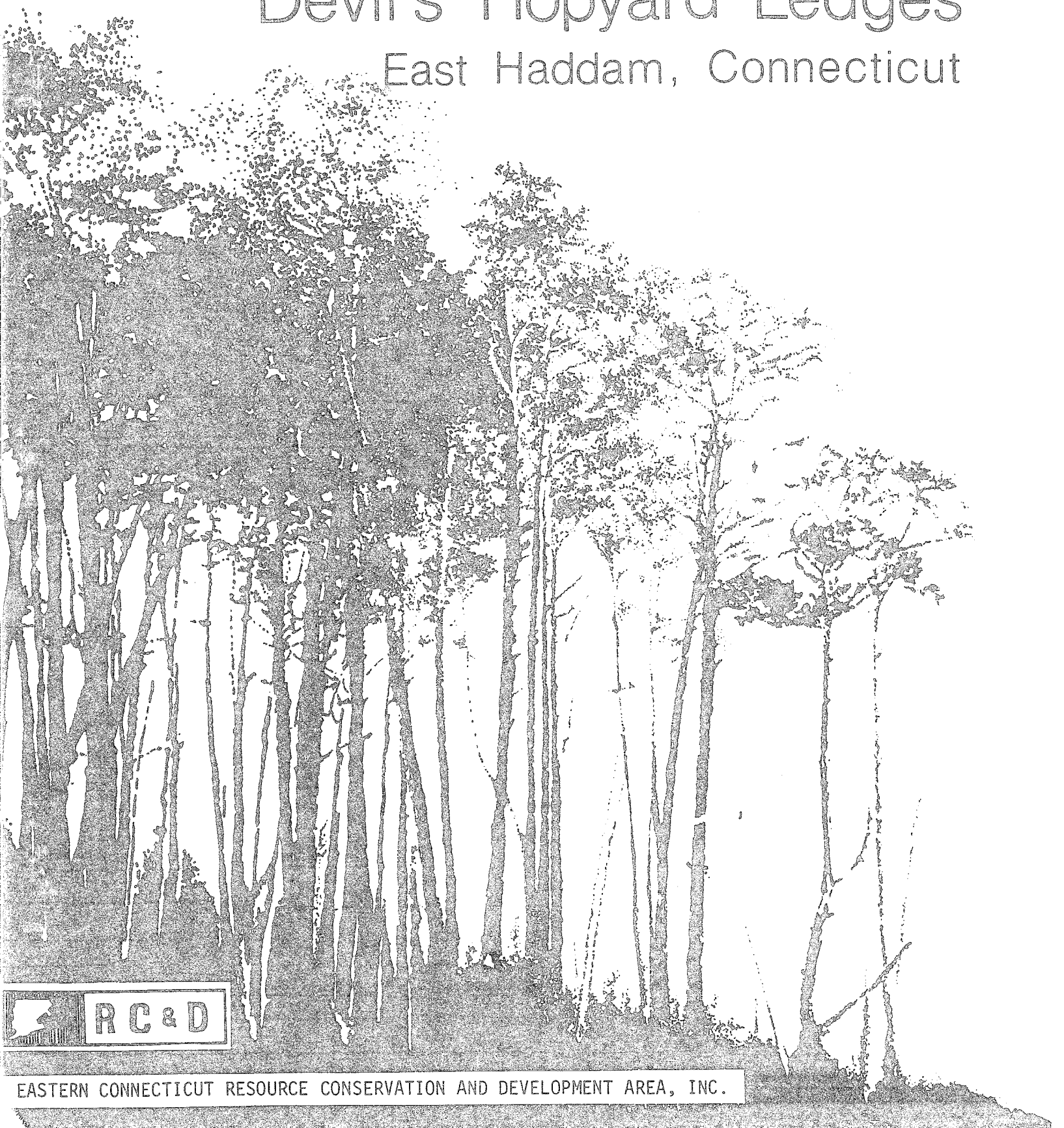
Environmental Review Team Report

Devil's Hopyard Ledges

East Haddam, Connecticut



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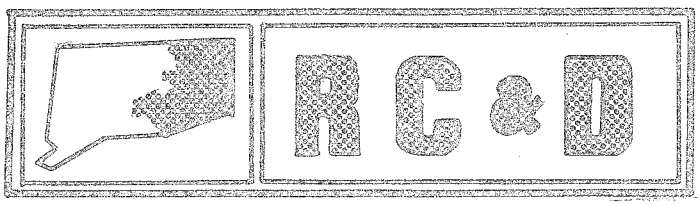
EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team Report
on
Devil's Hopyard Ledges
East Haddam, Connecticut

