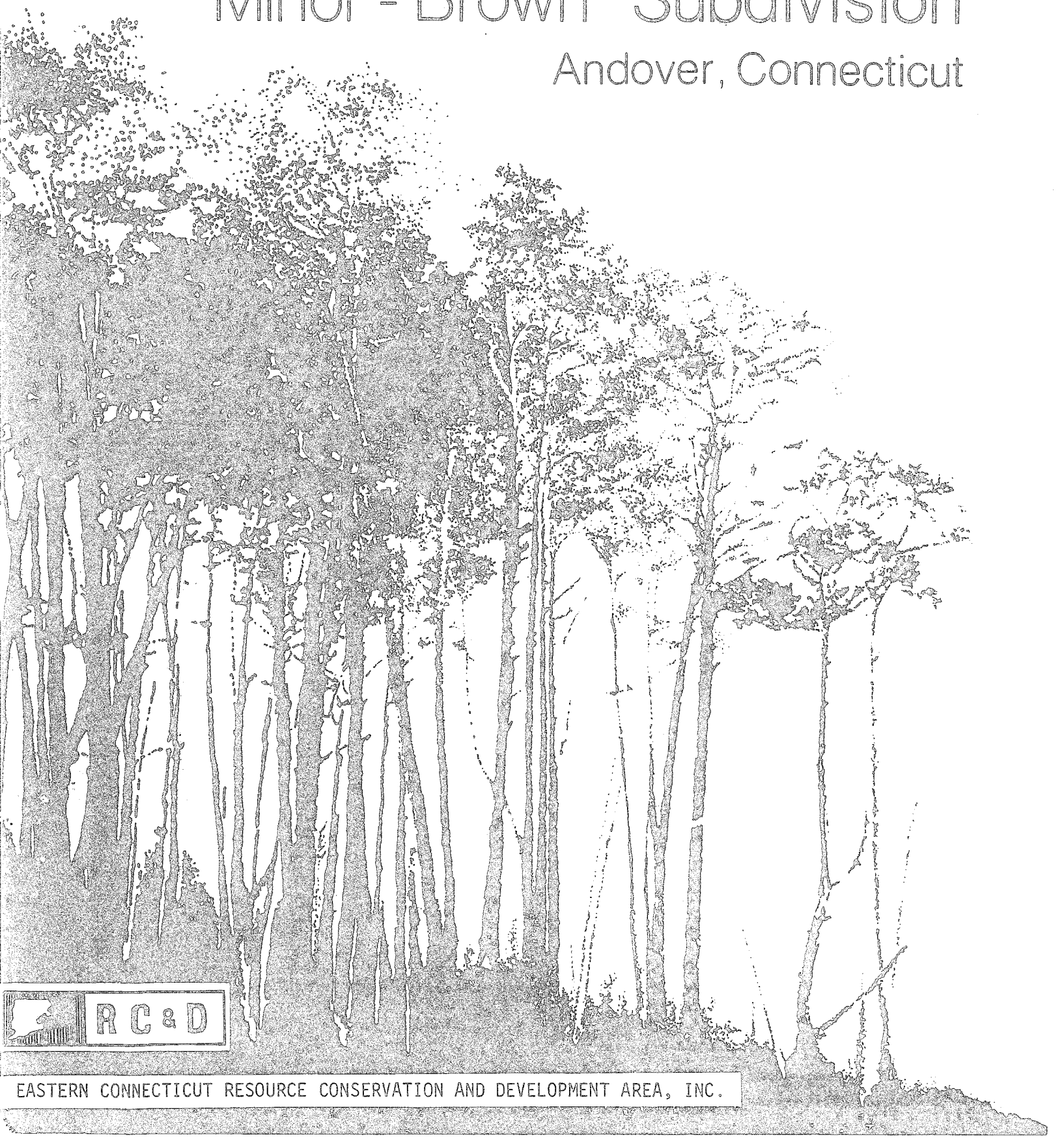
Environmental Review Team Report

Minor - Brown Subdivision

Andover, Connecticut

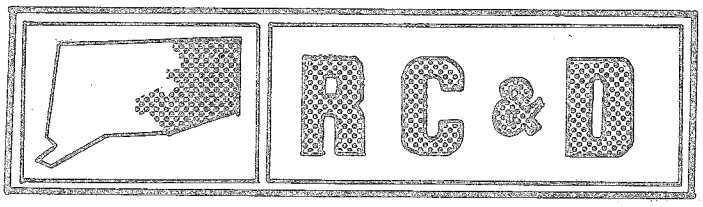


R C & D

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team Report on Minor - Brown Subdivision Andover, Connecticut

