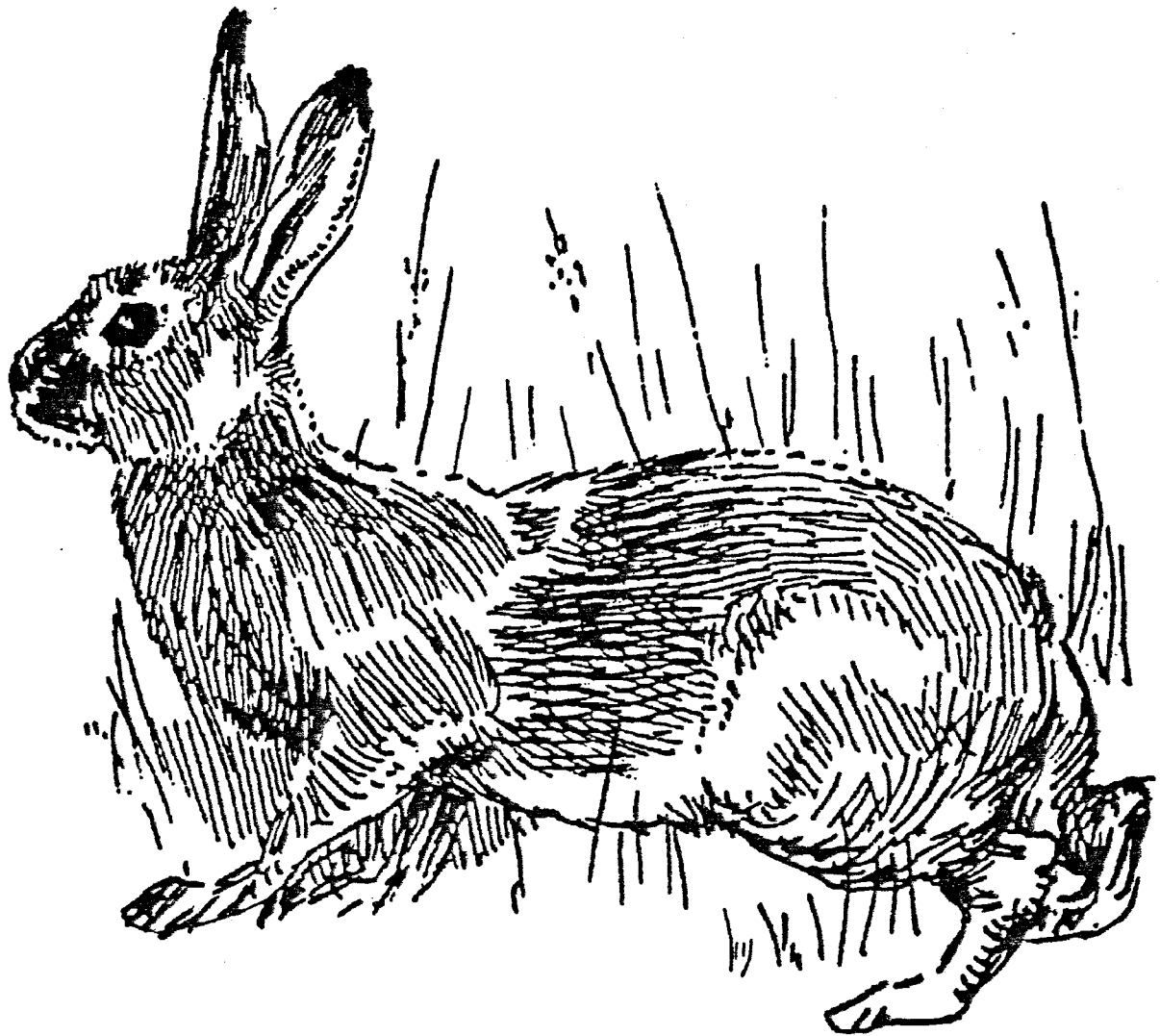


KING'S MARK ENVIRONMENTAL REVIEW TEAM



REPORT FOR

**THE BARNES PROPERTY SUBDIVISION**

BRISTOL,  
CONNECTICUT

King's Mark Resource Conservation and Development Area, Inc.

# THE BARNES PROPERTY SUBDIVISION

## BRISTOL, 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

Bristol Inland Wetlands 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 Inland Wetlands Commission and the City. 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.

OCTOBER 1989

## 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  
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589-7820

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

Finally, special thanks to Paul Strawderman, Asst. City Engineer, Lee Levesque, Bristol Inland Wetlands Commission, Thomas Barnes, property owner and Joseph Caggiano, engineer for the developer, for their cooperation and assistance during this environmental review.

# EXECUTIVE SUMMARY

## Introduction

The Bristol Inland Wetlands Commission has requested that an environmental review be conducted on the Barnes Property, a site proposed for subdivision development. The site is located in northcentral Bristol and contains open fields, woodlands, several areas of steep slopes, wetlands and farm buildings. The developer proposes 87 lots, 6700 feet of new road, and 4 detention ponds for the property. The site will be served by City sewer and water.

The review process consisted of 4 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, development limitations and development opportunities were identified. The major findings of the ERT are presented below:

## Setting, Zoning and Land Use

The site is bounded by Perkins Road, residences and private, undeveloped land. The vicinity is characterized by medium to low density residential development. The site is located in a R-25 zone. A review of air photos indicates that over time there has been a gradual loss of farmland and an increase in houses.

## Topography

Site elevations range from 750 to 950 feet above mean sea level. The land slopes at an approximately 9% grade to the east.

## Geology

The bedrock type underlying the site has been mapped Bristol Gneiss. The bedrock has been exposed to the east of the site. Glacial till overlays the bedrock on the site. The texture of the till is mostly silty and compact. Thickness of the till is unknown, but probably ranges from 10 to 15 feet thick. The majority of the till on the site contains a hardpan layer with seasonally high water tables. According to the plans, wetland soils occur in small drainageways. Wetland soils will be crossed in 7 places.

## Geologic Development Concerns

Water and sewer lines will be extended to serve the project. This should ameliorate many of the hydrogeologic concerns. Geologic limitations to development include wetlands, hardpan soils with high water tables and erodible soils. The hardpan soils and seasonally high water tables will require footing drains to keep basements dry. These drains can be outletted to daylight, but may cause problems on neighboring lots. It is suggested that the footing drains be outletted into the storm drainage system. Deep cuts in hardpan soils can be difficult to stabilize. They

should be kept to a minimum and properly stabilized as soon as possible. Seepage controls should be required where cut sections extend below the water table

Based on the plans, 7 road crossings are proposed for the wetlands. Alternative road layouts should be considered. The final road layout should have the least impact to the wetlands possible. Although undesirable, wetland crossings are feasible, provided they are properly engineered. On a few lots, homes will be constructed in wetland soils. If this activity is permitted, a geotechnical survey should be done to determine the loading rates of the soils. Every effort should be made to avoid building in wetland soils. Also, each lot should have a usable amount of dry land to prevent illegal filling by property owners. Till soils with a high clay content are susceptible to erosion. An erosion and sediment control plan should be implemented and maintained.

