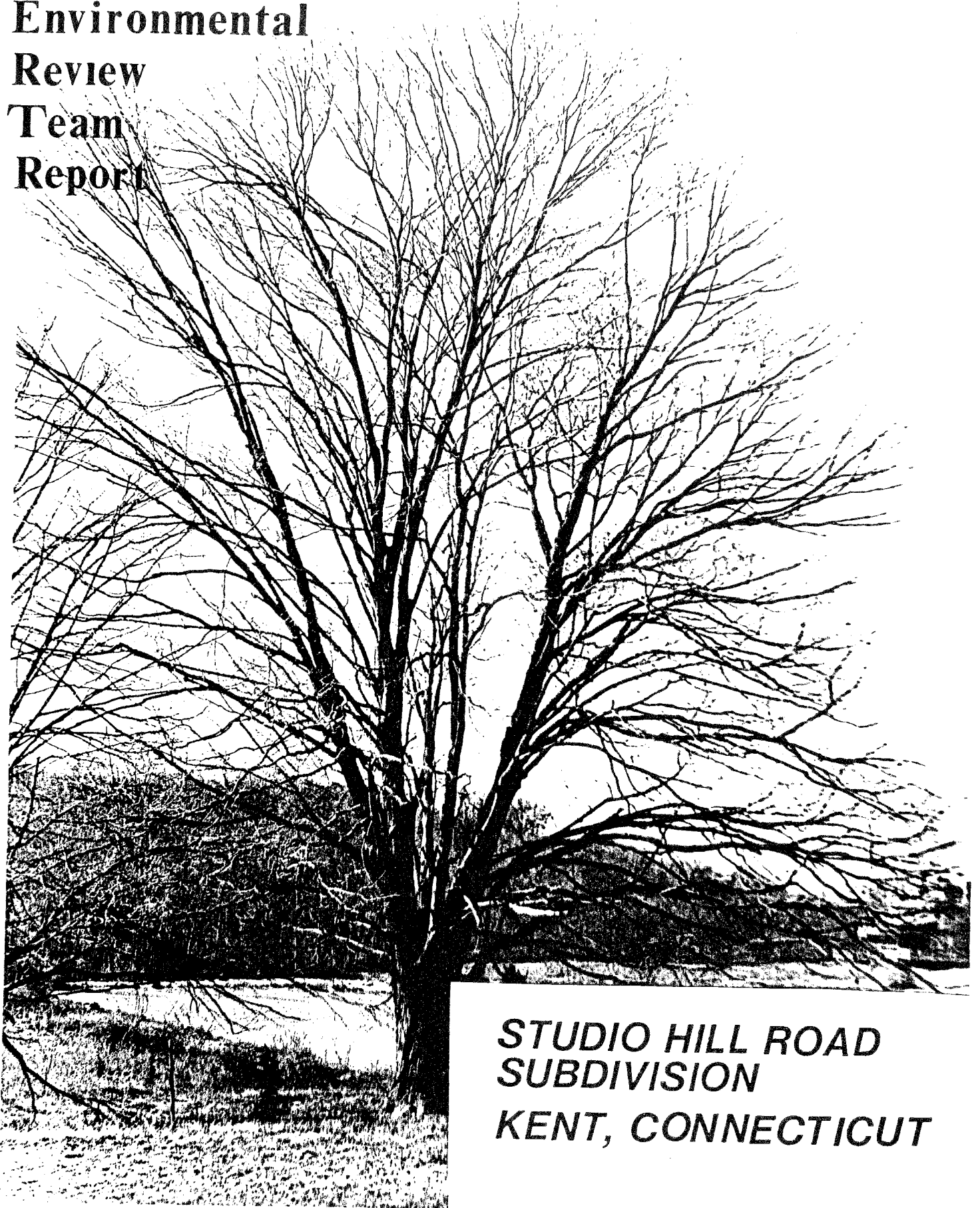


**King's Mark
Environmental
Review
Team
Report**



**STUDIO HILL ROAD
SUBDIVISION
KENT, CONNECTICUT**

STUDIO HILL ROAD SUBDIVISION

KENT, CONNECTICUT

Environmental Review Team Report

Prepared by the King's Mark Environmental Review Team
of the King's Mark Resource Conservation
and Development Area, Inc.

Wallingford, Connecticut

for the

Kent Planning and Zoning Commission

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 Planning and Zoning Commission and the Town. The results of the Team action are oriented toward the development of a better environmental quality and long-term economics of the land use. The opinions contained herein are those of the individual Team members and do not necessarily represent the views of any regulatory agency with which they may be employed.

FEBRUARY 1988

ACKNOWLEDGMENTS

The King's Mark Environmental Review Team Coordinator, Nancy Ferlow, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this study:

- * William Warzecha, Hydrogeologist
Department of Environmental Protection - Natural Resource Center
- * Kipen Kolesinskas, Soil Resource Specialist
USDA - Soil Conservation Service
- * Kathy Hanford, District Conservationist
USDA - Soil Conservation Service
- * Douglas Cooper, Wetland Specialist
Department of Environmental Protection - Water Resources Unit
- * Frank Schaub, Sanitarian
Department of Health Services
- * Linda Cardini, Regional Planner
Northwestern Connecticut Council of Government
- * Harry Siebert, Transportation Planner
Department of Transportation

I would also like to thank Susan Anderson, Secretary, and Janet Jerolman, Cartographer of the King's Mark Environmental Review Team for assisting in the completion of this report.

Finally, special thanks to Paul Moroz and Barbara Lasch, Kent Planning and Zoning Commission and Wesley Wyrick and George McBride, developers, Mark Heller, engineer for the developer, and William Manasse, attorney for the developer, for their cooperation and assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

The Kent Planning and Zoning Commission has requested that an environmental review be conducted on Studio Hill Road, a site proposed for a subdivision development. The site is located in the center of the town, on the west side of Kent Mountain. The 132-acre site is characterized by second growth, mixed hardwood forests, wetlands, and former agricultural lands. Steep slopes occur in much of the site. There are scattered wetland communities as well as numerous streamcourses. The proposed subdivision would encompass 19 house lots, ranging in size from 2.0 acres to 10.2 acres. A paved access road and two gravel cul-de-sacs are proposed to serve the subdivision. The subdivision would rely upon on-site sewage disposal and water.

The Town was primarily concerned with the potential impact that the proposed development would have on: (1) existing natural resources; (2) existing wetland corridors; (3) effects of erosion and sedimentation; (4) stormwater drainage; and (5) site design compatibility. Therefore the Town asked the ERT to inventory on-site resources and determine their suitability for the proposed development.

The review process consisted of four phases: (1) inventory of the site's natural resources; (2) assessment of these resources; (3) identification of resource problem areas; and (4) presentation of planning and land use guidelines. Based on the review process, specific resources, areas of concern and development limitations and opportunities were identified. The major findings of the ERT are presented below:

Setting, Topography and Geology

Current land use of the area includes low density single family homes and agricultural areas. The majority of the site is dominated by moderate to steep slopes. The topography is controlled by the underlying bedrock. Except for the northwest parts of the site which contain sandy, gravelly deposits, the site is covered by glacial till. Overlying the sandy, gravelly deposits are swamp and muck deposits. Seasonal watercourses, paralleled by narrow bands of wet soils, are found on the slopes. It appears that some of these watercourses may not have been identified in the field. It is suggested that a soil scientist delineate all the wetland boundaries which would then be surveyed onto a site plan.

The bedrock on the site is metamorphic. The central and western parts are underlain by Manhattan Schist; the low lying land in the western parts is underlain by the Basal Member of the Walloomsac Schist; underlying the western limits is Walloomsac Schist. The bedrock is a source of water to many homes in the area.

Geologic Development Concerns

The main geological limitations found on the site include: (1) the presence of till soils, some of which have indications of high ground water levels and moderately slow percolation rates; (2) the presence of regulated inland-wetland soils; (3) the presence of shallow bedrock on lots 5 and 12; and (4) presence of steep slopes. These limitations will affect the ability to provide adequate subsurface sewage disposal systems. In many cases, proper planning and engineering can overcome these limitations, but at added expense.

Based on the plans, the subdivision roads will cross several wetland/streamcourses. Wetland crossings are generally feasible, provided they are properly designed. Detailed plans for any proposed crossings should be submitted to the proper town authorities for review. Wetland disturbance can be mitigated by planning and careful delineation of wetland boundaries, using setbacks from the wetlands, and protecting the wetlands with erosion and sediment controls.

Water Supply

The subdivision will most likely be served by on-site bedrock wells. These wells generally supply small but reliable yields of water depending on the number and size of the water bearing fractures. Ideally each well should be located on a high portion of the lot, separated from sources of pollution. The quality of the water should be satisfactory. Wells drilled into schists and gneisses may have elevated amounts of iron and/or manganese. Wells tapping the marble unit may have elevated hardness levels.

The sandy, gravelly deposits in the northwestern parts may be an aquifer capable of yielding moderate to large amounts of water. Hydrogeologic data for this area is incomplete and verification will require further testing. There are four houses planned for this area and with careful planning and construction, the threat to groundwater quality is expected to be low.