January, 1982

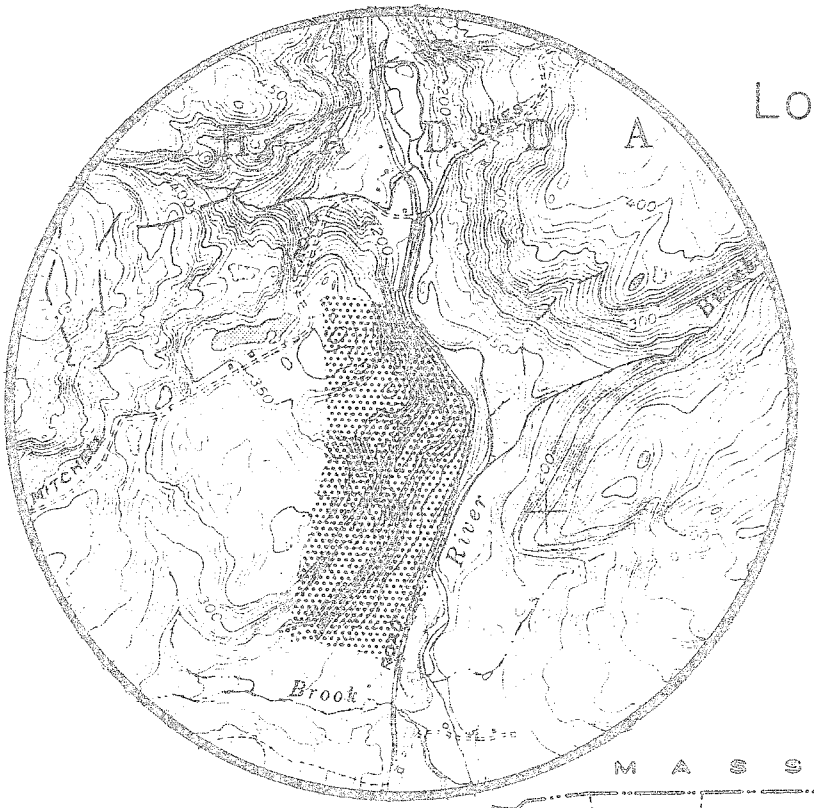


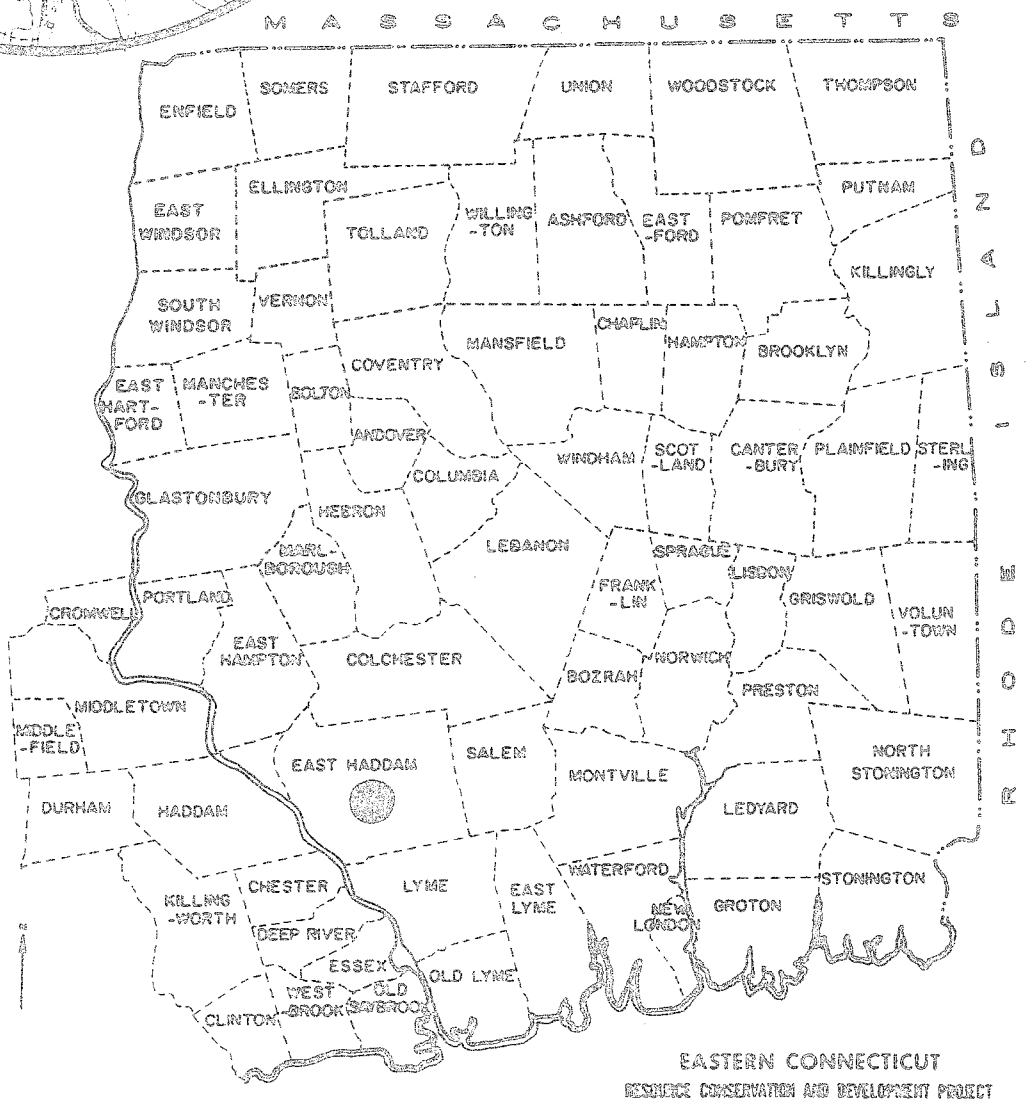
eastern connecticut resource conservation & development area

environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site

DEVIL'S HOPYARD LEDGES
EAST HADDAM, CONNECTICUT





EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
DEVIL'S HOPYARD LEDGES
EAST HADDAM, CONNECTICUT

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

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

The ERT that field-checked the site consisted of the following personnel: Barry Cavanna, District Conservationist (SCS); Mike Zizka, Geologist, Connecticut Department of Environmental Protection (DEP); Rob Rocks, Forester, (DEP); Don Capellaro, Sanitarian, State Department of Health; Karl Lutz, Wildlife Biologist, (DEP); Valerie Zampaglione, Planner, Midstate Regional Planning Agency; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field checked the site on Tuesday, December 1, 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 East Haddam. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

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

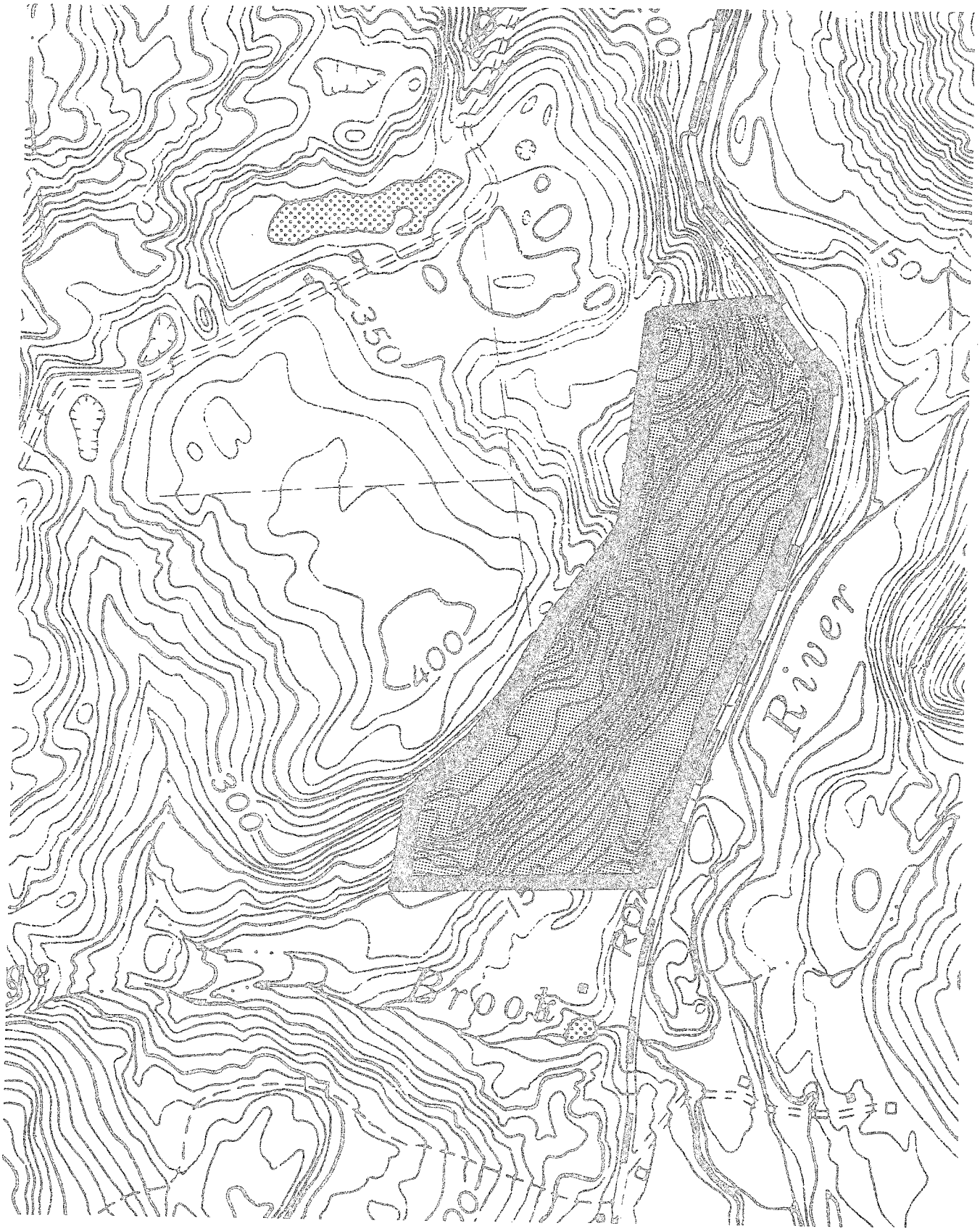
If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.

