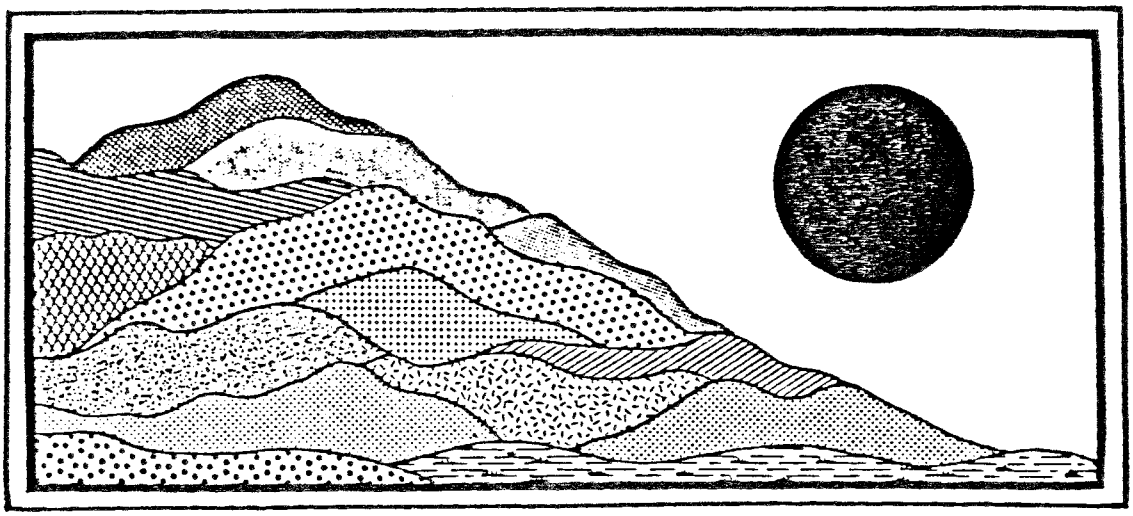
Toby Hill Estates

Westbrook, Connecticut

January 1988



ENVIRONMENTAL REVIEW TEAM REPORT

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Toby Hill Estates

Westbrook, Connecticut

Review Date: NOVEMBER 19, 1987

Report Date: JANUARY 1988

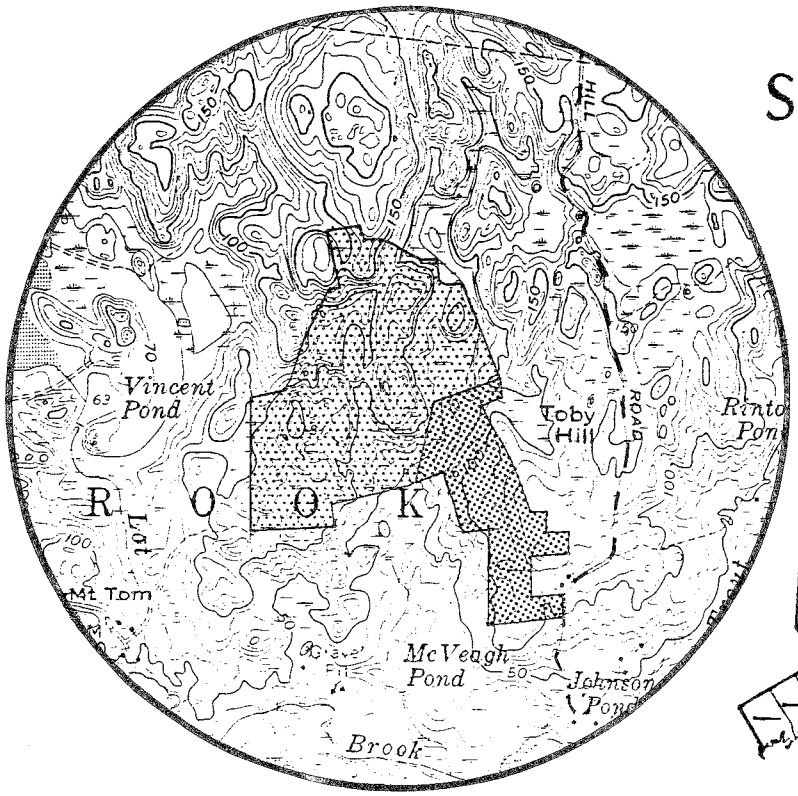
RC&D

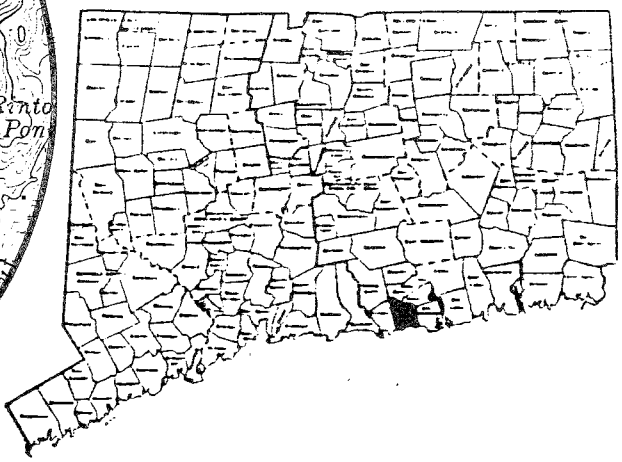
ENVIRONMENTAL REVIEW TEAM
PO BOX 198
BROOKLYN, CONNECTICUT 06234

Site Location

TOBY HILL ESTATES II-IV

WESTBROOK, CONNECTICUT





EASTERN CONNECTICUT

RESOURCE CONSERVATION

& DEVELOPMENT AREA

ENVIRONMENTAL REVIEW TEAM REPORT

ON

TOBY HILL ESTATES

WESTBROOK, CONNECTICUT

This report is an outgrowth of a request from the Westbrook First Selectwoman 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. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The ERT met and field checked the site on Thursday, November 19, 1987. Team members participating on this review included:

Don Capellaro	--Sanitarian - CT Department of Health
Tom Ladny	--Acting District Conservationist - U.S.D.A. Soil Conservation Service
Brian Murphy	--Fisheries Biologist - DEP, Eastern District
Richard Stoecker	--Regional Planner - CT River Estuary Planning Agency
Elaine Sych	--ERT Coordinator - Eastern CT RC&D Area
Bill Warzecha	--Geologist - DEP, Natural Resources Center

Prior to the review day, each team member received a summary of the proposed project, a list of the Town's concerns, a location map, a topographic map, a soils map and a map showing the location of the subdivision sections.

During the field review the team members were given preliminary plans and other information provided by the Town. The Team met with, and were accompanied by a representative of the developer, the engineer for the project, members of the Inland Wetland Commission, the Planning Commission, a representative from the Selectman's Office and a member of the press. Following the review, reports from each team member were submitted to the ERT Coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site designs or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project -- all final decisions and conclusions rest with the Town and landowner. 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. The results of this Team action are oriented toward the development of better environmental quality and the long-term economics of land use.

The Eastern Connecticut RC&D Executive Committee hopes you will find this report of value and assistance in making your decisions on this proposed subdivision.

If you require any additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P. O. Box 198
Brooklyn, CT 06234
(203) 774-1253

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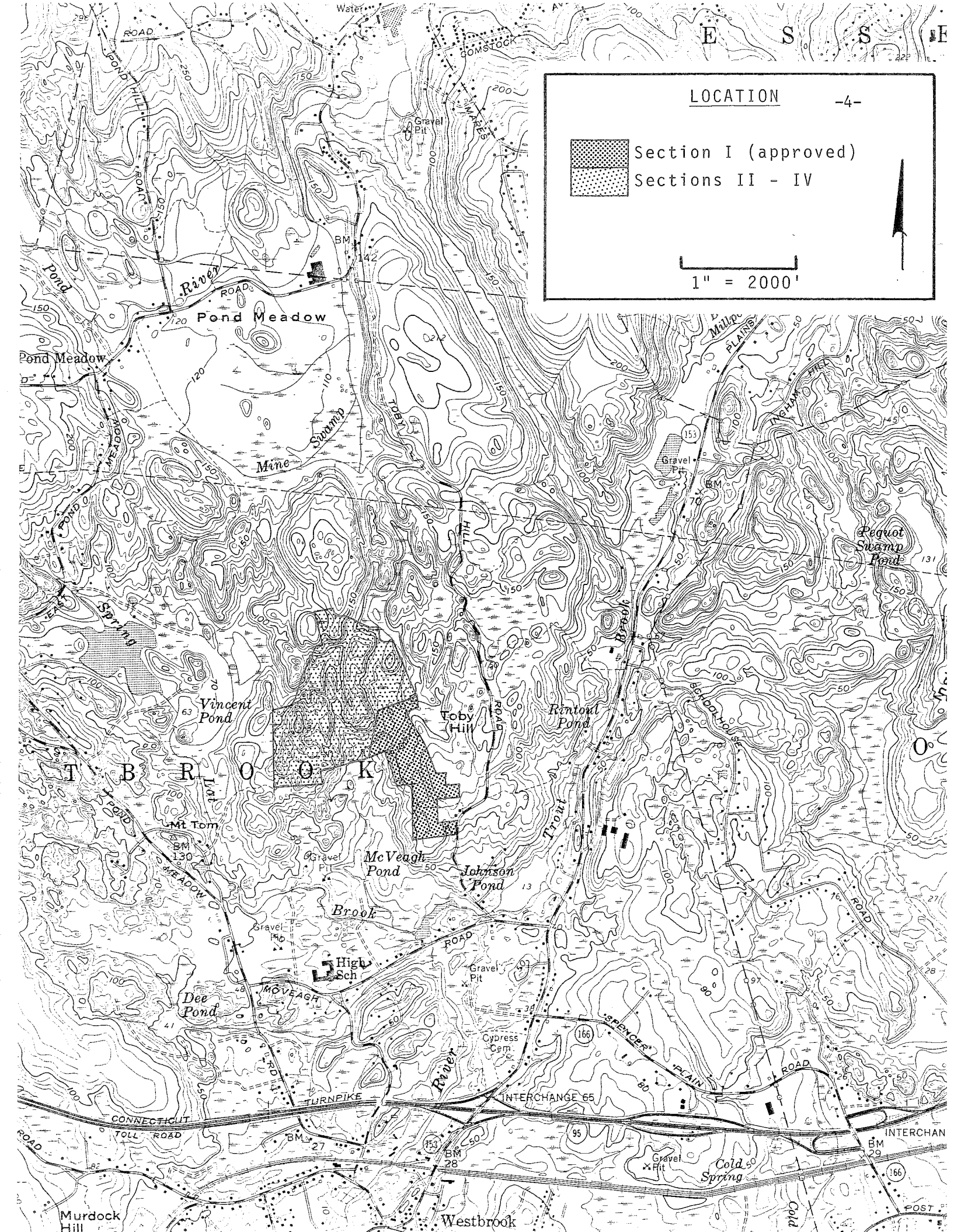

