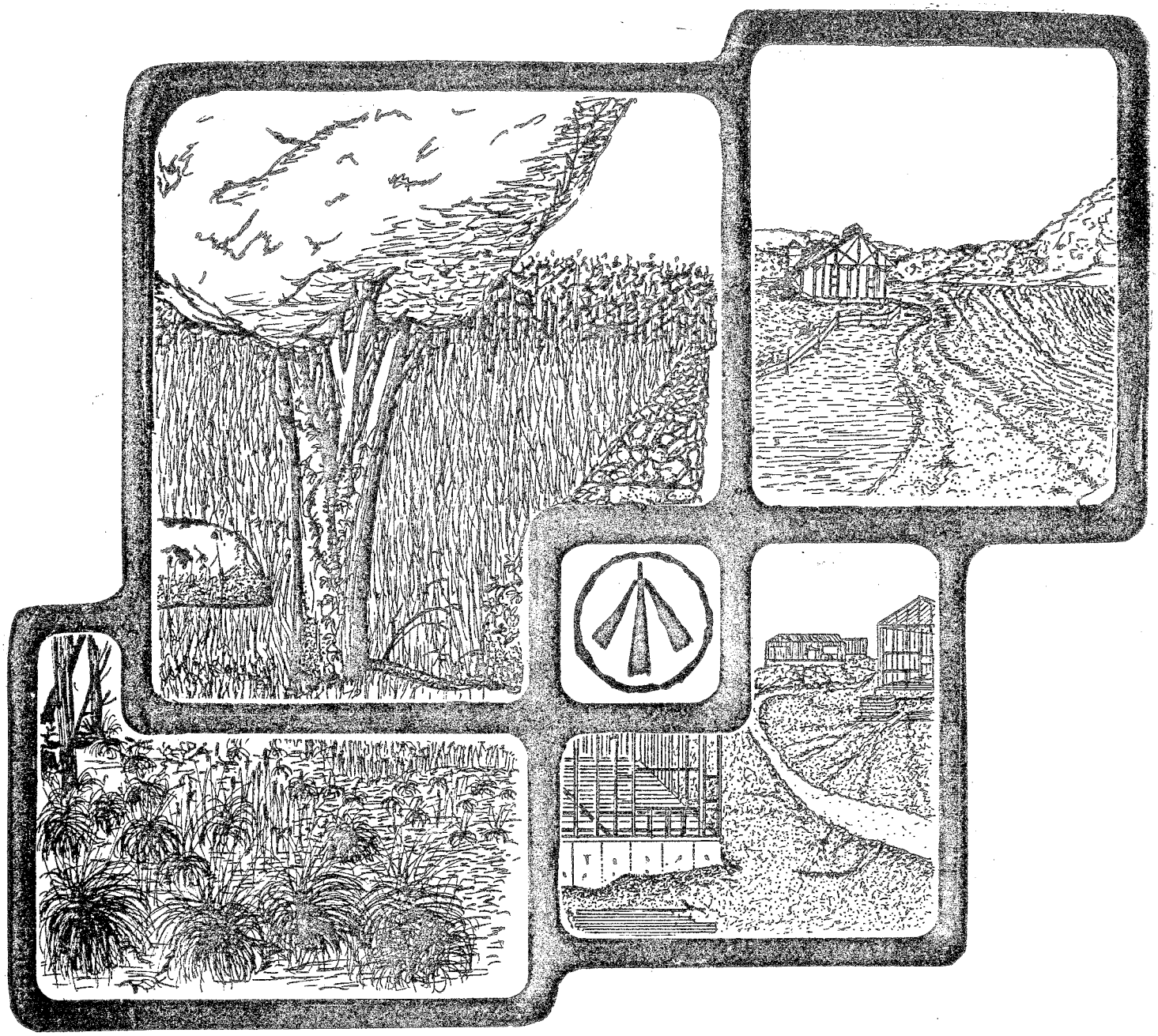
ENVIRONMENTAL REVIEW TEAM REPORT



HIGHWOOD FARMS
THOMASTON, CONNECTICUT

KING'S MARK
RESOURCE CONSERVATION & DEVELOPMENT AREA

KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT

HIGHWOOD FARMS
THOMASTON, CONNECTICUT

MAY 1981

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Environmental Review Team
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DEPARTMENT OF HEALTH
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NEW HAVEN COUNTY SOIL AND WATER CONSERVATION DISTRICT
HARTFORD COUNTY SOIL AND WATER CONSERVATION DISTRICT
FAIRFIELD COUNTY SOIL AND WATER CONSERVATION DISTRICT
NORTHWESTERN CONNECTICUT REGIONAL PLANNING AGENCY
VALLEY REGIONAL PLANNING AGENCY
LITCHFIELD HILLS REGIONAL PLANNING AGENCY
CENTRAL NAUGATUCK VALLEY REGIONAL PLANNING AGENCY
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TABLE OF CONTENTS

Page

I. Introduction..... 1

II. Summary..... 5

III. Geology..... 8

IV. Hydrology..... 8

V. Water Supply.....11

VI. Soils.....13

VII. Sewage Disposal.....19

VIII. Vegetation.....20

IX. Wildlife Habitat.....25

X. Planning Considerations.....26

XI. Appendix.....29

Soils Map

Soils Limitation Chart

LIST OF FIGURES

1 Simplified Site Plan..... 2

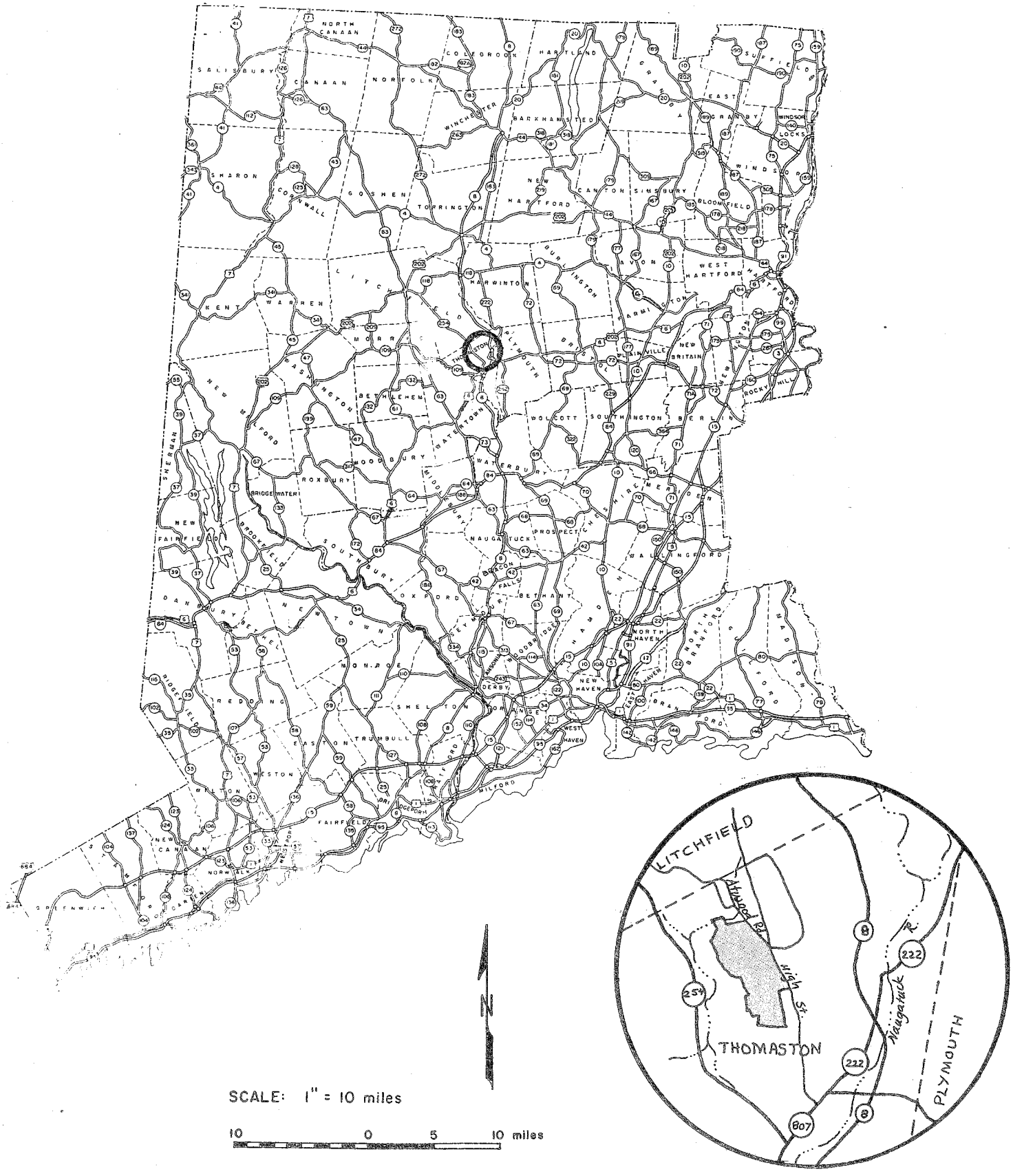
2 Topographic Map..... 3

3 Surficial Geology..... 9

4 Vegetation Type Map.....21

LOCATION OF STUDY SITE

HIGHWOOD FARMS
THOMASTON, CONNECTICUT



ENVIRONMENTAL REVIEW TEAM REPORT
ON
HIGHWOOD FARMS - THOMASTON, CT

I. INTRODUCTION

The Thomaston Planning and Zoning Commission is presently considering an application for residential subdivision of ± 27 acres of land. The proposed project calls for 25 lots with about 10 acres of open space. The lots would be served by public sewers and individual on-site wells.

The present subdivision application represents phase 1 of a larger residential development proposal. This larger residential development proposal encompasses about 127 acres and is known as "Highwood Farms". Additional development phases for "Highwood Farms" will be submitted for approval subsequent to the approval of phase 1. According to the applicant, no detailed subdivision design work has yet been completed for the subsequent development phases nor has a timetable been established. A conceptual site plan for the entire project, calling for a total of 101 lots has been prepared. A simplified version of this conceptual site plan is presented in Figure 1.

The Highwood Farm site is located in the northcentral portion of town. Access to the site is available from the east off High Street and Atwood Road. The site is characterized by moderately sloping open fields in the southern half and moderately to steeply sloping wooded land in the northern half. Figure 2 shows the topography of the Highwood Farms site and also the surrounding land use.

The Thomaston Planning & Zoning Commission requested the assistance of the King's Mark Environmental Review Team to help them in analyzing the proposed project. The Team was asked to identify the natural resource base of the site, to comment on the suitability of the land for the proposed project, and to provide an objective evaluation of the potential development impact. Of major concern to the Planning and Zoning Commission is the possible impact of a former landfill on the property on on-site wells.

The King's Mark Executive Committee considered the town's request from an ERT study of the development proposal and approved the project for review by the Team.