### Hydrology

Drainage from most of the site ultimately flows into Polkville Brook. The southwest corner drains to Birge Pond Brook. Surface waters on the site are presumed to be Class A. Development of the site is expected to increase the amount of runoff. The stormwater management plan indicated that 4 detention basins will be built to keep the post-development flows at pre-development levels. A management plan for the detention basins should be devised.

### Soil Resources

The site is dominated by moderately drained to well drained soils on compact till. The major soil limitations on the site are slope, seasonal high water tables and large stones. The erosion hazard is high, and the site requires an extensive erosion and sediment control plan. The data for the hydrological study and storm water management plan is insufficient for complete analysis.

### Flood Control Considerations

The calculations for the stormwater drainage system were based on the TR-55 method. The detention basins are designed to comply with the City regulations for the 25-year storm. However, the analysis does not comply. Watershed A and Watershed B combined show zero increased rate of runoff, but separately the analysis shows that Watershed A exceeds the peak pre-development flows. Each watershed should comply with the regulations. Discharges from the 2-year, 10-year and 100-year storms should be analyzed to insure that the detention basins act to minimize flooding. A natural drainageway which will outlet the northeast detention basin is eroded. Increased flows will hasten the erosion if controls are not implemented. Plans for the detention basins should be submitted to the DEP Dam Safety Unit to see if a permit is needed.

## Wetland Considerations

The wetlands on-site include permanent and intermittent watercourses. They aid in flood control by absorbing surface water and releasing it slowly. Several wetlands primarily serve to drain surface water. The vegetation and soils trap sediment and contaminants. Wetlands also provide habitat for wildlife.

Plans include detention basins within wetlands and several road crossings. The dual detention basins are planned for an area that already detains water. They could be located in an upland area near the wetlands. Erosion and sediment controls are needed to protect the wetlands. The Commission should require the applicant to submit alternative plans for the site to see if a prudent and feasible alternative exists.

## Wildlife Considerations

The wildlife habitat on the site includes forestland, old fields/open fields and wetlands/ponds. Species that might use these areas include deer, grouse, raccoons, small mammals, birds, reptiles and amphibians. The greater the variety of habitat, the greater the number of species that can use the site. As with any development, the impact on wildlife habitat will be negative. Large portions of the site will be broken up with homes, roads, parking areas and walkways. Other impacts include the creation of lawns and the presence of humans, traffic, dogs and cats. Certain species which are adaptable may increase, and nuisances may occur. Wetland use by wildlife can be preserved with buffer strips. Detention basins provide little or no habitat for wildlife.

There are many steps that can be taken in order to make the area more suitable for wildlife. These include buffer strips, natural landscaping techniques and maintaining forest wildlife requirements.

## Threatened and Endangered Plant and Animal Species

According to the DEP - Natural Diversity Database, there are no Federally listed Endangered Species or Connecticut "Species of Special Concern" on the site.

## Planning Considerations

The site is zoned R-25 which requires a minimum lot size of 25,000 square feet. The lots either meet or exceed this requirement. The State Policies Plan for the Conservation and Development of Connecticut identifies the site as a Conservation Area bordering an area of urban growth. Development in a Conservation Area should be designed to protect natural resources. The Regional Development Plan classifies the area as low to medium density residential, allowing 1 to 4 units per acre. The Bristol Plan of Development identifies this as low density residential with lot sizes of 25,000 feet or larger.

By extending the long cul-de-sac to Perkins Street, shortening and dead ending the first road loop so it does not cross the wetland and connecting the road to Westwoods road to the south, this project would have acceptable traffic flow, while

protecting the wetland areas. To be more compatible with the various plans in the area, some open space should be provided either by designating open space or decreasing the number of lots. Conservation easements could protect the wetlands. Steep slopes will be difficult for development. Careful engineering and erosion and sediment control should be implemented and maintained.

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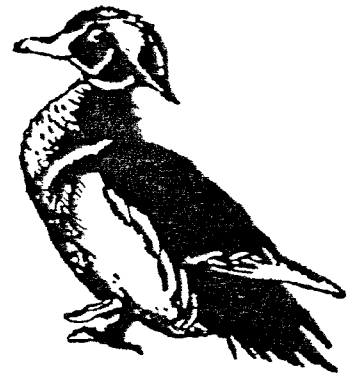
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# INTRODUCTION



## THE ERT PROCESS

Through the efforts of the Bristol Inland Wetlands Commission, the developer's representative and the King's Mark ERT, this environmental review and report was prepared for the City. This report primarily provides a description of on-site natural resources and presents planning and land use guidelines. The review process consisted of 4 phases:

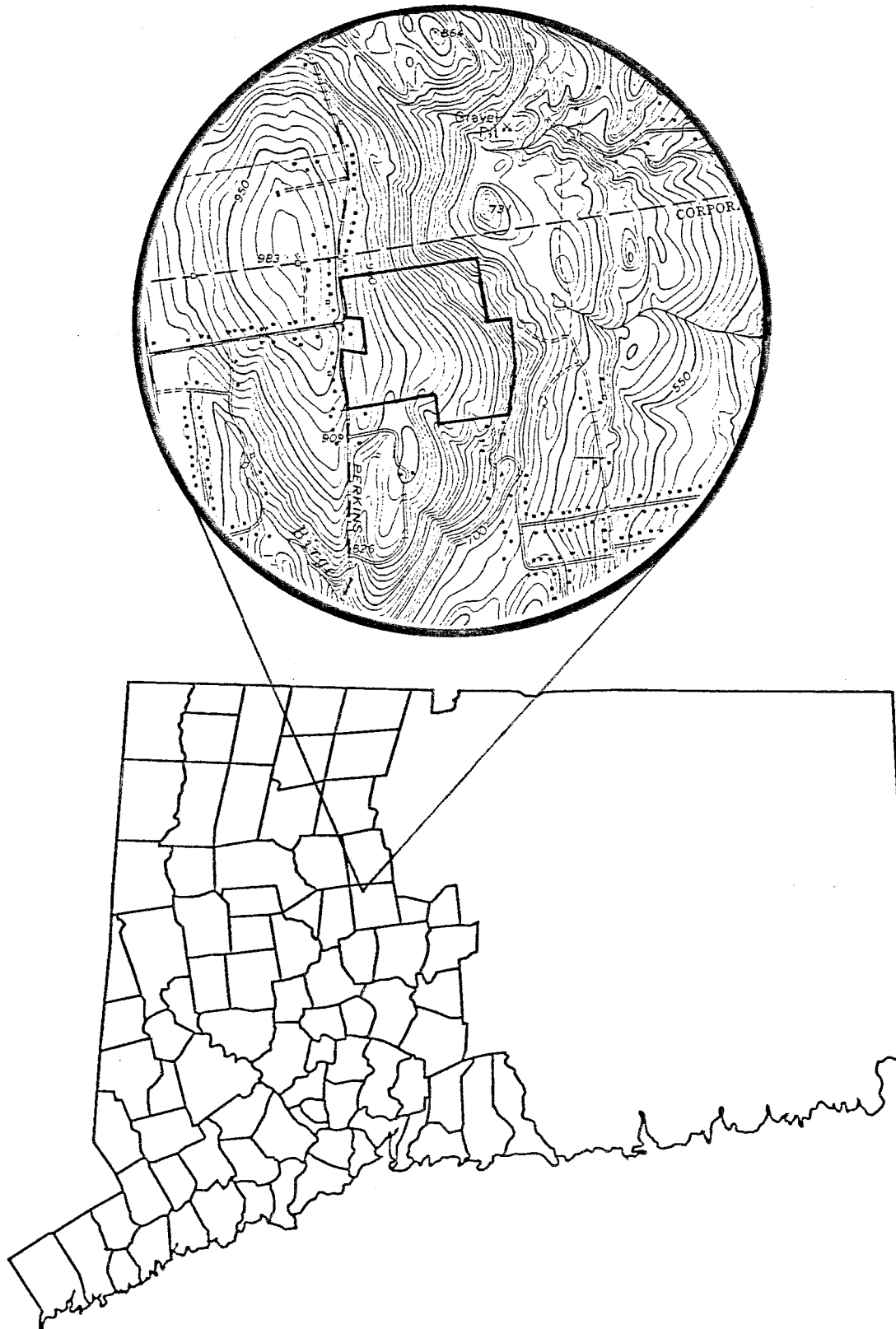
- 1) Inventory of the site's natural resources (collection of data);
- 2) Assessment of these resources (analysis of data);
- 3) Identification of resource problem areas; and
- 4) Presentation of planning and land use guidelines.

The data collection phase involved both literature and field research. The ERT field review took place on August 23, 1989. 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, they were able to analyze and interpret their findings. The results of this analysis 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.

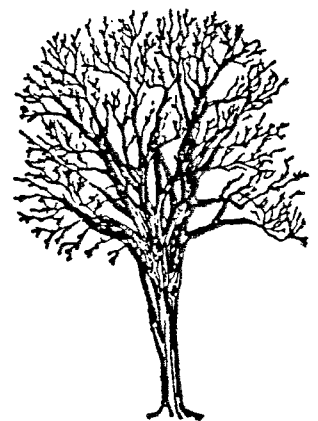
Figure 1

LOCATION OF STUDY SITE





# PHYSICAL CHARACTERISTICS



Gentle slopes occur in the western third of the site, but become more moderate in the central parts. Steepest slopes occur at the northeast corner and eastern limits of the site. From the open fields in the western parts, scenic views are available to the east.

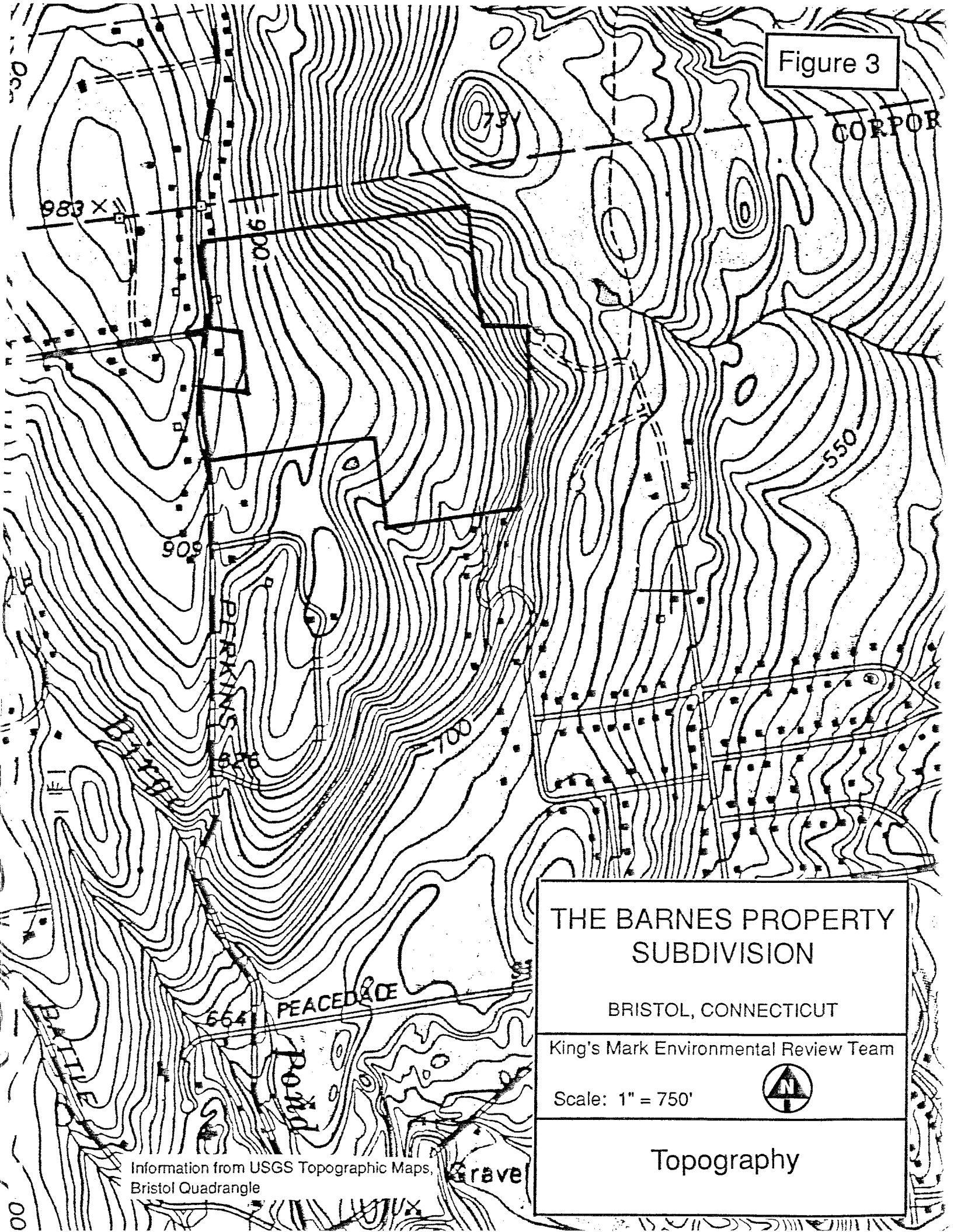
## GEOLOGY

Outcroppings of ledge were visible east of the site, where bedrock was encountered during road construction. Bedrock underlying the site is identified as Bristol Gneiss, a light-gray medium-grained gneiss (see Figure 4). The exact depth to bedrock across the site is unknown. Most likely, the bedrock surface is 10 feet deep or more in most places. Unless the underlying bedrock is encountered during excavation for sewer and water lines, foundations or road cuts, it should pose no major problems to the proposed development because municipal water and sewer lines are available. If bedrock is encountered during excavation, blasting may be necessary. Blasting generally results in higher development and engineering costs.