LOCATION
-4-
Section I (approved)
Sections II - IV
1" = 2000'
T B R Lot O O K
Pond Meadow
Pond Meadow
River
Pond
Swamp
Mine
Vincent Pond
Toby Hill
Rintoul Pond
Pequot Swamp Pond
Spring
Brook
Trout
McVeagh Pond
Johnson Pond
Dee Pond
Mt Tom
BM 130
High Sch
Gravel Pit
Cypress Cem
Cold Spring
Westbrook
Murdock Hill
INTERCHANGE 65
CONNECTICUT TOLL ROAD
TURNPIKE
SPENCER PLAIN ROAD
POST
ROAD
POND HILL ROAD
MEADOW ROAD
EAST
TOBY HILL ROAD
SCHOOLHOUSE
MILLER PLAIN
INGHAM HILL
COMSTOCK
MARSH
BM 142
BM 27
BM 28
BM 29

I. INTRODUCTION

The Eastern Connecticut Environmental Review Team had been asked by the Westbrook First Selectwoman to review the Toby Hill Estates Subdivision II--IV and to make general comments concerning potential development in adjacent areas. This report mainly pertains to an evaluationof Toby Hill Estates with mention of concerns about future development. At the time that future developments are submitted to the Town, the ERT can be requested to do a more in-depth study of each proposal.

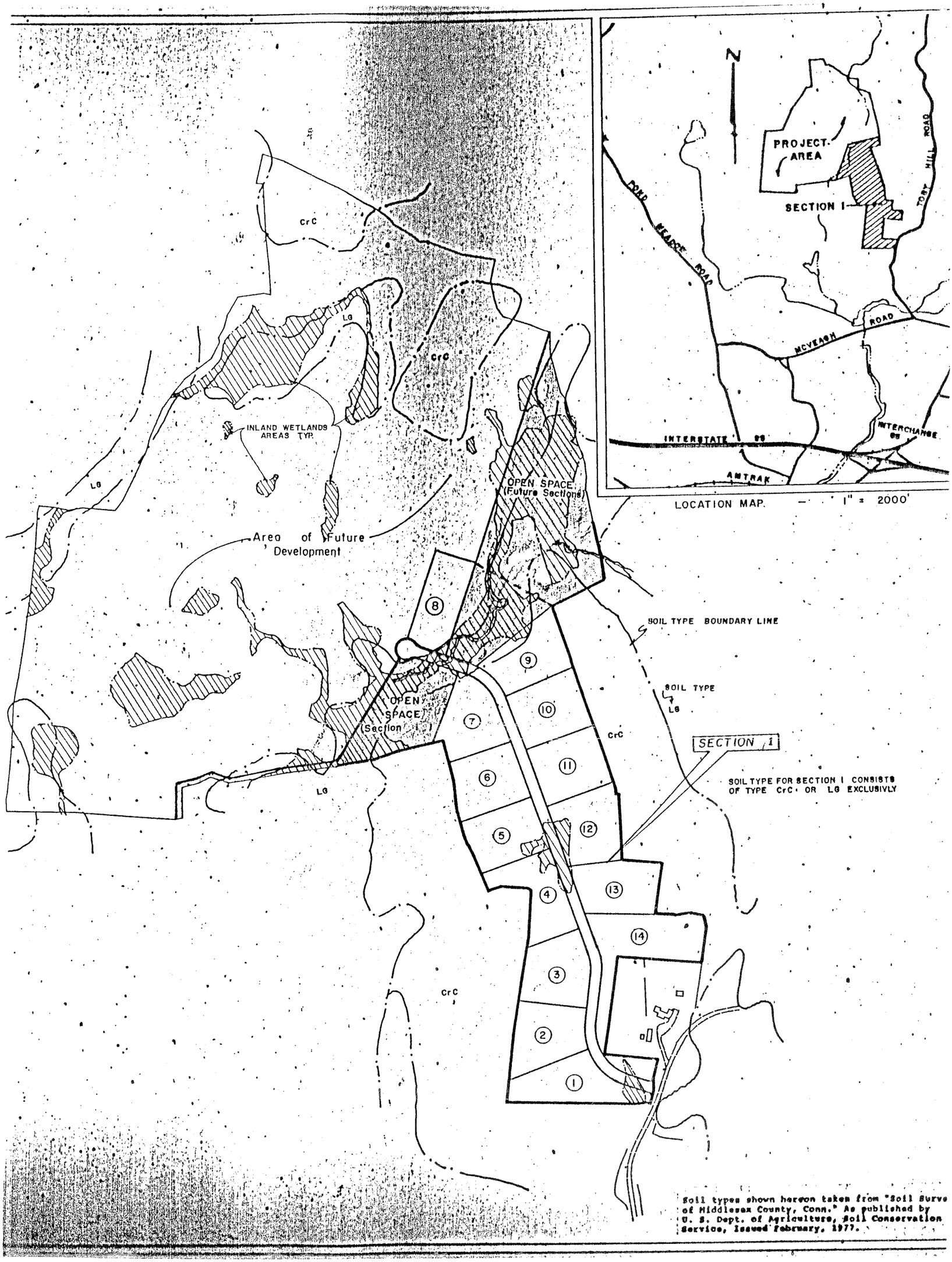
The main characteristics of the study parcel, which consists of ± 90 acres and which would extend from a cul-de-sac and roadway under construction which represents the end of Section I (14 lots), are the hills and ridges interspersed with intermittent drainageways. The eastern side contains a sizable wetland area and has a defined, perennial stream which flows into McVeagh Pond located south of the property. Vincent Pond lies off the west side of the parcel. There are also a number of other indicated wetland areas scattered about the land. To the north of the property is a very large wetland area, Mine Swamp. The western portion drains toward Spring Lot Brook. There are also telephone and light and power transmission lines which cross near the northern top of the property. Soils throughout the parcel are very rocky and in most cases would apparently have a shallow depth to underlying bedrock.

Town zoning requires minimun size lots of two (2) acres. At the present time the developer's consulting engineer, Radcliffe Engineering Company, has not prepared subdivision plans for Sections II to IV.

Water supply as well as sewage disposal is to be provided by means of private on-site facilities.

II. TOPOGRAPHY AND SETTING

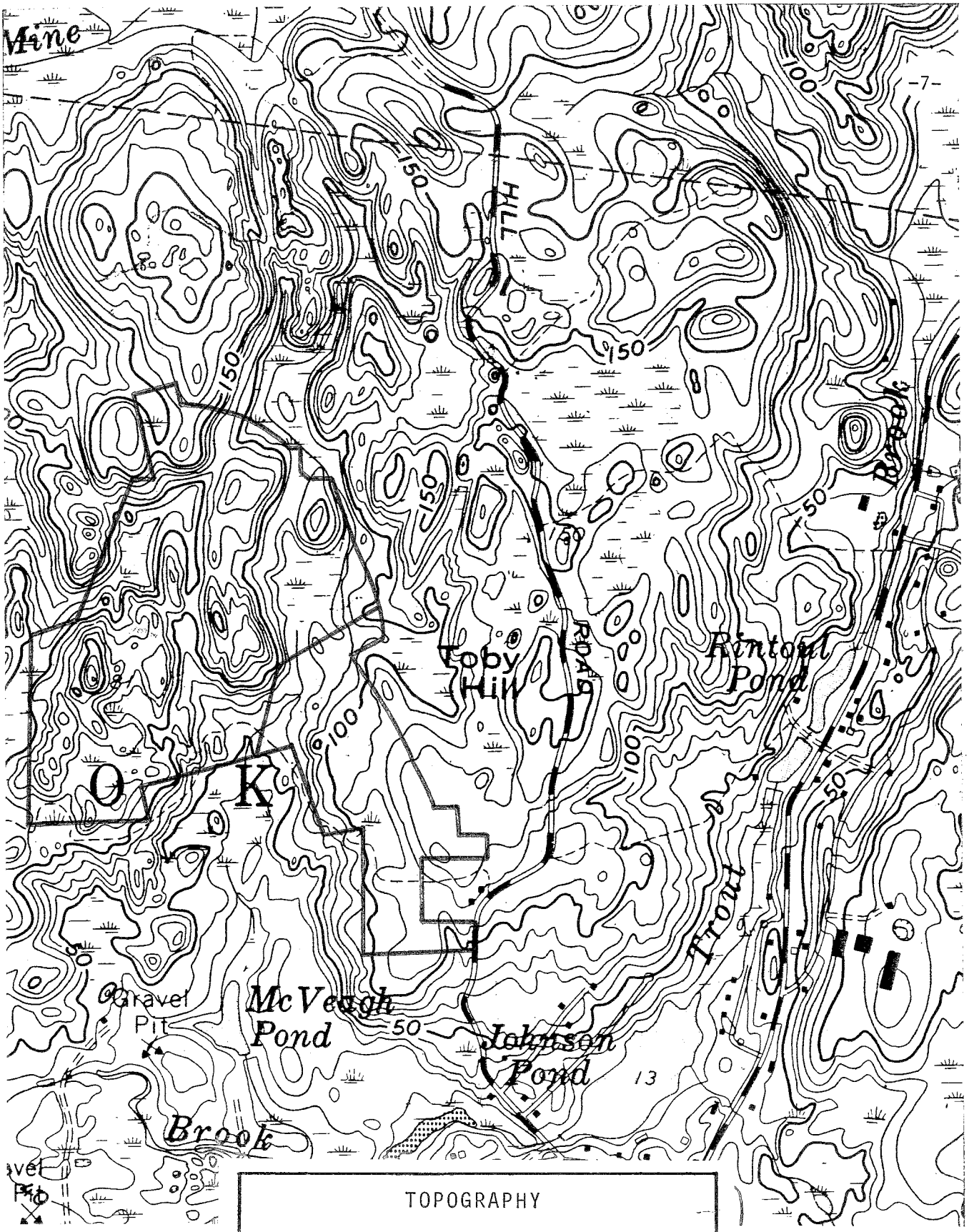
The proposed Toby Hill Estates Subdivision II to IV consists of approximately ± 90 acres of wooded land in eastern Westbrook. The major topographical feature in the area is Toby Hill, a bedrock-controlled upland area characterized by shallow soils and extensive outcrops/ledges. The parcel is located northwest of Toby Hill Estates (Section I) and south of Pond Brook Subdivision, a ± 300 acre parcel. An Environmental Review Team report was prepared for the latter subdivision site in February, 1979.