There are several shallow wells on the site. A determination of the use of these wells should be made so that they can be properly abandoned or protected.

Hydrology

The subdivision lies within the Cobble Brook watershed. The construction of new houses, roads and driveways can be expected to increase the amount of runoff from the site. The wetlands and man-made ponds northwest of the site should serve as natural runoff detention areas. Because of the low density, runoff increases are expected to be small. A stormwater management plan needs to be submitted in order to determine the actual impacts. Increased runoff has the potential to erode streambanks and create gullies. A comprehensive stormwater management and erosion and sediment control plan should help to avoid such impacts.

Soil Resources

Areas of special concern with respect to soil limitations are: wetlands/watercourses that may not have been located on the plans; areas of steep slopes; and shallow to bedrock soils. Several percolation tests that were performed in October may need to be redone because this is not a good month for evaluating seasonal high water tables.

Sediment and Erosion Control Plan

A complete Erosion and Sediment Control Plan has not been submitted. The Guidelines for Soil Erosion and Sediment Control should be used as a guide for the plan. Several soils located on the site are highly erodible or are on steep slopes. Carefully planned and maintained erosion and sediment controls will be needed.

Wetland Considerations

All of the wetlands and watercourses should be shown on the site plans. The design of the roads and lots appears to be sound, however this needs to be checked against a complete map. Care should be exercised to avoid unnecessary disturbance to the drainageways on the steep slopes as they provide an important drainage network to the site. The most significant potential impact to the wetlands will be siltation if erosion and sediment controls are not properly developed and maintained.

Planning Considerations

The subdivision is consistent with the Town Plan of Development and local subdivision regulations. The open space area exceeds the amount suggested in the regulations. The subdivision is also generally consistent with the Regional Plan of Development. The Town will need to enforce the Town Inland Wetland regulations. Kent has recently joined the Torrington Area Health District and may need to have their approval for the subdivision. The site is within the Aquifer Protection Overlay Zone of the Kent Zoning Regulations. If the site is located on an aquifer, special care will need to be taken to protect the groundwater. A groundwater education program is suggested.

Studio Hill Road does not meet current road standards. Consideration might be given to requesting the applicant to contribute towards the cost of improving a fair share of the road.

Open space should be preserved through a permanent easement or as otherwise provided for in the subdivision regulations. Deed restrictions are not recommended as they can be overturned at a later date. Comments from Weantinogue Heritage might be sought so that a dialogue on minimizing visual impacts from the land trust holdings and development of trails can be held.

On-site Subsurface Sewage Disposal Considerations

Based upon a review of the data, all the lots would be suitable for subsurface sewage disposal, however the lots would be classified as areas of special concern and warrant detailed engineering plans. Items of concern include, high groundwater tables in some soils, steep slopes, shallow to bedrock soils and soils classified as severe for sewage disposal by the Soil Conservation Service. On some lots, other areas might be tested to see if more suitable locations might be found for sewage disposal.

Traffic Considerations

The proposed subdivision should not significantly impact traffic operations on either Studio Hill Road or Route 7. Studio Hill Road can accommodate the generated traffic even though steep slopes, sharp curves and lack of a snow shelf exist. Sight lines on Studio Hill Road may require adjustment and traffic control devices as safe turning movements need to be assured. If additional development occurs, road improvements between developments should be made to avoid hitting an improved section and returning to unimproved road, which can be unsafe.

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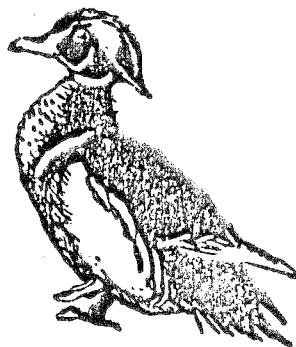
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INTRODUCTION



INTRODUCTION

The Kent Planning and Zoning Commission has requested that an environmental review be conducted on a site on Studio Hill Road, which is proposed for a subdivision development. The site is located in the center of the town, on the west side of Kent Mountain. Access is provided via Studio Hill Road, a road off Route 7.

The 132-acre site is characterized by second growth, mixed hardwood forests, wetlands, and former agricultural lands. Steep slopes occur in much of the site. There are scattered wetland communities as well as numerous watercourses. A 300-year old oak tree lies on the northeastern boundary of the property.

The proposed subdivision would encompass 19 house lots, ranging in size from 2.0 acres to 10.2 acres. A paved access road and two gravel cul-de-sacs are proposed to serve the subdivision. The subdivision would rely upon on-site sewage disposal and water.

THE ERT PROCESS

Through the efforts of the Kent Planning and Zoning Commission, the developer's representative and the King's Mark ERT, this environmental review and report was prepared for the Town. This report primarily provides a description of on-site natural resources, and presents planning and land use guidelines.

The review process consisted of four phases:

- (1) Inventory of the site's natural resources (collection of data).
- (2) Assessment of these resources (analysis of data).
- (3) Identification of resource problem areas.
- (4) Presentation of planning and land use guidelines.

The data collection phase involved both literature and field research. The ERT field review took place on December 15, 1987. Field review and inspection of the proposed development site proved to be a most valuable component of this phase. The emphasis of the field review was on the exchange of ideas, concerns or alternatives. Mapped data or technical reports were also perused and specific information concerning the site was collected. Being on site also allowed Team members to check and confirm mapped information and identify other resources.

Once the Team members had assimilated an adequate data base, it was then necessary to analyze and interpret their findings. The results of this analyses enabled the Team members to arrive at an informed assessment of the site's natural resource development opportunities and limitations. Individual Team members then prepared and submitted their reports to the ERT Coordinator for compilation into the final ERT report.

The primary goal of this ERT is to inventory and assess existing natural resources occurring on the site as well as providing planning and traffic/access information. Specific objectives include:

- (1) assess the hydrological and geological characteristics of the site, including geological development limitations and opportunities, natural drainage patterns, postdevelopment stormwater runoff potential, and flooding;
- (2) determine the suitability of existing soils to support the proposed development;