Overlying bedrock across the entire site is a glacial sediment called till (see Figure 5). In general, the till consists of a grayish brown mixture of sediments that range in size from clay to boulders, but primarily contains sand and silt. The till covering the majority of the site is fine-grained (high silt content) and very stony. The exact thickness of till on the site is unknown, but is probably 10-15 feet thick in most places. The majority of the till soils on the site are characterized by a seasonally high water table, resulting from a firm soil zone or hardpan layer generally 1.5 feet below ground surface. The hardpan layer impedes the downward movement of percolating groundwater. In general, the till becomes sandier moving west to east across the site.

The till sediments were deposited directly by glacial ice onto the bedrock surface as it moved north to south-southeast through the region. Streamlined hills

Figure 3




THE BARNES PROPERTY  
SUBDIVISION

BRISTOL, CONNECTICUT

King's Mark Environmental Review Team

Scale: 1" = 750'



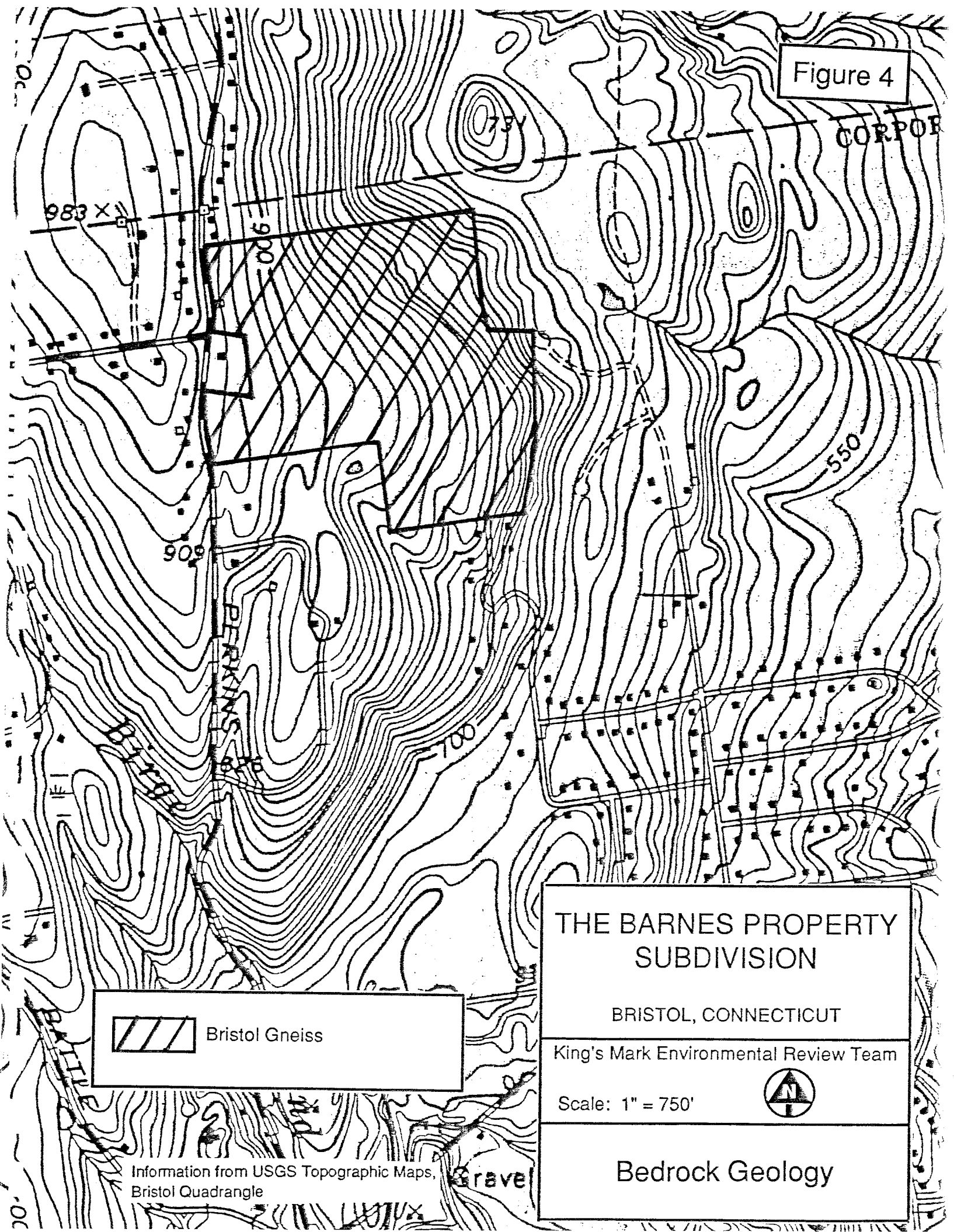
Topography

Information from USGS Topographic Maps,  
Bristol Quadrangle

Gravel



Figure 4



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Scale: 1" = 750'