INDEX MAP

TOBY HILL ESTATES

SCALE 1" = 400'



TOPOGRAPHY

Approximate Site

1"=1000'

The site, which is characterized by a complex terrain contains slopes that range from moderately sloping to steeply sloping. Rocky knolls and vertical cliffs are visible in many places on the parcel.

Maximum and minimum elevations on the site are about 170 feet and 40 feet above mean sea level, respectively.

The major watercourse on the site is located in the eastern part. This stream, which feeds McVeagh Pond and is tributary to Spring Lot Brook, flows in a southerly direction through the site. Many small drainageways on the site feed this watercourse.

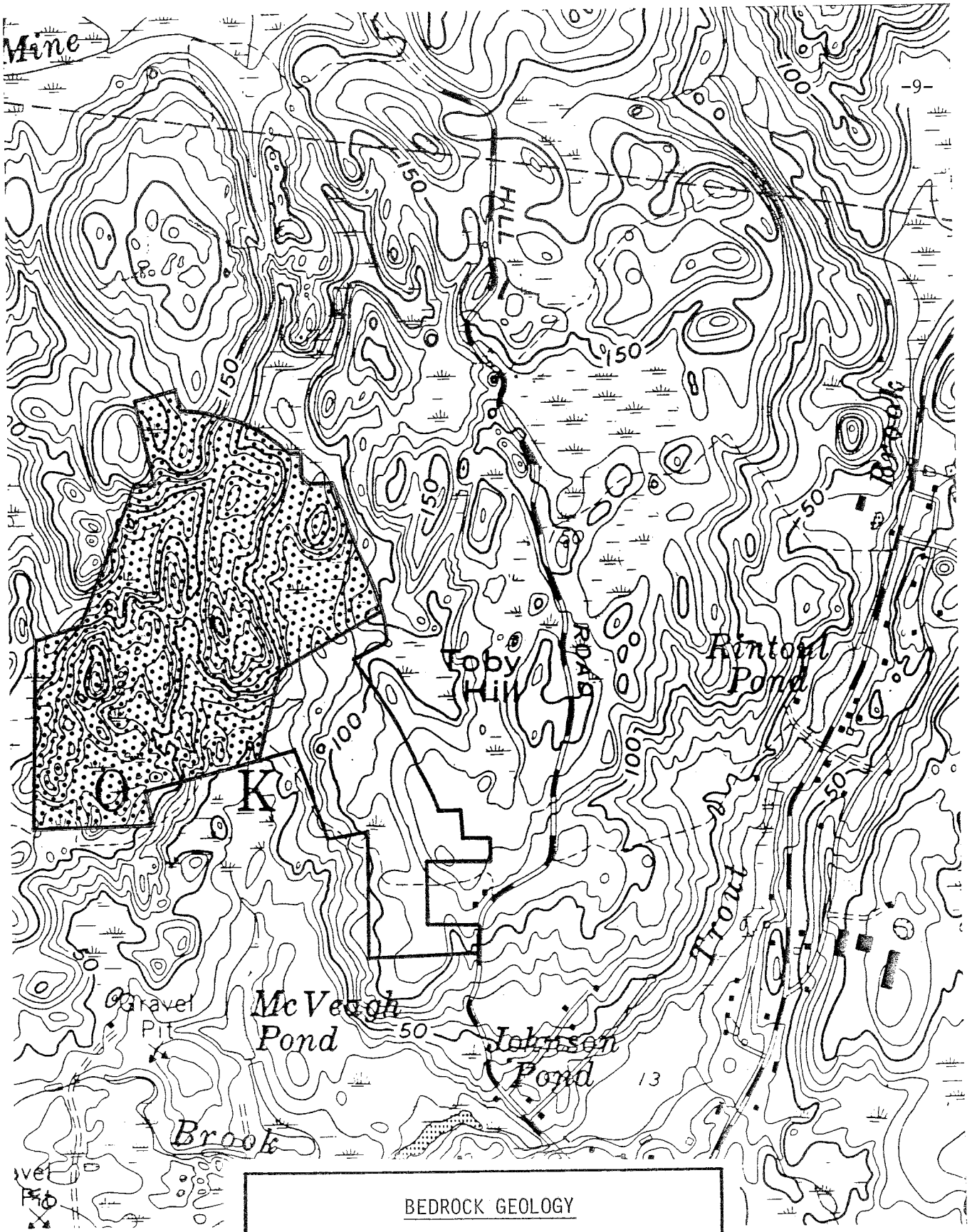
III. GEOLOGY

The subject parcel is located entirely within the Essex topographic quadrangle. A bedrock geologic map (QR-15, by L. Lundgren, Jr.) and a surficial geologic map (QR-31 by R. F. Flint) for the quadrangle have been published by the Connecticut Geological and Natural History Survey.

Numerous bedrock outcrops and shallow soils characterize this parcel of land. Because of the numerous bedrock outcrops visible on the site, it might be helpful to Town Officials if areas of continuous outcroppings are delineated on the subdivision plan. The bedrock beneath the site is described by Lundgren as Ordivician-aged (438-505 million years old) metamorphic rocks. The term metamorphic means that the rocks were geologically altered by great heat and pressure. The rock type underlying the site has been identified as Monson gneiss, a light-gray rock comprised of the mineral plagioclase, quartz, biotite and hornblende. The rock unit may be interbedded in places with dark-colored amphibolites (a rock composed of minerals, i.e. hornblende and plagioclase of the amphibole group) and pink alaskite granite (a rock comprised largely of light colored minerals such as quartz and feldspar).

The word gneiss used above is a textural term given to a metamorphic rock which is characterized by strong layering or banding, and which is typically coarse grained.

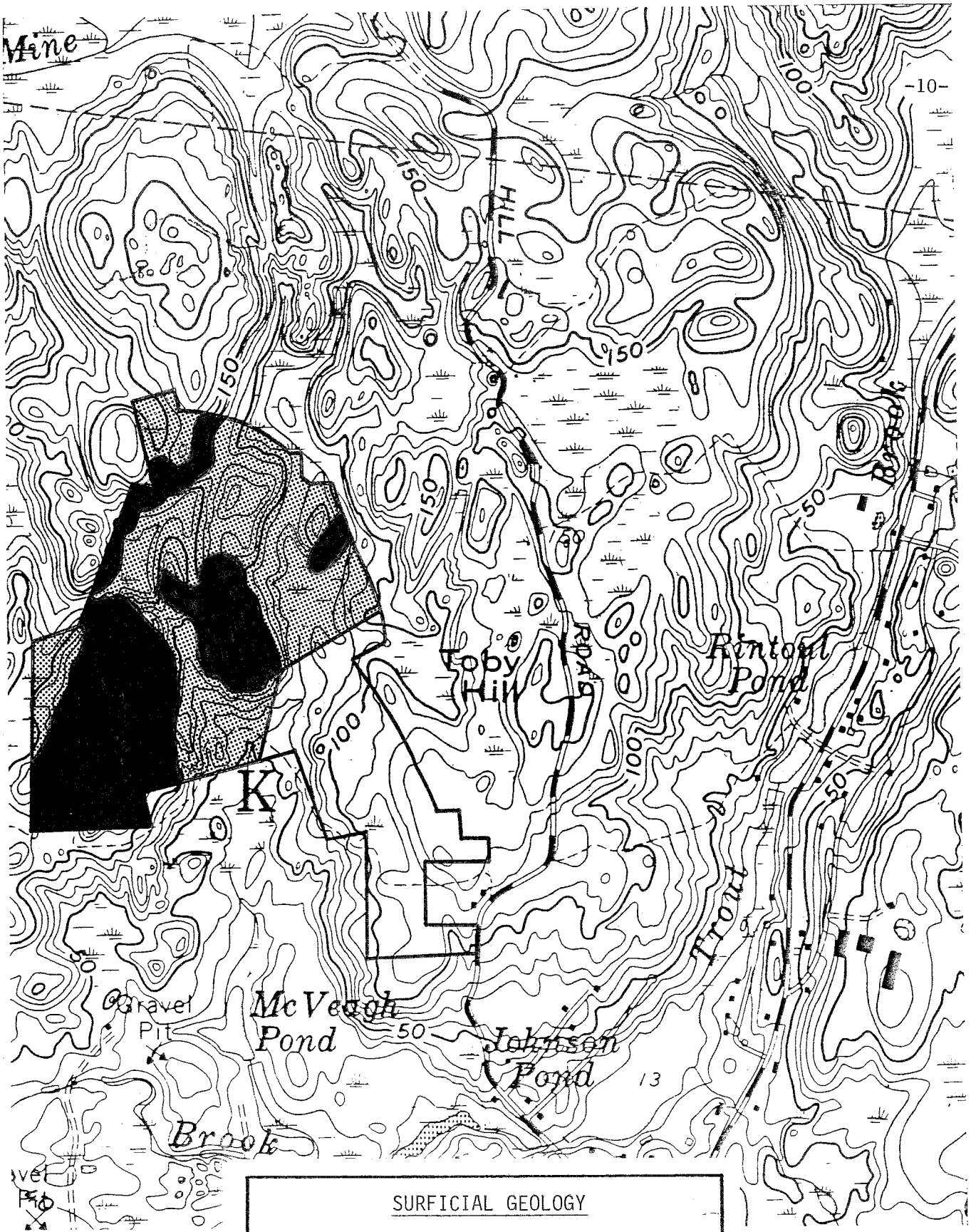
As mentioned earlier, shallow to bedrock soils characterize the parcel. Although no subsurface exploration has been conducted on site, depth to bedrock throughout most of the site probably does not exceed much more than five (5) feet. The underlying metamorphic



BEDROCK GEOLOGY

Monson Gneiss

1" = 1000'



SURFICIAL GEOLOGY

Till

Areas where bedrock is at or near ground surface.

1" = 1000'

rock is the water supply source to many homes in Westbrook and will be the source of domestic water to homes in the proposed subdivision (see Water Supply Section).