Figure 1

LOCATION OF STUDY SITE

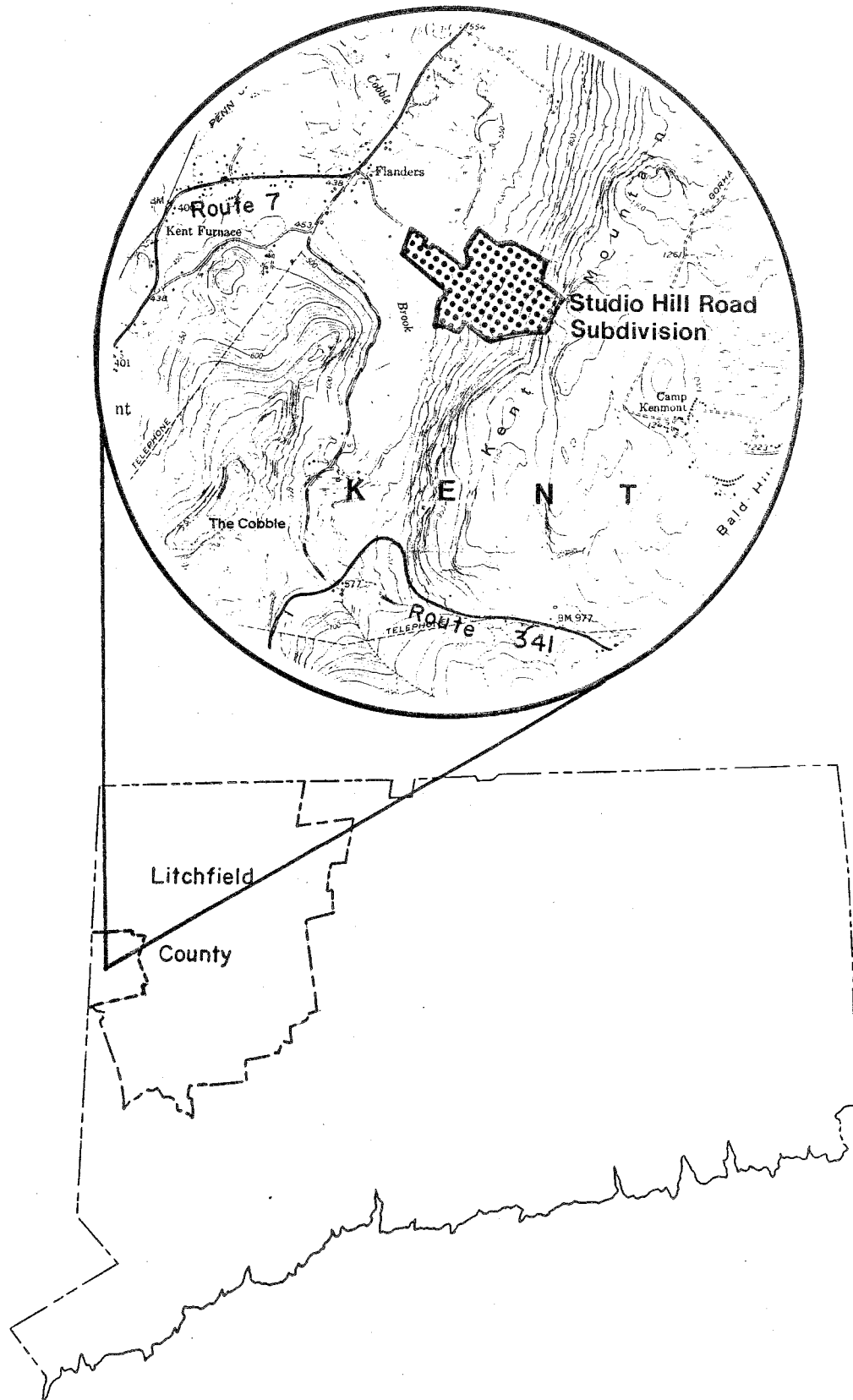
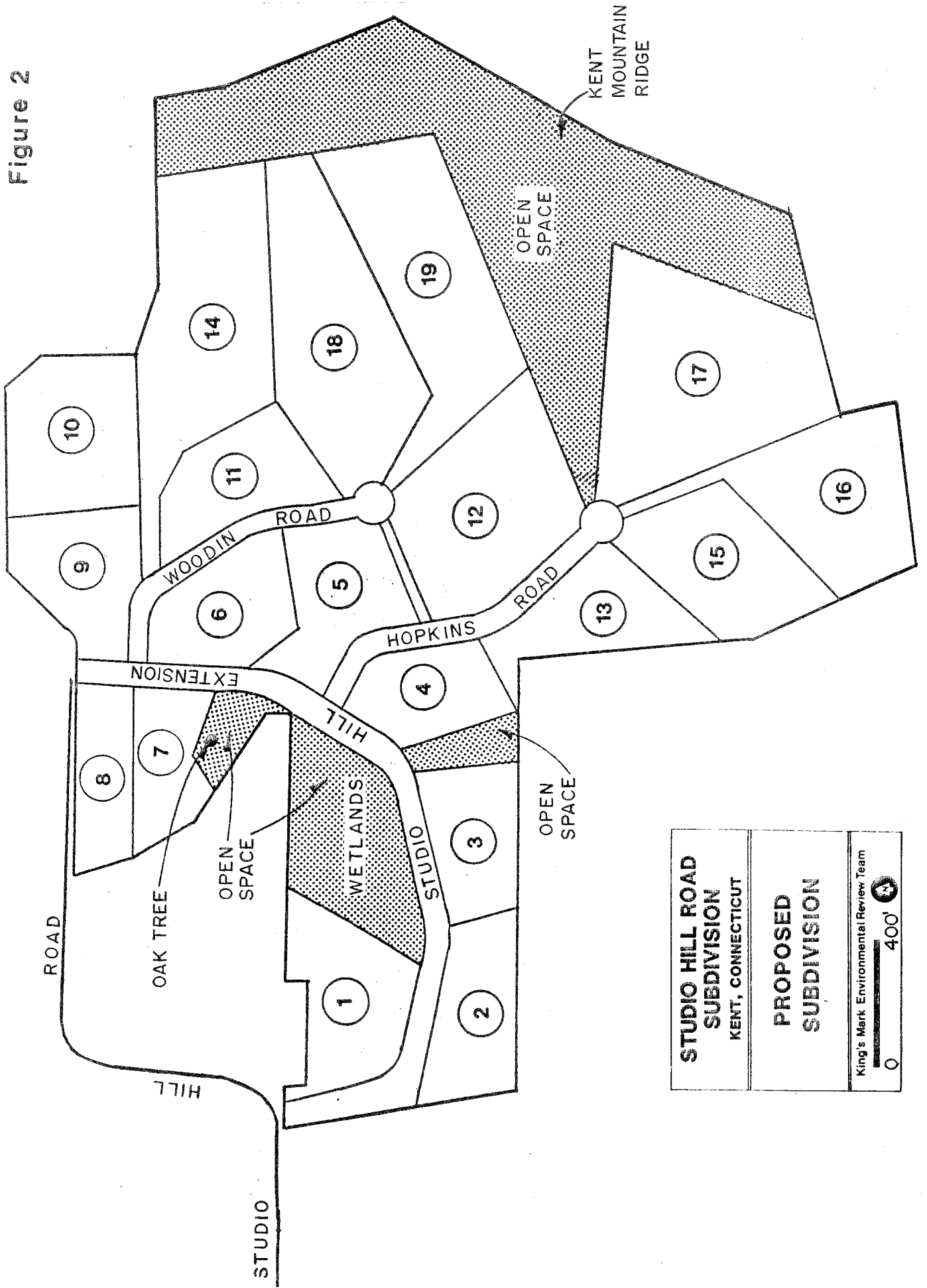



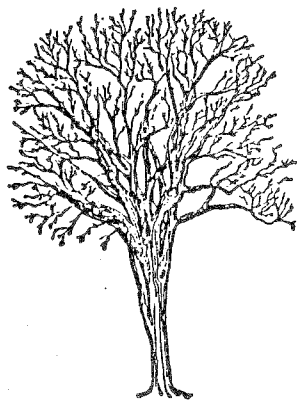
Figure 2



STUDIO HILL ROAD SUBDIVISION KENT, CONNECTICUT
PROPOSED SUBDIVISION
King's Mark Environmental Review Team 0 400' 

- (3) discuss soil erosion and sedimentation concerns;
- (4) assess the impact of the development on the wetlands;
- (5) determine the suitability of the site to support on-site septic and water facilities;
- (6) evaluate traffic and access concerns, and;
- (7) assess planning and land use issues.

PHYSICAL CHARACTERISTICS



SETTING, TOPOGRAPHY AND GEOLOGY

The proposed subdivision site is located in the center of town, on the west side of Kent Mountain. It consists of approximately 132 acres of wooded land and former farm fields (western parts), on which 19 building lots are presently proposed. Lots range in size from 2.0 acres to 10.2 acres. The irregularly shaped parcel is accessed via Studio Hill Road, a road off Route 7. The new road, called, Studio Hill Road Extension, will access the site near Lots 1 & 2 and reconnect with Studio Hill Road near Lots 8 & 9. Two cul-de-sac spurs (Hopkins Road and Woodin Road) are proposed off Studio Hill Road Extension in the central parts.

Current land use in the area of the proposed subdivision is characterized by low density single family homes and agricultural land. Some sand and gravel mining has occurred in the Cobble Brook Valley.

The majority of the site (central and eastern parts) is dominated by slopes which rise moderately to steeply eastward from about Lot 4. The topography throughout this area is controlled by the underlying bedrock. The western section is characterized by hummocky topography shaped by glacial meltwater deposits of sand and gravel.

Maximum and minimum elevations on the site are about 1,200 feet above mean sea level and 540 feet above mean sea level (Figure 3). The major streamcourses on the site are located in the western parts. Both are unnamed and are tributary to Cobble Brook.

The subdivision site is located entirely within the Kent topographic quadrangle. No bedrock or surficial geologic map has been published for the quadrangle to date. There is, however, preliminary geologic information available for the quadrangle at DEP's Natural Resource Center in Hartford. The

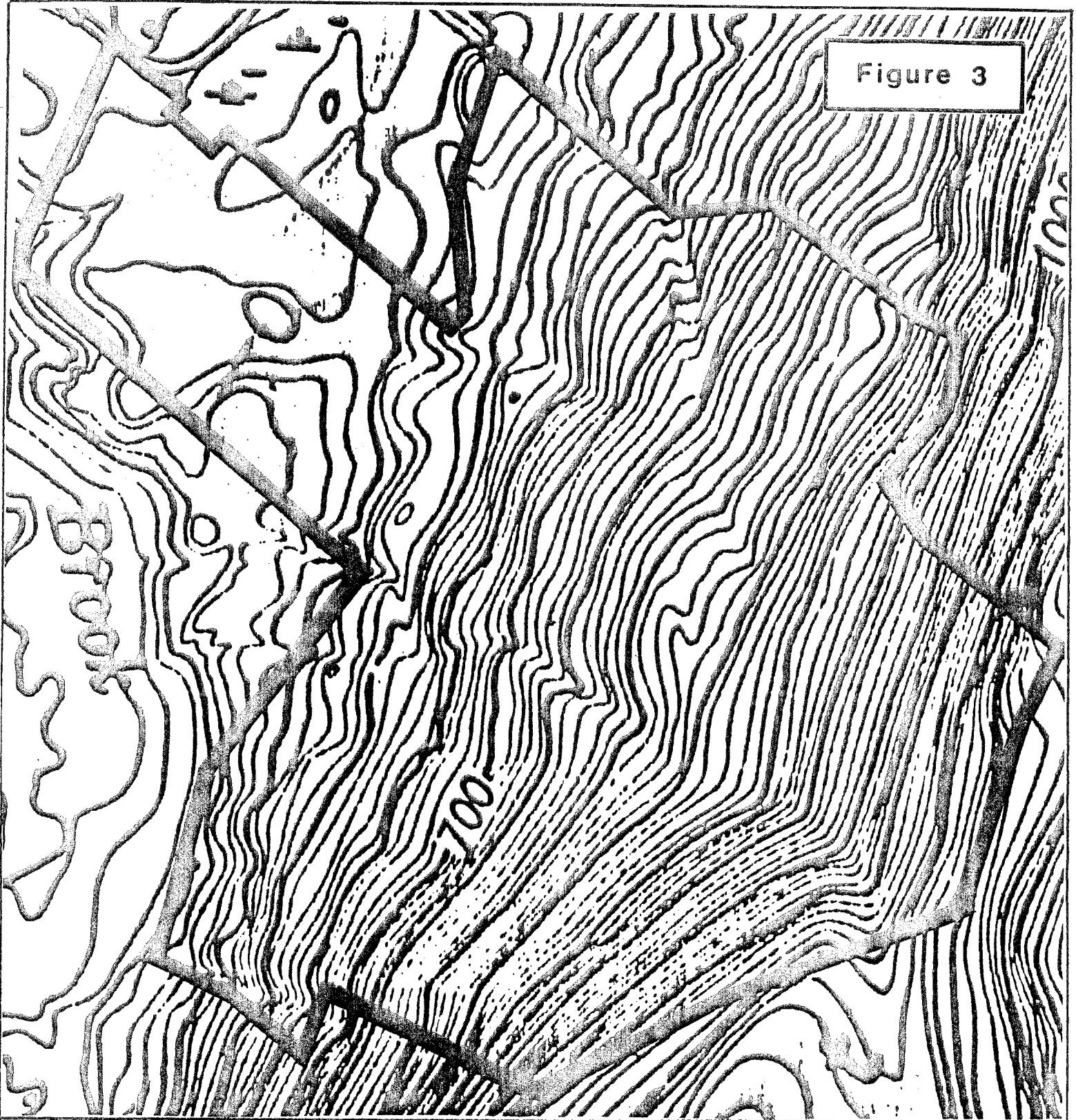
Team's geologist also referenced John Rodgers, Bedrock Geological Map of Connecticut, the Soil Survey for Litchfield County and soils and deep test pit information submitted by the applicant's soil scientist and engineer, respectively.