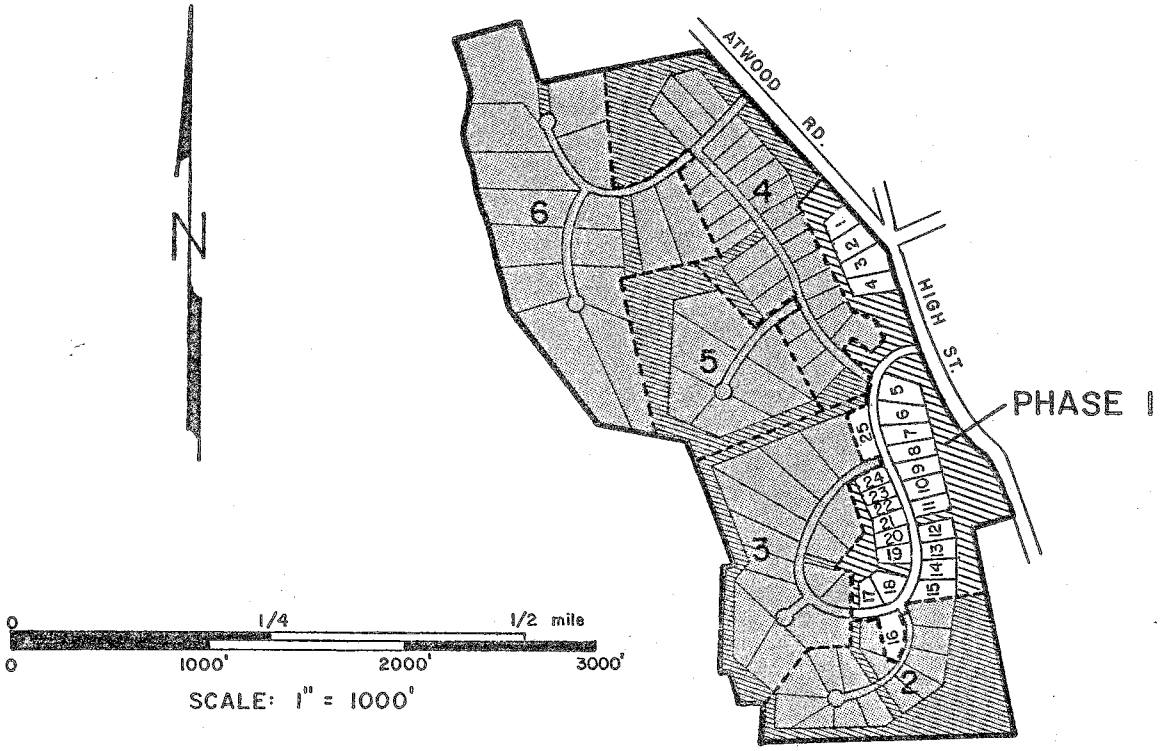
The ERT met and field reviewed the site on April 15, 1981. Team members for this review consisted of the following:

Paul Lagel	Wildlife Biologist	State Department of Environmental Protection
Gilbert Roberts	Sanitarian	Torrington Area Health District
Rob Rocks	Forester	State Department of Environmental Protection
Mike Schaeffer	Soil Conservationist	U.S.D.A. Soil Conservation Service
Charles Vidich	Regional Planner	Central Naugatuck Valley Regional Planning Agency
Mike Zizka	Geohydrologist	State Department of Environmental Protection

FIGURE I.

SIMPLIFIED SITE PLAN

* ADAPTED FROM DEVELOPER'S SITE PLAN OF 2/11/1981.



EXPLANATION

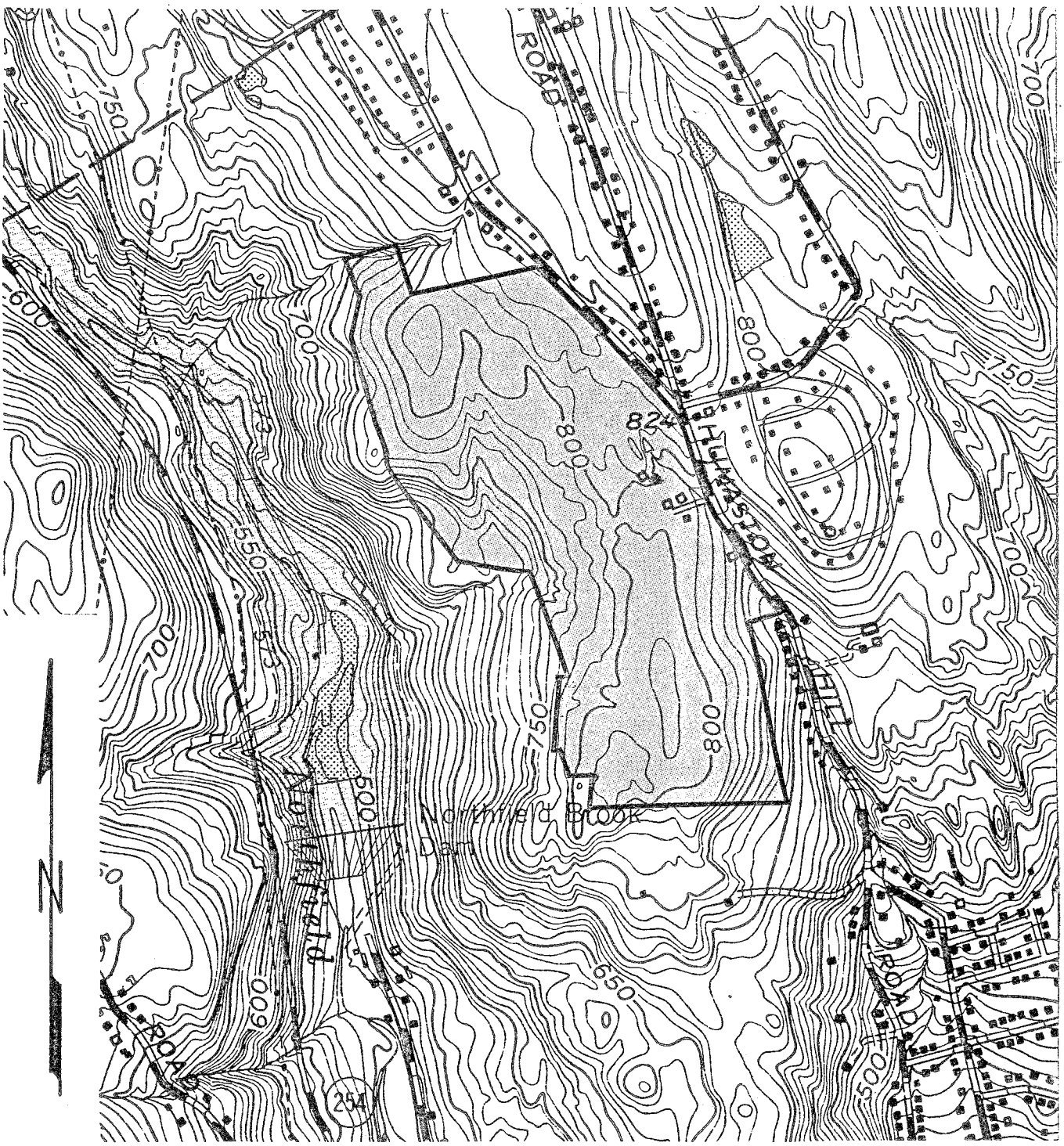
1 2 3 PROPOSED BUILDING LOTS

PROPOSED OPEN SPACE

4 SUBSEQUENT PHASES OF DEVELOPMENT

FIGURE 2.

TOPOGRAPHIC MAP



SCALE: 1" = 1000'

Prior to the review day, each team member was provided with a summary of the proposed project, a checklist of concerns to address, a detailed soil survey map, a soils limitation chart, a topographic map, and a simplified site plan of the development proposal. Following the field review, individual reports were prepared by each team member and forwarded to the ERT Coordinator for compilation and editing into this final report.

This report presents the team's findings. It is important to understand that the ERT is not in competition with private consultants and hences does not perform design work or provide detailed solutions to development problems. Nor does the team recommend what ultimate action should be taken on a proposed project. The ERT concept provides for the presentation of natural resources information and preliminary development considerations--all conclusions and final decisions rest with the town and the developer. It is hoped the information contained in this report will assist the Town of Thomaston and the developer in making environmentally sound decisions.

If any additional information is required, please contact Richard Lynn, (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, Sackett Hill Road, Warren, Connecticut 06754.

* * * * * * *

II. SUMMARY

1) Development of the property as planned will lead to increases in the amount of surface runoff generated during periods of precipitation. The estimated increases in peak flows are substantial for the stream that flows along High Street. This stream is reported to have caused flooding problems in the past. In light of this the Team geohydrologist recommends that the developer follow through on his stated intention to provide a runoff-retention area. It was mentioned during the ERT's field review that the developer might establish the retention area north of the present driveway off High Street. Since so many of the proposed lots would drain to the south of that area, it may be more helpful to design the basin for a position further to the south.

2) Runoff increases from the other portions of the developed site are unlikely to result in any flooding hazards since the drainage from these areas flows into Northfield Brook above the dam. In view of the steep slopes on the western side of the site, erosion and siltation hazards will be a more serious consideration. This is especially true because the majority of the western section drains into a stream that passes through the excavated area near the dam. It is therefore recommended that a careful erosion-control plan be included in developing the Phase 3, 4, 5, and 6 sections.

3) Public water supplies are not presently available to the site of the proposed subdivision. All lots would be supplied by on-site wells. Based upon statistical data, it would appear that the chances of developing a satisfactory water-supply well on any given lot would be good. It is not clear, however, that individual wells would be adequate through the long term for <u>all</u> the lots in the subdivision, particularly in the half-acre-density sections (Phases 1, 2, and 4). Examination of the local bedrock structure suggests a strong possibility that the lots immediately west of lots 1-15 will tap some of the same major supply fractures as the latter lots. Some mutual interference, whether or not problematic, therefore appears likely. Because of the reduced densities in phases 3, 5, and 6, inadequate yields are not as likely to hinder the proposed developments in those areas. The Torrington Area Health District has recommended that wells be drilled on each lot prior to any house construction to ensure adequate quantities of well water for each lot.

4) The quality of the water derived from the on-site wells is a major concern of the town. The source of the concern is a small landfill, presently in disuse, near the center of the parcel. The town formerly used the landfill for the disposal of residential wastes. Both the first selectman and the zoning enforcement officer have indicated that <u>no</u> industrial wastes were dumped on the site. Nevertheless, it should be recognized that many common, easily available materials, such as motor oils, are or can be hazardous if introduced into the groundwater system. On-site inspection revealed cans and possibly drums of motor oil in the fill area.