Topography

Site Boundary

0 660'
scale

N



INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare an environmental assessment of a proposed subdivision, "Devil's Hopyard Ledges" in the town of East Haddam. The site is approximately 60 acres in size and is located on the western side of Devil's Hopyard Road (Route 434). The property is presently in the private ownership of Adele Delfiner, a Norwich resident. Preliminary plans have been prepared by George Dieter, land surveyor.

Plans show the parcel divided into eight lots (numbered 2 through 8); lot 9 is not a part of the subdivision at this time. All lots have frontage on Devil's Hopyard Road. Access to lots would be via individual driveways to Devil's Hopyard Road. Each lot is five or more acres in size and will be served by individual on-site wells and on-site septic disposal systems.

The site is characterized by extremely steep slopes near Devil's Hopyard Road, and approximately 200 feet west of and paralleling the road. A narrow flat strip of land, 25 to 50 feet from Devil's Hopyard Road, will be used for the actual residential development. The site is densely wooded with Canadian hemlock; little understory exists in the actual development area. A stream crosses the property from west to east, cascading down the steep rocky slope and travelling along the base of this slope until it crosses under the road and into the Eight Mile River. A small wetland area is associated with this stream. Most soils on the site are gravelly in nature and well drained.

The Team is concerned with the effect of this development on the natural resource base of the site. Although severe limitations to development can often be overcome with appropriate engineering techniques, these measures can become costly, making a project financially unfeasible for a developer. Major development limitations posed by this site are steep slopes, rapidly permeable soils, wetlands and watercourses. Development concerns involve proper functioning of septic systems, potential for well pollution, sedimentation of the Eight Mile River and establishment of driveways on the steep slopes. These issues are discussed in detail in the Hydrology, Waste Disposal and Planning Concerns sections of this report.

ENVIRONMENTAL ASSESSMENT

GEOLOGY

Devil's Hopyard Ledges is certainly well-named. The most striking aspects of the site are the steep western slopes and massive rock outcrops. Bedrock or shallow-to-bedrock soils are found on approximately 85 percent of the property. The only easily buildable portion of the site is the eastern border, where the rocky terrain gives way to a narrow terrace of stratified drift.

The terrace, which adjoins Devil's Hopyard Road, is approximately 250 to 300 feet wide at the southern boundary of the parcel. It narrows toward the

north, ultimately "pinching out" near the mutual boundary of lots 7 and 8. Although most of the terrace is relatively flat, the slope breaks and becomes steep immediately west of Devil's Hopyard Road. Driveways into some of the lots will require cuts through the steep terrace face. In several of the southern lots, the vertical rise to the flat terrace top is 20 to 30 feet. In order to avoid steep driveways, angled cuts into the terrace face will be required. The Team recommends that some of the driveways be combined to minimize the number of cuts.

The stratified drift composing the terrace is a glacial sediment, which was deposited by rapidly flowing meltwater streams. The water sorted the sediment and deposited it in layers and lenses. As a result of the sorting, sand and gravel are the predominant components of the terrace.

On the steep western hillside, bedrock is overlain by thin patches of till, another glacial sediment. Till was deposited directly from the ice and consequently shows little evidence of sorting. Clay, silt, sand, gravel, and boulders are all mixed together.

Two basic types of rock have been described for this site (source: The Bedrock Geology of the Hamburg Quadrangle, Connecticut Geological and Natural History Survey Quadrangle Report No. 19, by Lawrence Lundgren, Jr.). The bedrock in the western third of the parcel is an interbedded assemblage of brownish gray quartz-biotite-plagioclase schist and greenish gray calc-silicate gneiss. "Schist" is a term given to metamorphic (geologically altered) rocks with a strong foliation caused by the alignment of flaky or elongate mineral grains. "Gneiss" is a term given to metamorphic rocks in which thin bands or lenses of elongate or flaky mineral grains alternate with layers or lenses of granular minerals. The bedrock in the eastern two-thirds of the site is primarily a gray, biotitic quartz-feldspar gneiss.

HYDROLOGY

The entire parcel drains into Eight Mile River. Two possible intermittent streams were seen flowing in the northern half of the property on the day of the field review. On stream flows through a culvert at the point where the lot 4 - lot 5 boundary intersects Devil's Hopyard Road. The other stream flows through a culvert at lot 9.

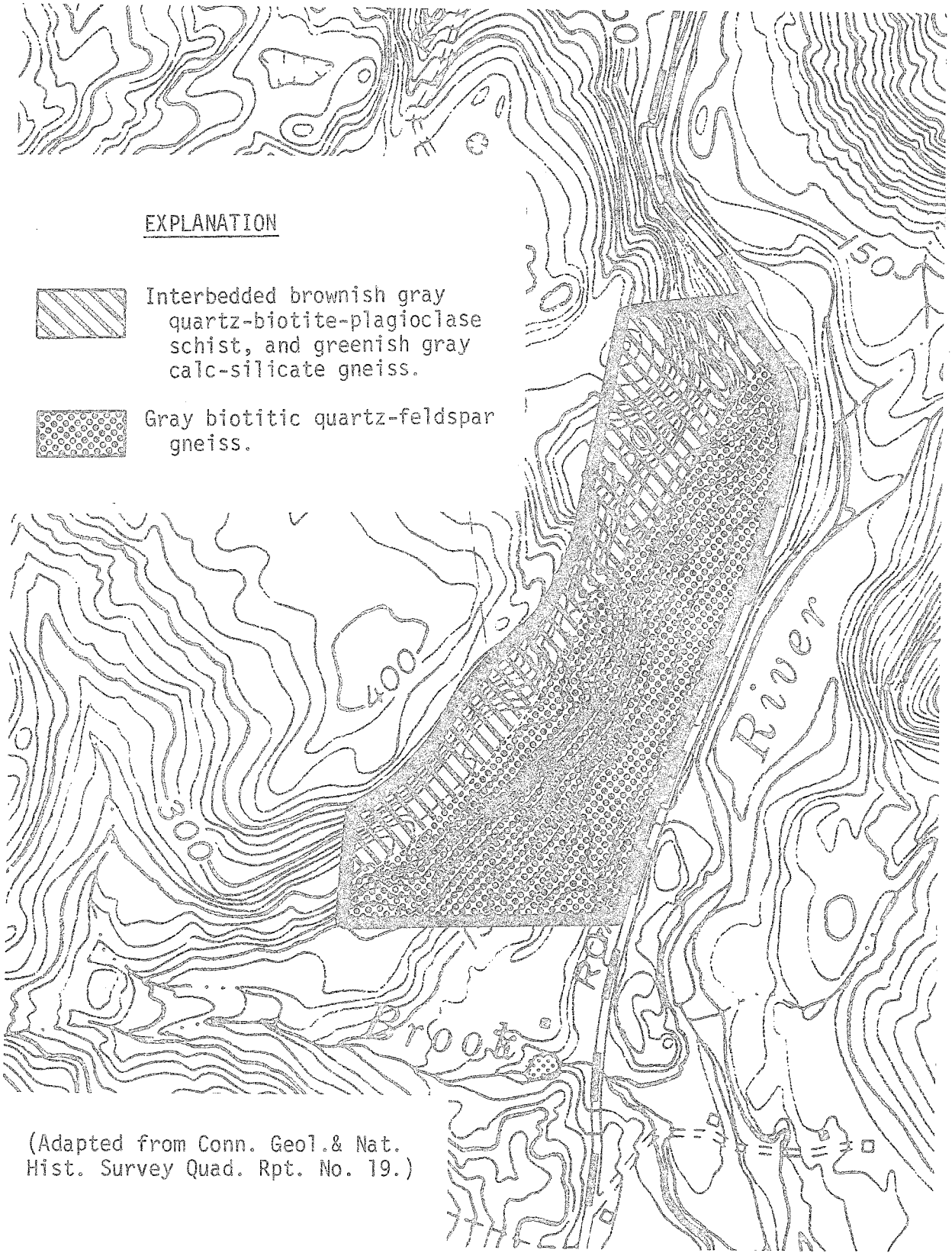
Development of the property as planned will cause increases in runoff. Because of the low development density and the large drainage area of Eight Mile River, there will be no noticeable impact on the river's normal flow rates. The driveways into the lots may become a source of pollution, however. Water flowing down the driveways during storm events or snow melt could carry sand, salt, oils, and other debris into the river. If some of the driveways are combined, the risk of pollution would be correspondingly reduced. If the driveways are gravel paved, the potential for pollution will be small.