Bedrock Geology

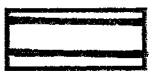
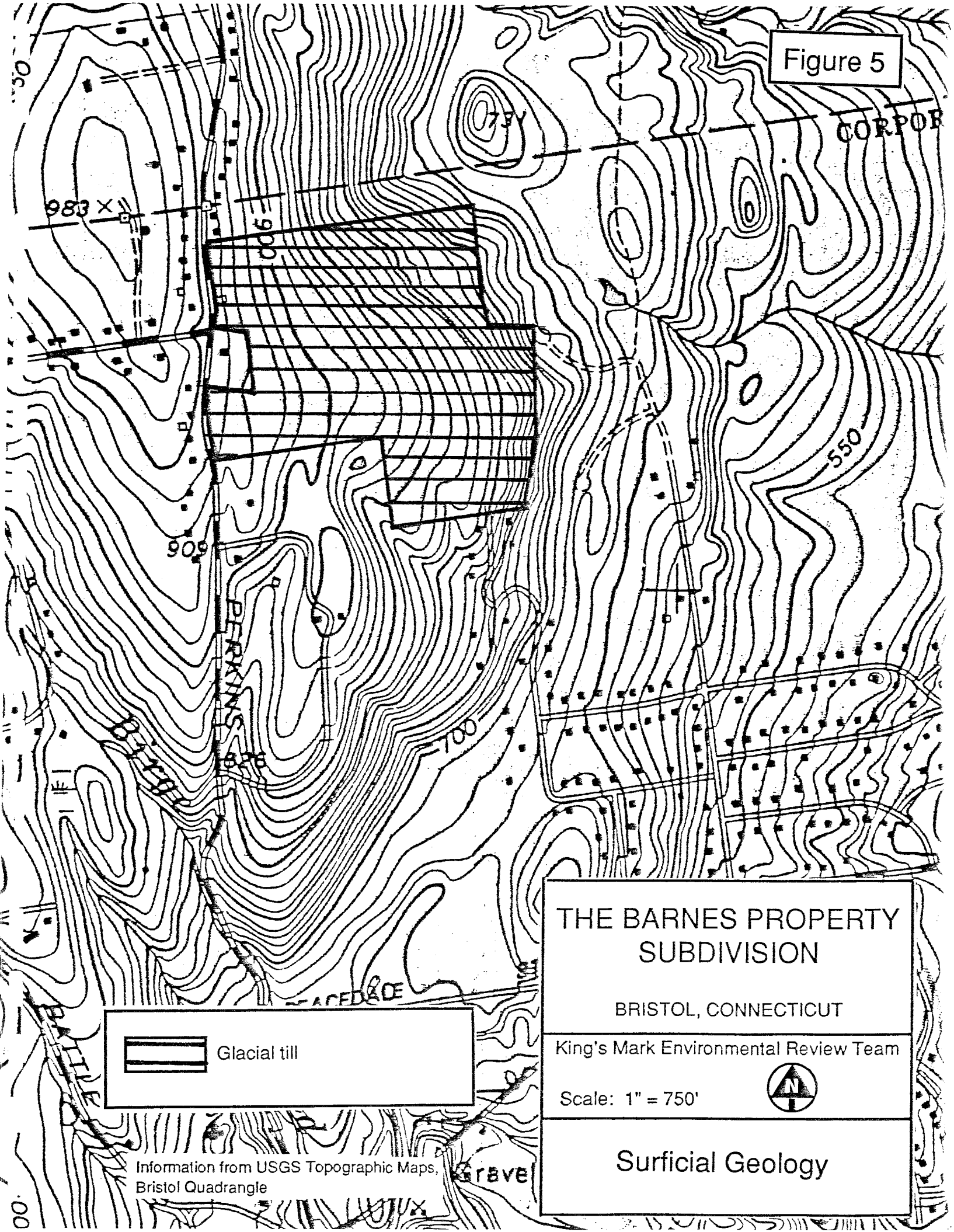


Bristol Gneiss

Information from USGS Topographic Maps,  
Bristol Quadrangle

Gravel

Figure 5



Glacial till

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Scale: 1" = 750'



Surficial Geology

Information from USGS Topographic Maps,  
Bristol Quadrangle

Grave

(drumlins) in Bristol, such as Chippen Hill and Hurley Hill, have main axes paralleling the direction of ice movement, testifying to glacial activity in the area.

According to the plans, regulated inland wetland areas occur on the site. In general, these soils occupy long, narrow drainageways on the upland till soils. Wetland soils were identified in the field by a certified soil scientist, and their boundaries were superimposed onto the subdivision plans.

The Hartford County Soil Survey identifies the wetland soils on the site as Leicester, Whitman and Ridgebury soils (LdA). This undifferentiated group consists of poorly drained (Leicester, Ridgebury) and very poorly drained (Whitman) soils that occur on nearly level to gently sloping terrain (0-5%). These soils are very stony. They are underlain by a slowly permeable hardpan layer and have seasonally high water tables. The drainageways and accompanying wetlands act as conduits, ultimately transporting runoff to Polkville Brook.

Based on present plans, regulated wetland soils which include intermittent streamcourses will be crossed in at least 7 locations. In addition, road grading and house and driveway construction appear to infringe on these soils in several areas. All crossings are located at relatively narrow points.

### GEOLOGIC DEVELOPMENT CONCERNS

The site lies within an R-25 zone (minimum lot size of 25,000 square feet) and will be served by public water from the Bristol Water Department and by public sewers tied into the Bristol municipal system. The applicant plans to develop 87 lots, each exceeding 1/2 acre or 25,000 square feet.

The availability of municipal sewer and water lines should soften the principal hydrogeologic concerns that usually arise when these utilities are not available. Nevertheless, there is concern about the potential hydrogeologic impacts of the

development with regard to wetlands, seasonally wet soils (hardpan soils) and potential construction problems (i.e., erosion and sediment control).

The widespread presence of hardpan soils on the site indicates that a seasonally high water table condition is likely and must be properly addressed. During wet times of the year or following significant periods of rainfall, the weathered and rooted zone above the restrictive hardpan layer becomes saturated with water. This creates a condition known as a perched water table, resulting from the low permeability of the hardpan layer. It is characterized by sloping areas that seep, especially where the surficial soil has been disturbed. Seeps were visible in the open fields in the western parts during the field review. In places, especially the central parts, surface water has collected in and eroded drainageways on the site.

In order to prevent basements from getting wet due to high water table conditions, all house foundations should be properly protected by building footing drains. The footing drains should be outletted to the storm drainage system serving the subdivision. Where topographic conditions allow, they may also be outletted to daylight on the lot served. However, because lot sizes are relatively small, the potential for creating water problems on neighboring lots exists.

Deep cuts into hardpan soils can be extremely difficult to stabilize due to seepage of water over the hardpan layer. This creates an unstable condition just below the seepage line. The weight of the unstable soil causes the soil to slump. Once this begins, the slope is very difficult to stabilize. Even with good vegetative cover, it is almost impossible to keep these soils from slumping. If deep cuts are required, they should be kept to a minimum and properly stabilized as soon as possible. In addition, seepage control should be required where cut sections extend below the water table.

Wetland soils on the site have been flagged by a certified soil scientist, and their boundaries superimposed on the subdivision plan. These soils are regulated under

Connecticut's Inland Wetland and Watercourses Act, Connecticut General Statutes (CGS) Section 22a-36 through 22a-45, inclusive (see Wetland Considerations section).

Based on the subdivision plan, 7 road crossings of the wetlands are proposed. It is estimated that a total of 140 feet of wetlands will need to be crossed by the new road system. This does not include potential driveway crossings, road grading or wetland disturbance due to home construction. The plans indicate some flexibility for the realignment of roads, which could result in less of an impact on the wetlands within the site. It is strongly suggested that alternative road layouts be considered to minimize wetland disturbances. In some cases, lot lines may need to be adjusted. Every effort should be made to use the road layout which would have the least amount of impact on wetlands, least amount of earthwork, seepage and drainage control requirements. These criteria should be evaluated for each alternate road layout.