A thin blanket of glacial sediment called till overlies bedrock on the site. It consists generally of a non-sorted mixture of sand, silt, clay, gravel and boulder. These materials were collected, transported and redeposited by an ice sheet as it moved through the region about 10,000 to 12,000 years ago. No test pit data was available to Team members on the review day. Nevertheless, soils mapping information suggests that soils are generally shallow (i.e., probably less than five (5) feet) throughout most of the site, but this would need to be confirmed by subsurface exploration. Some deeper pockets of soils may exist within the parcel (probably on side slopes). The texture of the till on the site is mostly sandy, very stony and loose.

Overlying till on the site are a few pockets of post-glacial sediments called swamp deposits. They consist of decayed vegetative matter, intermixed with differing amounts of silt, sand and clay, which fill depressional features on the site. Seasonally wet areas, which lack high organic content, parallel many of the drainageways on the site. It is understood that the wetlands on the ± 90 acre parcel have been flagged in the field by a certified soil scientist and superimposed on the subdivision plan.

IV. SOILS

A soils map of the site is included in this section. As noted, the boundaries of the Toby Hill Estates Subdivision, Phase II to IV, are approximate.

Soils typical of the Toby Hill Estates Subdivision include the Adrian series, the Charlton series, the Leicester, Ridgebury and Whitman series and the Hollis series. Development limitations related to these soils are caused by slope, depth to bedrock, large stones, wetness and drainage. The Adrian series and the Leicester, Ridgebury and Whitman series are wetland soils regulated under Public Act 155.

Soil Descriptions and Potentials

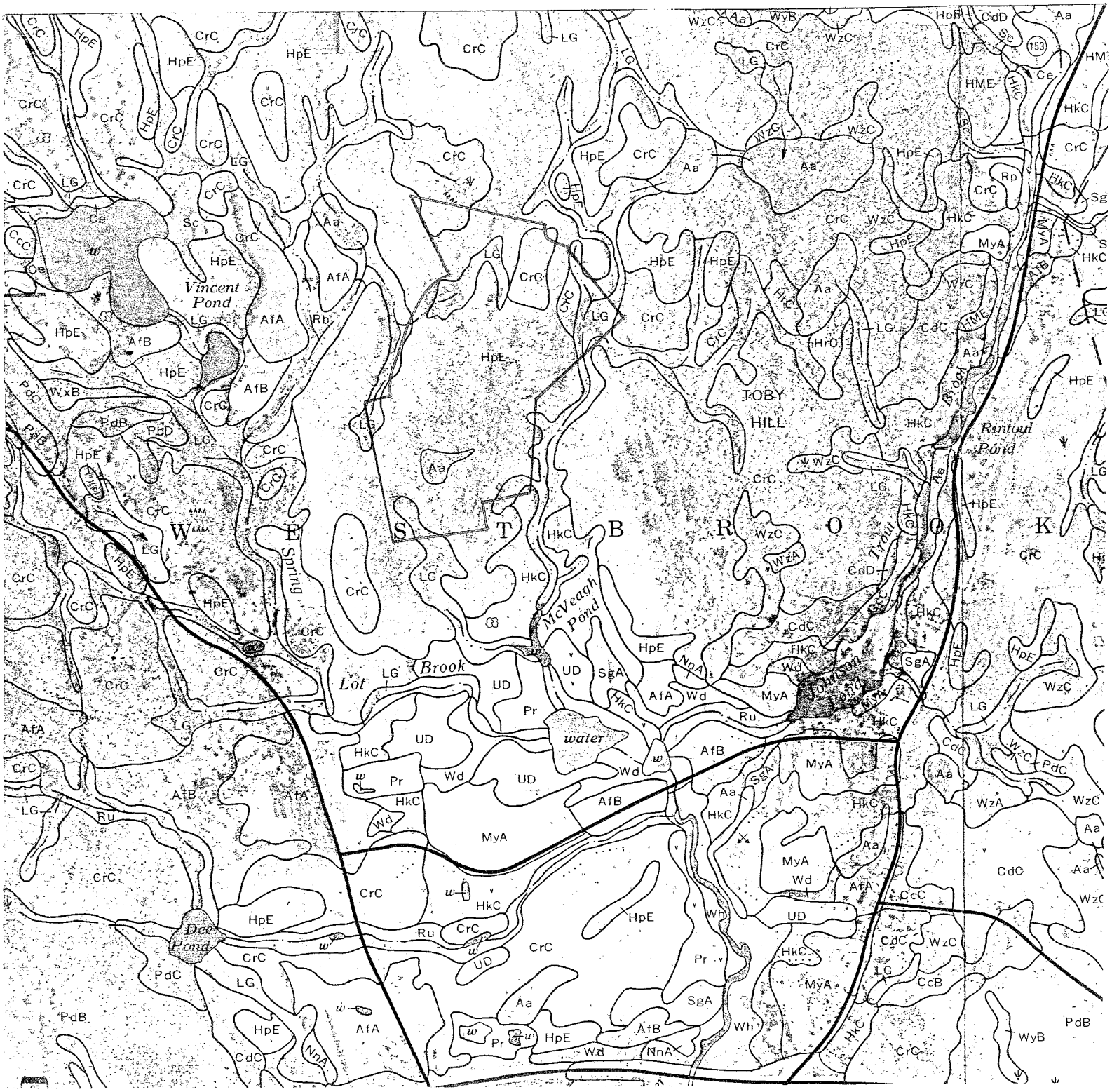
Aa - Adrian muck is nearly level, very poorly drained, organic soil in low depressions of outwash terraces and glacial till plains. Typically, this soil has an organic layer 24 inches thick.

United States Department of Agriculture

Soil Conservation Service

Middlesex County USDA-SCS
Middlesex Extension Center
Haddam, CT 06438
345-3219

Scale 1"=1320' Property boundary is approximate



Runoff is very slow or perched. The soil remains wet most of the year. It has poor potential for community development due to high water table at or near the surface most of the year, frequent flooding or ponding, very low strength and poor stability of the organic layer. On-site septic systems are not feasible on this soil.

CrC - Charlton-Hollis very stony fine sandy loams, 3 to 15% slopes, consists of gently sloping, sloping, well and somewhat excessively drained soils on ridges where the relief is affected by the underlying bedrock and on upland glacial till plains. This complex is about 50% Charlton soils, 30% Hollis soils and 20% other soils and bedrock outcrops.

This complex has fair potential for community development. The shallow depth to bedrock in the Hollis soils and the bedrock outcops make excavation difficult. On-site septic systems require very careful design and installation, and an area of more than two (2) acres is sometimes needed for proper siting of on-site septic systems.

HpE - Hollis-Charlton extremely stony fine sandy loams, 15 to 45% slopes, consists of moderately steep and very steep, somewhat excessively drained and well drained soils on ridges where the relief is affected by the underlying bedrock on upland glacial till plains. Most areas of this complex are wooded, and it is better suited to woodland than to most other uses. The erosion hazard is severe.

This complex has poor potential for community development. The soils are limited mainly by the steep slopes, shallowness to bedrock, rock outcrops and stoniness. On-site septic systems require very careful, and often special, design and installation. During construction, quickly establishing plant cover, providing temporary diversions and establishing siltation basins are suitable management practices.

This soil complex is the predominant soil for this subdivision proposal.

Lg - Leicester, Ridgebury and Whitman extremely stony fine sandy loams consists of nearly level to gently sloping, poorly drained and very poorly drained soils in drainageways and depressions of glacial till uplands.

These soils have poor potential for community development. Wetness, stoniness and the slow to very slow permeability of the substratum in the Ridgebury and Whiteman soils are major limitations. These soils are not suited to community development unless they are extensively filled. On-site septic systems are generally not feasible.

V. GEOLOGIC DEVELOPMENT CONCERNS

The major geologic limitations of the ± 90 acre parcel are (1) the presence of numerous rock outcrops and shallow soils throughout the site and (2) hostile terrain (moderate to steep slopes associated with bedrock outcrops).

The presence of bedrock at shallow depths suggests that blasting will be required in order to place on-site utilities (such as electric lines), for road construction, or installation of house foundations and septic systems.

Potential problems associated with blasting include:

(1) Increased turbidity levels in surface water and groundwater, at least in the immediate vicinity.

(2) Increase or decrease in the number of fractures or openings in the solid bedrock most likely in the immediate vicinity of the blasting, which may impact nearby wells that rely on the underlying bedrock as a water source (it should be pointed out that water stored in fractures and openings in the underlying bedrock is the source of groundwater to wells which tap the bedrock).

(3) Possible damage to nearby structures and foundations.

In regard to the last comment, a pre-blast survey of surrounding properties should be considered to reduce unwarranted damage claims. Any blasting activity which takes place on the site should be under strict supervision of persons experienced with state-of-the-art blasting techniques. This will hopefully reduce the chance of unnecessary seismic shock or damage claims.

It seems likely that blasting will occur in the moderate to very steeply sloping terrain areas. Blasting in these areas will undoubtedly increase the chances of mobilizing fine-grained soil particles, which may quickly find their way into drainageways. As a result, there is a chance for siltation problems to arise from blasting on rugged terrain. The blasting of bedrock in these areas will require a sound erosion and sediment control plan. Consideration should be given to constructing a sediment basin, which should allow fine-grained particles to settle out before reaching watercourses. Sediment basins would need to be maintained on a regular basis. (See Erosion and Sediment Control and Stormwater Management Sections)

As mentioned above, a shallow to bedrock condition is prevalent throughout the site. According to State Health Code criteria an area with less than four (4) feet of soil to ledge is an unacceptable condition at that time for on-site waste disposal. Detailed soil testing, including percolation tests and deep observation pits, on each proposed lot is necessary to confirm the suitability of proposed lots for on-site sewage disposal systems. It is recommended that a representative of the Town, certified in sewage disposal by the State Health Department of Health, observe all soil testing done. Because of the shallow bedrock conditions on the site, several deep test holes should be excavated on each lot so that a good profile of the bedrock surface can be ascertained.

Referenced earlier in the report, the applicant should be required to demarcate continuous ledge outcroppings within the site on the subdivision plan. According to a State Health Department Publication (Design of Subsurface Sewage Disposal Systems for Households and Small Commercial Buildings), there should be no ledge outcropping within 50 feet downslope of the leaching system, and no springs within 75 feet downslope. Clearly, identifying continuous outcrops on a site such as this on the subdivision plan will greatly aid the town Sanitarian during the evaluation of the site for on-site sewage disposal. (Also refer to Sewage Disposal Section).