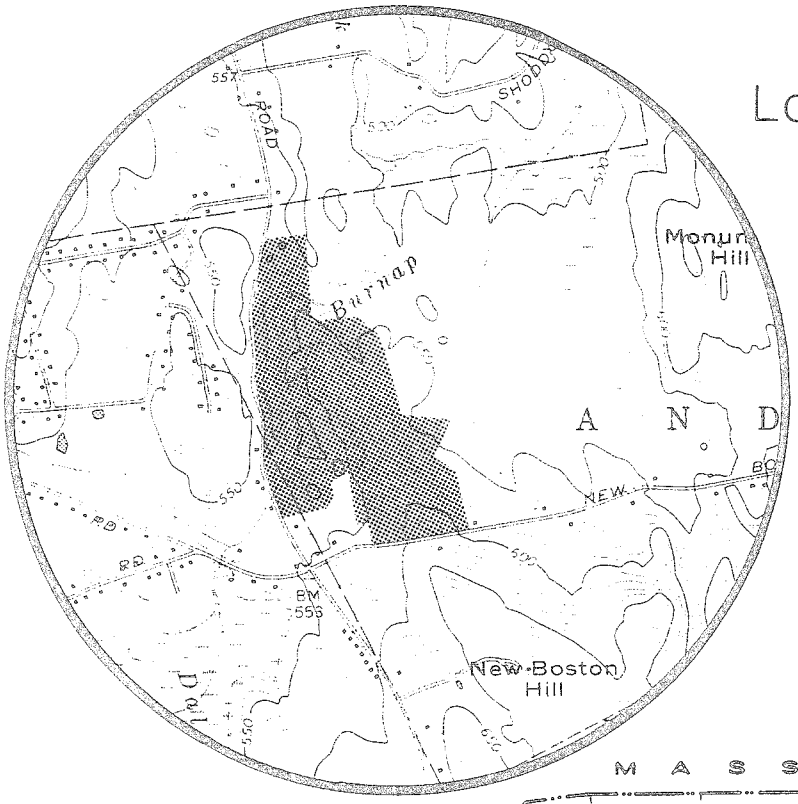
April 1981



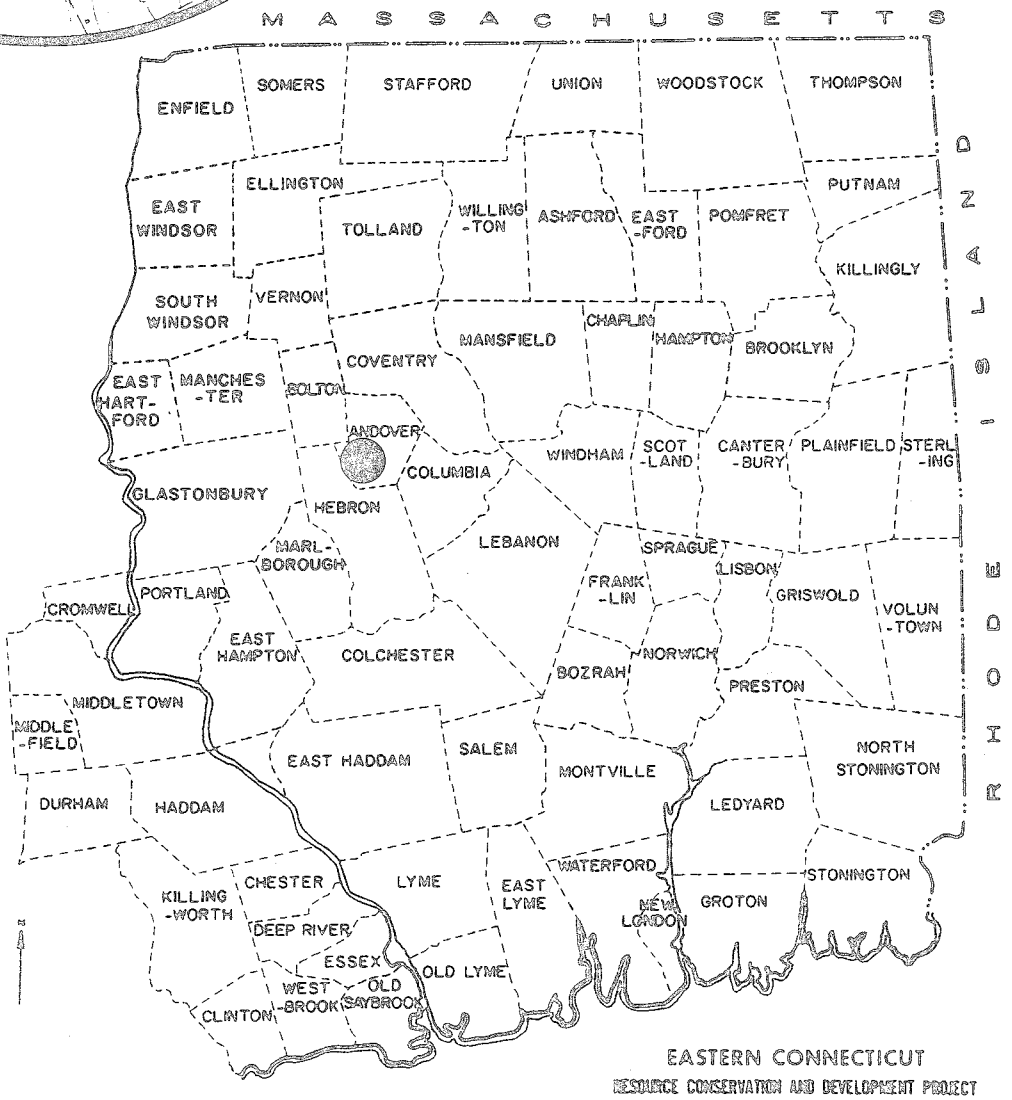
eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site



MINOR - BROWN SUBDIVISION
ANDOVER, CONNECTICUT



EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
MINOR-BROWN SUBDIVISION
ANDOVER, CONNECTICUT

This report is an outgrowth of a request from the Andover Planning and Zoning Commission to the Tolland 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 was reviewed by the Eastern Connecticut Environmental Review Team (ERT).

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

The ERT that field-checked the site consisted of the following personnel: Joseph Neafsey, District Conservationist, Soil Conservation Service (SCS); Michael Zizka, Geologist, Connecticut Department of Environmental Protection (DEP); Rob Rocks, Forester, (DEP); Chuck Phillips, Fisheries Biologist (DEP); Thom Hooper, Regional Planner, Capitol Region Council of Governments; Don Capellaro, Sanitarian, State Department of Health, Tim Dodge, Resource Conservationist, (SCS); and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

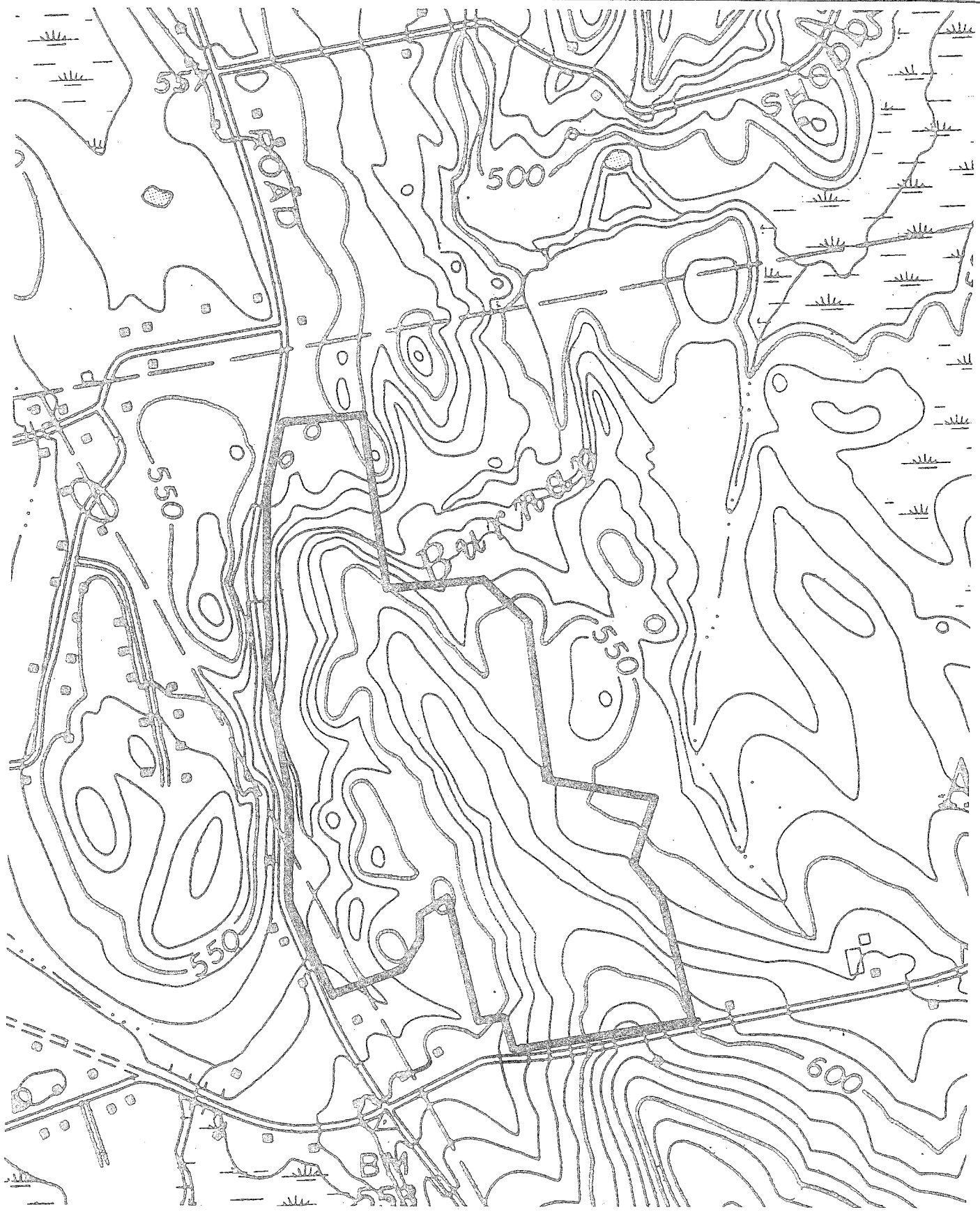
The Team met and field checked the site on Thursday, March 19, 1981. Reports from each contributing Team member were sent to the ERT Coordinator for review and summarization for the final report.

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

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

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

Topography



INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment of a proposed subdivision in the towns of Andover and Hebron. The 85± acre site is located on Boston Hill Road and East Street. The property is presently being handled by Fireside Realty. Preliminary plans were prepared by Douglas Prior, Land Surveyor. Richard Dimmock and Associates have prepared engineering plans for certain sections of the subdivision.

Preliminary plans show eighteen lots of two or more acres each. Sixteen of these lots have road frontage on East Street or Boston Hill Road, two lots are rear lots with 50 feet of frontage each on Boston Hill Road. The rear lots are approximately eight acres in size. All lots will have on-site wells and on-site septic systems. Access to lots 16, 15, 14, 13, 12, 11, 10, 9, and 8 will be provided by bridges crossing Burnap Brook, which runs along the site's western boundary.