5) Geological and topographic conditions existing in the vicinity of the landfill indicate that leachate would move in a westerly direction toward Northfield Brook under natural conditions. However, under the pumping conditions that would exist if the development proceeded as planned, there would be at least a slight possibility that leachate from the landfill could infiltrate wells in the Phase 1, 2, and 4 lots. These pumping conditions cannot be effectively simulated, so it is not feasibile to predict the long-range quality

of any of the wells. In view of the small size of the filled area, the length of time it has been closed, and the present environmental conditions, it is probably reasonable to conclude that most Phase 1, 2, 4, and 6 wells would not be seriously affected by landfill leachate. There is, on the other hand, some risk that one or several wells in those areas, particularly in Phases 1 and 4, would be noticeably contaminated. Wells in Phases 3 and 5 appear to face greater risks than other wells, but there is also a possibility that none of those wells will be affected. The Team recognizes the burden that this uncertainty places on the developer and the town, but this unfortunately is a situation that admits of no clear answers. Some suggestions may be made, however. A few test holes should be drilled to the bottom of the landfill. This would allow an analysis of the general nature of the solid waste, and it would permit samples of groundwater from the fill to be recovered and tested. In addition, any residential wells that are installed in the subdivision should be monitored on a regular basis to determine whether landfill leachate is having any effect. Efforts should also be made to assure that the landfill is properly sealed to prevent, or at least minimize, the infiltration of rainfall and the generation of more leachate. Finally, prior to the construction of Phases 3, 4, and 5 of this project, consideration should be given to digging test wells on those lots near the dump so that the water quality can be monitored for a period of time (e.g. up to several years). If monitoring wells indicate that ground water in the surrounding area is contaminated, then the developer will have adequate opportunity to reevaluate the location of the lots and/or the method of water supply. If the water is not contaminated, then these monitoring wells could be utilized subsequently as wells for the houselots.

6) In summarizing the water-supply concerns that are apparent for the immediate development proposal, Phase 1, it is fair to state that quantities of available groundwater, in view of the proposed density of development, are more likely to pose problems than quality of groundwater. Nevertheless, until more specific information can be gleaned about the contents of the landfill, it would be erroneous to conclude that the risk of well pollution in Phase 1 lots is negligible.

7) In general, the soils located within the boundaries of the Phase I area are favorable for development as shown in the plan provided the houses are sewered and proper subsurface drainage is installed around the houses and along the travel areas. Soil limitations on the remainder of the site vary from slight to severe for residential development (see text of report). Major limiting factors on portions of the site include shallow to bedrock conditions, inland wetlands, seasonal high water tables, and steep slopes.

8) Implementation of this project would eliminate 39 acres of prime farmland and 6.5 acres of other important farmland.

9) The developer should prepare a workable erosion and sediment control plan before any construction begins.

10) Throughout this tract are many large healthy trees and flowering shrubs which have high aesthetic value and should be retained to the greatest extent possible. Included with the trees that should be retained are the trees which are present along the fence rows which divide the open fields. Trees in several stands are declining in health and vigor due to overcrowding. These areas would benefit by receiving fuelwood thinnings.

11) With implementation of the proposed project, it would be highly desirable to minimize the amount of clearing on each lot. Leaving as much native vegetation has possible on each houselot will serve to augment the planned open space on the property and help to protect wildlife habitat.

12) The proposed development of 101 lots appears to be a reasonable blend of both the Town and Regional Plans of Development.

13) Access to the site is satisfactory and no significant traffic impact is envisioned with implementation of the project.

14) Consideration should be given to the inclusion of solar energy design with implementation of the project (see text).

15) One possible alternative means of developing the subsequent phases of this project would be to cluster development. The Thomaston Zoning Regulations contain detailed provisions allowing cluster design in the RA-20 zone. The advantage of clustering is that the developer could be allowed to increase densities on one portion of the tract by up to 20%, in exchange for a greater dedication of open space. The net result is that overall densities are kept the same as the underlying zone and the developer is given reduced costs for roads and site development. The principal advantage of clustering on this particular tract is that it may decrease the likehood of any possible problems raised by constructing houses and digging wells near the abandoned town dump located near the western fringe of the tract. A greater dedication of open space surrounding and including the abandoned dump site could be one effective means of increasing the distance between new wells and possible leachates that might emanate from the dump. With or without clustering, consideration should be given to the feasibility of sewering the entire project. Consideration should also be given to the feasibility of extending public water supply lines to service the site and/or the use of community wells.

III. GEOLOGY

The proposed subdivision site is located in an area encompassed by the Thomaston topographic quadrangle. A surficial geologic map of the quadrangle, by C.R. Warren, has been published by the U.S. Geological Survey (GQ-984). Partial bedrock information for the quadrangle is on file at the Department of Environmental Protection's Natural Resource Center in Hartford.

The geology of the site is not complex. The surficial deposits (overburden) consist largely of till, a nonsorted, nonstratified glacial sediment (see Figure 3). Till contains rock particles ranging in size from clay to boulders. Its texture is commonly sandy and stony near the surface, but it tends to become silty, and tightly compact at depth. Because of its textural characteristics, till is commonly referred to as "hardpan". With the exception of the hill crests in the northwestern and southeastern sections, most parts of the site contain less than 10 feet of till over bedrock. In a few wet areas, the till is overlain by organic-rich sediments. These sediments are generally less than 5 feet thick. A small landfill constitutes the only other surficial deposit that is worthy of notice. The contents of the landfill are not precisely known. Town officials have stated that domestic refuse makes up most of the fill. However, oil drums, hundreds of tires, and evidence of certain other non-domestic wastes were also observed in the landfill. It should be noted that motor oils are a form of hazardous waste, as are other household substances such as certain cleaning solvents.

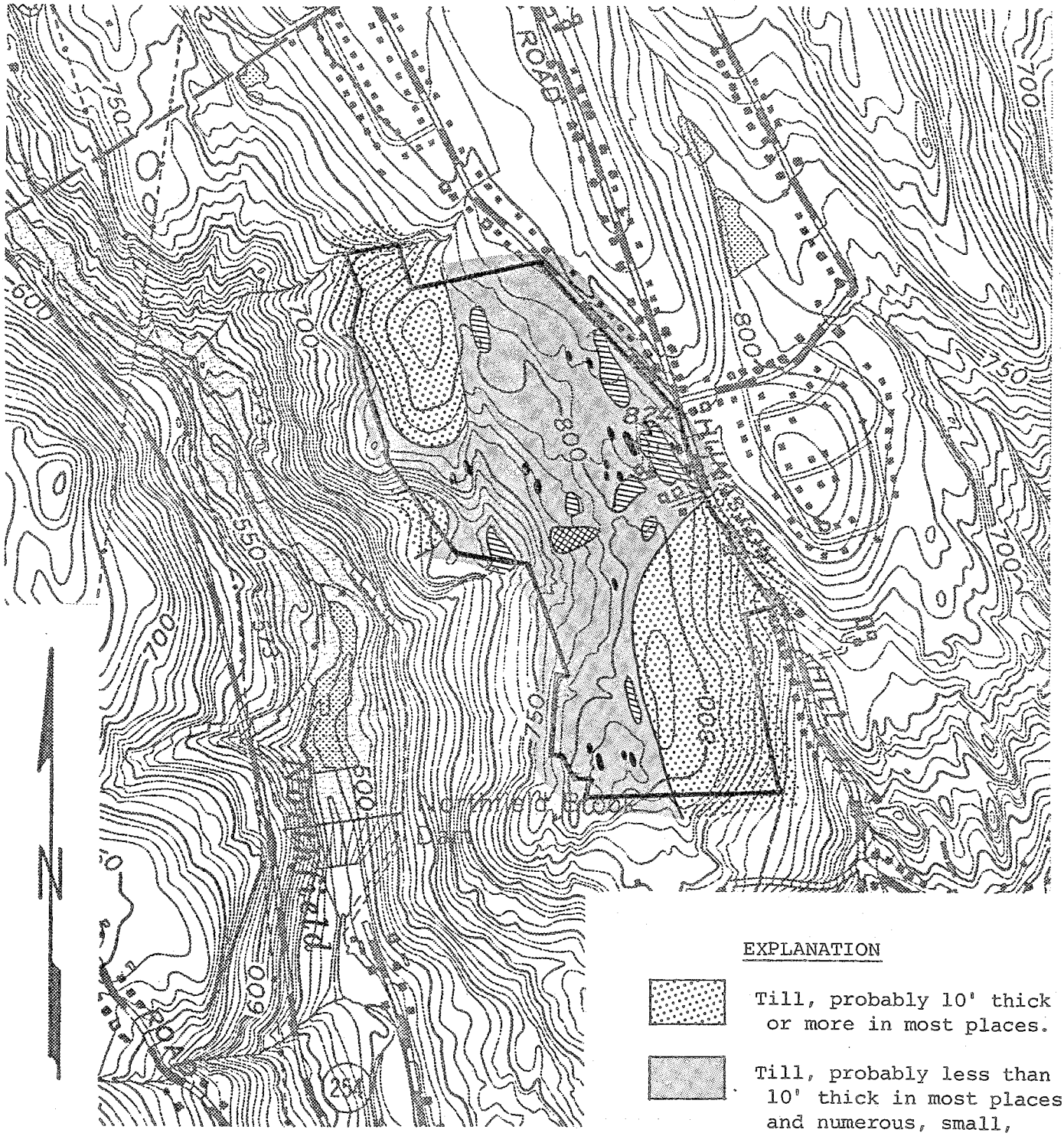
Bedrock exposures occur in many areas of the parcel, indicating the thinness of the glacial overburden. Most of the bedrock observed was quartz-mica schist and gneiss. The terms "schist" and "gneiss" refer to the lineation in the rocks, which is imparted by the parallel orientation of the flaky mica grains. Schists have a stronger lineation than gneisses because of a higher percentage of elongate minerals; consequently, schists tend to be slabby, with numerous parallel parting surfaces. Gneisses are distinctly lineated but are more massive due to a greater abundance of granular mineral grains. Schists appear to constitute most of the local bedrock. The parting surfaces observed dipped consistently in an east-southeasterly direction. No major cross-cutting fracture directions were noted.

IV. HYDROLOGY

Because the site is large and because it is situated at least partially on a hillcrest, surface drainage flows in several directions from the site. Approximately one-third of the parcel drains eastward toward High Street, which follows the bottom of a valley. A perennial stream that originates on the site flows south through the valley; it passes into an underground piping system at the northern end of the row of residential lots just east of the southeastern section of the parcel. The piped stream flows down through the center of Thomaston and ultimately discharges into Naugatuck River. Another perennial stream, flowing westward along the parcel's northern boundary, receives drainage from about 5 acres of the site. This stream discharges into Northfield Brook upstream from the dam. A third watercourse, which is not shown on the topographic map, drains about 63 acres of the site. This stream also discharges to Northfield Brook above the dam. The remainder of the parcel drains to Northfield Brook either by sheet flow or by small intermittent streams. All but about 3 acres of this remainder drains to the brook upstream from the dam. Northfield Brook ultimately discharges to Naugatuck River.

FIGURE 3.

SURFICIAL GEOLOGY*



SCALE: 1" = 1000'

EXPLANATION

- Till, probably 10' thick or more in most places.
- Till, probably less than 10' thick in most places, and numerous, small, unmapped bedrock outcrops.
- Individual bedrock outcrops observed on the site.
- Wet areas, may have a thin surface cover of silt, sand, and clay mixed with decayed plant material.
- Landfill.

* BASED ON FIELD INVESTIGATION, M. ZIZKA, 1981.