The major risk from the driveways would be sand. Although salt and oil may be introduced into the river, the quantities would probably not be significant

Bedrock Geology

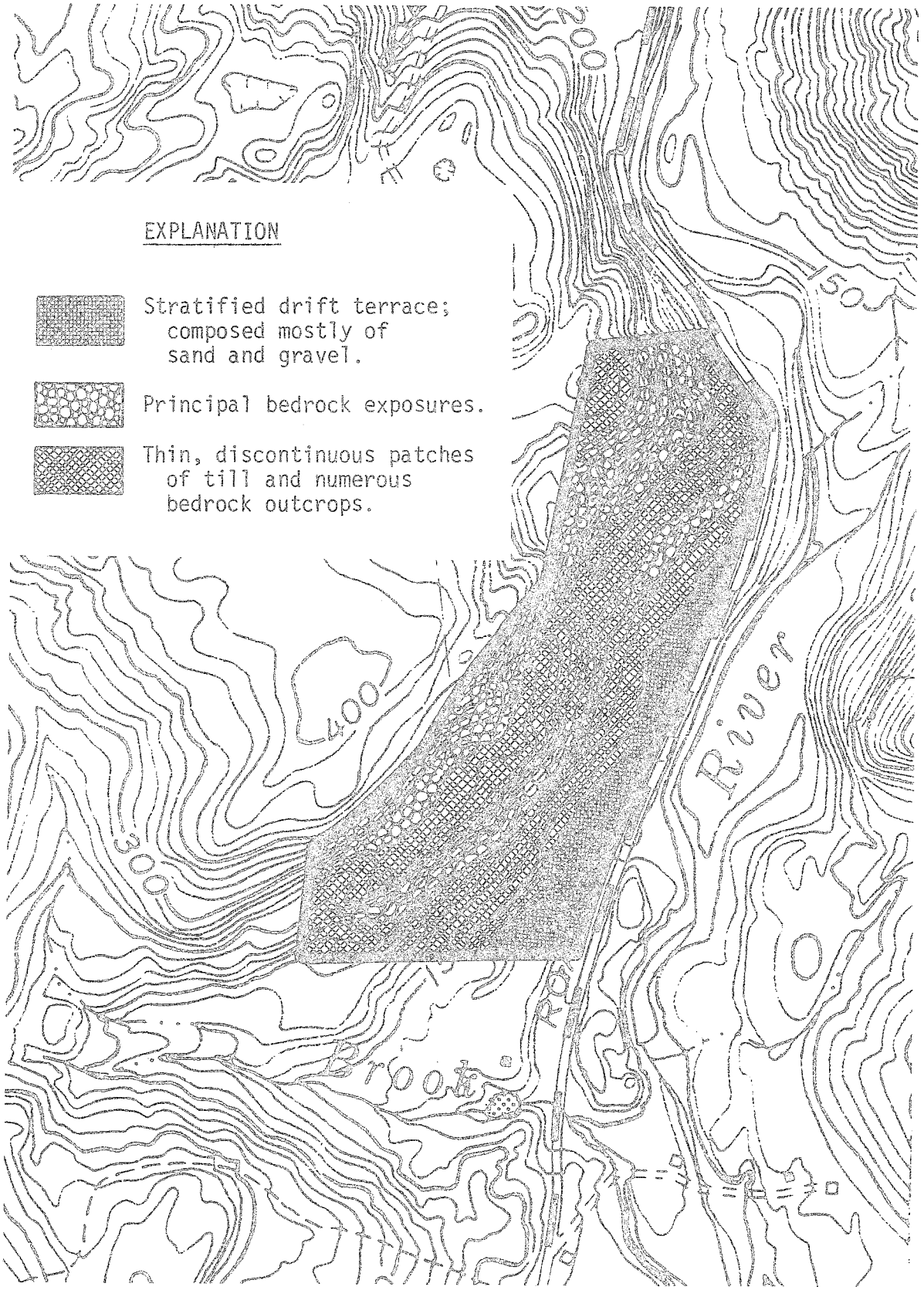
0 660'
scale

N



(Adapted from Conn. Geol.& Nat. Hist. Survey Quad. Rpt. No. 19.)

Surficial Geology



and the contaminants would be likely to move quickly through the river system. It must also be recognized that Devil's Hopyard Road is an existing source of potential contamination. Sand may be a bigger problem, though. Because of the topography of the site, the driveways may have to be moderately to steeply sloped. Sand could be washed quickly down the driveways, across the road, and into the river. Once in the river bed, the sand could tend to accumulate, rather than migrate. Perhaps some type of sediment trap could be designed for the end of the driveways to prevent sand from crossing the road.

One other potential problem is apparent with regard to the driveways. The steep slopes and dense forest cover on and near the property shades much of the sunlight from the parcel. It seemed noticeably colder on the site than it did elsewhere on the day of the field review. For this reason, one may expect ice accumulations at the ends of the driveways during the winter. These ice patches may be dangerous for the subdivision residents and possibly for other drivers on Devil's Hopyard Road. It may be feasible to design a storm drainage system for the driveways to keep runoff from flowing onto Devil's Hopyard Road. This possibility should be investigated. Perhaps the sediment-trapping and driveway drainage measures could be combined.