The property is wooded at present, although many large trees were removed during a timber harvest in 1975. The topography of the site is characterized by a central ridge which slopes steeply to the brook. Soils typical of the site include the Hollis series, the Paxton series, the Woodbridge series and the Leicester, Ridgebury and Whitman series, a regulated wetland soil under Public Act 155.

The Team is concerned with the effect of this development on the natural resource base of this site. Although severe limitations to development can be overcome with proper engineering techniques, these methods may become costly, making a project financially unfeasible for a developer. The feature of this project which will have the major environmental and financial impact is that of the four driveway crossings designed for Burnap Brook. Detailed discussion of Team member's concern for this aspect of the design can be found in following sections of this report. An alternate design plan has been prepared by the Team, and was discussed with the developer during the field review. This plan eliminates many of the major Team concerns by utilizing the more easily developable soils in the eastern section of the site, eliminating numerous driveway crossings of Burnap Brook and eliminating numerous driveway cuts onto a very winding section of East Street. This plan, however, may be financially unfeasible for the developer, as it would require installation of approximately 3500 feet of new roadway.

Other concerns expressed by the Team include the needs for strict erosion and sediment controls during construction, especially in the area near Burnap Brook; and the need for bedrock delineation on the subdivision plan.

Bedrock Geology
(adapted from U.S.G.S.
Map GQ-791)

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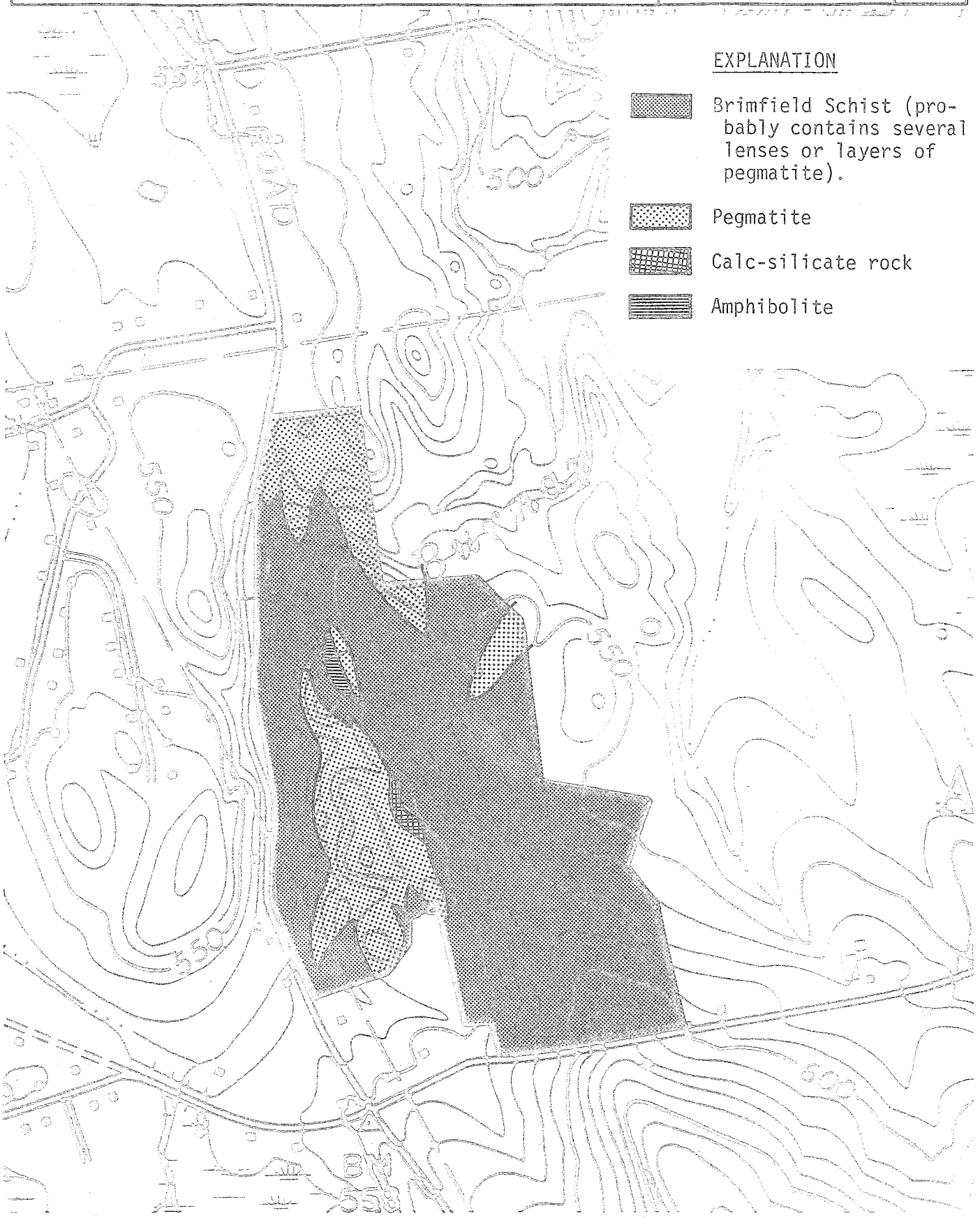

ENVIRONMENTAL ASSESSMENT

GEOLOGY

The proposed subdivision site is located in a section of Andover that is included in the Marlborough topographic quadrangle. A bedrock geologic map of the quadrangle (Map GQ-971 by G.L. Snyder) and a surficial geologic map of the quadrangle (Map GC-1504 by D.W. O'Leary) have been published by the U.S. Geological Survey. Those maps may be used to supplement the geologic information contained in this report.

Synder has identified several different rock types in the outcrops on the site. Most of the rock exposures, which are particularly concentrated in the western half of the parcel, consist of pegmatite, a very coarse-grained rock. The major mineral constituents of the pegmatite are quartz, albite, oligoclase, microcline, muscovite, biotite, and tourmaline. The pegmatite is relatively resistant to weathering as compared to the surrounding bedrock types; this explains the prominence of pegmatite in outcrops. The pegmatite is considered to be an intrusive rock which formed by the solidification of hot liquids or vapors in spaces in the older, surrounding rocks. The latter are collectively identified as Brimfield Schist, which mainly consists of rusty to silvery, medium-to-coarse-grained schist composed of oligoclase, quartz, muscovite, biotite, and garnet. "Schist" is a term given to rock which, under high pressure and temperature conditions, was altered in such a way that most of its mineral constituents were aligned parallel to each other. Parting surfaces are usually numerous and give the rock a slabby appearance. These surfaces are also generally lined with mica flakes, which impart a distinct sheen to the rock. Test pits in the eastern section of the site brought up many fragments of schist, most of which could be crushed easily in the hand. The schist consequently has been described as "rotten rock." Interlayered with the schist are local lenses of calc-silicate rock and hornblende-rich rock (amphibolite). The distribution of the various bedrock types on the site is shown in an accompanying illustration.

The types of bedrock encountered on the site have implications with regard to the need for blasting and with regard to well-water quality. The weak schists dominate the eastern half of the site. Although bedrock may be encountered during construction in this area, the upper few feet of it, at least, will probably yield easily to a back hoe. Consequently, little need for blasting is foreseen in this section. In the eastern section, relatively resistant pegmatites are predominant. Blasting is therefore more likely to be needed in this section, especially in proposed lots 9 and 10. As to well-water quality, the Brimfield Schist has been known to cause high iron, manganese, and sulfate concentrations in groundwater. This results from the dissolution of minerals that contain those elements. Since Brimfield Schist probably underlies as well as adjoins the less problematic pegmatites, deep wells can be expected to intersect at least some schist. Homeowners should therefore at least be prepared to obtain filters for their water, although it is entirely possible that no serious mineral content problems will arise.