Except for the western part of the site, which contains sandy gravelly deposits, the site is covered by a relatively thin blanket of glacial sediment called till (Figure 4). The till consists of a light to dark grayish brown mixture of sediments that range in size from clay size particles to large boulders. Based on deep test hole data and soil mapping information, the texture of the till on the site is generally sandy and loose but some test holes revealed the presence of silty and clayey materials that were more tightly compacted. The till sediments were deposited by glacial ice as it moved across the bedrock surface from north to south-southeast. It is 10 feet thick (or less) in most places.

The sandy, gravelly deposits in the western part were deposited by glacial meltwater streams during ice retreat in Cobble Brook Valley. These deposits, which are yellowish brown, probably range between 10 and 39 feet.

Overlying the sandy, gravelly deposits in the western parts are swamp and muck deposits consisting of muck, peat, silt, clay and sand. Numerous, seasonal water courses paralleled by narrow bands of wet soils are visible on the slopes throughout the eastern parts. It does not appear that all of these areas have been identified in the field. Based on visual observations made during the field review, some of the seasonal watercourses in the eastern parts were not flagged. It is suggested that the Commission require the applicant(s) have their soil scientist delineate all wetland boundaries and watercourses in the field. The boundaries should be flagged and numbered sequentially. This information should then be surveyed onto the plan map. The soil scientist

Figure 3



**STUDIO HILL ROAD
SUBDIVISION
KENT, CONNECTICUT**

TOPOGRAPHY

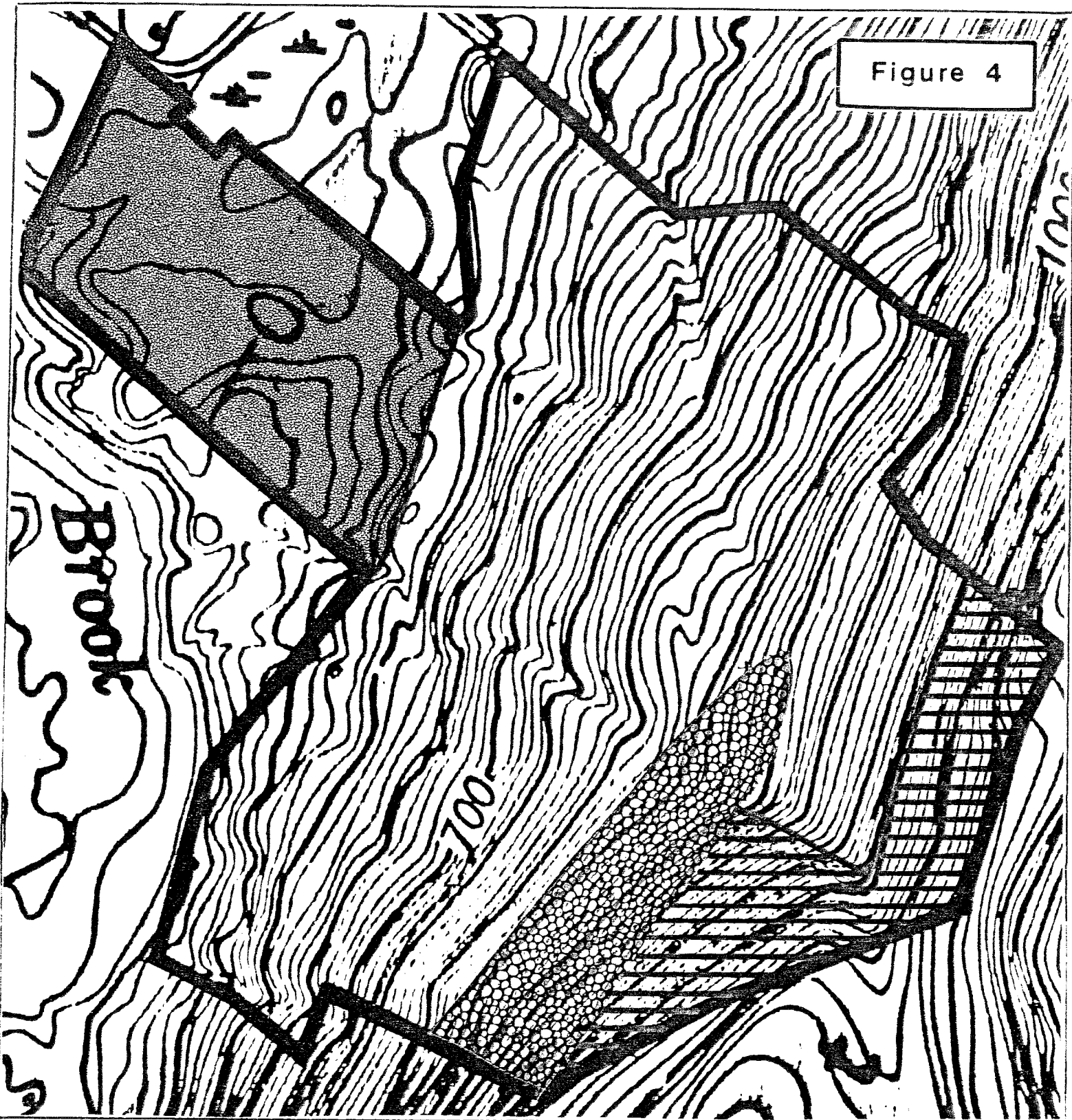
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Figure 4



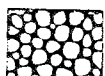
STRATIFIED DRIFT
(sand and gravel)



AREA WHERE BEDROCK
IS AT OR NEAR GROUND
SURFACE



TILL



TALUS (broken rock deposit
that accumulates at the
bottom of cliffs, mainly by
rockfall)

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**SURFICIAL
GEOLOGY**

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should then review and sign a statement on the map certifying that information is substantially correct. The areas of concern with respect to the latter are the seasonal watercourses on the slopes in the eastern parts. Woodin Road and Hopkins Road are proposed to cross several of these regulated areas.

All of the bedrock underlying the site is metamorphic; that is, it has been geologically altered by great heat and pressure within the earth's crust. The central and western parts of the site (from about Hopkins Road eastward) is underlain by Manhattan Schist (Figure 5). It is described as a dark gray to silvery rusty weathering, coarse grained schistose gneiss. Bedrock is at or near ground surface throughout much of this area.

The low lying, hummocky land (approximately Lots 2-4 and 7) in the western parts is underlain by a relatively thin band of soft rock (compared to surrounding rocks) called the Basal Member of Walloomsac Schist. It is described as a dark to light colored schistose marble. Because the marble is composed of minerals that are more easily susceptible to weathering processes than the minerals composing the surrounding schists and gneisses, bedrock outcrops are widespread and the topography more subdued.

The final rock type found on the site underlies the western limits near Lot 1 and is called Walloomsac Schist. It is described as a dark, fine grained schist. The terms gneiss, schist and marble used in the preceding paragraphs refer to metamorphic rocks. "Gneisses" are generally coarse-grained, foliated rocks characterized by alternating bands of light and dark minerals. "Schists" are generally cleavable rocks with layers defined by the parallel arrangement of platy or elongated minerals. "Marbles" are limestones or dolostones (composed of dolomite) that have been geologically changed (metamorphosed) by such forces as pressure, heat and chemical changes within the earth's crust.