Development of the property as planned will lead to increases in the amount of surface runoff generated during periods of precipitation. These increases will be due largely to the placement of impervious surfaces, such as roofs, driveways, and roads, on land that presently can absorb rainfall. Runoff increases can have deleterious effects unless appropriate precautions are taken. The most common problems are increases in local soil erosion and creation or augmentation of flooding hazards.

The Team was informed that the stream that flows along High Street had caused flooding problems in the past. It is not clear whether the piping system has had any influence on these problems. The stream's drainage area above the pipe consists of approximately 55 acres. That portion of the drainage area lying outside the site boundaries has been fully or almost fully developed; hence, if runoff from the proposed new lots is controlled, the streamflow conditions should remain stable.

It is possible to estimate the increases in peak flows that would occur in the stream after development. The point chosen for study is the upstream end of the underground pipe discussed above. It should be noted that 7 of the lots proposed under Phase 1 and 8 of the lots proposed under Phase 2 would drain to the High Street system below the point of study; the effect of these lots was therefore not considered in the estimation process. The reason for not choosing a study point further downstream was the uncertainty as to the effects of the piping system on peak flow rates. Nevertheless, the potential effects of the lots not considered for this report should be accounted for in any final runoff-detention plans.

The Team used the Soil Conservation Service's runoff-curve number method in its estimation process. There are several other standardized methods that could have been used; the Team's choice is not meant to suggest any qualitative differences among the various methods. All peak flow data are given in cubic feet per second (cfs). Estimates have been made for 24-hour storms of the following average frequencies: 25-year, 50-year, and 100-year. These storms respectively have a 4-percent, 2-percent, and 1-percent probability of occurring in any year.

	25 year	50 year	100 year
Peak flows before development	199 cfs	288 cfs	407 cfs
Peak flows after development	233 cfs	331 cfs	465 cfs
% flow increase after development	17%	15%	14%

The estimated increases in peak flows are substantial, as would be expected from the number of new lots to be created. The Team therefore recommends that the developer follow through on his stated intention to provide a runoff-retention area. It was mentioned during the field review that the developer might establish the retention area north of the present driveway off High Street. Since so many of the lots would drain to the south of that area, it may be more helpful to design the basin for a position closer to the study point used in this report.

Runoff increases from the other portions of the developed site are unlikely to result in any flooding hazards since the drainage from these areas flows into Northfield Brook above the dam. In view of the steep slopes on the western side of the site, erosion and siltation hazards will be a more serious consideration.

This is especially true because the majority of the western section drains into a stream that passes through the excavated area near the dam. It is therefore recommended that a careful erosion-control plan be included in developing the Phase 3, 4, 5, and 6 sections.

V. WATER SUPPLY

Public water supplies are not presently available to the site of the proposed subdivision. All lots would be supplied by on-site wells. In view of the geology of the parcel, the most suitable aquifer would be bedrock. Water is transmitted through crystalline rock virtually exclusively by way of fractures. The yield of a new bedrock well on the property would therefore depend upon the number and size of water-bearing fractures that the well intersected. Since fractures are distributed irregularly in bedrock, it is practically impossible to predict the yield of a well drilled at any specific site. Nevertheless, statistical data derived from studies in the lower Housatonic River basin (Conn. Water Resources Bulletin No. 19) show that, of all the wells studied which tapped schist, the bedrock type which is found on the Highwood Farms site, approximately 68 percent yielded 3 gallons per minute (gpm) or more, 80 percent yielded 2 gpm or more, and 92 percent yielded 1 gpm or more. A yield of 3 gpm is generally adequate to meet the needs of an average family, but smaller yields may be suitable as long as sufficient storage space is available either in tanks or in the well itself. Less than 20 percent of the schist-tapping wells that were surveyed yielded 10 gpm or more, and only about 4 percent yielded 20 gpm or more.

From the data discussed above, it would appear that the chances of developing a satisfactory water-supply well on any given lot would be good. It is not clear, however, that individual wells would be adequate through the long term for all the lots in the subdivision, particularly in the half-acre-density sections (Phases 1, 2, and 4). Several factors must be considered. First, groundwater recharge in till-covered areas in northwestern Connecticut has been estimated to be about 7 inches per year, on the average. This equals approximately 260 gallons per half-acre per day. The daily water usage of a family of four may be estimated to be about the same as the average recharge rate through a half acre. Hence, water demand in the half-acre zones would be equal to the anticipated recharge. It is highly unlikely that the wells would be able to capture all of the actual recharge. There are, however, offsetting factors. Deep bedrock wells may be able to draw water that originated in recharge areas outside the property. In addition, the strips of open space that would be preserved would provide some extra recharge area (i.e. they would reduce the actual site density). On the other hand, the till on the site appears to be thin; recharge through shallow-to-bedrock till areas is generally less than the average recharge on till-covered sites. Moreover, the very presence of impervious surfaces in the subdivision will reduce the amount of recharge from present levels.

Another important consideration is the possibility of mutual interference among the various wells: a condition in which pumping from some wells causes a drawdown in other wells. Because of the geometric restrictions of the half-acre zone, some wells are likely to be 100 feet or less from each other. In general, the closer two wells are spaced, the more likely it is that they will have an effect on one another. One rule-of-thumb formula suggests that bedrock wells should be spaced at least 300 feet apart to minimize the potential for mutual interference (see Connecticut Water Resources Bulletin No. 15). Examination of the local bedrock structure suggests a strong possibility that the lots immediately west of lots 1-15 will tap some of the same major supply fractures as the latter lots. Some mutual interference, whether or not problematic, therefore appears likely.

Because of the reduced density in Phases 3, 5, and 6, inadequate yields are not as likely to hinder the proposed developments in those areas. It is possible, however, that the large overall demand from the half-acre zones will have an impact on yields from some adjacent lots.

The quality of the water derived from the on-site wells is a major concern of the town. The source of the concern is a small landfill, presently in disuse, near the center of the parcel. The town formerly used the landfill for the disposal of residential wastes. Both the first selectman and the zoning enforcement officer have indicated that no industrial wastes were dumped on the site. Nevertheless, it should be recognized that many common, easily available materials, such as motor oils, are or can be hazardous if introduced into the groundwater system. On-site inspection revealed cans and possibly drums of motor oil in the fill area.

Geological and topographic conditions existing in the vicinity of the landfill indicate that leachate would move in a westerly direction toward Northfield Brook under natural conditions. However, under the pumping conditions that would exist if the development proceeded as planned, there would be at least a slight possibility that leachate from the landfill could infiltrate wells in the Phase 1, 2, and 4 lots. These pumping conditions cannot be effectively simulated, so it is not feasible to predict the long-range quality of any of the wells. In view of the small size of the filled area, the length of time it has been closed, and the present environmental conditions, it is probably reasonable to conclude that most Phase 1, 2, 4, and 6 wells would not be seriously affected by landfill leachate. There is, on the other hand, some risk that one or several wells in those areas, particularly in Phases 1 and 4, would be noticeably contaminated. Wells in Phases 3 and 5 appear to face greater risks than other wells, but there is also a possibility that none of those wells will be affected. The Team recognizes the burden that this uncertainty places on the developer and the town, but this unfortunately is a situation that admits of no clear answers. Some suggestions may be made, however. A few test holes should be drilled to the bottom of the landfill. This would allow an analysis of the general nature of the solid waste, and it would permit samples of groundwater from the fill to be recovered and tested. In addition, any residential wells that are installed in the subdivision should be monitored on a regular basis to determine whether landfill leachate is having any effect. It should not be assumed that, if leachate ultimately does enter a well or wells, it would show up within a short period of time; the large-scale nature of the development may cause a substantial change in groundwater flow patterns over long time periods. Efforts should be made to assure that the landfill is properly sealed to prevent, or at least minimize, the infiltration of rainfall and the generation of more leachate. Finally, prior to the construction of Phases 3, 4, and 5 of this project, consideration should be given to digging test wells on those lots near the dump so that the water quality can be monitored for a period of time (e.g. up to several years). If monitoring wells indicate that groundwater in the surrounding area is contaminated, then the developer will have adequate opportunity to reevaluate the location of the lots and/or the method of water supply. If the water is not contaminated, then these monitoring wells could be utilized subsequently as wells for the houselots.

In summarizing the water-supply concerns that are apparent for the immediate development proposal, Phase 1, it is fair to state that quantities of available groundwater, in view of the proposed density of development, are more likely to pose problems than quality of groundwater. Nevertheless, until more specific information can be gleaned about the contents of the landfill, it would be erroneous to conclude that the risk of well pollution in Phase 1 lots is negligible.

VI. SOILS

A. Soil Descriptions

The following soils have been identified and mapped on the site (refer to Soils Map in the Appendix):

CHARLTON SERIES

(ChB) Charlton Stony Fine Sandy Loam, 3-8% slopes

This Charlton soil is generally deep and well drained with slopes ranging from 3-8%. This particular Charlton soil also has a stony surface. Permeability is moderate to moderately rapid throughout the profile. Aside from the surface stoniness, few problems typically exist for urban development.

HOLLIS SERIES

The Hollis soils occur most often in the rougher upland areas. They are most often found on steep hillsides. Shallow to bedrock soil areas and rock outcrops are characteristic of the Hollis series. Soils of the Hollis series are well-drained to excessively well-drained. Permeability is moderate to moderately rapid. Severe limitations exist when developing these areas for urban uses. This is generally due to shallowness to bedrock, steep slopes, and large stones.

Hollis soils found on the site are:
(HrC) Hollis very rocky fine sandy loam, 3-15% slopes
(HrE) Hollis very rocky fine sandy loam, 15-35% slopes
(HxE) Hollis extremely rocky fine sandy loam, 15-35% slopes

LEICESTER, RIDGEBURY AND WHITMAN VERY STONY FINE SANDY LOAMS (Lg)

This mapping unit contains very stony soils with a high water table during most of the year. This undifferentiated soil unit is made up of poorly drained Leicester and Ridgebury soils and a very poorly drained Whitman soil. Areas of this mapping unit are defined as Wetlands in Connecticut and regulated under PA 155 (Inland Wetlands).

These soils impose severe to very severe limitations on all phases of urban development due to wetness and stoniness. Costly drainage and/or fill measures would be needed to overcome wetness.

PAXTON SERIES

The Paxton series consists of well-drained soils which developed in glacial till. These soils have a slowly permeable layer (hardpan) at a depth of 2' - 3'. Permeability of the surface layers is moderate. Most of the problems pertaining to urban development in Paxton soils are caused by slow subsurface percolation rates, seasonal wetness, large stones, and/or steep slopes.

Paxton soils identified on the site include:
(PbA) Paxton fine sandy loam, 0-3% slopes
(PbB) Paxton fine sandy loam, 3-8% slopes
(PbC) Paxton fine sandy loam, 8-15% slopes
(PbD) Paxton fine sandy loam, 15-25% slopes
(PdD) Paxton stony fine sandy loam, 15-25% slopes

SUTTON SERIES

The Sutton series consists of moderately well-drained, nearly level to sloping soils that developed in glacial till. Permeability is moderate to moderately rapid.