Surficial Geology
(adapted from U.S.G.S.
Map GQ-1504)

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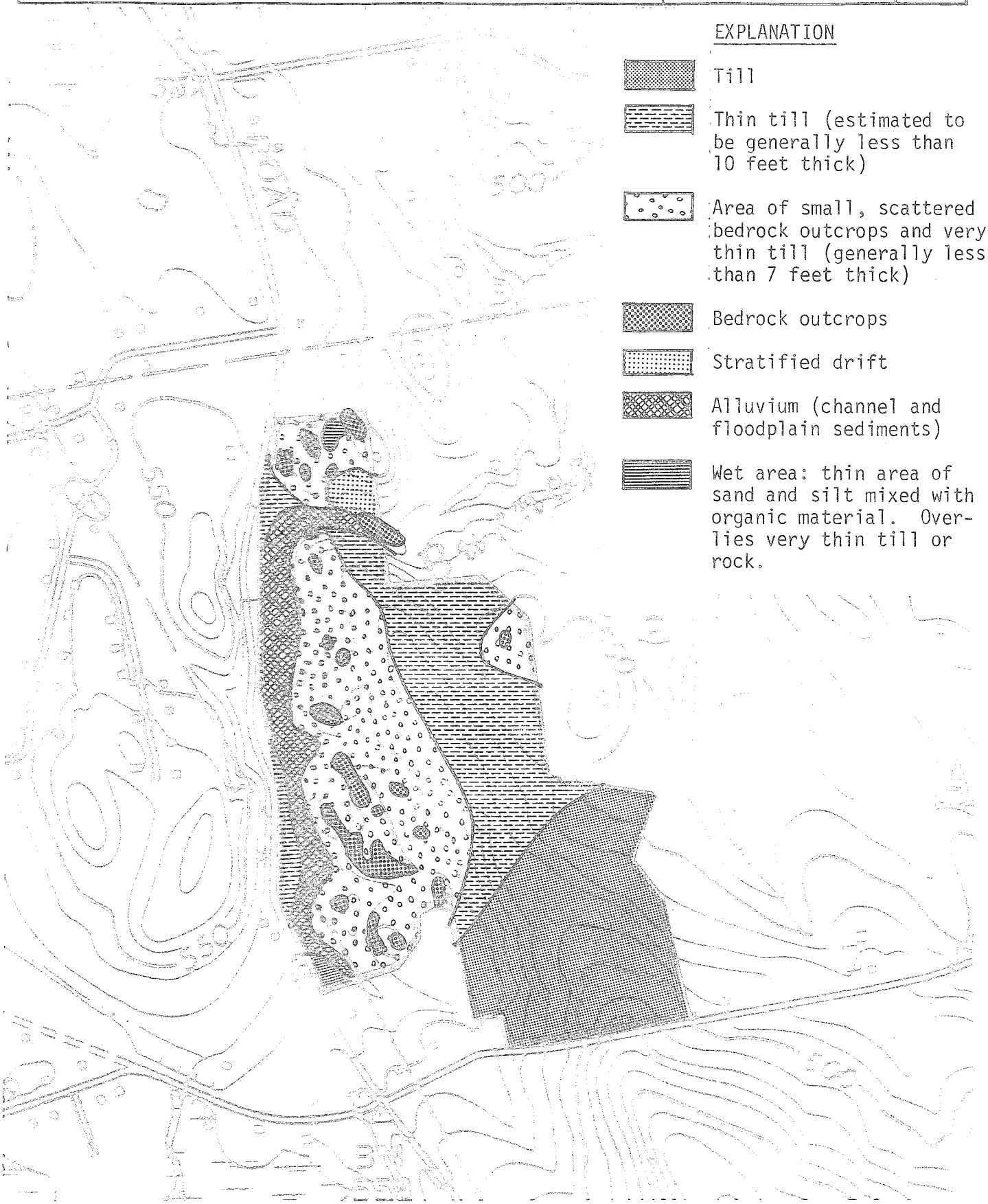

Bedrock is overlain in most parts of the site by sediments that were deposited directly from an ice sheet. These sediments, called till, are non-sorted (i.e., they are thoroughly mixed by grain size) and they usually contain the full range of clay, silt, sand, gravel, and boulders. Although the texture of the till varies, it is commonly sandy, stony, and relatively loose in the upper few feet or in shallow-to-bedrock areas, and siltier and very compact at depth. Till is commonly called "hardpan," although this term also has a specific meaning in soils descriptions.

The flat, narrow valley of Burnap Brook contains thin accumulations of sand, gravel, and silt which were deposited during flood stages or by channel accretion. As the brook leaves the site, it passes into an area of glacial meltwater deposits, called stratified drift. The sediments constituting the stratified drift are sorted because of their deposition by glacial streams. Sand and gravel are the major components. There is probably too little stratified drift on the site to have any real commercial value, although local mining for fill is possible.

The Team suggests that the developer delineate bedrock exposures on the subdivision plans. This will help the town evaluate those lots in which shallow-to-bedrock conditions may become limiting factors. For instance, it would allow an added appreciation of the position of bedrock with respect to septic systems proposed for lots 14 and 18, and with respect to the driveways for lots 9 and 10.

HYDROLOGY

Burnap Brook flows northward along the western boundary of the site, curves eastward through the northern section, and thereafter flows north-northeast to join Hop River. At the point where it leaves the parcel, the brook has a watershed area of approximately 1670 acres. Present plans call for placing four double driveways over the brook to service lots 9-16. Each driveway crossing would contain two 40-foot-long, 5'1" by 7'0" culvert pipes. The proposed size (diameter) of the pipes was based on a Rational Method estimate of the anticipated 100-year-frequency peak flow in Burnap Brook. It should be noted that peak-flow calculations for ungaged streams may be made by several methods and that the results may vary greatly. The SCS runoff-curve number method, for instance, would produce higher estimates for peak flows than the estimates derived by the developer's engineer. The Team notes these differences only to point out the uncertainty involved in this type of calculation, and not to suggest a preference for one method over others. The developer's estimate is based on a well-established procedure, and it therefore provides a reasonable prediction for the 100-year-frequency peak flow. However, the value used for the coefficient of imperviousness in the developer's calculations would probably be too low, should the watershed of Burnap Brook experience substantially more development. Because the major portion of the watershed is located in the town of Hebron, the town of Andover will not be able to insist on runoff controls that would mitigate the peak flow increase that further development could generate. In addition, the Hebron section of the watershed seems to be a prime area for development, as the present subdivisions in the northernmost part of that town attest. For these reasons, it may be worthwhile to recalculate the 100-year peak flow using a higher value for the coefficient of imperviousness.

The Minor-Brown subdivision itself would cause increased runoff to Burnap Brook. This additional runoff would augment peak flow, but only by a very small percentage. The reason the percentage would be small is that the Minor-Brown site represents only about 5 percent of the overall watershed and the density of the subdivision would be small (more than 4 acres per residence). The Team ordinarily recommends that runoff-control measures be considered in the development of subdivisions in order to prevent additional flooding or erosion problems from occurring downstream. While the impact of any single development may be small, the cumulative impact of unregulated runoff from many developments in a watershed may be severe. Nevertheless, the density of the development proposed for the Minor-Brown site is so low that runoff-control measures for the subdivision do not seem to be so important. It should be cautioned, however, that if the large lots are resubdivided, producing a greater overall residential density on the site, runoff considerations would again be involved.

The town questioned the effect of the septic tanks on water quality. If the systems are improperly designed or installed, there may of course be problems. This would be true for any septic tank in any subdivision or other areas. Assuming, however, that the systems function properly, there should be little or no deterioration of water quality. The overall subdivision density is too low to create any problem in itself. It does appear, on the other hand, that high seasonal watertables and shallow-to-bedrock conditions will necessitate engineered septic systems on many lots. If the installation of such systems is carefully supervised by local health officials, no significant problems should arise. In terms of water-quality protection, the greatest care should be used in the installation of septic systems on lots 17 and 18, and also on lots 14, 15, and 16 if the systems on those lots are to go in the areas presently designated in the plans. The question is not really whether septic effluent will enter the wetlands or the brook; because of normal groundwater flow patterns, it almost certainly will. This is not necessarily a problem. The question is whether the effluent will be adequately purified by the soil before it enters the wetlands or stream. With proper controls and precautions, such purification will occur.