The underlying bedrock is a source of water to many homes in the region and will be the likely source of domestic water to homes in the proposed subdivision (see Water Supply Section).

GEOLOGIC DEVELOPMENT CONCERNS

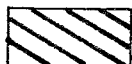
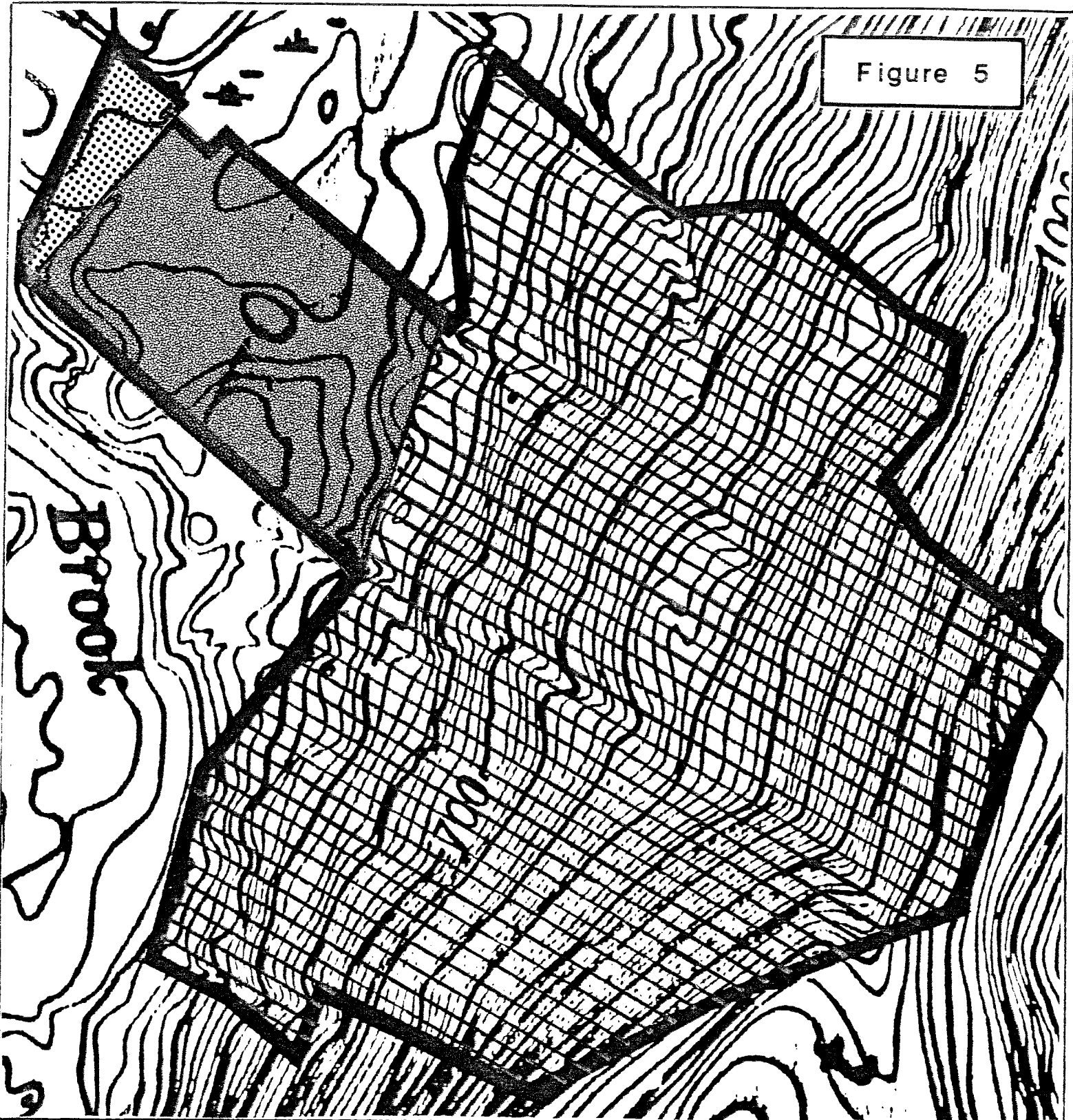
In terms of the proposed subdivision development, the main geological limitations found on the site include: (1) the presence of till soils, some of which have indications of high ground water levels and moderately slow percolation rates; (2) the presence of regulated inland-wetland soils; (3) the presence of shallow bedrock on lots 5 and 12; and (4) presence of steep slopes.

These geologic limitations will weigh heaviest on the ability to provide adequate subsurface sewage disposal systems serving homes constructed in the subdivision, since public sewers are not available. In many cases, proper planning and engineering can overcome these limitations, but only at added expense. It should be pointed out that even with an engineered septic system, there may be a lot or lots with such severe limitations that development on them should be precluded. This usually becomes more of a problem on smaller lots, one (1) acre or less. Because of the larger lot sizes proposed, the project engineer will have some flexibility for locating septic system areas.

Once septic systems are engineered and approved by the proper authorities (i.e., state and local health departments), it is imperative that the systems be installed properly according to design specifications, inspected by local authorities and also be properly maintained, e.g., pumped regularly (3-5 years) by the homeowner. (See On-site Subsurface Sewage Disposal Section).

Based on the subdivision plan, it appears interior roads will cross six (6) wetland areas/streamcourses within the parcel. Wetland crossings are generally feasible, provided they are properly designed (e.g., culverts are properly

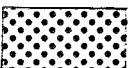
Figure 5



MANHATTAN SCHIST



BASAL MEMBERS OF WALLOOMSAC SCHIST



WALLOOMSAC SCHIST

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KENT, CONNECTICUT

**BEDROCK
GEOLOGY**

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amount of fill to be placed, pipe sizes, etc.. This will allow the wetland commission to review detailed standards for road construction and erosion control measures.

Because of the potential for wet soil conditions (at least, seasonally) on the site, it is strongly recommended that building footing drains be installed around foundations. This will help to prevent wet basements. Building footing and curtain drains will need to be outletted at points which will not present problems in terms of septic systems and on-site wells. Ideally, they should be outletted into the road drainage system.

WATER SUPPLY

Since there are no public water supply lines accessible to the parcel, it seems likely the proposed subdivision would be served by individual on-site wells. It appears that wells will need to tap the underlying bedrock aquifer. Wells drilled in bedrock generally supply small but reliable yields of groundwater. However, since the yield of a given well depends upon the number and size of water bearing fractures that it intersects, and since the distribution of fractures in bedrock is irregular, there is no practical way, outside of expensive geophysical testing, of predicting the yield of a well drilled in a specific location. Because fractures in the rock generally occur within the first 100 to 150 feet below the surface, it has been shown that the probability of increasing the yield of a well decreases with depth below this level.

Ideally, each well should be located on a relatively high portion of lot, properly separated from the sewage disposal system and any other potential pollutant (e.g., fuel oil storage tank, etc.) and in a direction opposite the expected direction of groundwater movement. They should all be cased with

steel pipe into the underlying bedrock. In order to provide adequate protection of the quality of the bedrock water, all wells will need to be properly installed in accordance with applicable State Public Health Code and Connecticut Well Drilling Board regulations. In addition, the Town Sanitarian for each Town will need to inspect and approve well locations.

In the Upper Housatonic River Basin, wells tapping crystalline bedrock (i.e., gneisses, schists, etc.) were surveyed in Connecticut Water Resources Bulletin No. 11. Of these, approximately ninety percent (90%) yielded one (1) gallon per minute or more; approximately fifty percent (50%) yielded about five (5) gallons per minute or more; and approximately ten percent (10%) yielded eighteen (18) gallons per minute or more. The belts of marble rock in the western parts generally have a slightly higher yield than the schists and gneisses (perhaps 2-3 gallon per minute or more). A well yield of three (3) gallons is generally satisfactory for most domestic uses.

The natural quality of groundwater should be satisfactory. The schists and gneisses beneath the site may have elevated amounts of iron and/or manganese minerals which would lower the overall quality. If elevated iron and/or manganese levels are present in the water, it may be necessary to provide suitable treatment filters. Wells tapping the marble unit in the western parts may have elevated hardness levels. If hardness levels are elevated, it is usually difficult to get soap to lather and clean effectively. It also leaves insoluble residues in sinks, bathtubs and clothing and causes scale to incrust water heaters, boilers and pipes. The latter cause a reduction in their capacity and heat-transfer properties. The presence of high concentrations of calcium and magnesium in the marble (carbonate) rock contributes to elevated hardness levels. If hardness levels are too high, appropriate water treatment devices may be needed.

It should be pointed out that the sandy, gravelly deposits covering mainly lots 1-4 in the northwestern parts may be an aquifer, having a saturated thickness ranging between 10 and 40 feet. Depending on the hydrogeologic factors such as texture of the deposits and proximity to major waterbodies/ streamcourses, these deposits may be capable of yielding moderate to very large amounts of water (50-2000 gallons per minute) to individual wells. Hydrogeologic data for the sand and gravel deposits on the site are incomplete and verification requires further investigation.