Because of moderate to steep slopes, there is a chance for gulleying and siltation problems if runoff from the site is not under control. A sound erosion and sediment control plan should be formulated and enforced by the Town for the proposed project. In order to protect streamcourses on the site as well as downstream areas from environmental damage, it will be most important to contain and filter silt-laden water.

VI. SEWAGE DISPOSAL

From the soils survey information and visual observation of the parcel the primary site limitations present are the vast areas which have steep to very steep slopes, and soils which have rock outcrops and shallow depth to bedrock in many spots. In addition, the drainageways, streams and wetlands limit other areas.

Based on this preliminary review most of the property appears to be unsuitable or marginally suited for subsurface sewage.

It is understood that at the present time the engineering firm has not undertaken testing of Section II to IV nor have they prepared any plans showing lot layouts. Certainly in areas which have rock outcrops and shallow ledge rock soils, a comprehensive testing program is needed

for information relative to possible variation in ledge rock depths, with particular attention to those areas with ledge rock at four (4) feet or less. Rock outcrops along with wetlands and watercourses should also be indicated on plans. Conceptual lot layout should depend on identifying suitable areas of sufficient size capable of supporting sewage disposal systems. Testing should be observed by the local sanitarian as well as representatives of the engineering firm. This would also allow him to become familiar with the land topography.

In general, in areas where there is less than six (6) to seven (7) feet of existing soil over ledge rock, the placement of some amount of fill would be necessary. The placement of "specified" fill material can usually be implemented satisfactorily where there is at least four (4) to five (5) feet of naturally occurring soil above ledge rock. However, particularly where sloping lots are involved, this does not imply that the means to stabilize the fill and prevent erosion and sedimentation problems are not needed. Matching the conditions of the natural environment with detailed engineered systems should be done in a careful, proven manner for a quality evaluation.

The state Public Health Code identifies several soil conditions in the area of sewage leaching systems to be unsuitable for sewage disposal purposes. In ledge rock areas this is where there is a depth of less than four (4) feet of suitable existing soil over underlying rock. The feeling is that the ledge rock may interfere with the operation of the system and not provide adequate treatment and dispersal of the effluent. This is why the depth of soil overlying ledge rock for a distance downslope from the actual leaching system should also be taken into account. Generally there should be no ledge outcrops within a distance of fifty (50) feet downslope of the leaching area. One must also carefully consider any areas that have shallow groundwater.

While zoning would require large lots (2 acres minimum), due to the acreage having a number of obvious and apparent adverse conditions and limitations for sanitary and environmental purposes, it would seem reasonable to expect that for subdivision feasibility larger lots of varying sizes may be necessary in order to mitigate various conditions and concerns. (Please see the Appendix for further information on soil potential ratings for septic tank absorption fields.)

VII. EROSION AND SEDIMENT CONTROL

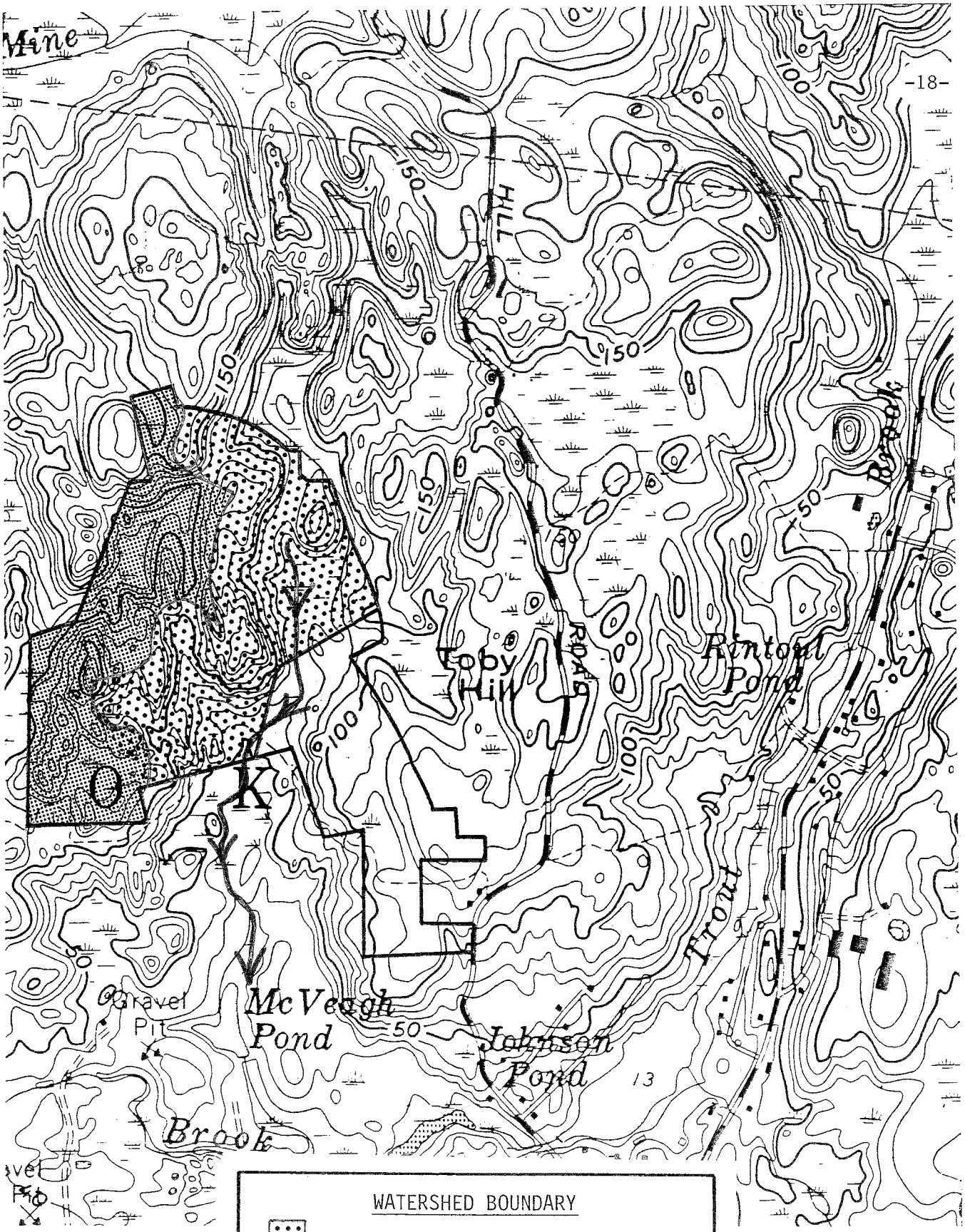
Because of the steep slopes and shallow to bedrock soils that exist, erosion and siltation of wetlands and streams may become severe, unless extensive erosion and sediment controls are implemented and maintained. If this property is to be developed, it is suggested that open space areas be expanded to include not only wetlands but also the steep slopes and bedrock areas which border wetlands. Creation of such a streambelt buffer zone will provide some protection to streams and wetlands and also provide some useful wildlife habitat.

In addition, the physical conditions of the site (soils, wetlands, steep slopes) will present severe limitations to the traditional residential development proposed, and it is suggested that if suitable sites for homes can be located, consideration be given to cluster housing or large estates. Retaining most of this fairly rugged diverse area as open space would definitely provide maximum long-term benefits to the area. These would include watershed protection, use of the area as timberland or for firewood production, wildlife habitat, and open space recreation.

After examination of preliminary soils and topography information and field review of the site, it seems obvious that the density of development proposed is unrealistic. Locations for 50 septic systems will be extremely difficult to find due to the shallow-to-bedrock soils, slope, and wetlands present on this site. Road construction, as proposed on the preliminary plans, will require massive cuts and fills which may be prohibitively expensive. Construction of these roads in conjunction with their associated wetland crossings will require extensive sediment and erosion control measures to be implemented and maintained. A potential for stream pollution from salts, sands and oils on these roads exists.

VIII. HYDROLOGY

Drainage on the parcel can be roughly divided in half. Surface runoff in the eastern part flows downslope to an unnamed tributary to Spring Lot Brook. However, before merging with Spring Lot Brook, the unnamed watercourse flows into McVeagh Pond. Surface runoff in the western part flows downslope via seasonal drainageways to Spring Lot Brook. Spring Lot Brook is tributary to Patchogue River.


Mine
HILL
150
100
50
Toby Hill
ROAD
Rintoul Pond
Trout
Gravel Pit
McVeagh Pond
Johnson Pond
13
Brook
K
WATERSHED BOUNDARY
Portion of site that drains to unnamed streamcourse in the eastern parts.
Portion of site that drains to Spring Lot Brook.
1" = 1000'

Groundwater in the area is classified by the DEP as GA, which means that it is suitable for private drinking water supplies without treatment. As a result, discharge of household sewage to the subsurface from homes in the proposed subdivision will need to be handled with great care, especially in view of the shallow soils.

Development of the site for residential use would be expected to lead some increases in the amount of runoff shed from the parcel. The amount of increase will depend upon the extent of development, the impervious surfaces created and the amount of vegetation removed or preserved. In view of the geologic limitations mentioned earlier, it seems likely that densities would have to be low.

To date, a stormwater management plan and drainage calculations have not been prepared for the proposed subdivision. Once plans become more defined, the project engineer will need to address in detail both of the above (stormwater management and drainage calculations). The two (2) major concerns associated with increased runoff is the potential for flooding downstream and streambank erosion/gullying.

The developer of this parcel and of adjoining parcels should analyze each development individually and collectively. The need for detention should be based on density, amount of wetlands and associated storage and calculated runoff increases. If detention is warranted, it should be located where its effect would be maximized and its impact on the wetland minimized. Obviously, detention at the head of a drainageway is less effective than further downstream. Ideally, if detention basins are required to handle post-development flows, they should be located on upland soils. However, because of the steep slopes and shallow to bedrock soils, it may not be possible to do this. As a result, there may be a need to use wetland pockets within the site as detention areas. Finally, all downstream culverts should be carefully examined. Based on the field investigation of the site, it seems that the density of the development should be much less than proposed. Very large lots may be needed to accommodate engineered septic systems located in suitable areas. In this case, detention may not be needed but again, stormwater management should be examined.