SOILS

A detailed soils map of this site is included in the Appendix to this report, accompanied by a chart which indicates soil limitations for various urban uses. As the soil map is an enlargement from the original 1320 feet/inch scale to 660 feet/inch, the soil boundary lines should not be viewed as absolute boundaries, but as guidelines to the distribution of soil types on the site. The soil limitation chart indicates the probable limitations for each of the soils for on-site sewerage, buildings with basements, buildings without basements, streets and parking and landscaping. However, limitations, even though severe, do not preclude the use of the land for development. If economics permit large expenditures for land development and the intended objective is consistent with the objectives of local and regional development, many soils and sites with difficult problems can be used. Ths soils map, with the publication Soil Survey, Tolland County, Connecticut, can aid in the identification and interpretation of soils and their uses on this site. Know Your Land: Natural Soil Groups for Connecticut can also give insight to the development potentials of the soils and their relationship to the surficial geology of the site.

Mr. Lewis Ilgen, a private soil scientist, prepared a detailed soil map for the site and transposed it onto the site plan. This information appears to be substantially correct. Soils on the site are mapped as follows:

Soil Symbol	Soil Series	Slope
PbB*	Paxton fine sandy loam (f.s.l)	3-8%
PbC	Paxton f.s.l.	8-15%
PdB	Paxton stony f.s.l.	3-8%
PdC	Paxton stony f.s.l.	8-15%
PeC	Paxton very stony f.s.l.	3-15%
Lg**	Leicester, Ridgebury, Whitman very stony complex	
HrC	Hollis very rocky f.s.l.	3-15%
HrE	Hollis very rocky f.s.l.	15-35%
WzC	Woodbridge very stony f.s.l.	8-15%

* Inland Wetlands as defined by P.A. 155 as amended
** Prime Farmlands as defined by USDA Soil Conservation Service

The Paxton series is a deep upland soil formed over compact glacial till or "hardpan". The hardpan is discontinuous in this area; but where present, is 16 to 36 inches below the soil surface. Permeability through the pan is drastically reduced and excess water above the pan usually occurs for short periods during spring thaws and heavy rainstorms. The hardpan is the principal limiting factor.

The Hollis series consists of shallow, well drained or somewhat excessively drained soils formed in acid glacial till from schist and gneiss. Depth to bedrock ranges from 10 to 20 inches. This soil has severe limitations to development, including foundation excavations and on-site septic systems. It is possible to find pockets of soil which may exceed 10 feet in depth. If these locations can be identified, septic systems and other development activities may be constructed with little difficulty.

The Leicester-Ridgebury-Whitman complex is an upland soil formed over friable to firm glacial till. It is poorly to very poorly drained soil that has a water table within 6 inches of the soil surface during the wettest months. The soil has a high water table during most of the year. These soils have severe to very severe limitations to most urban uses due to wetness and poor drainage. This series is listed as a Connecticut Inland Wetland regulated under Public Act 155.

The Woodbridge series is a moderately well drained compact till upland soil. It has a moderately high water table during wet seasons. This is the very stony phase, and installation of septic disposal systems is more difficult than the non-stony phase. Hardpan, seasonal high water table, and stones are the primary limiting factors.

The detailed plan for driveway culverts across Burnap Brook appears adequate. If this plan is implemented as proposed and construction proceeds during a low flow period, loss of silt to the stream will be minimized.

A detailed erosion and sediment control plan should be developed for the remainder of the driveway construction phase of the proposal if this concept is approved. The plan should detail actions to minimize loss of silt to Burnap Brook. If driveways are to remain gravelled, consideration should be given to measures which will prevent erosion and subsequent siltation of wetland and the watercourse. On request, the Tolland County Soil and Water Conservation District can review this plan to ensure adequacy.

The most severe impact of this proposal is the four driveway crossings of Burnap Brook. These driveways will intercept the continuity of the wetland-stream corridor and the cost for construction will be considerable.

An alternative to consider is maximizing the use of the best soils on the property. These exist on the eastern half of the parcel. A denser development on the better soils will eliminate the need to make repeated wetland and stream crossings and avoid use of shallow to bedrock soil. It would be the responsibility of the Planning and Zoning Commission to adopt policies that would encourage an alternative type of development. The conditions on this parcel of land drastically illustrate the need for innovative policies that can promote good land use.

VEGETATION

The 85± acre site is completely forested at present. Four vegetation types can be distinguished within this tract, they include three mixed hardwood areas totalling 67± acres; a streambelt/hardwood swamp area totalling 10± acres; an old field area of 2± acres; and a spruce plantation of 1± acre. Sixty acres of this tract received a harvest in 1975 which removed all merchantable sawtimber-size trees present at that time.

Vegetation Type Descriptions

Type A (Mixed hardwoods). This 60± acre mixed hardwood stand was harvested of all its saleable sawtimber-size trees in 1975. The trees remaining are sapling to pole-size white oak, red oak, black oak, red maple, black birch, white ash, shagbark hickory, mockernut hickory and scattered pitch pine. Many of these trees have excessive branching on their trunks. These branches, referred to as "epicormic branches", were formed by the stimulation received by direct sunlight reaching the tree trunks after harvest of adjacent trees. These branches lower the value of these trees for future timber.

The understory is comprised of seedling-size eastern white pine, eastern hemlock and American chestnut with blue beech, maple leaf viburnum, witch hazel, azalea, winterberry and various other hardwood tree seedlings. Grasses, club moss, Christmas fern, Canada mayflower, rattlesnake plantain, striped pipsisewa, raspberry, wild strawberry and huckleberry form the ground cover in the drier sections of this area. Cinnamon fern, hayscented fern and steeple bush are present where more ground moisture is available.

Vegetation

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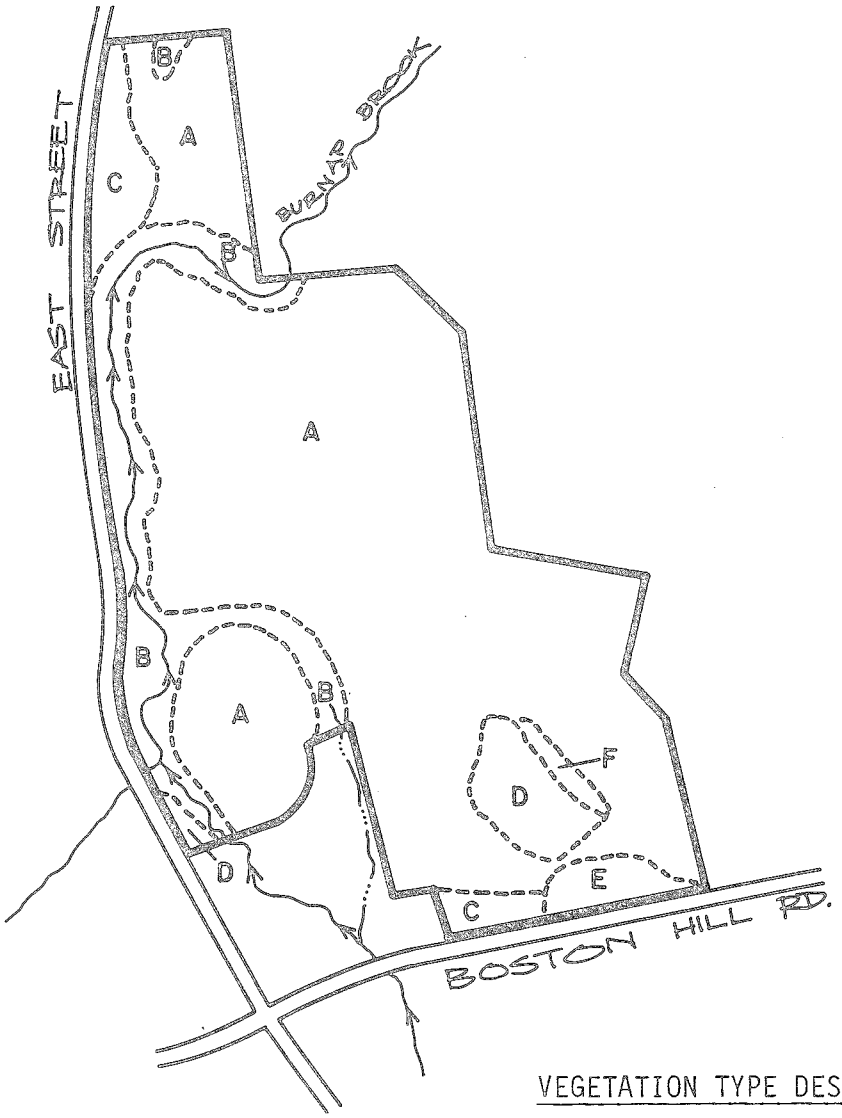


LEGEND

- Roads
- Property Boundary
- Vegetation Type Boundary
- Stream
- Intermittent Stream

VEGETATION TYPE DESCRIPTIONS*

TYPE A. Mixed hardwoods, 60±acres.