The applicant wishes to develop four lots in this area, ranging between 3 and 4 acres. Due to the low density of the lots and with sufficient testing, proper design and construction practices for on-site sewage disposal systems, the risks to groundwater quality in this area would be expected to be low.

It should also be noted that a few shallow water supply wells were visible in or near the seasonal watercourses in the central and eastern parts of the site. All existing wells, whether inactive or active should be noted on the subdivision plan. A determination should also be made as to whether the wells are inactive or active. If inactive, they should probably be abandoned in accordance with the State Health Code and the Well Drilling Board Rules and Regulations. If wells are currently active, they will need to be properly protected from new septic systems, road drainage, etc., in compliance with the State Public Health and any local regulations.

HYDROLOGY

The entire subdivision site lies within the Cobble Brook watershed. Cobble Brook ultimately flows into the Housatonic River. Surface runoff, and to a large extent, subsurface runoff, flow westward to discharge points such as the

unnamed tributaries to Cobble Brook and the wetlands in the western parts of the site.

The subdivision of the property as planned, followed by the construction of new homes, driveways and cul-de-sacs can be expected to lead to increases in the amount of runoff from the site. The wetlands in the western parts of the site and the man-made ponds northwest of the site will serve as natural runoff detention areas. This will help to lessen the effects of post-development runoff from the site. Also, because the proposed density is relatively low, post-development runoff increases would not be expected to be very high. However, in order to determine the impacts of post-development runoff, the applicant needs to produce a stormwater management plan which includes pre- and post-development hydrologic calculations. To date, the applicant's engineer has provided computations only for the sizing of culverts passing under the proposed roads. Once the stormwater drainage plans and computations have been completed, the town's engineer and/or a consulting engineer familiar with road drainage should review the plan. Close examination of all downstream culverts, especially the outlet pipe for the man-made pond, northwest of the site (at Studio Hill Road) is warranted.

Another concern with increased runoff is the potential for streambank erosion and gulleying. In view of the moderate to steep slopes, the presence of silty soils and seasonal seeps, in the eastern parts, the potential for erosion related problems would be expected to be high, especially if a comprehensive erosion and sediment control plan is not developed for the subdivision. The Connecticut Soil Erosion and Sediment Control Act (Public Act Number 83-388), which became fully effective July 1, 1985 requires a detailed erosion sediment control plan for the project. The erosion and sediment control plan should be properly enforced by the Town. Disturbed areas should

be kept to a minimum under such a plan. The erosion and sediment control measures called for under the plan should be shown on the final subdivision plan.

Groundwater in the area is classified by the Department of Environmental Protection as GA, which means that it is suitable for private drinking water supplies without treatment.

SOIL RESOURCES

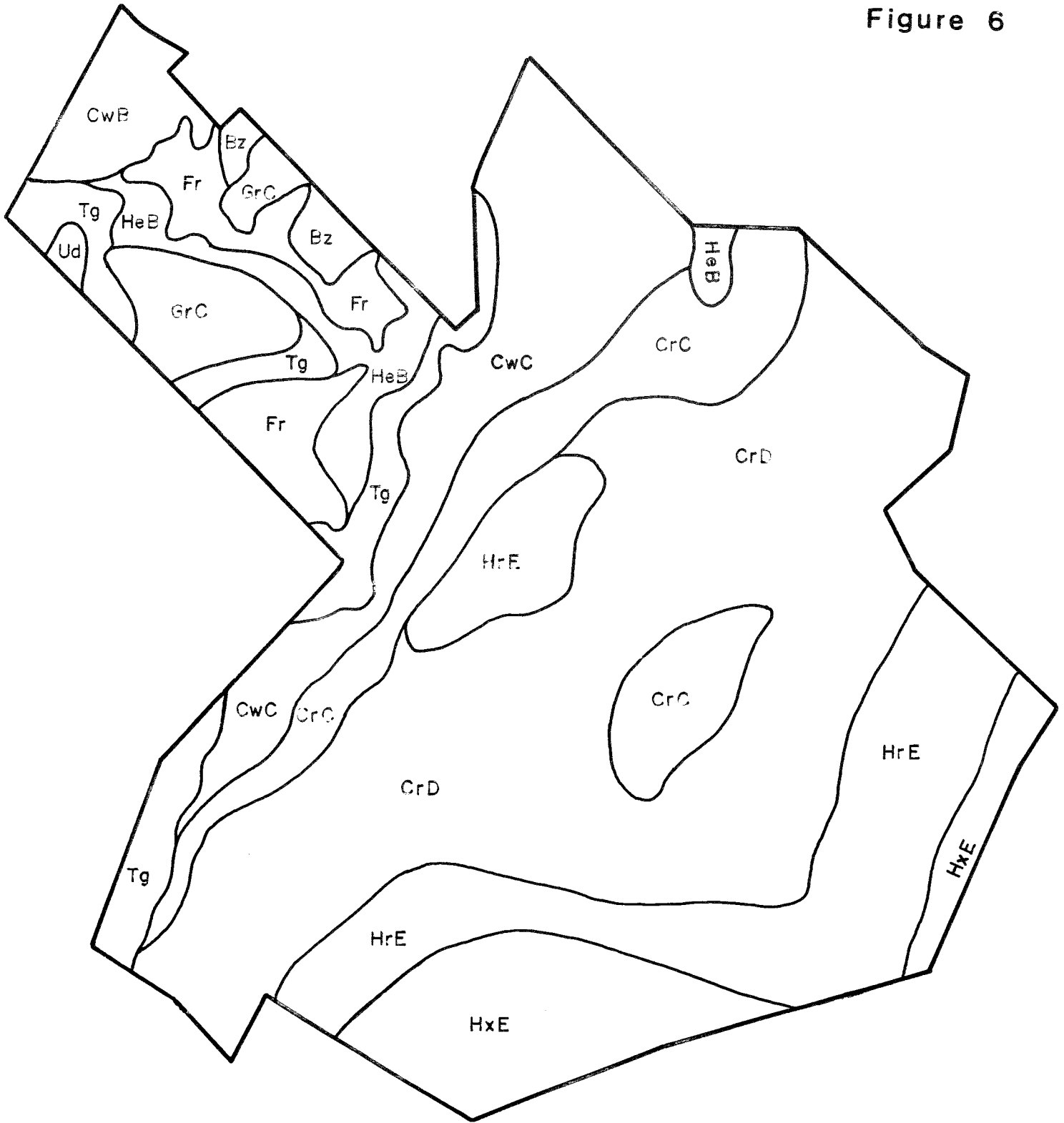
The western portion of the Studio Hill Road Subdivision property is dominated by stratified drift features typical of the Housatonic River Valley. Convex, kame-like features are dominated by excessively drained to well drained soils formed in sand and gravel deposits. Lower concave areas and along drainageways are dominated by moderately well drained to very poorly drained soils.

The middle portion of the property (base of steeper slopes) is dominated by mixed glacial outwash and water-sorted till deposits on sloping to steep slopes. Watercourses dissect these lower slopes.

The western portion is dominated by steep to very steep bedrock controlled landscapes with large areas dominated by deep (>4 ft.) well drained soils. The sideslope is dissected by numerous intermittent watercourses, many (but not all) of which are shown on the subdivision plans.

The soil map included in this report (Figure 6) has been created from on-site investigation and information provided during the review (test pit logs, wetland maps, soil maps). This map can be used for a general discussion of soil limitations on the parcel.

Figure 6



Bz - Birdall silt loam *

CrC - Charlton very stony fine sandy loam, 3-15% slopes

CrD - Charlton very stony fine sandy loam, 15-35% slopes

CwB - Copake loam, 3-8% slopes

CwC - Copake loam, 8-15% slopes

Fr - Fredon silt loam *

GrC - Groton gravelly sandy loam, 3-15% slopes

HeB - Hero loam, 3-8% slopes

HrE - Hollis very rocky fine sandy loam, 15-35% slopes

HxE - Hollis extremely rocky fine sandy loam, 15-35% slopes

Tg - Terrace escarpments

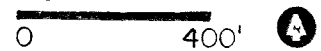
Ud - Udorthents

*wetland soils

**STUDIO HILL ROAD
SUBDIVISION
KENT, CONNECTICUT**

SOILS

King's Mark Environmental Review Team



The following list highlights some of the revisions needed for this plan.

1. The proposed line of clearing should be shown on the plan or should be clarified. The location of the proposed snow fence (item #2 of the "Sedimentation/Erosion Controls" should be shown on the site plans.
2. The installation and removal of specific E & S controls should be included in the sequence of events. For example silt fence and mulching after final grading are two E & S controls which are typically not installed at the same time.
3. Proposed road cuts and fill should be shown on the same sheet as E & S controls so a comparison can be made between E & S control locations and areas where they are needed. Without this information it is not possible to adequately review the proposed E & S control measures.
4. The vegetation mixes, dates of planting and rates of planting should be included in the plan. Tables 1 and 2 referred to in the "Sedimentation/Erosion Controls" were not submitted for review.
5. The location of all areas to be mulched should be shown on the plan.
6. The location of all watercourses and drainageways should be located on the plans. Without this information it is not possible to adequately plan for septic system location, road culvert and driveway culvert locations, or erosion and sediment controls.
7. The purpose and E & S controls for the berm adjacent to Studio Hill Road Extension is unclear and should be clarified.
8. Table 3 of the "Erosion and Sediment Controls" was not submitted for review. Due to the areas of steeply sloping soil and numerous watercourses on the property, E & S controls are critical to proper site development.