SOILS

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

Soil series typical of this site include the Agawam series, the Hinckley-Manchester series, the Hollis-Charlton series and the Hollis-rock outcrop series. Detailed descriptions of these soil types follow.

Agawam fine sandy loam, 3 to 8 percent slopes. This gently sloping, well drained soil is on outwash plains and stream terraces. The areas are dominantly irregular in shape.

Typically, the surface layer is dark brown fine sandy loam eight inches thick. The subsoil is dark brown and strong brown fine sandy loam sixteen inches thick. The substratum is dark brown and grayish brown, stratified sand to a depth of sixty inches of more.

Included with this soil in mapping are small, intermingled areas of moderately well drained Ninigret soils, somewhat excessively drained Merrimac soils, and excessively drained Hinckley and Windsor soils. A few areas along the Connecticut River have more red in the substratum than this Agawam soil. Included areas make up 5 to 15 percent of this map unit.

The permeability of this soil is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid or rapid in the lower part of the subsoil, and rapid in the substratum. Available water capacity is moderate Runoff is medium. This soil dries out and warms up early in the spring. Unlimed areas are very strongly acid to medium acid.

This soil has good potential for community development. Steep slopes of excavations are unstable. Onsite septic systems need careful design and installation to prevent pollution of ground water. Quickly establishing plant cover, mulching, and establishing siltation basins are suitable management practices during construction.

Hinckley and Manchester soils, 15 to 45 percent slopes. These soils are moderately steep to very steep and excessively drained. They are on kames and eskers of outwash terraces and plains. Areas are irregular in shape. Slopes are smooth or complex. Approximately 45 percent of the total acreage of this unit is Hinckley soils, 30 percent is Manchester soils, and 25 percent is other soils. The areas of this unit consist of Hinckley soils or Manchester soils or both. These soils were mapped together because they react similarly to use and management.

Typically, the surface layer of the Hinckley soils is dark grayish brown gravelly sandy loam five inches thick. The subsoil is twenty-two inches thick. The upper fifteen inches is brown gravelly loamy sand, and the lower seven inches is yellowish brown gravelly sand. The substratum is brown and light brownish gray very gravelly sand to a depth of sixty inches or more.

Typically, the surface layer of the Manchester soils is dark brown gravelly sandy loam four inches thick. The subsoil is reddish brown gravelly loamy sand fourteen inches thick. The substratum is reddish brown very gravelly sand to a depth of sixty inches or more.

Included with these soils in mapping are areas of excessively drained Penwood and Windsor soils, somewhat excessively drained Hartford and Merrimac soils, and well drained Branford and Agawam soils.

The permeability of these soils is rapid in the surface layer and subsoil and very rapid in the substratum. Available water capacity is low. Runoff is rapid. Unlimed areas of the Hinckley soils are extremely acid to medium acid. Unlimed areas of the Manchester soils are very strongly acid to medium acid.

These soils have poor potential for community development. They are limited mainly by steep slopes. Steep slopes of excavations are unstable. Onsite septic systems need very careful and often special design and installation to insure that effluent does not seep to the surface. Lawns, shallow-rooted trees, and shrubs need watering in summer. Quickly establishing plant cover,

providing temporary diversions, and establishing siltation basins are suitable management practices during construction.

Hollis-Charlton extremely stony fine sandy loams, 15 to 40 percent slopes. This complex consists of moderately steep to 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. These soils formed in glacial till derived mostly from granite, gneiss, and schist. Areas of this complex are irregular in shape. Slopes are smooth or complex and are mostly 100 to 800 feet long. The areas have a rough surface with bedrock outcrops; narrow, intermittent drainageways; and small, wet depressions. In most areas, 3 to 5 percent of the surface is covered with stones and boulders. The total acreage of this complex is about 40 percent Hollis soils, 35 percent Charlton soils, and 25 percent other soils and bedrock outcrops. The soils of this complex are in such an intricate pattern that it was not practical to map them separately.

Typically, the surface layer of the Hollis soils is very dark grayish brown fine sandy loam three inches thick. The subsoil is friable, yellowish brown fine sandy loam eleven inches thick. Hard, unweathered schist bedrock is at a depth of fourteen inches.

Typically, the surface layer of the Charlton soils is dark brown fine sandy loam two inches thick. The subsoil is thirty-four inches thick. The upper thirty inches is dark yellowish brown, and light olive brown fine sandy loam. The lower four inches is light yellowish brown gravelly sandy loam. The substratum is friable, brown fine sandy loam to a depth of sixty inches or more.

Included with this complex in mapping are small, intermingled areas of well drained Canton, Montauk, and Paxton soils and moderately well drained Woodbridge soils. Also included are bedrock outcrops, areas of soils with slopes of less than 15 percent, and a few nonstony areas.

The permeability of the Hollis soils is moderate or moderately rapid above the bedrock. Available water capacity is low. Runoff is rapid. Unlimed areas of the Hollis soils are very strongly acid to medium acid.

The permeability of the Charlton soils is moderate or moderately rapid. Unlimed areas of the Charlton soils are very strongly acid to medium acid.

This complex has poor potential for community development. The soils are limited mainly by the steep slopes, shallowness to bedrock, rock outcrops, and stoniness. Excavation is difficult because of the shallow depth to bedrock in many places. Onsite septic systems require very careful and often special design and installation. Many areas of this complex provide a scenic and picturesque setting for homes. The rock outcrops, stones, and boulders have aesthetic value and are sometimes left undisturbed. During construction, quickly establishing plant cover, providing temporary diversions, and establishing siltation basins are suitable management practices.

Hollis-Rock outcrop complex, 15 to 40 percent slopes. This complex consists of moderately steep to very steep, somewhat excessively drained soils and areas of Rock outcrop. The complex is glacial till uplands where the relief is

affected by the underlying bedrock. Areas are long and narrow or irregular in shape. Slopes are mainly 100 to 700 feet long. The areas have a rough surface with bedrock outcrops; a few narrow, intermittent drainageways; and small, wet depressions. In most areas, 3 to 25 percent of the surface is covered with stones and boulders. This complex is about 50 percent Hollis soils, 30 percent Rock outcrop, and 20 percent other soils. The Hollis soils and Rock outcrop are in such an intermingled pattern on the landscape that it was not practical to map them separately.

Typically, the surface layer of the Hollis soils is very dark grayish brown fine sandy loam three inches thick. The subsoil is yellowish brown fine sandy loam eleven inches thick. Hard, unweathered schist bedrock is at a depth of 14 inches.

Rock outcrop consists of exposed bedrock that is mainly schist, gneiss, and granite.

Included with this complex in mapping are areas that are made up of as much as five acres of well drained Canton and Charlton soils, moderately well drained Woodbridge soils, and soils that have bedrock at a depth of twenty to forty inches. Also included are a few areas of soils that have slopes of as much as 90 percent.

The permeability of the Hollis soils is moderate or moderately rapid above the bedrock. Available water capacity is low. Runoff is rapid. The Hollis soils are very strongly acid to medium acid. The areas of rock outcrop have very rapid runoff.