Although undesirable, wetland road crossings are feasible, provided they are properly engineered. Provisions should be made for removing unstable material beneath the roadbed, backfilling with a permeable road base fill material and installing culverts as necessary. When crossing any wetland, the road should be at least 1.5 feet, and preferably 2 feet, above the surface elevation of the wetlands. This will allow for better drainage of the roads and will decrease the frost heaving potential. All work in the wetlands should be done at the dry time of the year. Provisions should include an effective erosion and sediment control plan.

On a few lots, proposed homes will be constructed on regulated wetland soils. If this activity is permitted, the applicant should conduct geotechnical soil and foundation studies on these lots. This should be done to ensure that these soils can support the house and that water damage will not occur. Every effort should be made to avoid construction of homes in wetland areas. Also, each lot in the subdivision

should have a usable amount of "dry" land. This will help to prevent the illegal filling of wetlands on the site.

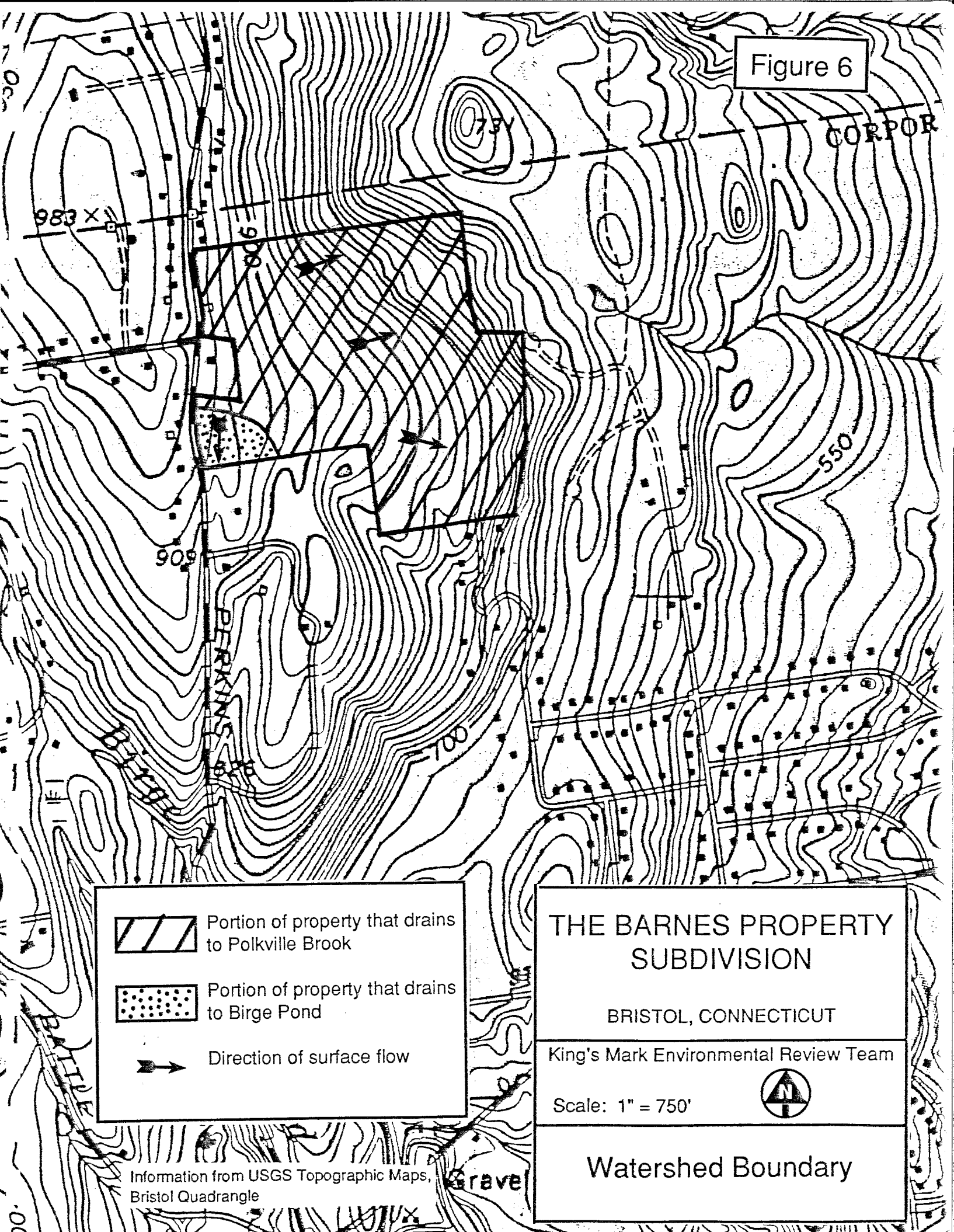
The presence of till soils, which may have a high silt and clay content and seasonally high water table, and the presence of moderate to steep slopes suggests that development of the site will make the soil susceptible to erosion. Therefore, an erosion and sediment control plan which includes proper control measures should be developed and implemented with construction of the site. The procedures outlined in the Connecticut Guidelines for Soil Erosion and Sediment Control should be closely followed. Site conditions warrant regular inspection by City officials during construction periods.

### HYDROLOGY

The site lies entirely within the Polkville Brook drainage area, except for approximately 9 acres in the southwest corner (see Figure 6). At its point of outflow to Copper Mine Brook, Polkville Brook drains an area of about 2.33 square miles or 1491 acres. The southwest corner of the site drains to Birge Pond Brook. For the purpose of the proposed stormwater management plan, the applicant's engineer has divided drainage on the site into 4 subwatershed areas, all of which ultimately flow to Polkville Brook or an unnamed tributary.

Although the intermittent and permanent streamcourses on the site have not been classified by the Department of Environmental Protection (DEP), they are presumed to be Class A water resources. This classification means that the resources may be suitable for drinking, recreational or other uses and may be subject to absolute restrictions on the discharges of pollutants, although there may be certain discharges that would be permitted.

Figure 6



Portion of property that drains to Polkville Brook



Portion of property that drains to Birge Pond



Direction of surface flow

# THE BARNES PROPERTY SUBDIVISION

BRISTOL, CONNECTICUT

King's Mark Environmental Review Team

Scale: 1" = 750'



Watershed Boundary

Information from USGS Topographic Maps, Bristol Quadrangle

Gravel

watercourses on- and off-site. The erosion and sediment control plan should include a narrative report that describes the phasing and scheduling of clearing, tree cutting, stockpiling of earth materials, limits of disturbed areas and land restoration. Also, consideration should be given to the maintenance of and access to the proposed detention basins. They will need to be maintained (i.e., silt removed from time to time) and should be checked regularly.