Sutton soils commonly have a seasonally high water table where the water table remains within 15" - 25" from the surface during wet periods. This high water table limits the successful use of properly functioning septic systems. On stony soils, problems may arise in the installation process.

Sutton soils identified on the site include:
(SvB) Sutton fine sandy loam, 3-8% slopes
(SxC) Sutton very stony fine sandy loam, 3-15% slopes

WOODBRIDGE SERIES

(WxB) Woodbridge fine sandy loam, 3-8% slopes

This Woodbridge soil is non-stony and moderately well-drained with slopes of 3-8%. Woodbridge soils are developed in compact glacial till. Woodbridge soils are underlain by a compact slowly permeable layer (hardpan) at a depth of about 24". Permeability is moderate in the surface layer and subsoil, but slow in the substratum. Most urban use problems are related to seasonal wetness, and slow percolation.

B. Management Practices to Overcome Soil Limitations

1. For On-Site Sewage Disposal Systems:

Soil/Map Symbol	Management Practices
Hollis Series	Intensive field investigation for areas suitable for on-site sewage systems. NOTE: Due to shallow depth to bedrock, a potential pollution hazard exists from septic effluent seeping through rock layers to underground water sources.
Charlton (ChB) 3-8% slopes	- enlarge leaching area - avoid construction when wet
Paxton (PbA)(PbB) 0-8% slopes	- avoid construction when wet - restrict percolation testing to wet seasons of year - interceptor drains over hardpan - large field, sand filter or mound system
Paxton (PbC) 8-15% slopes	- all of the above and serial tile distribution due to steep slope
Paxton (PdD) 15-25% slopes	- all of the above and land shaping and stone removal

Soil/Map Symbol	Management Practices
Sutton (SvB) 3-8% slopes	- restrict percolation testing to wet seasons - regional drainage - enlarge leaching area - avoid construction when wet
Sutton (SxC) 3-15% slopes	- all of the above with serial tile distribution and land shaping/stone removal
Woodbridge (WxB)	- restrict percolation testing to wet seasons - large field, sand filter or mound system - interceptor drains over hardpan

2. For Homes With Basements:

Soil/Map Symbol	Management Practices
Paxton soils Sutton soils Woodbridge (WxB)	- footing drains - avoid construction when wet
Hollis soils	- intensive field investigation to find suitable site for excavation

3. For Drives and Roads:

Soil/Map Symbol	Management Practices
Paxton soils Sutton soils Woodbridge (WxB)	- Subsurface drainage under and along road beds to prevent frost heaving. Surface and subsurface drainage on roadcuts to prevent soil slippage caused by seepage.
Hollis soils	- Intensive field investigation to find suitable site for excavation.

C. Soils vs.Proposed Land Use (refer to Figure 1)

PHASE I - Each house is planned to be sewered. Individual wells are planned for water supply. Minimum lot area is 20,000 square feet.

In general the soils located within the boundaries of the Phase I area are favorable for development as shown in the plan, provided that:

1. The houses are tied into a sanitary sewer system (due to the nature of the soils vs the relatively small lot size).

2. Proper subsurface drainage is installed around the houses and along the travel areas.

Parts of lots #1-4 and #25 are mapped as wetland areas. Care should be taken on filling in the wetland portion of these lots. (No actual house locations are shown on the plan.)

The access road from High Street is planned to cross ± 100 lineal feet of wetland. With proper designing of the road and culvert, the effect on the wetland system should be minimal. The remaining portion of the road within the Phase I area seems to be well planned crossing a minimum of contours in its traverse.

PHASE II - Each house is to have individual wells. No actual provisions have been made on the plan for sewage disposal. Minimum lot size is 20,000 square feet. If the proposed lots within the Phase II area are to be sewered, few problems should arise due to the nature of the soils provided that:

1. Proper subsurface drainage is installed around the houses and long travel areas.

2. The steeper slopes are avoided when constructing driveways and foundations (unless the house design is site specific).

If the lots are not to be sewered, problems may arise due to the relatively small lot sizes in relation to the anticipated effluent carrying capacity of the soils on the sites.

The road through the Phase II area seems to be well planned.

PHASE III - Each house is to have an individual well and on-site sewage disposal. Minimum lot size is one acre.

A large portion of Phase III (west of planned road) is mapped as HrC-Hollis very rocky fine sandy loam with slopes ranging from 3-15%. Due to the shallow to bedrock characteristics of this soil, test holes should be dug on each lot to determine the feasibility of constructing septic systems and homes with basements.

Improperly designed systems may result in septic effluent moving through layers of bedrock and polluting groundwater.

The remaining soils on the site should present few problems for development provided that subsurface drainage is installed and steep slopes are avoided as in Phase I and II.

The roadway through the Phase III area seems to be well planned (maximum slope ± 8%).

PHASE IV - Each house is to have an individual well. No provisions have been made on the plan for sewage disposal. Minimum lot size is 20,000 square feet.

A large portion of the Phase IV area is mapped as HrC (see phase III description and appendix for associated problems).

Some wetland soils are located on 13 of the 27 lots. However, if care is taken not to fill or build in these areas, few problems should arise. If Phase IV houses are tied into the sewer system, many anticipated problems associated with hardpan soils and shallow to bedrock soils could be avoided.

Subsurface drainage should be properly installed around houses and travel areas within the PbB mapping unit.

If the area is not to be sewered, problems may arise due to the relatively small lot size vs the anticipated effluent carrying capacity of the soils.

The roadway through Phase IV seems to be generally well-planned with a maximum slope of ± 7%.

PHASE V - Each home is to have on-site sewage disposal and individual wells. Minimum lot size is one acre.

The Phase V area is made up entirely of HrC and Lg mapping units. Severe to very severe limitations exist for any type of urban development in this area.

PHASE VI - Each house is to have an individual well and on-site sewage disposal system. Minimum lot size is one acre.

Most of the Phase VI area is mapped as Charlton very stony fine sandy loam with slopes ranging from 3-8%. After on-site investigation and examination of the topographical survey, it was found that inclusions of steeply sloping soils were present within the ChB mapping unit. In this section of Phase VI, development may be hampered on several lots due to steep slopes.

Several lots in the Phase VI area also contain large proportions of wetland soils. Care should be taken to avoid filling or building in these areas. Septic systems should be placed as far away from the wetland areas as possible on each of these lots.

The access road for Phase VI traverses approximately 250 lineal feet of wetland area. This crossing is located approximately 300' south of the northern tip of the wetland area. With proper design of the road and culvert, the effects on the wetland system should be minimal.

Slopes of the road should not exceed 10%. Driveway slopes should also be kept as low as possible.

D. Prime Farmland/Important Farmland Soils

	Prime Farmland		Important Farmland	
	Acres (+)	% (+)	Acres (+)	% (+)
Phase I	14	52	5	19
Phase II	10	63	1.5	9
Phase III	9	40	0	0
Phase IV	6	23	0	0
Phase V	0	0	0	0
Phase VI	0	0	0	0
TOTAL	39	30	6.5	5

As can be seen from the above data, this project would eliminate 39 acres of prime farmland and 6.5 acres of other important farmland.

E. Open Space

Most of the open space on the site occupies steep slopes and/or wetland areas. Besides functioning as an aesthetic buffer zone system, the open space area can be used for limited recreation activities such as hiking trails and possible horseback riding trails. Because of the nature of the slope and/or wetness of most of the soils involved in the open space areas, careful planning and construction of trails is important.

Erosion control measures should be taken on steeper sections of the trail system.

The open space serves as wildlife habitat to some extent.

F. Storm Water Management

Many of the wetland areas on the site play an important part in the detention of storm water; therefore these areas should be disturbed as little as possible to aid in handling the increased runoff that will occur from rooftops and paved areas.

The northernmost detention pond shown on the plan should be shortened on the north side (a reasonable cutoff point seems to be in the proximity of the 800 contour line).

The westernmost pond shown on the plan may not be feasible due to the nature of the soils in the area. It appears that a culvert crossing from this area to across the street into another planned detention pond will suffice.

The watershed for the northernmost pond is $\pm$ 12 acres. For the best detention value, a principal spillway should be designed for a two year storm, and emergency spillway for 25-50 year storm.

For aesthetic quality, the spillway for the other ponds could be lined with fieldstone. In the emergency spillway where the pond is to have a 2 year principal spillway, a well maintained grass cover should be sufficient.

G. Erosion/Sediment Control

Erosion and sedimentation will not be increased considerably due to development, if basic precautionary measures are taken. These measures include:

- Disturb the least amount of soil as possible during construction
- Regrade and revegetate areas that have been disturbed as work progresses
- Do not exceed 2:1 slopes in cut and fill areas
- Plan to work when the ground is not seasonally wet
- Maintain detention ponds and any other erosion/sediment control structures to insure their proper function.

The developer should develop a workable erosion and sediment control plan before construction begins. Methods for erosion and sediment control can be found in "Erosion and Sediment Control Handbook - Connecticut" (USDA, Soil Conservation Service, 1976). Technical assistance in developing erosion and sediment control plans is available through the Litchfield County Conservation District.

H. Miscellaneous

Between Phases III and V is located an old dumping site. On top of the pile are literally hundreds of discarded tires. These tires are aesthetically displeasing and could cause serious problems if the pile started on fire (underground or aboveground). Filling on top of the pile would be impractical due to the inherent instability of the tires. These tires should be removed prior to development of this section of the site.

VII. SEWAGE DISPOSAL

Phase I of the Highwood Farms subdivision is to be sewered. The Torrington Area Health District has reviewed the proposed sewering plans and has recommended that if and when Highwood Farms is approved, the Town "stipulate that the wells be drilled before house construction (to insure adequate quantities of well water) and that the sewer lines meet the same standards as those used by the Town Sewer Authority" (see 2/10/81 letter from TAHD to Town Planning & Zoning Commission). Based upon the concerns of the ERT geohydrologist with regards to the abandoned landfill in the area and its possible impact on Phase I and other phases of the project, the Torrington Area Health District supports the drilling of test wells and water quality monitoring on this site prior to project implementation.

It was unclear at the ERT's field review whether the remaining phases of this project would be sewered or rely upon individual septic systems. Apparently, at least some of the phases (e.g. those with one acre lots) will be served by septic systems. The preceeding section of this report discussed the general suitability of the soils on-site for supporting subsurface sewage dispoal facilities. Since site testing for subsurface sewage disposal has not been conducted, it is difficult to be more specific. Based upon site evaluation and the Soil Conservation Service soil maps, however, the following comments are offered:

1. A portion of the subdivision contains Lg soils, which are designated wetlands. The Torrington Area Health District would not approve a subsurface sewage system in an inland wetland area.

2. The Hollis (HrC) soils found in the central portion of the subdivision represent severe site conditions for subsurface installation because of shallow to bedrock conditions. Presently, the Torrington Area Health District requires 4 feet of original material over ledge rock to install a system.

3. The spacing of wells and septic systems must be very carefully planned to avoid stacking leaching systems above wells on adjoining lots.

4. Paxton soils which comprise a large section of the subdivision offer severe limitations for septic installation, primarily due to high seasonal water tables and slow seeping soils. The percolation rates found in Paxton soils vary from average (20 min/inch) to rates which would prohibit septic installation (greater than 60 min/inch).