This complex has poor potential for community development mainly because of shallowness to bedrock, steep slopes, Rock outcrop, and stoniness. Excavation is difficult, and blasting is required in most places. Onsite septic systems require special design and installation. The complex is used for homesites. Quickly establishing plant cover, providing temporary diversions, and establishing siltation basins are suitable management practices during construction.

The developer has noted that detailed site plans will be prepared for each lot. Each of the site plans should have a detailed sediment and erosion control plan which should include the following as a minimum:

1. Location of areas to be stripped of vegetation, and other exposed or unprotected areas.
2. A schedule of operations to include starting and completion dates for major development phases such as land clearing and grading, street, sidewalk, and storm sewage installation, etc.
3. Seeding, sodding, or revegetation plans and specifications for all unprotected or unvegetated areas.
4. Location and design of structural sediment control measures such as diversions, waterways, grade stabilization structures, debris basins, etc.
5. Timing of planned sediment control measures.
6. General information relating to the implementation and maintenance of the sediment control measures.

The Soil Conservation Service field office in Haddam is available to supply technical assistance in preparing these plans if needed.

VEGETATION

The tract proposed for the development of the "Devil's Hopyard Ledges" subdivision may be divided into two vegetation types which are described below.

Vegetation Type Descriptions:

Type A. (Hemlock) The majority of this 54± acre stand is over-stocked with medium quality pole to sawtimber-size eastern hemlock with black birch, black oak, red maple, mockernut hickory and yellow birch intermixed. Scattered throughout this stand, where soils are deeper, are several half-acre pockets of pole size sugar maple, tuliptree and bigtooth aspen. Understory vegetation throughout this stand is characterized by widely scattered patches of mountain laurel and occasional hemlock seedlings and witch hazel. Ground cover vegetation consists of Christmas fern, evergreen wood fern, maidenhair fern, rock polypody, aster, Pennsylvania sedge, partridgeberry, club moss and Canada mayflower.

Although most of the trees in this stand are crowded and declining in health and vigor and would benefit from receiving a thinning, steep rocky slopes severely limit the potential for forest management in this area.

The potential for tree loss due to windthrow is high through much of this stand. The trees which are present are unable to become securely anchored in the shallow to bedrock soils. The saturated soils near streams and extremely steep slopes may intensify this hazard. If the underlying bedrock is, however, highly fractured, the windthrow hazard will be lessened because tree roots will be able to penetrate deeper for improved stability. The development of large linear clearings which allow wind to pass through rather than over windthrow-prone areas should be avoided.

Sudden exposure of the hemlock trees to direct sunlight or the increased soil temperature which accompanys sudden exposure may injure or possibly cause mortality in these trees. Complete vegetation clearing which exposes hemlock to direct sunlight should be kept to a minimum.

Type B. (Old Field) Approximately 1.5 acres of old field vegetation is present within this tract. Sapling size eastern red cedar dominate this understocked area. Scattered sapling-size black oak, red maple, gray birch, blue birch and bigtooth aspen are also present. Ground cover vegetation in this excessively drained area consists of grasses, Pennsylvania sedge, club moss and hairy cap moss. Management of this area is limited due to its small size, however, lot owners could choose desirable trees and encourage them by removing undesirable trees which are competing with them.

WILDLIFE

The site is almost entirely forested with a mature hemlock overstory. A few scattered hardwoods are also found in the overstory. A small pocket of

Vegetation

0 660'
scale

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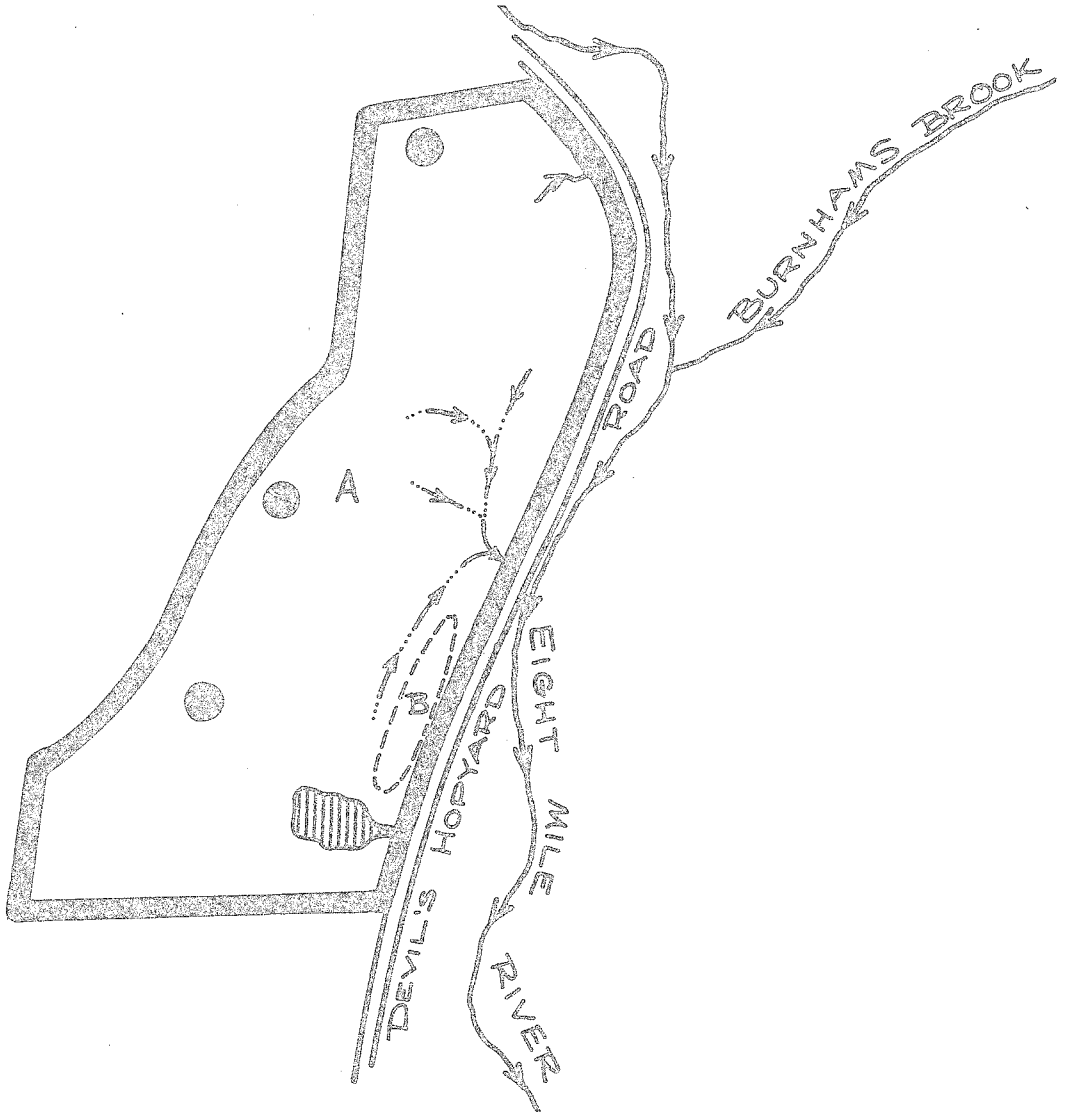


LEGEND

- Road
- Stream
- Property boundary
- Vegetation type boundary
- Cleared area, approx. 1 acre
- 0.5 acre patches of deciduous trees

VEGETATION TYPE DESCRIPTIONS *

TYPE A. Hemlock. 54 ± acres. Over-stocked, pole to saw-timber-size.