Soil erodibility varies between soil types on the property. Errodibility of the subsoil is shown by the K factor listed in Appendix A. A K factor of 0.10 to 0.24 designates low soil erodibility. A K factor of 0.43 to 0.64 designates high soil erodibility. The Birdsall series is in the high soil erodibility group. However, the Birdsall soil is an inland-wetland soil on which little construction disturbance is proposed.

The CrC, CrD, DwB, and GrC soils have low erodibility but steep slopes. These steep slopes require properly installed and maintained E & S controls for areas of land disturbance.

The Hollis series is in the moderate soil erodibility group. Since the Hollis soils (HrE, HxE) are steeply sloping and have moderate erodibility, extreme care must be taken in planning and applying E & S controls on these soils.

WETLAND CONSIDERATIONS

After reviewing the plans and specifications for work proposed in the development of the subdivision with respect to impacts upon inland wetlands and watercourses, comments and recommendations are as follows:

- 1) Most of the wetlands and watercourses on the property have been delineated in the field by a certified soil scientist. All wetlands and watercourses should be shown on the site plans.

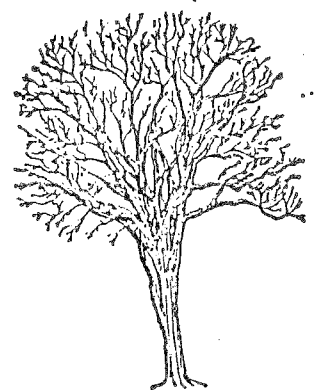
- 2) The proposed roadway and lot layout appears to have implemented sound site design practices to avoid wetland/watercourses impacts. These should be checked against the complete map.
 - (a) All proposed lots have adequate non-wetland soil for development of homesites, driveways, wells and subsurface sewage systems.

 - (b) The roadway crossing for Studio Hill extension is proposed for the most desirable location in that the wetland is at its narrowest at this point and a small roadway crossing already exists in this location.

- 3) Several lots are dissected by drainageways from the steeper uplands on the site. These watercourse features provide valuable drainage network for the site and do pose some limitations to homesite, driveway and roadway development. Care should be exercised to avoid unnecessary disturbance or relocations of these watercourses. Adequate cross culverts for driveways should be provided. It is frequently valuable to have more detailed site plans for individual lots showing existing and proposed contours at 2 ft. intervals, foundation elevations and other specific treatments to ensure proper design in the vicinity of these watercourses.

- 4) Perhaps the most significant potential impact from development of this site will be as a result of soil erosion. Siltation will occur if adequate Erosion and Sediment controls are not developed.

**LAND USE AND PLANNING
CONSIDERATIONS**



LAND USE: RURAL AREAS

Goal

To preserve and conserve areas within the region that are of environmental, historic, archaeological and cultural significance and to encourage development occurring outside of village centers to be environmentally sound and consistent with the regions rural landscape.

Objective: Conservation of Critical Areas

To conserve critical areas from substantial land use changes through land use control and appropriate state programs.

Policy and Implementation

1.2 Inland Wetlands

The NWCCOG recommends the development of a program designed to assist Inland Wetlands Commissions in specifically identifying significant wetlands and watercourses and which activities within wetlands as well as on land adjacent to wetlands should be considered by the Commission as "significant activities" for the purpose of more intense regulation.

Comments/Recommendations

The Town needs to ensure full enforcement of Town Inland Wetland regulations and address any concerns/recommendations made in the Wetland Considerations section.

Objective: Environmentally Sound Development in Rural Areas

To encourage adoption of local regulations, local programs and state programs that promote environmentally sound land use, development at a density that reflects the regions soil system, and is consistent with the regions rural character.

Policy and Implementation

1.12 Residential Development

To support local adoption of zoning regulations which determine residential lot sizes based on the soil's suitability to support on-site septic systems. The NWCCOG has prepared a model soils zoning regulation that can be modified for local adoption. The COG supports improved State standards for the installation of sanitary systems and water supply systems.

Comments/Recommendations

Policy 1.12 encouraging soil-based regulations has been complied with by the Town of Kent and the proposed subdivision meets or exceeds the minimum lot size required by soil-based regulation.

The Town Plan of Development recommends seepage tests be conducted between November 15 and May 15. The ERT soil scientist noted the need for retesting certain lots in the spring. He also noted shallow soils and steep slopes in locations proposed for septic systems. Kent has recently joined the Torrington Area Health District. If necessary, the subdivision plan should be referred and approved by the Torrington Area Health District prior to final action by the Planning and Zoning Commission.

1.17 Soil Erosion and Sediment Control

The NWCCOG policy is to recommend the control of soil erosion and sedimentation as outlined in detail in "Guidelines for Soil Erosion and Sediment Control" published by the Connecticut Council on Soil and Water Conservation and as required by state statute.

Comments/Recommendations

The above-referenced guidelines are enforced through the Kent zoning and subdivision regulations. Provided the subdivision is developed in accordance with those regulations, and any added guidelines suggested by ERT members, there should be no conflict with the Regional Plan Policy.

WATER SUPPLY

Goal

To effectively establish, protect and manage sufficient high quality water supply sources to meet future needs.

Objective

To encourage every town to protect water resources to meet future water needs.

Actively promote water conservation practices and programs to minimize the social, environmental, and economic costs of water supply.

Preserve sources adequate to meet long-term needs and establish protective measures to maintain resources for drinking water purposes.

Policy and Implementation

- 7.3 Encourage local mechanisms to preserve potential water supply sites from development.
- 7.4 Encourage local and water company efforts to protect aquifers which are potential sources of water supply to preserve their pre-emption from development.
- 7.5 Where appropriate, encourage towns to adopt and incorporate aquifer protection into local zoning regulations and local plans of development.
- 7.6 Support alternative methods to aid utilities in financing the direct costs associated with planning acquisitions and construction of future water supply sources.

Comments/Recommendations

The site is located within the Aquifer Protection Overlay Zone of the Kent Zoning Regulations. The Cobble Brook Watershed ERT noted the potential significance of stratified drift deposits for future water supplies. A report entitled "Protection of High and Moderate Yield Stratified Drift Aquifers" by the Department of Environmental Protection, 1987, identified the Upper Housatonic Aquifer as one of seven Class I High Yield Aquifers in the State. If the Studio Hill Road subdivision site is located on that aquifer, special care should be taken to encourage homeowners in proper disposal of household wastes that could contaminate this potential community drinking water supply.

It is recommended that the Torrington Area Director of Health be consulted to learn if additional information might be required of the applicant regarding the presence of the aquifer prior to the plan being approved by the Health District and the Town. It is also recommended that the Town initiate a groundwater education program and update its planning process as described in the DEP's "A Guide to Groundwater Protection for Local Officials." The Housatonic Valley Association in Cornwall has a Groundwater Action Program which provides technical assistance to towns. The program may be an important resource for Kent to pursue.

Additional Comments and Recommendations

As noted in the Cobble Brook Watershed ERT, the rural character of an area can be maintained through proper building siting in relation to the road frontage. The applicant is encouraged to review the guidelines and concepts in that report, particularly those extracted from the study "A Preservation and Conservation Study - Northwestern CT Regional Planning Area," 1975.

The existing Studio Hill Road is a town road that does not meet current town road standards. Consideration might be given to requesting the applicant to contribute towards the cost of improving a fair share of the roadway along the subdivision frontage and off-site as well. A traffic planner should be able to provide a reasonable estimate of the subdivision's fair share.

Open space preserved within the subdivision should be through permanent easement and/or as otherwise provided in the Town's subdivision regulations. The use of deed restrictions to preserve the open space is not advisable, as this mechanism has the potential for being overturned at a later date.

Comments of Weantinogue Heritage, Inc. should be sought by the Town prior to approval of the plan, in order that the applicant have the opportunity to minimize visual impact of the lots adjacent to the land trust holdings. In addition, if open space trails are planned to link with private land trust property, discussion of mutual objectives and concerns should take place.

ON-SITE SUBSURFACE SEWAGE DISPOSAL

As indicated in the ERT summary report and the design engineer's comments, the overall density of development is relatively light for this large parcel. Based upon a review of the detail soil test data provided, all 19 lots would be

classified as suitable in accordance with the Public Health Code definitions. However, for a number of varied reasons, the vast majority of the proposed 19 lots would be classified as areas of special concern and warrant detailed site investigation and engineering design plans in order to assure each subsurface sewage disposal system was properly constructed. Several items of concern include the relatively shallow depth to seasonally high groundwater and soil mottling observed in a number of the deep test pits; the steep slope which exists throughout much of the eastern section of this property; the limited areas where bedrock was observed at depths of less than 7 feet below existing grade; and the soil types classified as severe for sewage disposal purposes by the Soil Conservation Service.