5. The Charlton (CrB) soils have generally been found quite suitable for subsurface disposal.

6. Given the land characteristics of this site, it is unlikely that an entire subdivision of one-acre lots could be approved for subsurface sewage disposal. It certainly would be worthwhile to weigh the costly sewering of the subsequent phases against the highly probable loss of a number of proposed one-acre lots.

VIII. VEGETATION

The parcel proposed for subdivision into "Highwood Farms" may be divided into five vegetation types. These include five mixed hardwood stands which total 57± acres; open fields which total 28± acres; old fields, totaling 22± acres; hardwood swamp areas which total 6± acres; and two open swamp areas which total 2± acres. (Please see the Vegetation Type Map and Vegetation Type Descriptions).

Throughout this tract are many large healthy trees and flowering shrubs which have high aesthetic value and should be retained to the greatest extent possible. Included with the trees that should be retained are the trees which are present along thre fence rows which divide the open fields.

Trees in several of this tract's stands are declining in health and vigor due to overcrowding. These areas would benefit by receiving fuelwood thinnings aimed at improving the over all condition of the residual trees. The open fields could be planted with tree species to provide cover for wildlife, reduce the effect of wind, and improve aesthetics.

A. Vegetation Type Descriptions

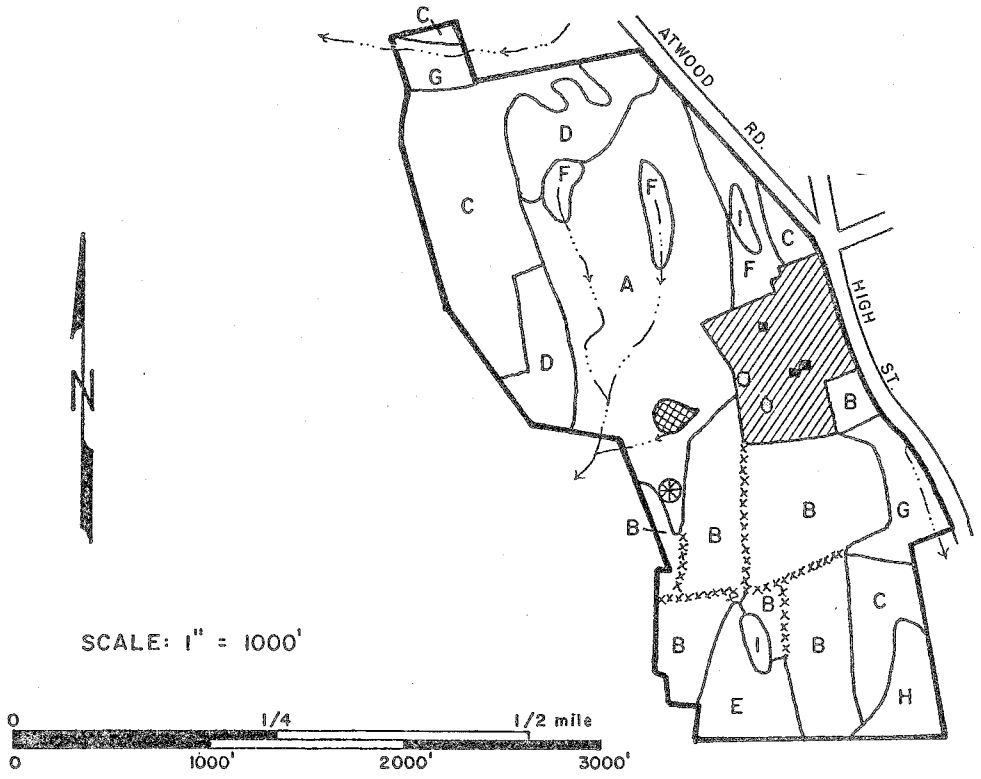
TYPE A. MIXED HARDWOODS. This 32± acre stand received a harvest which removed the majority of its larger sawtimber size trees approximately 8 years ago. The remaining trees are medium quality pole to small sawtimber size white oak, black oak, red oak, black birch, shagbark hickory, red maple and yellow birch with occasional sugar maple and paper birch. Scattered throughout this stand are several healthy large sawtimber size trees, which were not removed during the recent harvest. The majority of this stand is fully-stocked, however due to the harvest, some variation in stocking levels is apparent. Hardwood tree seedlings, sapling size eastern red cedar, hemlock seedlings, mountain laurel, maple leaved viburnum, alternate leaved dogwood, flowering dogwood, gray birch, barberry, hazelnut and witch hazel make up the understory in this stand. Ground cover consists of wild strawberry, partridge berry, grasses, Canada mayflower, aster, club moss, and hay scented fern. Cinnamon fern, poison ivy, false hellebore and spice bush are present along the streams which pass through this area. Dense patches of raspberry and multiflora rose have become established in the larger openings which were left after the harvest.

TYPE B. OPEN FIELD. Approximately 28 acres of open fields are present within this tract. Grasses, goldenrod, meadow sweet, milkweed and black-eyed susans predominate. The many fence rows which divide these fields are vegetated with medium quality white ash, red maple, sugar maple, apple trees, shagbark hickory, white oak, red oak and black birch of all size classes. The shrub species present include hawthorn, gray stemmed dogwood, barberry, and multiflora rose.

TYPE C. OLD FIELD. Three old field areas which total 22± acres are present within this property. These areas are understocked with seedling to sapling size white oak, black oak, black cherry and white ash. Flowering dogwood, eastern red cedar, eastern white pine, gray birch and apple trees are also present. Shrub species include tartarian honeysuckle, arrowwood, red osier dogwood, gray stemmed dogwood, hawthorn, old field juniper, multiflora rose, barberry, maleberry, sweet fern, bay berry, smooth sumac, meadow sweet and localized patches of raspberry. Ground cover consists of grasses, goldenrod, milkweed, Queen Anne's lace, and cinquefoil. Several high quality pole size eastern white pine are present in the old field to the west.

FIGURE 4.

VEGETATION TYPE MAP



VEGETATION TYPE DESCRIPTION*

TYPE A — Mixed hardwoods. Fully stocked, pole to small sawtimber size. 32± acres.

TYPE B — Open field. 28± acres.

TYPE C — Old field. Understocked, seedling to sapling size. 22± acres.

TYPE D — Mixed hardwoods. Fully stocked, pole size. 10± acres.

TYPE E — Mixed hardwoods. Fully to over-stocked, pole size. 6± acres.

TYPE F — Hardwood swamp. Overstocked, sapling to pole size. 6± acres.

TYPE G — Mixed hardwoods. Fully stocked, pole size. 5± acres.

TYPE H — Mixed hardwoods. Overstocked, sapling size. 4± acres.

TYPE I — Open swamp. Understocked, seedling size. 2± acres.

LEGEND

- Road
- Property Boundary
- Vegetation Type Boundary
- Stream
- Fence Rows
- Homestead Area (11± acres)
- Ponds
- Buildings
- Land Fill (1± acre)
- Large Red Oak Specimen Tree (51" d.b.h)

*Seedling size: Trees less than 1" in diameter at 4½' above the ground (d.b.h.)
Sapling size: Trees 1" to 5" in d.b.h.
Pole size: Trees 5" to 11" in d.b.h.
Sawtimber size: Trees 11" and greater in d.b.h.

TYPE D. MIXED HARDWOODS. Poor quality pole size red maple, white ash, black birch and black cherry make up this 10± acre fully stocked stand. The understory is dominated by spice bush, high bush blueberry, eastern red cedar, eastern hemlock, gray birch, barberry, multiflora rose, patches of mountain laurel and scattered flowering dogwood. Vine species present include wisteria, fox grape and poison ivy. Wild strawberry, grasses, cinnamon fern and club moss form the ground cover in this area.

TYPE E. MIXED HARDWOODS. This 6± acre fully to over-stocked stand is made up of sapling to pole-size red oak, black oak, shagbark hickory, mockernut hickory, white ash, red maple, black birch, black cherry and quaking aspen. Maple leaved viburnum, black beech, shadbush, azalea, hardwood tree seedlings and hemlock seedlings are present in the understory. Ground cover vegetation in this stand includes spotted wintergreen, partridge berry, barberry, poison ivy, Japanese honeysuckle, evergreen wood fern and club moss.

TYPE F. HARDWOOD SWAMP. Sapling to pole size red maple are present along with occasional yellow birch in this 6± acre over stocked stand. A dense understory of spice bush, high bush blueberry, and speckled alder has become established in this stand. Ground cover is made up of marsh rue, tussock sedge, cinnamon fern, sensitive fern, false hellebore and skunk cabbage.

TYPE G. MIXED HARDWOODS. Pole size white ash, red maple, sugar maple, black birch and shagbark hickory are present in this 5± acre fully-stocked stand. The understory is dominated by spice bush, deciduous holly, red osier dogwood, high bush blueberry, multiflora rose and barberry. Ground cover consists of cinnamon fern, sensitive fern, skunk cabbage, wild violets and false hellebore.

TYPE H. MIXED HARDWOODS. This 4± acre stand is over stocked with sapling size white ash, red maple, quaking aspen, gray birch, red cedar and scattered apple trees. Gray stemmed dogwood, high bush blueberry and arrowwood are the shrub species which are present. Grasses, goldenrod and wild strawberry form the patchy ground cover which is present.

TYPE I. OPEN SWAMP. Two open swamp areas which total approximately two acres are located within this tract. Seedling size speckled alder and red maple are present along with high bush blueberry, cattail, common reed, tussock sedge, cinnamon fern, sensitive fern, marsh marigold and large blue flag.

B. Aesthetic Considerations

Many of the vegetation types present within this property have scattered healthy trees which have high aesthetic and shade value.

Of special interest is a reasonably healthy red oak which measures 51 inches in diameter at four and a half feet above the ground. This tree is located at the southern tip of vegetation type A (see Vegetation Type Map). There are several dead branches on this tree which should be properly removed to improve its aesthetic quality and reduce potential hazards.

Several large healthy oak trees, which were not removed during the recent harvest, are also present within Stand A, along with a few high quality paper birch. These trees would make exceptional specimen trees.

A small number of high quality eastern white pine are present in the old field area (Vegetation Type C) to the west. These trees are the largest trees in the old field, and have high aesthetic and shade value.

The trees which are present along the fences which run through the open fields (Vegetation Type B) add considerable character to this tract of land. If it is at all possible these fence rows should be incorporated into the overall site plan for this property.

The flowering shrubs, including flowering dogwood, mountain laurel, apple trees and tartarian honeysuckle which are present in vegetation types A, C and D have high aesthetic value. The flowering of these shrubs may be stimulated by allowing direct sunlight to reach them. This may be accomplished by complete or partial removal of the overstory trees above these shrubs.

It would be desirable to incorporate the retention of the trees and flowering shrubs mentioned above into the final site plans. These trees and shrubs should be located in the field and clearly marked for their retention. The presence of this vegetation may enhance the value of the individual house lots by as much as twenty percent.

Trees and shrubs 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.