TYPE B. Old field. 1.5 acres. Under-stocked, sapling-size.

* Seedling-size = trees less than 1 inch in diameter at 4.5 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.

cedar and young oak is found on the southern end of the site. There is very little understory vegetation other than hemlock reproduction.

There is a mountain stream which runs through the center of the site into the Eight Mile River. There are also several spring seeps located on or near the property.

Rocky cliffs run about the entire length of the property on the steep slopes.

Overall this site is not a very good wildlife food producer due to the lack of understory vegetation. However, the area is receiving heavy wildlife use, primarily because it provides good cover. Good food-producing areas are found adjacent to this property.

The evergreen hemlocks are excellent roosting and perching areas for a variety of birds and provide shelter for other animals from harsh weather. There is evidence of heavy deer use on the area: tracks, trails, bedding areas, droppings and one actual sighting during the field inspection. Many songbirds were heard and/or sighted in the overstory trees. Fox tracks and droppings were observed in the snow among the rocky cliffs. Tracks that may have been made by a bobcat were observed. Evidence of other small furbearers such as the raccoon was seen. Wild turkey are known to be in this general area and may be attracted to this site. They and other wildlife depend on spring seeps and mountain streams for water, particularly in the winter months.

Construction on this site will probably eliminate many shy wildlife species from the area. Species such as the fox, bobcat, and turkey will probably relocate. The deer use of the immediate area will most likely decline also.

The wildlife more adaptable to human presence such as the raccoon, skunk, squirrel and opossum will probably remain in the area. These species have the potential to become pests near homes - getting in the garbage, the attic, under the porch, etc.

Every effort should be made to protect the stream on the site and the Eight Mile River. A buffer strip of at least 35 feet (more if on a slope) should be left undisturbed by construction and equipment use on each side of the stream.

Disturbance near this stream will cause erosion of the soil and put silt into the stream. The silt may clog up the stream and will be harmful to the water quality of the river below.

In general, this site is a very valuable part of a larger area. Development of the site will reduce its value to wildlife considerably.

Further assistance is available from the Wildlife Unit, Department of Environmental Protection.

FISH RESOURCES

The Eight Mile River, a major trout stream stocked annually with over 5,000 trout by the state, flows along the east side of Devil's Hopyard Road which would service the proposed subdivision. Across the road from proposed lots 2 through 7, the river flows very close to Devil's Hopyard Road leaving very little floodplain to arrest erosion and sedimentation of the river which could be caused by the proposed driveway drainage.

Planning considerations which would help to protect water quality would include reducing the numbers of driveways entering Devil's Hopyard Road and acquisition of drainage easements on the east side of the road sufficient to allow construction of splash pools to absorb the force of driveway drainage flows. The developer indicated that a small intermittent watercourse on the property proposed for subdivision will not be altered during development.

WATER SUPPLY

On-site wells are proposed to service homes in the subdivision. Although there is a small probability that the sand-and-gravel terrace deposits could be tapped for water supplies, it seems more likely that these deposits are too thin to provide an adequate supply. Bedrock is the most likely water source on the site. Bedrock is generally capable of yielding small but reliable quantities of ground water to individual wells.

Wells and sewage disposal systems would apparently be located towards the flatter, eastern portion of the property. This appears necessary as access into the upper middle and rear portions of the property does not appear to be feasible. As soils in the front area consist of porous, well drained gravel, there is some concern that the soils may not provide for a high degree of filtration and renovation of sewage effluent. However, the indicated percolation rates are not excessively fast. Nonetheless, additional protection could be provided for the water supplies by locating wells towards the west and having the casings properly sealed in the underlying ledge. The minimum required 75-foot separating distance from a sewage disposal system could also be increased. Normally, a greater horizontal separating distance is necessary where the required yield or withdrawal rate of a well is ten or more gallons per minute. Centainly with single family house lots, yields under ten gallons per minute can supply a sufficient quantity of water.

In some areas, mineral constituents of the water, particularly iron and/or manganese, will exceed potable water standards. Where these conditions occur, the inclusion of water treatment facilities will be necessary in order to prevent objectionable features (e.g. water coloration).

WASTE DISPOSAL

Houses in the subdivision for this rural area are to depend upon the satisfactory installation of on-site subsurface sewage disposal systems. Based on visual observation, soil survey mapping data and deep test pit and percolation

information the most feasible area for sewage leaching systems is the eastern part of the property. The great majority of the land area is restricted or limited by slope, exposed and/or underlying bedrock and also by surface or ground water drainage moving down slope. Deep test hole data indicates the soils in the eastern portion consist of sand and/or gravel. Apparently there is no shallow or relatively shallow water table or bedrock within this area. It is noted that percolation rates were all in the range of 4 to 5 minutes per inch.

In general, a minimum of four feet of original soil should be maintained between the bottom of a leaching system and bedrock. Likewise, at least eighteen inches is to be maintained above the maximum ground water level. There should also be adequate lateral separating distance from the top of an embankment and/or a watercourse in which the direction of effluent may be moving.

Considering the quantity of sewage applied by a single family residence to a one acre or larger lot, one would not anticipate water quality problems as a result of too high a density.

There should be assurance that the lots within the subdivision will have sufficient area for the leaching systems (primary and reserve area) as well as possible house locations and well sites. In keeping with the locations of the sewage systems, consideration of excessive slopes and the proximity of water-courses would also be paramount. Where porous soil is a predominant factor, a separation distance of at least 50 feet should be maintained.

Before a possible approval is granted for the subdivision, further testing is recommended. Not all lots have been tested in the areas proposed for possible sewage systems. Also, the possibility of some bedrock extending into the leaching area of lot 8 should be evaluated more completely. At the time of review, there also appeared to be a pocket which retains surface water towards a side area of lot 3. This area should be more clearly defined.

Due to site limitations and the apparent depth of gravelly soil in the area(s) tested, it may be feasible to utilize deeper leaching facilities. Although such facilities will usually conserve on the amount of space needed for installation, shallower type systems will usually provide better conditions for treatment and renovation of sewage effluent. Again, the previous specified vertical separating distance from bedrock and ground water would have to be maintained from the bottom area of any leaching pits.

PLANNING CONCERNS

The location and design of driveways is important in this development. The rolling topography of Devil's Hopyard Road limits the areas where driveways may be located with adequate sight lines. The land climbs steeply from the road edge to the house sites on most lots, thus requiring extensive site work for driveways.

For optimum safety, the sight distance at each proposed driveway should be a minimum of 350 feet for a design speed of 30 mph on Devil's Hopyard Road based on Connecticut Department of Transportation guidelines. CONNDOT driveway permits will be required for the lots in this development because Devil's Hopyard Road is a State Route. However, while the State may require some modification to the proposed driveway location or some improvements to the sight line, the State cannot deny any residential property owner access to their property even if the sight lines are dangerously short.