TYPE B. Streambelt/hardwood swamp, 10±acres.

TYPE C. Mixed hardwoods, 4±acres.

TYPE D. Mixed hardwoods, 3±acres.

TYPE E. Old field, 2±acres.

TYPE F. Plantation, 1±acre, Norway Spruce.

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

Type B (Streambelt/mixed hardwoods). The vegetation in this area is quite variable. Pole and sawtimber-size red oak, sugar maple, red maple, white ash, and black birch are present between Burnap Brook and East Street. While sapling and pole-size red maple, yellow birch and white ash are present east of the brook and deeper within the property. These areas are fully-stocked. The understory throughout these areas is made up of spice bush, swamp azalea, highbush blueberry and witch-hazel. Ground cover consists of skunk cabbage, false hellebore, tussock sedge, sphagnum moss, spirea, cinnamon fern, Christmas fern, sensitive fern and poison ivy.

Type C (Mixed hardwoods). These two areas which total $4\pm$ acres are fully-stocked with pole to sawtimber-size white oak, black oak, black birch, red maple and white ash. Sassafras, witchhazel, azalea, maple-leaf viburnum, chestnut sprouts and eastern white pine seedlings are present in the understory. Ground cover is made up of club moss, grasses, wild strawberry, raspberry, Christmas fern, evergreen woodfern, hayscented fern, partridgeberry and striped pipsissewa.

Type D (Mixed hardwoods). Sapling-size red maple, black cherry, shagbark hickory, gray birch, eastern red cedar, quaking apen, and big-tooth aspen are present in this over-stocked stand. Understory and ground cover vegetation is scarce in this stand, because of the dense overstory.

Type E (Old field). Approximately 2 acres of this property is understocked with seedling to sapling-size eastern red cedar, red maple, quaking aspen, apple trees, black oak and shagbark hickory. Other species present include red cedar, steeple bush, meadow sweet, bayberry, highbush blueberry, goldenrod, grasses and club moss.

Type F (Plantation). Several rows of pole-size Norway spruce are present in the south central portion of this tract. The size of this plantation is approximately one acre. No understory or ground cover vegetation is present.

The tops which were left after most of the largest trees were harvested from this parcel are still present and reduce the aesthetic value of the area. The removal of these tops whould be beneficial. The aesthetic quality of this tract would be improved greatly if the tops were removed. As these tops still have value for fuelwood, their removal could provide up to two cords of fuelwood per acre.

Many of the larger trees which are present in the streambelt area have high aesthetic value, and provide valuable shade for Burnap Brook. The trees in this area should be retained to the greatest extent possible. Any disturbances in this area may cause increased soil erosion, potentially degrading the water quality of Burnap Brook. Disturbances may also accelerate the loss of the trees in this area to windthrow. Some of the trees in this area are therefore susceptible to windthrow.

Permanent stream crossings if they are constructed should not block or restrict natural flows. Blocking or restricting natural flows may cause water to pond up over vegetation roots. This condition, if long term, may result in considerable mortality of the trees, shrubs and herbaceous vegetation growing in these areas.

In an attempt not to accelerate soil erosion or further reduce aesthetics, vegetation clearing in vegetation type A, vegetation type B, and vegetation type C, (mixed hardwood), should be kept to a minimum. Where clearing must occur, care should be taken not to disturb the trees that are to be retained. In general, healthy, high vigor trees should be favored over unhealthy trees because they are usually more resistant to the environmental stresses brought about by development of the type proposed.

Where feasible, trees should be retained in small groups or "islands". This practice lowers the possibility of soil disturbance and mechanical injury. Individual trees and "islands" of trees should be temporarily, but clearly marked so they may be avoided during construction.

Trees are very sensitive to the condition of the soil within the entire area under their crowns. Development practices near trees such as excavating, filling and grading for construction of roadways and buildings may disturb the balance between soil aeration, soil moisture level and soil composition. These disturbances may cause a decline in tree health and vigor potentially resulting in tree mortality within three to five years. Mechanical injury to trees may cause the same results. Dead trees reduce the aesthetic quality of an area and may become hazardous and expensive to remove if near roadways, buildings or utility lines.

WILDLIFE

Wildlife habitat is provided by the site to animals associated with the woodland community. The site is woodland, although most all merchantable timber has been removed. This action has opened the canopy allowing sunlight to reach the ground. The sunlight in turn has stimulated an understory growth of shrubs and vines including briars, hardwood sprouts of oak and hickory, and shrubs such as viburnum and blueberry. This new understory growth is beneficial to wildlife including white-tailed deer, ruffed grouse, cottontail rabbits and seasonal songbirds. It provides food in the form of buds, twigs, catkins and foliage as well as providing protective cover. Most of the mast (hard fruit and nut) producing trees, have been harvested, leaving the soft maple and birches. Leaving more of the oaks and hickories would have increased habitat values in the existing area.

The understory will persist and be useful to wildlife until the tree canopy develops to the point of shading out the shrubs and vines, or the shrubs and vines grow above a useful height by most wildlife. Development to housing would alter the vegetative pattern, adding lawn areas and ornamental shrubs. A recommendation would include utilizing shrubs beneficial to wildlife (Primarily songbirds) in landscaping operations rather than the traditional ornamentals. Beneficial shrubs produce food in the form of fruit at different seasons of the year, and nesting cover.

Development would increase disturbance by people and pets which would reduce the value of this site as wildlife habitat.

This area is part of a larger relatively undeveloped area of woodland, and wetlands, including Daily, Warner and Merrow and Bishop swamps. Collectively the area provides high quality habitat for wildlife.

Wildlife tend to use stream corridors as routes of travel. Development of a wetland corridor may interupt a travel route. Burnap Brook connects with significant wetland areas upstream and downstream of the site. Development of homes along the wetland margin could force wildlife to use other routes of travel. Due to existing subdivision development to the west of the site, areas of travel would more likely be shifted to the east.

FISH RESOURCES

Much of the segment of Burnap Brook on the property flows through an old pond site. The brook is slow moving as it passes by East Street and would be prone to serve as a catch basin for gravel washing in from the proposed driveways. Downstream of the breached dam the stream gains velocity and becomes a typical woodland stream with well defined riffles and pools.

Several stream fish species would be expected to inhabit Burnap Brook. These would include common shiners, golden shiners, black-nose dace, long-nose dace, fall fish, eels, red fin pickerel, white suckers and brook trout.

While driveways across the stream might be visually aesthetic for residents, four bridges at a width of 40 feet each would remove over a hundred fifty feet of fish habitat. A roadway to service the subdivision in lieu of the proposed driveways would be preferable from a fisheries standpoint.