### SOIL RESOURCES

Soil resource investigations of the site were made on August 23, 1989. Excavations of up to 4 feet were observed using a soil auger. Stereopaired aerial photographs at a scale of 1"=1000' were used to identify areas of special concern. Wetland flagging was observed in the field. Site plans entitled "Map of Lot 15 - Perkins Street, Bristol, Connecticut" (dated 6-9-88 and revised 2-28-89) were reviewed. Wetland limits, as mapped and at the scale shown, appeared adequate.

Several map units appear on this proposal (see Figure 7) and are listed in Appendix A. The majority of the area is dominated by moderately well drained and well drained soils formed in a compact glacial till. The area has bedrock controlled topography with shallow to deep soils occurring in a complex pattern. The site slopes from west to east with minor exceptions of several small drainage areas along the western property line.

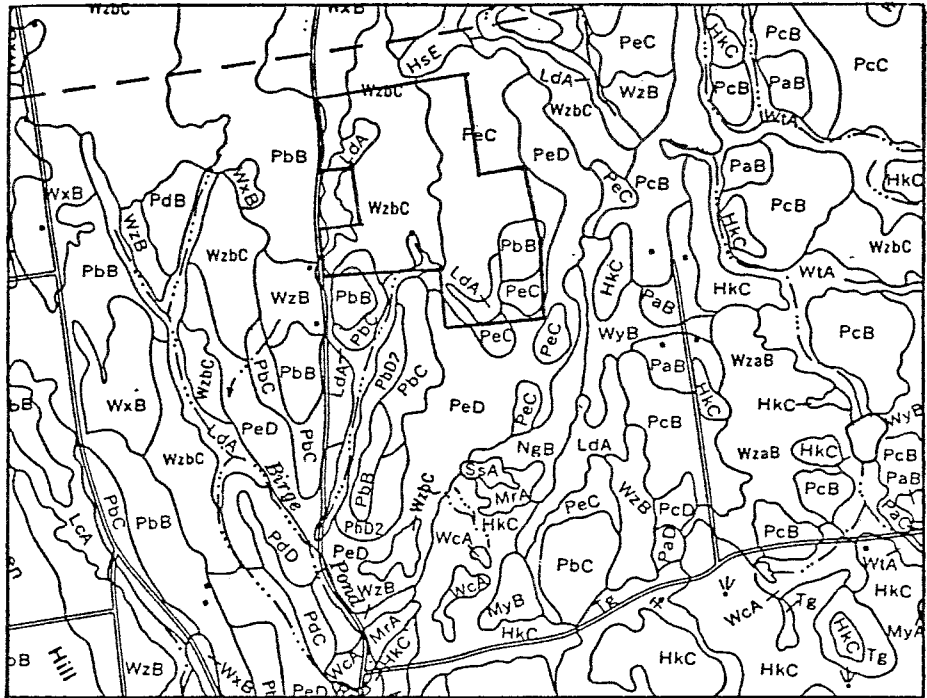
#### Soils Description

LdA - This soil unit is a complex comprised of the soil types Leicester, Ridgebury and Whitman. This unit is very deep, ranging from poorly drained to very poorly drained soils formed in glacial till. These soils have a seasonal water table at or near ground surface for 9 months of the year, and instances of ponding will occur on the Whitman soil type. Permeability ranges from moderate to moderately rapid in the surface layer and subsoil to moderate to rapid in the substratum for the Leicester soil. Permeability in the Ridgebury and Whitman soils is slow to very slow. Major limitations



Figure 7

HARTFORD COUNTY, CONNECTICUT-SHEET NUMBER 41



Scale 1:20000 0 5000 Feet

LdA -	Leicester, Whitman, Ridgebury, very stony soils
PbB, PbC -	Paxton loam
PeC, PeD -	Paxton very stony loam
WxB -	Woodbridge loam
WzBC -	Woodbridge stony loam


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BRISTOL, CONNECTICUT

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King's Mark Environmental Review Team

Scale: 1" = 1666'



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Soils

Information from Hartford County Soil Survey  
Scale: 1" = 1666'

more comprehensive analysis should be used with a methodology that will aid in the evaluation of the stormwater detention structures and downstream off-site effects. It is strongly recommended that the study of downstream effects be carried to a point of known flooding to determine what impact this development may have.

### FLOOD CONTROL CONSIDERATIONS

The proposed subdivision site lies in the upper reaches of the Polkville Brook Watershed. The Polkville Brook Watershed is a subwatershed of Copper Mine Brook and part of the Farmington Regional Basin.

Under existing conditions, the site consists of a mixture of open fields, woodlands and several areas of steep slopes. The development proposal includes 87 lots, 6700 linear feet of new road and 4 excavated detention basins.

The hydrologic design calculations for the stormwater detention system was based on the Tabular Hydrograph method from TR-55. Based on a comparison of the proposed and existing conditions, the applicant's consultant concludes that the proposed stormwater detention system will reduce peak flows by 1.5 cfs, using the outflows estimated for a 25-year storm and considering the site as a whole.

The detention basins are included in this proposal to comply with City regulations requiring that pre-development flows be maintained on the site under post-development conditions. The developer is proposing to limit post-development flow rates to pre-development flow rates for the 25-year storm frequency. However, the consultant's analysis indicates that the proposal does not comply with this criteria. The Storm Drainage Detention Analysis (dated April 1989) shows that Watershed A exceeds the existing 25-year peak by 8 cfs. When combining this effect with the results of the analysis of Watershed B, the report concludes the net peak runoff from both watersheds is zero. The intent of the Zero Rate of Runoff

requirements is applied erroneously. Ultimately, the analysis should show a net zero increased 25-year runoff for each individual watershed.

The impacts of post-development runoff in the study area should be understood clearly in terms of flooding. If the primary purpose of the detention basins is to minimize flooding, the peak discharge from the 2-year, 10-year and 100-year frequency storms should be analyzed. A number of other items should also be considered. The timing of the peak flows from the detention basins should be designed so that the discharge does not coincide with the occurrence of the peak flow in the Polkville Brook Watershed. Also, an analysis should be performed to identify the distance downstream that the water surface elevations in Polkville Brook are increased due to the outflow from the detention basins. The installation of the detention basins and storm sewer network are going to change the watershed's response to precipitation. The development will act to reduce infiltration and decrease travel time. The effects of these modifications should be analyzed in view of the entire watershed.

Some consideration should be given to the long term effects that the detention ponds will have on the existing drainageway. The natural drainageway, located below the northeastern corner of the property, is severely eroded. The discharge from the detention basin will direct more concentrated flows of increased duration through this area, and an investigation into the effects of this activity should be made.

Once the natural drainage system of a site is altered, the potential for downstream damage due to improper stormwater management practices can increase. Ultimately, it is the responsibility of the local Planning and Zoning and Inland Wetlands Commissions to determine whether this proposal is consistent with the floodplain management and stormwater management programs under local jurisdiction.