Although the optimum sight line cannot be required, the developer should be encouraged to locate the driveways with the best possible sight lines. This may seem unnecessary due to the low traffic volume on Devil's Hopyard Road, but there is little room to avoid a collision should a conflict occur because the road is extremely narrow and there is no clear shoulder area available.

Some lot lines may need to be shifted to achieve the desired sight lines. For example, if a driveway cannot be located sufficiently away from the crest of a vertical curve to provide the desired sight distance, it would be better to locate the driveway at the crest of the vertical curve. Even at the most advantageous driveway locations, some trees will have to be cut down because many trees are located close to the road pavement edge and they will block a driver's sight line.

In order to traverse the steep ground between Devil's Hopyard Road and the house sites, much clearing and grading will be required and the driveways will be quite steep. The maximum grade for any driveway should be 15%, and any sections over 8% should be paved with bituminous concrete. A driver will be able to safely stop with greater ease if the first twenty feet or so from the edge of the road is less steep. The driveway should slope away from the road at a desirable maximum grade of three percent, while six percent is the absolute maximum.

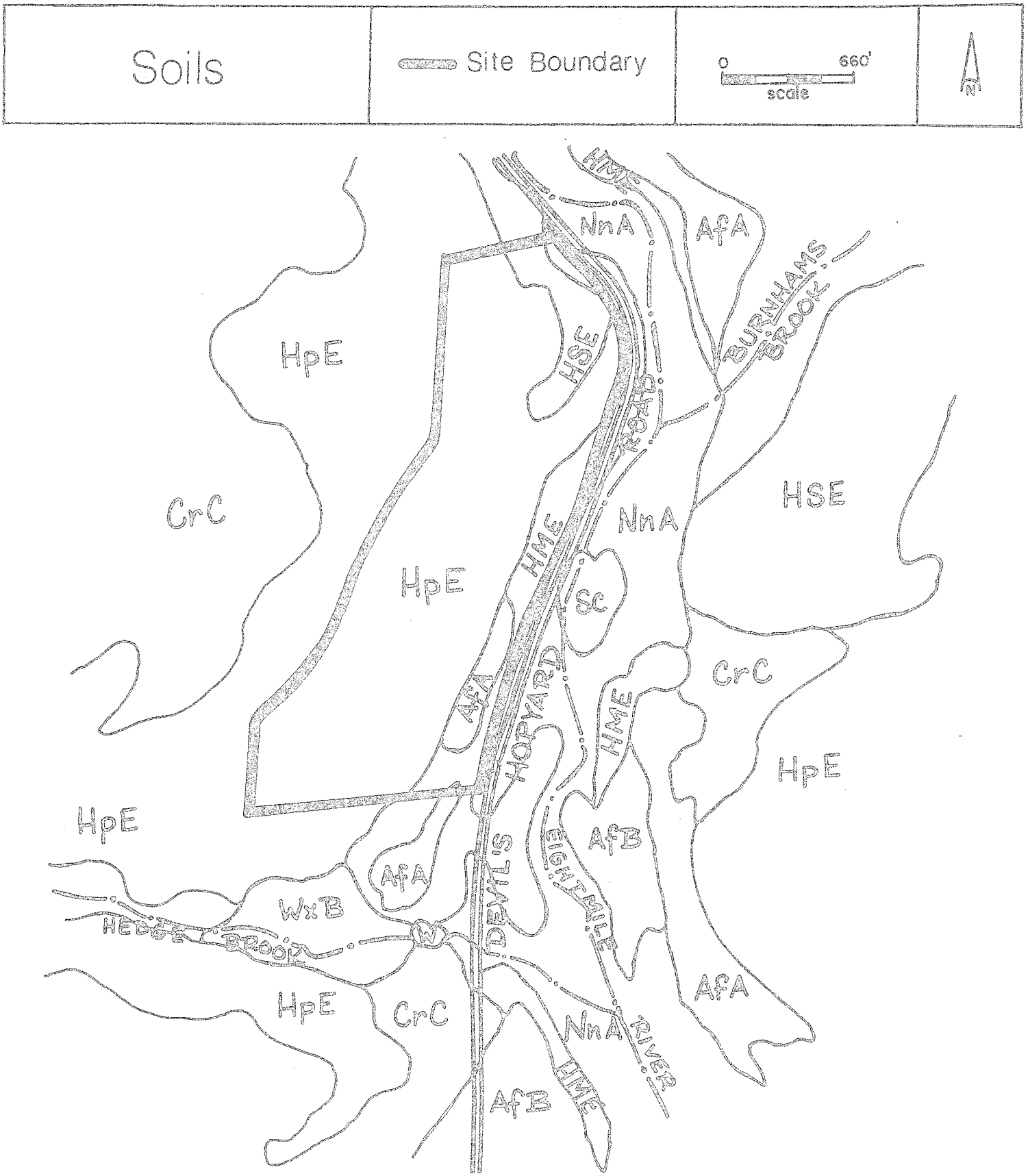
The driveways in cut sections should be graded with a swale on the uphill side of the drive. The swale will help to reduce the amount of runoff that will flow down the traveled portion of the driveway. Not only will the amount of erosion to the driveway be reduced, but the amount of icing in winter months will be reduced, thus reducing the amount of sand and salt needed to make the driveways traversable. Extra care should go into the sediment and erosion control for the driveways so that runoff does not wash out the exposed cut and fill areas.

The driveways should be flared at the road to provide adequate turning radii for cars because Devil's Hopyard Road is extremely narrow. Passenger cars require an inside turning radius of fifteen feet. A back-around area should be provided for each driveway such that no vehicle will have to back onto Devil's Hopyard Road.

Joint driveways may have many advantages in this development. By combining driveways, only the best locations with respect to sight line and accessibility

to the house sites will be used. However, driveway easements will be required. For example, lots 2, 3, and 4; lots 5 and 6; and lots 7, 8, and 9 could have combined driveways. Therefore, there would be three driveway cuts instead of eight. Less trees would have to be cut along the road for sight lines, and on the steep area between the road and the house sites. The possibility of erosion will be reduced because there will be less cut and fill areas. Any possible impact on Eight Mile River will be reduced because there will be less possible erosion and fewer driveways will be sanded or salted.

Appendix


Soils
Site Boundary
0
660'
scale
N
HME
NnA
AfA
BURNHAMS BROOK
HpE
HSE
RR
CrC
HME
NnA
HSE
HpE
SC
HME
CrC
AfA
HOPYARD
HME
HpE
HpE
AfB
AfA
EIGHT MILE
WxB
HEDGE BROOK
DAVIS
AfA
HpE
CrC
NnA
RIVER
HME
AfB

DEVIL'S HOPYARD LEDGES
EAST HADDAM, 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
Agawam	AfA	2	4%		1	1	1	1
Hinckley-Manchester	HME	6	10%	Slope, small stones	3	3	3	3
Hollis-Charlton	HpE	45	79%	Slope, large stones	3	3	3	3
Hollis-rock outcrop	HSE	4	7%	Slope, depth to rock, large stones	3	3	3	3
		57	100%					

LIMITATIONS: 1 = slight, 2 = moderate, 3 = severe.

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.