The other concern regarding increased runoff is the chance for streambank erosion and gullying. Connecticut's Soil Erosion and Sediment Control Act (P.A. number 83-388) requires that the applicant devise a thorough erosion sediment control paln. Because of the moderate slopes present on the site and the aquatic habitat in downstream water-courses, the concern for potential erosion becomes a significant one. A well managed activity will need to take all necessary measures to contain and filter disturbed water so that it does not cause environmental damage. The best solution for erosion sediment control is to keep

disturbed areas to a minimum.

IX. FIRE PONDS

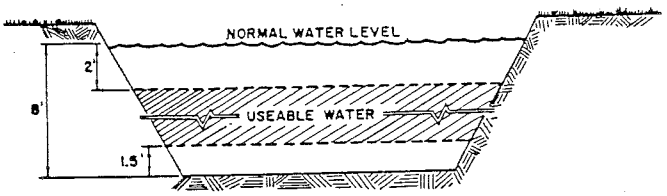
Location and installation of fire ponds is dependent on the water source. Naturally, intermittent streams are not a good source for water in the summer. Thus, location of the fire pond should be where the watershed is large enough to recharge the pond. Groundwater recharge also contributes greatly to fire pond recharge ability.

General criteria for fire protection pond design and location is shown below.

Criteria For Fire Protection Pond

1. Capacity Requirements - The pond shall have a minimum capacity of 50,000 gallons measured from an elevation 1.5 feet above the bottom of the pond to an elevation 2 feet below normal water level.

2. Depth - The minimum depth shall be eight feet below normal water level over at least 25 percent of the pond surface area, unless a permanent surface or subsurface water source is available. In no case shall the depth be less than six feet. The deepest part of the pond is to be located at the pumping site.



3. Facilities for Pumping - Provision shall be made to insure availability of water during all seasons of the year. Facilities for pumping shall be by means of a dry hydrant (preferred), or by a brine barrel or tapered plastic barrel located over the deepest part of the pond and accessible from the shore.

4. Locations - The pond or hydrant will be located adjacent and reachable from an all-weather road. The minimum distance from the nearest building will be 100 feet. The maximum travel distance from the pond to the farthest building to be protected will be 900 feet. A turn around for fire equipment should be provided.

Suggested Minimum Pond Sizes
(Eight feet Pond Depth, 2:1 Side Slope)

Minimum Top Dimensions	Minimum Bottom Dimensions	Volume Cu.Yds.	Capacity Gallons
56 ' x 56'	24' x 24'	500	101,000
63' x 49'	31' x 17'	485	98,000
60' Diameter	28' Diameter	500	101,000

X. WATER SUPPLY

Based on soils and topography it would appear that wells would have to be drilled rock wells. In general, wells should be located to the higher side of lots consistent with the general layout and surroundings. They must at least meet all minimum required separating distances from probable sources of pollution, particularly sewage disposal systems, buried fuel oil storage tanks, discharges from water treatment facilities (softeners), agricultural wastes and chemicals, etc. They must also be properly separated from drains, watercourses and be protected from surface wash. The main concern in the area in question relates to the considerable presence of shallow ledge rock. Certainly the depth of soil overlying ledge rock provides means for treatment and renovation of many pollutants. With sewage wastes a minimum depth of four (4) feet needs to be maintained between the bottom area of a leach system and ledge rock. Experience has shown that well pollution is more of a problem in areas of shallow ledge rock where sewage effluent can move rapidly and for considerable distances in permeable drainage channels or crevices on top of ledge. This is one reason why all wells drilled into rock should be adequately cased and properly sealed where the overlying soil is less than twenty (20) feet deep. The key is obtaining proper sealing which is not always achieved. Another procedure which may subject wells to pollution in areas of shallow ledge rock is blasting to construct roadways, house basements and foundations, or excavating for septic tanks. While adverse soils and site characteristics along with the possible number of lots to be developed would favor the extension of public water, large lots and the likelihood of difficult and costly construction would probably make public water not feasible. However, it is noted the Connecticut Water Company has a public water supply well on the north side of McVeagh Road near the junction of Spring Lot Brook and the outlet stream from McVeagh Pond.

One should also ascertain with individual on-site wells that they have sufficient yield to provide for normal household usages. Increased well depth and larger storage tanks are means by which supplies can often be made sufficient to meet water demands during peak peirods. In the lower Connecticut River basin (the site is encompassed by this area), numerous wells were surveyed for Connecticut Water Resources Bulletin No. 21. Of all the wells (314) surveyed that tapped a type of bedrock similar in characteristics to the bedrock underlying the Toby Hill Estates Subdivision, 80 percent yielded 3 gallons per minute or more and 90 percent yielded about 1.8 gallons per minute. A desirable yield for domestic purposes would be about 3 gallons per minute. This yield computes to 4320 gallons per day.

Assuming a consumption rate of 75 gallons of water per person per day, a family of 5 would use about 375 gallons of water per day. Hence, it is likely that the bedrock beneath the site would be a sufficient aquifer for domestic purposes.

In certain rock formations, usually those high in iron and manganese, excessive minerals may be found in the groundwater. If these concentrations exceed recommended drinking water standards they can impart taste, color and odor and the water staining of clothes and fixtures can be a problem. In such cases it is necessary to make provisions for appropriate water treatment.

Areas of hostile terrain will be a major hindrance making some areas inaccessible for well drilling rigs.

XI. FISHERIES RESOURCES

SITE DESCRIPTION

The proposed Toby Hill Estates Subdivision (phases II to IV) borders approximately 3,500 feet of an unnamed watercourse. This watercourse empties near the mouth of Spring Lot Brook which flows immediately into the Patchogue River. The unnamed watercourse is classified by the Department of Environmental Protection (DEP) as "Class A" surface waters. Designated uses for this classification are: potential drinking water sources; fish and wildlife habitat; recreational use; agricultural and industrial supply; and other legitimate uses. The lower section of Spring Lot Brook where the unnamed watercourses drains into is classified as "B/A". Uses are the same as "Class A" except that this brook cannot be used as a potential drinking water supply. The Patchogue River is classified as "SB/SA" where designated uses are: marine fish, shellfish, and wildlife habitat; recreational use; industrial use; and other legitimate uses including navigation.

The unnamed watercourse is unique since it alternately flows through several wetland/swamp regions and cuts between hilly terrain. Stream width varies between 3 and 10 feet in width in areas where the stream channel is well defined. An optimal 1:1 pool/riffle ratio was observed. Pools provide fish with hiding, resting areas while riffles are commonly utilized for feeding purposes. Excellent instream habitat was documented such as undercut streambanks and fallen trees. These structures also provide beneficial cover and resting areas. Dominant stream structure is comprised of large rocks and boulders on top of fine sands and gravels. Sufficient overhead vegetation is provided by streamside trees which benefits aquatic resources by cooling stream waters.

AQUATIC RESOURCES

The Bureau of Fisheries does not stock the unnamed brook with trout. The brook is expected to contain the following species of fish: native (wild) brook trout, longnose dace, blacknose dace, tesselated darter, and American eel.

The Patchogue River serves as an important nursery area for a host of marine fishes and shellfish. Species of marine fish which inhabit this river are: striped bass, bluefish, winter flounder, fluke, windowpane founder, alewives, blueback herring, menhaden, mummichogs, and Atlantic silversides. Areas within this river support populations of softshell clams, hardshell clams, and oysters.

IMPACTS

The following impacts on the unnamed watercourse and downstream areas can be expected to occur if proper mitigative actions are not taken:

1. During construction soil erosion and sedimentation of watercourses through increased surface runoff from unvegetated zones - research has shown that erosion and sedimentation due to construction activities is a major cause of stream degradation. A great potential exists for increased surface runoff at this development site due to steep, hilly terrain. If realized, excessive silt deposition can result in the reduction of:

* Stream pool depth - pools provide cover, shelter, and resting areas for fish. Pools are a very important habitat variable.

* Fish egg survival - sufficient water flow, free of sediment particles is a basic requirement of egg respiration (biological process of extracting oxygen from water) and successful hatching.

* Aquatic insect production - sediment free water is also a basic need for successful aquatic insect egg respiration and hatching. Aquatic insects are the primary foods consumed by stream fishes. Decreased amounts of insects will adversely effect fish growth and survival since excessive energy demands are required to locate preferred aquatic insects when population levels are low.

* Streamwater oxygen levels - organic matter associated with soil particles is decomposed by micro organisms. Decomposition will contribute to the depletion of oxygen in waters overlying deposited sediments.

Another major impact caused by silt deposition is the accelerated growth of rooted aquatic weeds and algae. Eroded soils contain plant nutrients such as nitrates and phosphates. Although algae and aquatic weeds require these nutrients for growth, most aquatic stream ecosystems contain very small amounts. Consequently, these nutrients act as fertilizers once they are introduced into streams. This process results in increased plant growth.

2. Percolation of septic effluent into watercourses - this development site contains an area in which major limitations exist in regard to placement of individual septic systems. Development limitations exist due to steep slopes, stony soils, shallow bedrock, and seasonally high water tables. A failure of individual septic systems to operate properly would be potentially dangerous to aquatic ecosystems. Nutrients and assorted household chemicals that residents may place in septic systems could enter streamwaters in the event of a failure. The introduction of septic effluent could result in a major threat to fish, public health, and overall water quality conditions. Effluent will also stimulate the growth of nuisance aquatic vegetation and algae.

3. Introduction of road salts, sands, and oils to watercourses - surface drainage from roads and driveways may allow salts and other pollutants to enter streams. this scenario will result in water quality and stream habitat degradation.

4. Transport of lawn fertilizers and chemical to watercourses - runoff and leaching of nutrients from fertilizers will stimulate nuisance aquatic weed growth. Introduction of lawn chemicals may result in "fish kills" and water quality degradation.

5. Impacts to downstream environments - any water quality problems and habitat degradation that directly occurs within this unnamed watercourse due to increased sedimentation, septic tank effluent, road and stormwater drainage, and lawn chemicals or fertilizers will eventually be observed in downstream areas. Increased eutrophication or nutrient enrichment will occur in McVeagh Pond, a stream impoundment on the lower stretch of the unnamed watercourse. Ultimately the impacts of this development will be seen in the fragile marine environment of the Patchogue River.

IMPACTS OF FUTURE HOUSING DEVELOPMENTS

A tremendous amount of futre development is expected to occur both north and east of the Toby Hill Estates Subdivision. Impacts on aquatic resources discussed in the previous section apply to all future developments.

Potential additional impacts will be increased streamflow caused from subdivision runoff and warming of stream water temperatures. Increased streamflows can lead to flooding problems whereas elevated water temperatures will produce aquatic habitats which favor the survival of warmwater fish species. Coldwater species such as trout will be eliminated.