WATER SUPPLY

Individual water-supply wells drilled into bedrock should adequately serve the needs of homeowners in the new subdivision. Bedrock transmits water mostly by means of its fracture system. The yield of a well therefore depends upon how many fractures it intersects and how much water each fracture is capable of transmitting. Yields of bedrock wells typically are small but reliable. It usually is advisable to space bedrock-based wells as far apart as is practical in order to prevent mutual interference during pumping. A spacing of at least 200 feet is desirable. The Team therefore suggests that the developer consider repositioning the wells planned for lots 3 and 4, 9 and 10, 12 and 13, and 16.

Each well should be located on a relatively high portion of a lot, properly separated from the sewage disposal system and in a direction opposite the expected direction of ground water movement. Of particular concern at this property is the area(s) having shallow depth to ledge rock and steep slope. These adverse conditions can allow for the rapid movement and wide dispersal of sewage along or through seams in the rock without providing adequate filtration and renovating of the sewage effluent. Wells which also derive their source of water from the same cracked and creviced rock formations are subject to a much greater potential hazard. While the minimum separating distance from a sewage disposal system is 75 feet, a greater distance, however, would normally provide additional

protection for a well. Also providing an adequate depth of well casing, tightly sealed into the underlying rock and grouting the annular space around the outside of the casing will help protect the sanitary quality of the ground water.

Water quality in this area may be affected by iron, manganese, and sulfate because of the nature of the underlying bedrock (Brimfield Schist). Although objectionable mineral concentrations are not a certainty, it should be recognized that this problem may arise. Filters are available to alleviate most such problems. Care will be needed in the installation of septic systems on lots with shallow-to-bedrock soils in order to prevent contamination of wells by effluent.

WASTE DISPOSAL

Sewage disposal within the parcel would have to be achieved by on site subsurface systems. Based on visual observations and a review of soil service mapping data and deep test hole information, it is apparent that all or most of the property along East Street is poorly suited for subsurface sewage disposal. The major waiting factors in this area are Burnap Brook and wetlands, rock outcrop and slope. Test pit data has also indicated mottling to be generally at a relatively shallow depth.

As you are aware, the State Public Health Code requires the bottom area of the leaching system to be at least 18 inches above maximum ground water level and 4 feet above bedrock. Not only are these separating distances necessary to prevent interference or possible failures with the system but particularly with bedrock to have sufficient overlying soil to allow for adequate treatment of the septic effluent. Experience has shown well pollution is more likely to occur in areas where shallow bedrock is a predominent factor involving a number of building lots with both on-site disposal and water supply wells.

The preliminary subdivision plan indicates about half of the proposed lots along East Street with building and sewage sites toward the upper, rear portions. This upper area along with the area (lots) on and to the rear of Boston Hill Road should generally be more favorable for sewage disposal. However, due to the relative imperviousness of the underlying compact soil layer, a seasonal or perched high ground water condition will be a limiting factor. This condition can probably be controlled by the use of curtain drains and proper surface grading and drainage. In addition, the use of fill may be needed for individual sewage systems.

While a number of test pits have been dug, the Team Sanitarian feels that sufficient tests have not been performed for some of the more questionable lots (areas) along East Street to establish suitability of the tentative areas indicated for primary and reserve leaching systems. Due to the rock and/or water conditions, systems would have to be kept shallow and spread out. Also, systems would probably have to be large. Thus the need for having a relatively sizable area in which the systems may possibly be accommodated.

Generally, subdivision conditions are such that all lots would warrant having detailed engineering design for the sewage disposal systems.

PLANNING/DESIGN CONCERNS

The preliminary plans provided by the developer utilize a rather standard approach to subdivision layout. The lot configurations appear to have been determined by using 200 x 400 feet or greater rectangles, having 200 foot frontages, and minimizing right-of-ways and back lot development. Unfortunately, this method requires bridging Burnap Brook, and associated wetlands with double driveways, entering East Street where less than ideal sight lines exist, and trying to find a suitable building location on the lot after the lot lines are determined.

This site has a number of natural features and resources which could guide a development plan somewhat differently. These features include Burnap Brook and associated wetlands, shallow to bedrock soils and rock outcrops, a natural drainage way in the northwestern portion of the site and a rather flat ridge with deep Paxton soils along the eastern portions of the site.

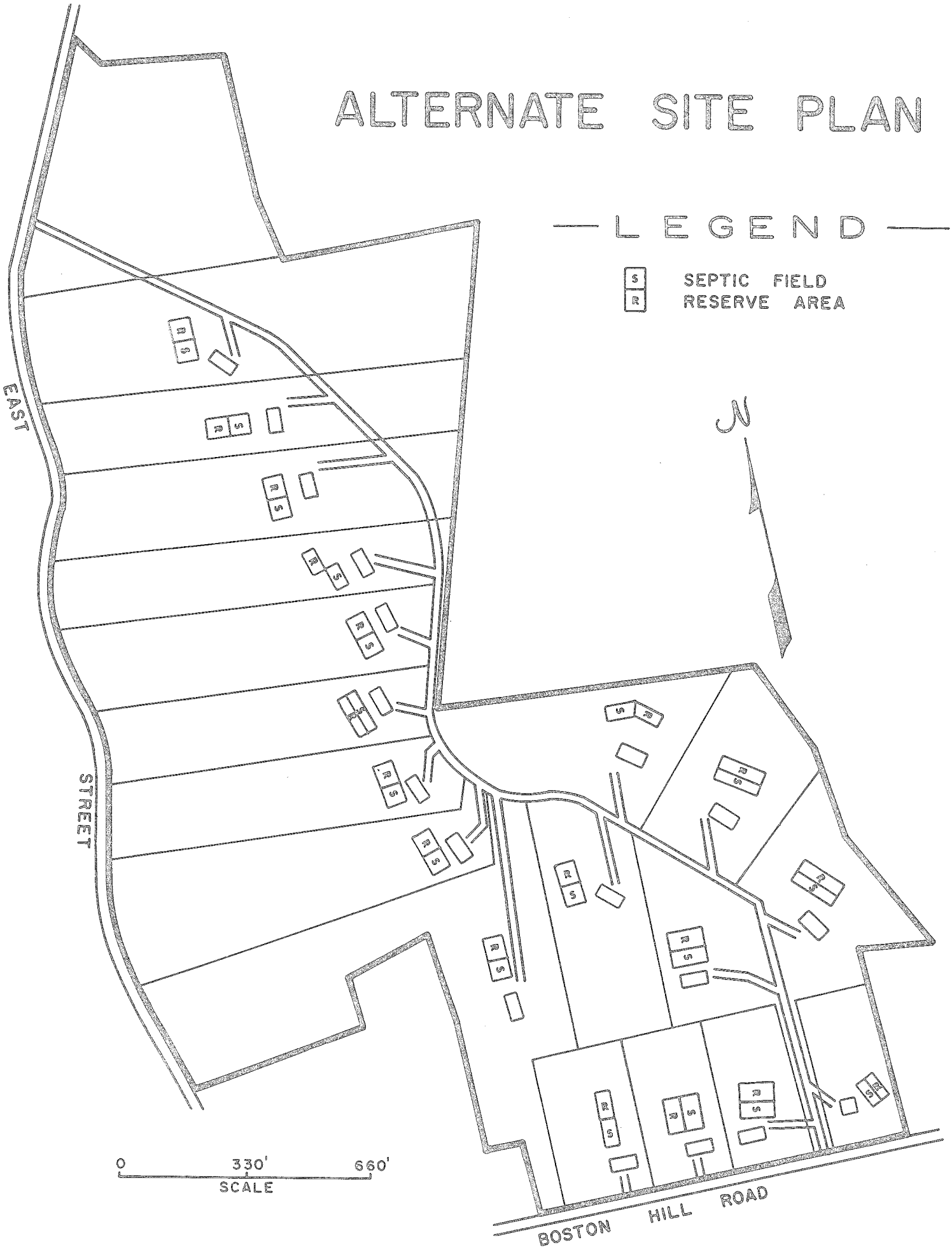
By identifying these features on a map, a configuration could be developed which includes 18 lots of varying acreage; shallow to bedrock soils can be avoided, the natural drainage way can be avoided, Burnap Brook and wetlands crossed one time, driveways kept shorter and laid on the contour as much as practical. This configuration could maximize use of the deeper Paxton soils and the flatness of the ridge which extends generally north to south. Potential erosion and sediment problems would be minimized by this type of development pattern.