Care should be taken during the construction period not to disturb the trees that are to be retained. In general, healthy and high vigor trees should be favored over unhealthy trees because they are usually more resistant to the environmental stresses brought about by construction.

Where feasible, trees should be saved 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.

C. Conditions Which Limit Vegetation Potentials

The high water table and saturated soils present in the hardwood swamp (vegetation type F) and open swamp (vegetation type I) limit vegetative growth to species that are able to tolerate excessive moisture conditions. The red maple and occasional yellow birch that are able to survice in the hardwood swamp areas are poor in quality, slow growing and shallow rooted. The high water table is more critical in the open swamp areas where tree species are unable to survive past the seedling/sapling stage. This is primarily because the depth of tree root systems is restricted by the saturated soils and, as a result, trees are unable to become firmly rooted and fall over as soon as their weight is unsupportable. The shrub species which are present in these areas provide excellent food and cover for many species of wildlife.

D. Potential Hazards

The loss of trees to windthrow is a potential hazard in the hardwood swamp areas (vegetation type F) and also along the streams which pass through vegetation type A. In these areas tree root systems are shallow and many of the trees are unable to become securely anchored. Any clearings within or alongside these areas may accelerate windthrow by allowing wind to pass through rather than over these areas.

As noted earlier some of the larger trees present within this tract have large dead branches which should be removed. If these branches are not removed the potential for them falling and causing damage will remain high.

Vegetation type D has many severly damaged trees that should be removed prior to development of this area to reduce potential hazards.

E. Management Considerations

The trees present in vegetation type E (mixed hardwoods) are beginning to decline in health and vigor as a result of their crowded condition. A fuelwood thinning in this stand, following the "crop tree selection method" (preferably prior to development of this area), would reduce the competition between residual trees for space, sunlight, nutrients and water, resulting in a healthier more stable stand over time. The healthier stand would be better able to withstand any new stresses brought about by development.

Under the "crop tree selection method", 100 of the highest quality trees in each acre should be identified (trees spaced approximately 20' x 20' will equal 100 trees per acre), and one, two, or three trees that are in direct competition with each of those identified should be removed. The 100 trees per acre that are in direct competition with each of those identified should be removed. The 100 trees per acre that are selected as potential crop trees should be healthy, large crowned, and show little or no signs of damage. Trees which are not directly competing with the 100 selected trees should not be removed, unless they are severely damaged. This thinning, if implemented, will provide between 4 and 6 cords of fuelwood per acre.

The trees in the hardwood swamp (vegetation type F) and the mixed hardwood stand Type G are also declining in health. Light thinnings in these stands would help to improve the stability of the residual trees in time. These thinnings should remove no more than one fourth of the total volume which is present. They should be focused on removing unhealthy, poor quality, damaged trees and trees which are directly competing with healthy trees. These thinnings will produce approximately 5 cords of fuelwood per acre.

If the above mentioned thinnings are not feasible at this time they may be implemented on an individual lot basis by the owners after the property is subdivided. Ideally these thinnings should take place several years before the subdivision and subsequent development occurs. This will allow the remaining trees time to become more stable.

If the open field areas (vegetation type B) are not to be developed for several years it would be desirable to establish trees. These fields could be planted with a random mixture of eastern white pine, european larch and eastern hemlock, spaced between 10 and 15 feet apart. As this area is developed, the trees which need to be removed could be transplanted to other areas. These trees

would provide good cover for wildlife, a good wind barrier and they would improve the aesthetics of the area once houses were constructed.

A public service forester or private forester should be contacted if any of the above vegetation management is desired. Revenues from the thinnings will more than cover the costs of hiring a consultant to provide further help and information.

IX. WILDLIFE

A. Major Habitats on the Property

The property in general consists of open haylots, pastures with intermingling hedgerows, and woodlands comprised of varying successional stages ranging from reverting old fields through mature adult hardwoods and some softwoods.

The open haylots and pastures comprise slightly more than one-third of the property. This open land is edged and crisscrossed by hedgerows containing dogwood, white ash, aspen, rose, barberry and blackberry; all valuable wildlife foods. Next to some of the fields are some small brushy areas containing many of the same food plants. This is excellent cottontail rabbit habitat, especially being next to the open lots and their lush grasses. Songbirds are also inhabitants of this type of area. Woodchucks ought to be found in fields like these, but no burrows were seen the day of the ERT's field review. At different times of the year, deer and grouse may also use these haylots and pastures.

The woodlands on the property are comprised of old fields reverting back to woods, and sapling size through mature mast-producing hardwoods. All of these mixes contain high value wildlife food. The mast crop is subject to failure in any given season, but there are enough oaks, hickories and beech on the property to support a small but stable deer population, along with grouse, squirrel and raccoon. The sapling sized hardwoods provide browse for deer, and buds for grouse, songbirds and rabbits. The old fields contain some juniper, cedar, viburnums, barberry, dogwood, grapes, hawthornes, and black locust. All of these plants are excellent sources of food for wildlife. Species inhabiting these areas include songbirds, grouse, rabbits, some squirrel, and deer. No one species seemed to be overly abundant, but small populations would be expected to be in the area. There was not much evidence of squirrel nesting in the area.

B. Effects of the Development on Wildlife

Phase I with one-half acre lots will destroy all wildlife habitat where the houses are erected. The small amount of open land left around the perimeter of Phase I will be of value to some of the displaced wildlife, mostly songbirds and cottontail rabbits. Both are quite adaptable and should over the years survive the change from open haylots and hedgerows to manicured lawns and brushy edges. Their population levels will go down quite a bit at first, then slowly, their levels will come back up. However, population levels will never reach pre-development levels.

Phases II and III are located in the same general type of habitat as Phase I, and the wildlife impacts would be roughly the same. Some of the lots in Phase III appear to be one acre lots. If as much of the natural vegetation as possible is left when these lots are cleared, the adaptation period for wildlife will be

shortened considerably. Some of Phase III contains woodlands and these woods may contain some squirrel. These animals along with the songbirds and rabbits in the area are quite adaptable, and should do fairly well around houses after a period of population fluctuation because of the change in habitat. Phase IV, which encompasses brushy woods, and is planned for one-half acre lots, should experience the same shift in population numbers as that seen in Phase's II and III. Phases V and VI are located in wooded areas, and the use of one acre lots will spread the houses out throughout the entire woods. Very little land will be left open and wild. This will effectively push out those animals that cannot live in close quarters with humans, such as deer and grouse. Again, those adaptable animals will survive the change, such as rabbits, squirrel, and songbirds.

To conclude, there are some nice sections of woods and old fields on this property that contain very nice wildlife habitat. The value of this property for wildlife habitat will diminish considerably with implementation of this development. With project implementation those areas of each house lot that have not been cleared should remain as useable "wildlife edge" for the more adaptable species.

C. Alternate Management Techniques

With implementation of the proposed project, it would be highly desirable to minimize the amount of clearing on each lot. Leaving as much native vegetation as possible on each houselot will serve to augment the planned open space on the proeprty and help to protect wildlife habitat.

One alternative which should be considered for this tract is cluster development. From a wildlife perspective, cluster development is superior to conventional development, providing density is not significantly increased. A cluster development approach could allow the protection of larger open space parcels and facilitate wildlife management. The more open space left for wildlife, the easier the adaptation period will be. In addition, under a cluster plan, there might be room left for those less tolerant species that cannot cohabitate an area with man.

X. PLANNING CONSIDERATIONS

The proposed Highwood Farms subdivision plan is generally consistent with the Thomaston Plan of Development. The Thomaston Plan of Development identifies the tract of land as best suited for densities of two families per acre. In contrast, the Regional Plan of Development prepared by the Central Naugatuck Valley Regional Planning Agency identifies most of the tract as best suited for low density development with minimum lot sizes of two acres per dwelling unit. In addition, the Regional Plan of Development identifies that portion of the tract fronting onto High Street Extension and Atwood Road as best suited for urban low density development with two to four dwellings per acre. The proposed development of 101 lots appears to be a reasonable blend of both the Town and Regional Plans of Development. By providing one-half acre lots fronting onto High Street Extension and by reducing the minimum lot sizes to one acre throughout the rest of the remaining phases of the subdivision, the developer appears to have met the intent of both local and regional plans.

The zoning map for the Town of Thomaston indicates that the 127 acre tract of land is zoned for residential development at two dwelling units per acre. Development of this tract of land for residential purposes should have no adverse impact upon surrounding property largely because the area on the east side of High Street Extension is already an established residential area while the area on the west side of the tract is owned by the United States Government and is used for the Northfield Brook Dam.

A. Clustered Development

One possible alternative means of developing the subsequent phases of this project would be to cluster development. The Thomaston Zoning Regulations contain detailed provisions allowing cluster design in the RA-20 zone. The advantage of clustering is that the developer could be allowed to increase densities on one portion of the tract by up to 20%, in exchange for a greater dedication of open space. The net result is that overall densities are kept the same as the underlying zone and the developer is given reduced costs for roads and site development. The principal advantage of clustering on this particular tract is that it may decrease the likelihood of any possible problems raised by constructing houses and digging wells near the abandoned town dump located near the western fringe of the tract. A greater dedication of open space surrounding and including the abandoned dump site could be one effective means of increasing the distance between new wells and possible leachates that might emanate from the dump.

B. Access to the Site

The proposed subdivision has access to High Street Extension and Atwood Road. The initial phase of development proposes an entrance way on High Street Extension near to the existing driveway of the farm house. In addition, phase 4 of the subdivision will include an accessway to Atwood Road, 1,700 feet to the north of the first entranceway. Both entranceways to the proposed subdivision are well located and should create no highway safety problems.

Assuming that 101 dwelling units are constructed at the ultimate development of the tract, and that each dwelling unit generates 11.4 vehicular trips per day there will be an estimated 1,151 additional vehicles utilizing High Street Extension on a daily basis. While no traffic count data is available for High Street Extension, a reasonable estimate can be made based on the number of dwelling units to the north of the proposed tract which currently must use this road. An estimated 90 dwelling units make use of High Street Extension generating an estimated 1,026 vehicle trips per day. At ultimate development of the tract, the average daily traffic count for High Street Extension at the main entrance to Highwood Farms could be as high as 2,177 vehicle trips per day. Based on the geometry, width and alignment of High Street Extension, this road has a capacity of 2,000 vehicles per hour based on the "volume to capacity formula" for rural two-lane roads developed by the Connecticut Department of Transportation. At ultimate development the vehicle to capacity ratio would approach 15% which is well below the critical vehicle to capacity level of 75% when queuing and stop and go traffic conditions emerge.

C. Solar Energy Considerations

With rising costs of fossil based fuels, it is becoming increasingly important to make optimum use of solar energy for space heating and domestic hot water purposes. The inclusion of solar energy considerations into a subdivision plan can be done relatively easily and cheaply when planned from the initial stages

of a development. The proposed tract of land is ideally suited for the utilization of solar energy largely because of favorable slopes and minimal levels of vegetation to threaten access to sunlight.