Future development will only add to any stream degradation and water quality problems that develop. Additional development within this watershed may lead to a situation in which stream protection measures are no longer effective against the prevention of pollution. Rehabilitation of aquatic environments is extremely difficult once water quality and habitat degradation has occurred.

RECOMMENDATIONS

The impact of residential development within this watershed can be minimized by implementing the following precautionary measures:

1. Maintain at the minimum a 100 foot open space buffer zone along the unnamed brook's edge - no construction or alteration of riparian habitat shall take place in this zone. Considering the steep terrain on this site, the buffer zone should be widened if proposed building lots are located on slopes that directly drain into the brook. The team's fisheries biologist can be contacted at 295-9523 if further technical assistance is required concerning this matter.

2. A comprehensive erosion and sedimentation control plan should be submitted since this development contains extremely steep slopes - install and maintain proper erosion and sedimentation controls during subdivision construction. This includes such mitigative measures as silt fences, hay bales, and catch basins. The developer must direct all runoff away from the brook and regularly maintain catch basins. Once construction is initiated, officials from the Town of Westbrook should regularly police this development to ensure that all erosion and sedimentation controls are porperly positioned and regularly maintained.

3. Properly design and locate the individual septic systems (refer to Waste Disposal section)- the addition of septic effluent to the brook and downstream areas can be one of the greatest threats to aquatic resource ecology. Homeowners should regularly maintain septic systems to ensure proper operation and prevent failures.

4. An effective stormwater management plan should be designed and implemented - stormwaters should not be directed to the brook.

5. Limit liming, fertilization, and the introduction of chemicals to subdivision lawns close to the brook - this restriction will help abate the amount of additional nutrients to watercourses.

6. Stress the use of low phosphate laundry detergents - laundry detergents loaded with phosphates could enter the brook in the event of a septic system failure.

XII. PLANNING REVIEW

The subdivision is compatible with the surrounding zoning which is classifeid as RR. A two (2) acre minimum is required for a RR Residence District along with a frontage of not less than 200 feet. Due to the steep slope and amount of wetland soils in the area the Regional Plan of Development depicts the area as a "Natural Resource Area". The Plan of Development for the Town of Westbrook considers the area to be limited for development because of the amount of ledge and poorly drained soils.

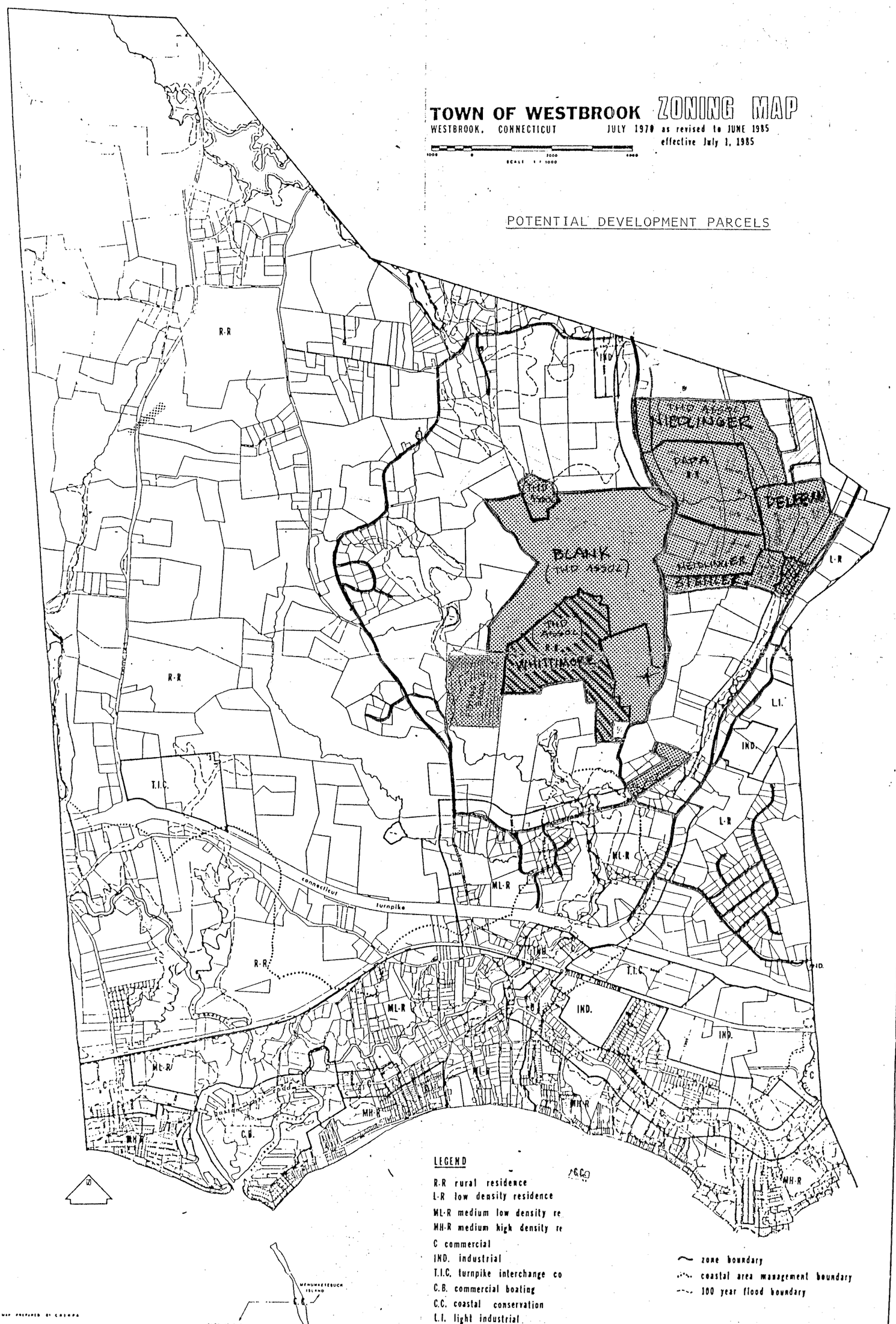
This Toby Hill Estate Subdivision proposal would continue a roadway from Phase I which contains 14 residential building lots. Phases II to IV of Toby Hill Estate Subdivision would call for continuation of a roadway to eventually intersect again with Toby Hill Road 1.2 miles north of the entrance road to Phase I.

A proposed east-west connector road would provide access and join Fishing Brook Road with the Toby Hill Estate I Cul-De-Sac. This east-west connector road would either cross wetlands in a straight line path or pass through severely sloped terrain. The Town should insure that the proposed road grade is not too severe and proper control measures are taken to deal with erosion and sedimentation from any cut and fill work. The access to the proposed fire ponds for siphoning should be a major concern for the Town.

Traffic Generation

Estimated traffic generated by the proposed phased development would be as follows:

	Trips to and from site per day	Peak A.M.	Peak P.M.
Phase I 14 lots	130	10	14
Phase II to IV 50 lots	465	37	50



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The traffic generated by the proposed subdivision would flow into Toby Hill Road and Pond Meadow Road via the Fishing Brook Road extension. Traffic volume counts are not available for Toby Hill Road at the present time. Toby Hill Road is a minor collector road which currently is being extended to act as an alternative north-south arterial road. It can be estimated that the present traffic on Toby Hill equals about 180 trips daily, with the peak a.m. figure at 13 and the peak p.m. figure being 17. These numbers are based on existing dwellings and dwellings presently under construction. As more development takes place adjacent to Toby Hill Road improved drainage will be required along the road. Excessive ravelling of the pavement was observed on the shoulders on the northern section of the road. For the purpose of this review the anticipated daily traffic flow would most likely be evenly split between Pond Meadow Road and Toby Hill Road would also be a well travelled minor collector for commuters accessing I-95 to the south.

Accident reports supplied by the Connecticut DOT indicate that there were 8 accidents recorded on Toby Hill Road between 1979 and 1984. The two reported one car accidents in 1983 were determined to be caused by excessive speed of the operator. McVeagh Road had 15 reported accidents during this same time frame along with 21 reported accidents on Pond Meadow Road.

Although a north-south road system providing access to the central area of Town would aid traffic circulation, the environmental constraints for development of this site are severe enough to warrant very careful consideration of the proposed road connections through the available plots (CT Water Company and Neidlinger). Continuation of subdivision roads between Route 145 and West Pond Meadow Road creating an east-west connector should be more of a priority and actively encouraged by the Town.

XIII. SUMMARY

Note: This is a brief summary of the major points, concerns and recommendations of the Team. You are strongly urged to read the entire report, and to refer back to the specific sections in order to obtain all the information concerning a certain topic.

* Because of the numerous bedrock outcrops visible on the site, it would be helpful for Town officials to have areas of continuous outcroppings delineated on the subdivision plan.

* Development limitations related to the soils found on the site include slope, depth to bedrock, large stones, wetness and drainage.

* The major geologic limitations to development include numerous rock outcrops and shallow soils and hostile terrain with steep slopes.

* Blasting will probably be required and there are several problems associated with it, such as increased turbidity levels in surface and groundwater, an increase or decrease in the number of fractures in the bedrock which could effect water supply, and possible damage to nearby structures.

* Detailed soil testing, including percolation tests and deep observation pits on each proposed lot is necessary to confirm suitability for on-site sewage disposal systems.

* A profile of the bedrock surface should be obtained because of the shallow to bedrock conditions.

* It appears by preliminary review that most of the property is unsuitable or marginally suitable for on-site sewage disposal.

* Extensive erosion and sediment controls measures should be implemented and maintained.

* It is suggested that open space areas be expanded to include not only wetlands but the steep slopes and bedrock areas that border them.

* It seems that the present proposed density of the subdivision is unrealistic. Consideration should be given to cluster housing or large estates. That way much of the area could be kept as open space with long-term benefits such as watershed protection, timber or firewood production, wildlife habitat or passive recreations.

* The project engineer will need to prepare a stormwater management plan and drainage calculations. The two major concerns being the potential for downstream flooding and streambank erosion/gullying.

* The developer of Toby Hill Estates and of adjoining parcels should analyze each development individually and collectively. The need for detention should be determined.

* The location and installation of fire ponds is dependent upon the water source.

* There is a potential for well pollution in areas of shallow ledge rock from septic effluent. All wells should be properly cased and sealed in areas where the overlying soil is less than 20 feet deep.

* Public water supply may warrant looking into.