A development plan such as this would require an interior road connecting to East Street and Boston Hill Road, a distance of approximately 3,500 feet. Set back lines of 75 feet could be maintained and lots could probably average 3.5 acres.

The major advantages would include preservation of Burnap Brook and retention of the streambelt corridor including its wetlands. Avoiding development on shallow to bedrock soils, fitting homes, driveways and septic systems to the soils and topography, minimizing driveway lengths and steepness of grade, minimizing erosion and sedimentation on the site, preserving fish and wildlife habitat values, and allowing for interior road construction on the contour. All lots could be sited so that surface drainage is away from the houses, and all houses could be above the road elevation.

The major disadvantages are the costs of the interior road construction, and the irregular shape of some lots. While the interior roadways would be expensive, some of that cost would be offset by fewer bridge crossings and shorter driveway lengths. There is now approximately 8,000 feet of driveway needed. That amount could be reduced to about 4,000 feet.

The Town of Andover may wish to consider amending its Planning and Zoning regulations with regard to density of zoning and interior road requirements. Obviously the best land in the town is already developed, less suited land will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BOSTON HILL ROAD

of necessity provide future sites. How future development is guided and somewhat fragile or sensitive areas protected, will be in part the role of Planning and Zoning in its review of development plans. Guidance, by the various commissions, which encourages development that provides the greatest protection of the natural resources should be promoted.

ROADS/TRAFFIC CONCERNS

As currently designed, the creation of 18 residential structures on this site would produce approximately 160-180 vehicle trips per day. The latest (1977) Department of Transportation traffic counts suggests only 600 daily trips can be expected on Boston Hill Road. This minor addition to the present transportation system should be handled with little or no problem. These projections were based on a family size of four people and a slightly higher than average family income. These assumptions are consistent with the type of development which is planned.

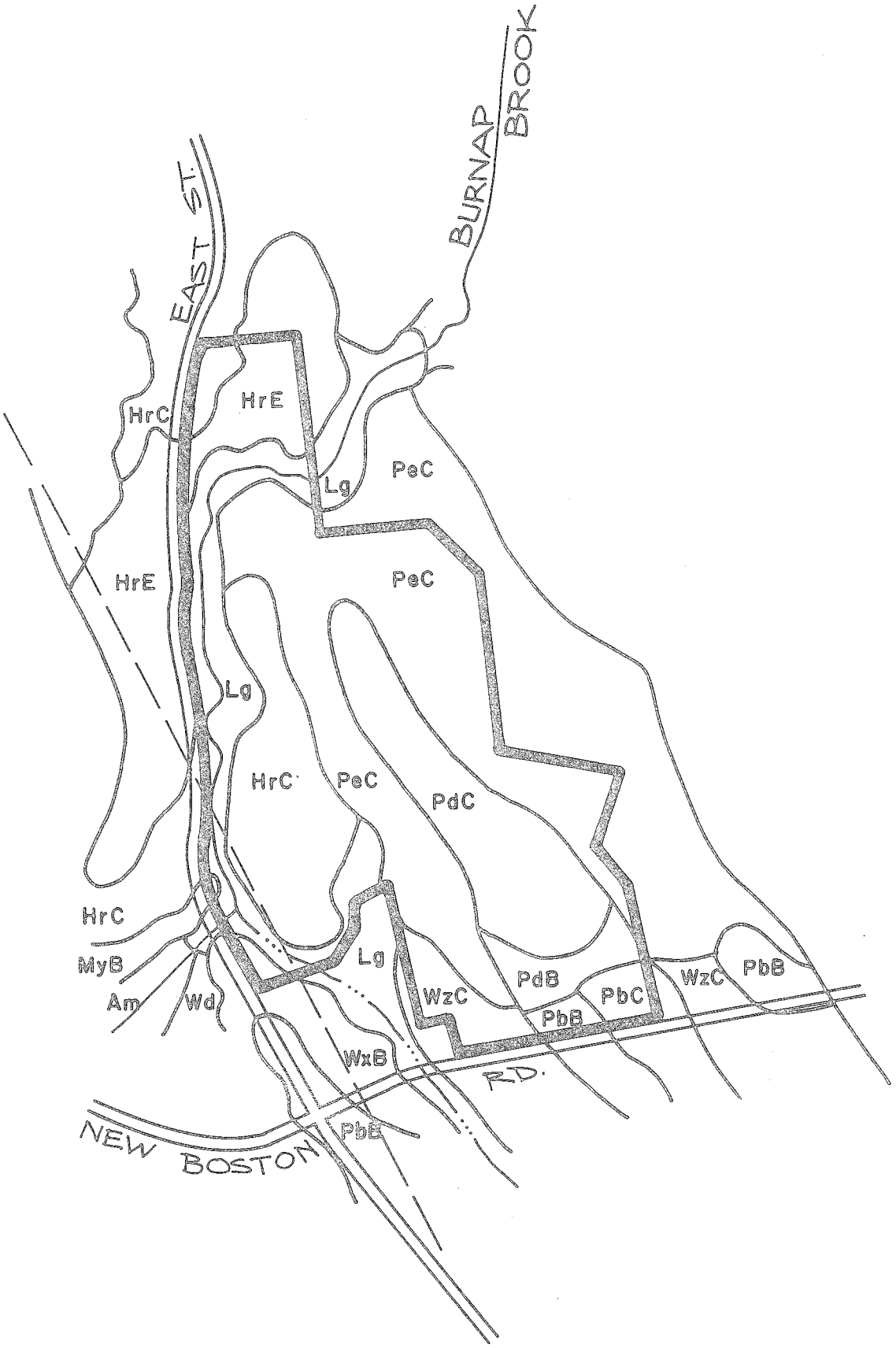
The only concern relative to the transportation system in general would be based on safety considerations. The developer has mitigated some initial concerns by halving the number of curb cut locations. Given an ideal location, one drive per lot would not be of any consequence. In this case, with the winding roadway, restricted sight lines and the concern for Burnap Brook, any attempt to minimize the number of drives should be looked upon favorably.

In working with the developer, the Town should make every attempt to locate curb cuts so that the line of sight is maximized. This may pose a problem in that some of the lot lines may have to be reestablished.

In general, the only transportation concerns are related to the accessing of Boston Hill Road and East Street by the potential home owners. Other than this safety concern, the present transportation system is more than able to accommodate any traffic generated by this subdivision.

Appendix

Soils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WxB
RD.
NEW BOSTON
PbB

MINOR BROWN SUBDIVISION
ANDOVER, CONNECTICUT
PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Urban Use Limitations*			
					On-Site Sewage	Buildings with Basements	Streets & Parking	Land-Scaping
Hollis	HrC	14	16	Slope, depth to rock	3	3	3	3
Hollis	HrE	6	7	Slope, depth to rock	3	3	3	3
Paxton	PbB	2	2	Percs slowly	3	1	2	1
Paxton	PbC	2	2	Percs slowly	3	2	2	2
Paxton	PdB	3	4	Percs slowly	3	2	2	2
Paxton	PdC	15	18	Percs slowly	3	2	2	2
Paxton	PeC	27	32	Percs slowly, large stones	3	3	2	3
**Leicester, Ridgebury & Whitman	Lg	12	14	Large stones, percs slowly, wetness	3	3	3	3
Woodbridge	WZC	4	5	Percs slowly	3	3	3	1
		85	100					

Limitations: 1 = slight; 2 = moderate, 3 = severe.

**Regulated Wetland Soil under Public Act 155.

SOIL INTERPRETATIONS FOR URBAN USES

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

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

Slight Limitations

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

Moderate Limitations

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

Severe Limitations

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

About the Team

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

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

PURPOSE OF THE TEAM

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

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

REQUESTING A REVIEW

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

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