Despite the limiting factors observed on many of the 19 lots, it is reasonable to assume that these items can be readily addressed by detailed engineering design and additional soil testing. With such large lots, it is quite possible that areas other than those tested will be examined in the future to determine if more suitable locations for septic systems can be found. The most common limiting factor observed on many lots is the seasonal groundwater levels. In general, the lots are well suited for installation of groundwater intercepting drains and it is likely that select fill material will be placed on several lots to elevate trench bottoms sufficiently above the compact soils observed 24 inches below existing grade.

Subdivision plans illustrate a fairly reasonable proposal for house and utility locations on each of the 19 lots. A brief review of this plan did identify the following items which should be reviewed and adjustments made where applicable:

- 1) Plot #1 contains a considerable area of Fredon silt loam, a wetland soil. The existing contours also indicate a relatively flat gradient in the general area of the sewage disposal system further from the wetlands than indicated on the subdivision map. If this is not the case, additional testing should be performed within the proposed primary and reserve leaching areas to determine maximum seasonal groundwater levels and assure both primary and reserve areas are placed not less than 50 feet from the water mark of the brook flowing through this wetlands.
- 2) A major concern with construction on steep slope lots such as exists within this proposed subdivision is the placement of leaching areas above driveways which have been notched out of the hillside. A very real potential for partially treated sewage to bleed out at these soil cuts exists if inadequate separation is provided. The driveway location shown on Lot 4 could be considered a potential problem if a soil cut along the driveway is proposed. Fortunately the gradient is not as severe on this lot as is on the lots to the east. As a general rule, leaching systems located 75 feet upgradient from a soil cut would not be considered a problem.
- 3) The proposed sewage disposal system area serving the residence on Lot 14 appears to be located at the headwaters of a brook. Soil test data obtained from 2 pits adjacent to this septic area identified potential water levels at 24 inches below existing grade. On this 7.7-acre parcel, it is likely that additional tests will be performed to shift the leaching area away from this wet area. The location of the residence further up the hill would obviously provide more flexibility in identifying and selecting a suitable leaching area.

In summary, there can be no objection to approval of this 19-lot residential subdivision with respect to construction of subsurface sewage disposal systems based upon review of the information available at this time. Due to the various site limitations noted on a large majority of the lots, it is recommended that detailed plans be prepared by a professional engineer prior to the issuance of building permits for each of the 19 lots. Where there is concern with respect to the varying seasonally high groundwater elevations, provisions should be made for installation of groundwater monitoring pipes to facilitate water level monitoring during this forthcoming spring period. Properly designed and installed subsurface sewage disposal systems constructed on each of the 19 lots should not present any adverse health or environmental pollution problems.

TRAFFIC CONSIDERATIONS

A review of material provided for the proposed subdivision and existing ConnDOT data for Route 7 (2100 ADT, January 1985) does not indicate major concerns exist relative to traffic. Existing Studio Hill Road can accommodate traffic generated by the subdivision even though geometric deficiencies (poor driving conditions due to steep slopes and sharp curves) exist.

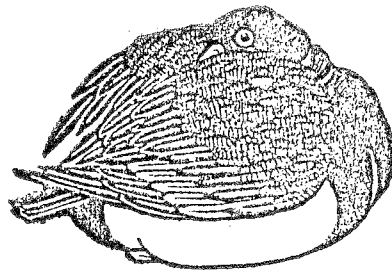
Nineteen residences may generate approximately 200 trips per day. Seasonal traffic is restricted at times due to the lack of a snow shelf along the roadside. Internal subdivision road grades will add additional surface water that must be managed by an appropriate design so as not to significantly effect intersections with Studio Hill Road.

A review of a small number of residences on a large site can only address the obvious, nineteen lots will not significantly impact traffic operations on Studio Hill Road or at Route 7. The sightlines for the internal road system intersecting Studio Hill Road might require adjustments to Studio Hill Road along with the appropriate traffic control devices. Town approval should assess the need to insure that safe turning movements into and out of the subdivision are provided. If warranted, provision for school bus turn-in should be considered.

If additional development occurs along Studio Hill Road, road improvements between developments should be made to avoid encountering an improved section of the road and then returning to the existing unreconstructed road. This can be unsafe. The "what if" consideration always occurs, relative to land use change and a partial response is to require "developers" to contribute to a dedicated improvement fund. This may seem to convey a permissive attitude

towards land use change, but such roadway improvements are suggested for safety. Spot improvements and land use change can not be separated when safety is a consideration.

APPENDICES



Appendix A: Soils Limitation Chart

MAJOR LIMITATIONS TO DEVELOPMENT

MAP UNIT NAME	GENERAL SOIL PROPERTIES	DRAINAGE CLASS AND DEPTH TO SEASONAL HIGH WATER TABLE	HOMES WITH BASEMENTS	SEPTIC SYSTEMS	ROADS AND STREETS	EROSION FACTOR
Bz - Birdall silt loam	Formed in waterlaid deposits of loamy materials. May be underlain by sand	Very poorly drained 0-1 ft.	Wetness	Wetness	Wetness, subject to frost action	0.64
CrC - Charlton very stony fine sandy loam, 3 to 15% slopes	Formed in loamy glacial till materials	Well drained >3 ft.	None	None	None	0.24
CrD - Charlton very stony fine sandy loam, 15 to 35% slopes	Formed in loamy glacial till materials	Well drained >3 ft.	Steep to very steep slopes	Steep to very steep slopes	Slope	0.24
CwB - Copeke loam, 3 to 8% slopes	Formed in loamy over sandy and gravelly glacial outwash materials	Well drained >3 ft.	None	Substratum may be poor filter	None	0.24
CwC - Copake loam, 8 to 15% slopes	Formed in loamy over sandy and gravelly glacial outwash materials	Well drained >3 ft.	None	Substratum may be poor filter	None	0.24
Fr - Fredon silt loam	Formed in loamy over sandy and gravelly glacial outwash materials	Poorly drained 0-1.5 ft.	Wetness	Wetness	Wetness, subject to frost action	0.24
GrC - Groton gravelly sandy loam, 3 to 15% slopes	Formed in sand and gravel glacial outwash materials	Excessively drained >6 ft.	None	Substratum may be poor filter	None	0.17
HeB - Hero loam 3 to 8% slopes	Formed in loamy over sandy and gravelly glacial outwash materials	Moderately well drained 1.5 - 2.5 ft.	Wetness	Wetness, substratum may be poor filter	Subject to frost action	0.20

MAJOR LIMITATIONS TO DEVELOPMENT

MAP UNIT NAME	GENERAL SOIL PROPERTIES	DRAINAGE CLASS AND DEPTH TO SEASONAL HIGH WATER TABLE	HOMES WITH BASEMENTS	SEPTIC SYSTEMS	ROADS AND STREETS	EROSION FACTOR
HrE - Hollis very rocky fine sandy loam, 15 to 35% slopes	Formed in shallow to deep loamy glacial till materials	Excessively drained to well drained >6 ft.	Variable depth to bedrock, slope	Variable depth to bedrock, slope	Depth to bedrock, slope	0.32
HxE - Hollis extremely rocky fine sandy loam, 15 to 35% slopes	Formed in shallow to deep loamy glacial till materials	Excessively drained to well drained >6 ft.	Depth to bedrock, slope	Depth to bedrock, slope	Depth to bedrock, slope	0.32
Tg - Terrace escarpments	Formed in loamy to sandy and gravelly glacial outwash materials	Excessively drained to well drained >3 ft.	Slope	Substratum may be poor filter, slope	Slope	--
Ud - Udorthents	Cuts and fills associated with excavations for sand and gravel	Variable	Variable	May be poor filter	Variable	--

NOTES

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, soil scientists, foresters, climatologists, landscape architects, recreational 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 83 town area serving western Connecticut.

As a public service activity, the Team is available to serve towns and/or developers within the King's Mark RC & D Area - free of charge.

PURPOSE OF THE ENVIRONMENTAL REVIEW TEAM

The Environmental Review Team is available to assist towns and/or developers in the review of sites proposed for major land use activities. For example, the ERT has been involved in the review of a wide range of significant land use activities including subdivisions, sanitary landfills, commercial and industrial developments, and recreational/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 site, and highlighting opportunities and limitations for the proposed land use.

REQUESTING AN ENVIRONMENTAL REVIEW

Environmental Reviews may be requested by the chief elected official of a municipality, or the chairman of an administrative agency such as planning and zoning, conservation, or inland wetlands. Environmental Review Request Forms are available at your local Soil and Water Conservation District, and the King's Mark ERT Coordinator. This request form 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 investigate. When this request is approved by the local Soil and Water Conservation District and King's Mark RC & D Executive Committee, the Team will undertake the review. At present, the ERT can undertake two (2) reviews per month.

For additional information regarding the Environmental Review Team, please contact your local Soil and Water Conservation District or Nancy Ferlow, ERT Coordinator, King's Mark Environmental Review Team, King's Mark Resource Conservation and Development Area, 322 North Main Street, Wallingford, Connecticut 06492. King's Mark ERT phone number is 265-6695.