* Well drilling rigs may find some areas inaccessible because of the hostile terrain.

* The unnamed watercourse which flows through the subdivision has "Class A" surface waters and is unique because it alternately flows through several wetland/swamp regions and cuts between hilly terrain. It contains excellent instream habitat.

* There are many serious impacts on the unnamed watercourse and downstream areas if proper mitigative actions are not taken.

* Future development will only add to any stream degradation and water quality problems that develop.

* The impact of residential development on the watershed can be minimized by implementing precautionary measures.

* The subdivision is compatible with the surrounding zoning. The Regional Plan of Development depicts this area as a "Natural Resource Area" and the Town Plan of Development considers this an area to be limited for development.

* The east-west connector road should be checked to insure that the road grade is not too severe.

* The Town should carefully review access to any fire ponds for siphoning.

* Improved drainage along Toby Hill road will be required as more development takes place.

* A north-south road system should be very carefully considered, at this time an east-west connector should be more of a priority.

APPENDIX

Soil Potential Ratings

for

Septic Tank Absorption Fields

TABLE 1

SOIL POTENTIAL RATINGS FOR SEPTIC TANK ABSORPTION FIELDS BY MAP UNIT
MIDDLESEX COUNTY, CONNECTICUT

MAP SYMBOL	MAP UNIT NAME	POTENTIAL RATING	CONCERNS	CORRECTIVE MEASURES	ADDITIONAL CONSIDERATIONS	STATE REGULATIONS
CrC	Charlton-Hollis very stony fine sandy loams, 3-15% slopes	MEDIUM			Feasibility study. Increase area of investigation to utilize the deepest soils. Verify depth to bedrock.	
	Charlton part	very high	None.			5
	Hollis part	extremely low	Depth to bedrock.			
CsB	Cheshire silt loam, 3-8% slopes	VERY HIGH	None.			
CsC	Cheshire silt loam, 8-15% slopes					
CyC	Cheshire-Holyoke very stony silt loams, 3-15% slopes	MEDIUM			Feasibility study. Increase area of investigation to utilize the deepest soils. Verify depth to bedrock.	
	Cheshire part	very high	None.			5
	Holyoke part	extremely low	Depth to bedrock.			
EfA	Ellington fine sandy loam, 0-5% slopes	LOW	Fast perc rate, depth to water table.	Fill. Double separating distance between wells and absorption field.		1
HfA	Hartford sandy loam, 0-3% slopes	HIGH	Fast perc rate.	Double separating distance between wells and absorption field.		1
HfB	Hartford sandy loam, 3-8% slopes					
HkC	Hinckley gravelly sandy loam, 3-15% slopes					
HME	Hinckley and Manchester soils, 15-45% slopes	MEDIUM#	Fast perc rate, slope.	Double separating distance between wells and absorption field. Design and installation to accommodate for slope.	Increase area of investigation to utilize the flattest slopes.	1
HpE	Hollis-Charlton extremely stony fine sandy loams, 15-40% slopes	VERY LOW			Feasibility study. Increase area of investigation to utilize the deepest soils and flattest slopes. Verify depth to bedrock.	5
	Hollis part	extremely low	Slope, depth to bedrock.			
	Charlton part	high#	Slope.	Design and installation to accommodate for slope		1 for slopes >25%
HrC	Hollis-Rock outcrop complex, 3-15% slopes	EXTREMELY LOW	Depth to bedrock.			5

This rating applies to slopes of up to 25%. On slopes greater than 25%, the potential rating may be significantly lower.

1 Identified as an area of special concern by state regulations - engineer's design required.
5 A permit to install an absorption field cannot be issued if the depth to bedrock, of the naturally occurring soil, is less than 24 inches.

APPENDIX 6

CORRECTIVE MEASUSURES - DEPTH TO BEDROCK

SOIL FEATURE	CONCERNS	COMMON CORRECTIVE MEASURES	STATE REGS.	POSSIBLE ADDITIONAL CORRECTIVE MEASURES	OTHER CONSIDERATIONS
>72 inches	None	None			
40-72 inches*	Insufficient soil depth for effluent renovation.	1-3 feet of fill.	1 or 2*		
20-40 inches*	Insufficient soil depth for effluent renovation.	3-5 feet of fill.	2*		
<20 inches	Insufficient soil depth for effluent renovation. Possible groundwater pollution.	Identified as unsuitable by state health code regulations. A permit cannot be issued for absorption field installation on these sites.	5		

* The Soil Survey of Middlesex County, Connecticut, identifies soils less than 20 inches deep and 20 inches to 40 inches deep to bedrock. For the purpose of this report, the soils identified as not having bedrock within 40 inches are assumed to be 72 inches or more deep. The state health code regulations do not coincide with these depth ranges. According to the health code, soils 48 inches to 60 inches deep are identified as an area of special concern and soils less than 48 inches deep are unsuitable in their natural condition. A permit to install an absorption field cannot be issued if the depth to bedrock of the naturally occurring soil is less than 24 inches.

1 Identified as an area of special concern by state regulations - engineer's design required.
2 Identified as unsuitable in its natural condition by state regulations - an engineer's evaluation is needed to determine whether an absorption field can be built.
5 A permit to install an absorption field cannot be issued if the depth to bedrock, of the naturally occurring soil, is less than 24 inches.

SOIL POTENTIAL RATINGS BY MAP UNIT

The Soil Survey Report of Middlesex County, Connecticut, identifies and displays the dominant soils in the county. This data is on maps having a photographic background. The symbols on the maps identify map units. Each map unit symbol represents a unique combination of soils. Areas with the same symbol have the same composition.

The soil survey report does not replace on-site investigation. The report identifies the probability of finding a particular soil or combination of soils.

> The maps in the soil survey report are at a scale of 1:15, 840. At this scale, areas of contrasting soils smaller than 2.5 acres in size are generally not delineated. Maps enlarged from the soil survey report do not provide more detailed soils information. More detailed information can only be obtained through on-site investigations. These investigations may significantly refine the data shown in the published soil survey.

Table 1 assigns a potential rating of each map unit. The list of map units are in alphabetical order. The potential rating is based on the ease of installing a septic tank absorption field in the dominant soil(s) of the map unit.

The majority of the map units are composed of one dominant soil or of several soils with similar characteristics. A single potential rating is listed for these map units. Other map units are composed of two kinds of contrasting soils. In these cases, an overall potential rating is listed for the map unit, followed by ratings for the individual soil components that make up that map unit. The Soil Survey of Middlesex County, Connecticut, should be consulted for additional information concerning map unit composition.

The limiting soil characteristics for each map unit are identified in the column labelled CONCERNS. The special design or construction practices that may be required on a site are listed in the column labelled CORRECTIVE MEASURES.

ADDITIONAL CONSIDERATIONS are practices and site specific land evaluations that may be needed before selecting a leach field site. These additional considerations do not alleviate soil problems. Instead, they may be needed to identify and determine the extent of limiting soil or landscape features, allow for the installation of a system, or determine the most practical solution for a soil problem.

RATING CLASSES

The rating class definitions refer to a septic tank absorption field installation which will meet state helath code regulations. An engineer's design of the septic system is required by state health code regulations for soils in each class except where otherwise noted.

Soils with very high potential have characteristics that meet the performance standard. A "base" system (defined in the Performance Standard Section) can be readily installed in these soils at an index cost of x. The cost x represents the going rate for installing a septic tank absorption field in a soil that has soil characteristics within the performance standard and does not require an engineered design. The cost of installing a septic tank absorption field in a soil that has soil characteristics outside of the performance standard are higher. The higher total cost reflects the cost of additional time, materials, and in the case of engineered systems, engineering services. The more difficult the soil limitations are to overcome, the higher the cost. The cost of installing absorption fields is expressed as a multiple of x and is called the cost factor. They are index values and vary with the amount of effort (cost) required to overcome limiting soil characteristics. A cost factor of 3.0x to 3.5x means that the estimated cost of overcoming adverse soil properties is 3.0 to 3.5 times more than a field installed in a soil with very high potential. These cost factors provide relative estimates of overcoming adverse soil properties.

> The cost factors are only a guide. Actual expenditures for a septic system at a home site will vary both above and below the index ranges given. Actual costs for a septic system are influenced by on-site features, landowner preferences, and other conditions and variables not dependent on the soil. Appendix 7 on page 24 lists some site conditions and design considerations not represented in the ratings.

For example: a corrective measure may be gravel fill to overcome a soil limitation. The amount of gravel, cubic yards needed, and its cost at the gravel pit is figured into the cost factor. The trucking cost of the gravel from the pit to the septic system site in not included in the cost factor. Transportation costs are reflective of distance from the gravel source. While the trucking cost is a real expense to the landowner, it is variable and not figured in the index cost factor.

The soil potential ratings and associated cost factors are defined as follows:

Very high potential - These soils have the best combination of characteristics for septic tank absorption fields. An engineer's design is not required. The cost factor is 1x.

High potential - These soils have limitations which can be easily overcome using standard installation practices. An engineer's design is required in most cases. The cost factor ranges from 1.5x to 2.0x.

Medium potential - These soils have significant limitations that are generally overcome using commonly applied designs. The cost factor ranges from 2.0x to 2.5x.

Low potential - These soils have limitations which require extensive design and site preparation to overcome. These soils are commonly used for septic tank absorption fields in this area. The cost factor ranges from 2.5x to 3.5x.

Very low potential - These soils have severe soil limitations which require extensive design and site preparation to overcome. These soils are rarely used for septic tank absorption fields in this area. The cost factor ranges from 4.25x to 6.0x.

Extremely low potential - These soils have severe limitations which are extremely difficult to overcome. A permit for absorption field installation cannot be issued unless the naturally occurring soils meet the minimal requirements outlined in the state health code. It is unlikely that these soils can be improved sufficiently to meet state health code regulations.

Not rated - Areas labelled "NOT RATED" have characteristics that show extreme variability from one location to another. The work needed to overcome adverse soil properties cannot be estimated without on-site investigation.

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--an 86 town area.

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

PURPOSE OF THE TEAM

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

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

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected officials of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the Chairman of your local Soil and Water Conservation District. This request letter should include a summary of the proposed project, a location map of the project site, written permission from the landowner allowing the Team to enter the property for purposes of review, a statement identifying the specific areas of concern the Team should address, and the time available for completion of the ERT study. 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 Elaine A. Sych (774-1253), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, P.O. Box 198, Brooklyn, Connecticut 06234.