional plans of development point to the environmental sensitivity of this area for development. The Regional Plan of Development categorizes this area as a Natural Resource Area which is ecologically sensitive. This is indicated by the wetlands and steep slopes that are found on the site. The Old Saybrook Plan of Development, which is dated November 1970, recommends this area for open space. The current zoning regulations for Old Saybrook respond to the environmental sensitivity of this site by requiring minimum lot sizes of 60,000 square feet. This proposed subdivision meets the zoning requirements in this respect with many of the lots being substantially larger than the 60,000 square foot minimum. The environmental difficulties of this site, as indicated by the town and regional plans of development, point out the need for a careful review of the environmental impacts of this proposal.

Access

The only access to this site is provided by Ingham Hill Road. Using a trip generation rate of 10 trips per day for a single family residence* for this 23 lot subdivision would result in traffic generation of 230 trips per day. There are presently about 75 houses along Ingham Hill Road between the Connecticut Turnpike and the end of the road at Pequot Swamp Pond. The present traffic volume on this road can, therefore, be estimated to be about 750 vehicles per day. Using a peak hour traffic generation rate of one trip per single family residence* would result in a peak hour traffic flow of 75 vehicles. The 23 vehicle trips that

*"Trip Generation," 3rd Edition, Institute of Transportation Engineers, 1983.

this subdivision can be expected to add to peak hour traffic should not cause a major problem for this road. The town should, however, be aware that as development continues in this area there will soon be a problem with the traffic capacity of this road. The 18 foot width of Ingham Hill Road, as shown on the subdivision plan, causes a very limited traffic capacity for this road.

The fact that Ingham Hill Road only has one outlet creates a poor circulation pattern in this area and poses potential problems with emergency vehicle access should the road be temporarily cut off for some reason. The town Plan of Development poses a connector road to both Schoolhouse Road and Bokum Road. Ingham Hill Road would be bisected by this crossroad at Pheasant Hill Lane. The 1984 Regional Transportation Plan also shows this proposed road with the additional extension across Bokum Road to Route 154. The Regional Transportation Plan also calls for the extension of Ingham Hill Road to Route 153. This proposed subdivision would not prevent either of these road proposals so that, in that way, it is compatible with the circulation plans for this area. The town should be careful to insure that any future development in this area facilitates the extension of Ingham Hill Road so that it connects to other roads in this area.

The siting of the access road is made difficult because of the wetlands and steep slopes that are found on this site. The access road in the area of Lots 3 and 4 has to deal with especially steep slopes. Driveways on several of the lots will also have to deal with steep slopes. This is true for the driveways for Lots 6, 7 and 16. The careful use of erosion and sedimentation controls is made necessary by the erosion potential of these steep slopes and the possible impact on the nearby wetlands.

Storm Drainage

The access road within this site and, probably, many of the driveways will have to cross wetlands. The culverts used for these wetland crossings should be sized and constructed so that the natural drainage system is not impaired.

This site is located in the upper part of the Oyster River Drainage Basin. Runoff from this site will affect the lower end of the drainage basin. There is the potential for flooding problems as additional parts of the drainage basin are developed. With all of the wetlands on this site it would seem that there will be adequate detention of runoff from this development. If this is not supported by runoff calculations, there should be a close analysis of the downstream impacts of stormwater runoff.

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 activitis. 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 (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.