While east-west oriented streets are ideal from the standpoint of developing solar subdivisions, they are not an essential prerequisite. Proper building orientations as well as favorable lot line orientations can compensate for the inflexible pattern of the road network. Houses should be oriented within 30 degrees of true south if the developer wishes to make optimum use of solar energy as well as to qualify for local property tax exemptions for passive solar energy systems. Under Public Act 80-406, the Town will reduce taxes on those portions of a passive solar home, which are used for the collection of solar energy. This should serve as a significant incentive to a "solar conscious" design to the houses and the overall development.

The relatively open fields found on much of the southern portion of the tract are ideal for the use of solar energy systems. However, problems could emerge in the future if the developer does not provide solar easements which guarantee a right to light to the south wall of every passive solar home. This is an especially significant issue on the portion of the tract where lot sizes are one-half acre per dwelling unit and the road layout is generally on a less favorable north-south axis. One could easily imagine a neighbor planting an evergreen windbreak on the north side of his/her house which might eventually shade out the solar energy system to the north. Because of the relatively unfavorable lot orientations combined with the relatively high densities in the first phase of development, the developer may wish to consider solar easements or restrictive convenants which would guarantee sunlight to each solar energy system.

The second issue relates to the high altitude of the proposed development. The tract of land is at the top of a hill and is subject to direct exposure to prevailing winter winds. This is both an asset as well as a liability. The principal asset associated withthe hilltop location is the possible opportunity for the utilization of wind energy for electrical generation. A large wind energy conversion system could easily supply the electrical energy needs of several dwelling units under wind regimes experienced on the day of the ERT field inspection of the site. The principal liability of hilltop development is that heat loss is increased in the winter months from greater wind infiltration of the dwelling units. One means of mitigating the effects of winter wind exposure would be by planting evergreen windbreaks to the north of the proposed dwelling locations. A second means of accomplishing the same objective would be by relocating homes with unfavorable exposure to the winter winds to more protected southerly slopes or near wooded areas. In either case, the key consideration will be providing adequate wind protection while simultaneously avoiding any possible obstructions to the solar access to neighbors to the north. Proper selection of evergreen trees with short mature tree heights is one logical means of protecting solar access as well as creating winter wind breaks.

D. Dump Site Considerations

Perhaps the major planning issue raised by the proposed subdivision involves the possible impact of the abandoned dump on the water quality of the proposed lots. As discussed in the "Water Supply" section of this report, test holes to determine the quality of the groundwater in the vicinity of the landfill are desirable. If the water is contaminated in a portion of the tract, this may

not necessarily entail a change in the density of development or in the location of lots. The developer could extend the existing public water line serving the lower portion of High Street Extension so that all lots in the subdivision have public water. If this should become necessary, the developer may wish to consider increasing the density of development since the presence of sewer and water services present no limitations to densities of up to two dwelling units per acre as allowed by the zoning regulations. However, since the existing public water line is approximately 3,000 feet from the proposed entrance to the subdivision and nearly 4,000 feet from the abandoned dump site, the costs of extending this line may encourage the developer to consider an alternative approach such as a community well system. The advantage of a community well system is that utility costs could be reduced dramatically while still offering the developer the opportunity of developing at the maximum densities allowed by zoning. The disadvantage of developing a community well system is that the operating organization would be required to make annual reports to the Connecticut Public Utilities Control Authority under the rules governing water utility companies.

E. Summary

From a planning viewpoint, the proposed subdivision appears to be a valuable asset to the Town of Thomaston. The proposed project offers recreational opportunities, the potential for the use of solar energy and a plan of development which is generally consistent with local and regional plans of development. The major problem that must be faced by the developer and the town is the degree to which the abandoned dump site might affect the proposed locations of lots and the potability of the water. Once the Commission understands the extent of the environmental threats associated with development near the dump site (via the contents of this report and the results of any on-site testing), it will be in a better position to guide the location of the lots, the density of development, and the method of providing water service to the site.

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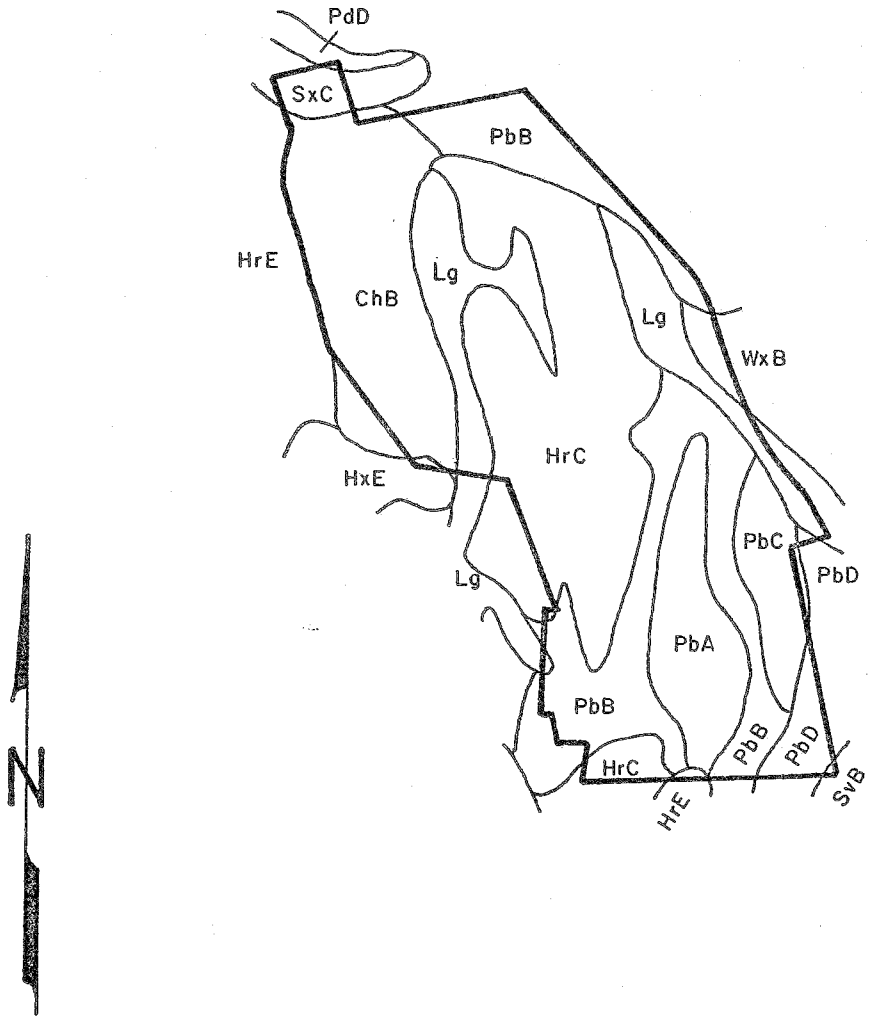
XI. APPENDIX

SOILS MAP

*ADAPTED FROM LITCHFIELD COUNTY SOIL SURVEY, U.S.D.A. – S.C.S.



0 1/4 1/2 mile

0 1000' 2000' 3000'

SCALE: 1" = 1000'

SOILS LIMITATION CHART - HIGHWOOD FARMS - THOMASTON

MAP SYMBOL	SOIL NAME	SEPTIC SYSTEMS	DWELLINGS W/ BASEMENT	ROADS OR DRIVEWAYS	LANDSCAPING
ChB	Charlton stony fine sandy loam 3-8% slope	Slight;	Slight;	Slight;	Moderate; large stones
HrC	Hollis very rocky fine sandy loam, 3-15% slopes	Severe; depth to bedrock	Severe; depth to bedrock	Severe; depth to bedrock	Severe; depth to bedrock
HrE	Hollis very rocky fine sandy loam, 15-35% slopes	Severe; slope, depth to rock, large stones	Severe; slope, depth to rock, large stones	Severe; slope, depth to rock	Severe; slope, depth to rock, large stones
HxE	Hollis extremely rocky fine sandy loam, 15-35% slopes	Severe; slope, depth to rock, large stones	Severe; slope, depth to rock, large stones	Severe; slope, depth to rock	Severe; slope, depth to rock, large stones
Lg	Leicester, Ridgebury & Whitman very stony fine sandy loams	Severe; wetness	Severe; wetness	Severe; wetness, frost action	Severe; wetness
PbA	Paxton fine sandy loam, 0-3% slopes	Severe; percs slowly	Moderate; wetness	Moderate; frost action wetness	Slight;
PbB	Paxton fine sandy loam, 3-8% slopes	Severe; percs slowly	Moderate; wetness	Moderate; frost action, wetness	Slight;

MAP SYMBOL	SOIL NAME	SEPTIC SYSTEMS	DWELLINGS W/ BASEMENT	ROADS OR DRIVEWAYS	LANDSCAPING
PbC	Paxton fine sandy loam, 8-15% slopes	Severe; percs slowly	Moderate slope, wetness	Moderate; frost action, wetness	Moderate; slope
PbD	Paxton fine sandy loam, 15-25% slopes	Severe; slopes, percs slowly	Severe; slope	Severe; slope	Severe; slope
PdD	Paxton stony fine sandy loam, 15-25% slope	Severe; slope, percs slowly	Severe; slope	Severe; slope	Severe; slope
SvB	Sutton fine sandy loam, 3-8% slopes	Severe; wetness	Severe; wetness	Moderate; frost action	Slight;
SxC	Sutton very stony fine sandy loam, 3-15% slopes	Severe; wetness	Severe; wetness	Moderate; slope, frost action	Moderate; slope, large stones
WxB	Woodbridge fine sandy loam, 3-8% slopes	Severe; percs slowly, wetness	Severe; wetness	Severe; frost action	Moderate; wetness

EXPLANATION OF RATING SYSTEM

1. SLIGHT LIMITATION: indicates that any property of the soil affecting use of the soil is relatively unimportant and can be overcome at little expense.
2. MODERATE LIMITATION: indicates that any property of the soil affecting use can be overcome at a somewhat higher expense.
3. SEVERE LIMITATION: indicates that the use of the soil is seriously limited by hazards or restrictions that require extensive and costly measures to overcome.

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

ABOUT THE TEAM

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state, and regional agencies. Specialists on the team include geologists, biologists, foresters, climatologists, soil scientists, landscape architects, recreation specialists, engineers, and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - a 47 town area in western Connecticut.

As a public service activity, the team is available to serve towns and developers within the King's Mark Area --- free of charge.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in the review of a wide range of significant activities including subdivisions, sanitary landfills, commercial and industrical developments, and recreation/open space projects.

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

REQUESTING A REVIEW

Environmental Reviews may be requested by the chief elected official of a municipality or the chairman of an administration agency such as planning and zoning, conservation, or inland wetlands. Requests for reviews should be directed to the Chairman of your local Soil and Water Conservation District. This request letter must include a summary of the proposed project, a location map of the project site, written permission from the landowner/developer allowing the team to enter the property for purposes of review, and a statement identifying the specific areas of concern the team should address. When this request is approved by the local Soil and Water Conservation District and the King's Mark RC&D Executive Committee, the team will undertake the review. At present, the ERT can undertake two reviews per month.

For additional information regarding the Environmental Review Team, please contact your local Soil Conservation District Office or Richard Lynn (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, P.O. Box 30, Warren, Connecticut 06754.