Detention Basins AP1, AP2 and AP3 will require permits through the DEP Dam Safety Unit. Pursuant to CGS Sections 22a-401 through 22a-410, these dams must have the capacity to pass a 100-year storm with 1 foot of freeboard over the design water surface elevation. In the course of the permit review process, the hydraulic adequacy of the entire stormwater management system will be evaluated.

# BIOLOGICAL RESOURCES



## WETLAND CONSIDERATIONS

### Development Proposal

The proposed subdivision involves creating 87 residential lots and 4 detention basins for stormwater management. This site is located at the top of the Polkville Brook Watershed and has the potential of negatively impacting wetlands and other downstream areas. Two wetland areas at this site have been proposed for detention, and a third wetland area has been considered for piping into a stormwater drainage system.

### General Site Features

The proposed subdivision encompasses approximately 72 acres. The site contains gentle sloping pastures and steep, mixed forests. The western portion of the site has an old farm pond with a stone dam. There is a finger of wetlands to the south of this area that has created a wet area within the pasture. Additionally, the northeastern portion of the property has 3 segments of wetlands which act as drainageways over the steep topography. An existing pond, located on an adjoining parcel to the south, was also reviewed because it will replace proposed Detention Basin C-P1.

### Wetland Functions and Values

The wetlands on this site include permanent and intermittent watercourses which ultimately flow off-site to Polkville Brook. All of the wetlands have been mapped as Leicester, Whitman and Ridgebury complex. The western wetland areas appear to have greater water storage capabilities than the eastern areas.

Wetlands provide flood control through their ability to detain overland runoff and release it at a slower rate. The majority of the mapped wetlands do not exhibit this feature because they convey runoff through channel drainage. Wetlands may also provide pollution abatement functions through the nature of the soils and

vegetation. Only 2 western areas displayed significant wetland vegetation (e.g., a wet meadow and an old farm pond). The existing off-site pond also contained flora which could aid in this process.

Wetland areas obviously provide habitat for a variety of animals. The wooded wetlands on this site are deficient in understory and groundcover. Only the most common animal species were evident (e.g., deer, songbirds, woodchucks, garter snakes, voles, etc.). The farm pond on the western portion of the site also has limited value, but may provide habitat for several species of hydrophyllic animals (amphibians and reptiles) as well as songbirds and voles.

The old farm pond located just west of Perkins Street exhibited little open water and was predominantly filled with wetland vegetation. A small rivulet drained from this pond to the adjoining lower pond and on through the meadow. These areas indicated an ability to hold, store and release water as well as perform certain water quality renovations. Additionally, the finger of wetlands identified within the western pasture was wet at the field review and may also provide water storage.

East of the pond, a wetland area passes through the tree line and progresses northeasterly down the hill into a mixed forest. This appeared to be an eroded channel which exhibited minor wetland vegetation and was dry at the field review. Two other drainageways to the east showed similar characteristics and may not have any water storage capabilities.

#### Wetland Effects and Recommendations

The proposed subdivision plan calls for the excavation, filling and/or draining of the wetlands on-site as well as increases in point discharges off-site. Impacts to the individual wetlands include:

- 1) The dual detention basin system proposed for the wetlands located just west of the intersection of Perkins and Chapel Streets will diminish the regenerative and water storage capabilities of this wetland as well as disrupt an existing ecosystem. Excavation within a wetland for stormwater

detention alters the ecological character of the wetland and is discouraged. Altering the natural storage function of the wetland by the excavation of a detention basin is counterproductive. Detention basins may be relocated in upland areas, depending on the configuration of the subdivision and the need for detention. The alternative of constructing the detention basin outside of the wetland boundary should be considered.

- 2) The road crossing proposed for the wetland located in the southwest corner of the property (Lots 123 and 126) does not indicate the quantity of fill and grading required. Culverting the seasonal flow may be needed as well as the installation and maintenance of erosion and sediment controls.
- 3) The proposed relocated site of Detention Basin C-P1 to an existing pond on an adjoining parcel was not mapped by the project soil scientist. Field observations identified grass and sedge species converging on the pond. This wetland may be a candidate for detention.
- 4) The northcentral wetlands/watercourses have 2 proposed road crossings which will require filling and grading of the steeper slopes. Also, the eroded drainage channel that conducts runoff from the property is intended to release post-development flows to the wetlands north of the site. There is insufficient hydraulic information available to determine the potential adverse impacts to downstream wetland areas.
- 5) There is a road crossing and a detention basin proposed for the northeast wetland/watercourse. The existing channel is scoured. Post-development flows may exacerbate this condition and possibly create a sediment problem in the detention basin. Therefore, the erosion and sediment controls for this location should be adequately installed and maintained.
- 6) The eastern finger of wetlands/watercourses is also a drainageway analogous to the northeast wetland and requires similar precautions. Its flows are proposed to be piped into the storm drainage system and discharged off-site to the adjoining wetland area. This action in conjunction with the northern drainage may adversely affect the wetlands/watercourses on the adjacent property.

### General Comments

The Inland Wetlands and Watercourses Act (CGS Sec. 22a-36 through 22a-45) provides for the preservation and protection of wetlands and watercourses from random, unnecessary and undesirable disturbances. This is to insure that the wetlands and watercourses resources of the State can continue to provide their natural functions including providing terrestrial and aquatic wildlife habitats,



minimizing the danger of flooding by detaining overland runoff, protecting water supplies by absorbing pollutants prior to entrance into watercourses and providing recreational and aesthetic public values.

Any change in surface hydrology combined with the installation of a storm drainage management system may alter, and in some cases dehydrate, the wetland areas on-site without increasing the net post-development runoff.

The Commission should require the the applicant to submit alternative configurations of the subdivision which are more sensitive to the wetlands on the site. Pursuant to CGS Sec. 22a-41(b), the Commission should not issue a permit if a feasible and prudent alternative exists.

### WILDLIFE CONSIDERATIONS

#### Description of Area/Habitats

The 72-acre site proposed for development contains a variety of habitats including forest, old reverting farm field, open field and various wetland areas. The site lies at the northern boundary of Bristol, and little of the land to the north and northeast is developed, making this an attractive site to a variety of wildlife. A housing development is planned for the site. Relatively small lots are planned, and the entire acreage will be developed.

Generally, the greater the habitat diversity and degree of interspersion of various habitat types, the greater the variety of wildlife there will be using an area. Just a small portion is presently used as pasture. The site provides the type of habitat diversity and interspersion characteristic of an abandoned farm and currently provides good to excellent wildlife habitat.

Forestland: Much of the site is covered by mature mixed hardwoods. The mixed hardwood forest contains sugar and red maple, oaks, white ash, black birch,

hemlock and a variety of other tree species. Mixed hardwood forest provides cover, food and a variety of nesting and den sites for a variety of wildlife species.

Oak trees and a variety of other nut bearing trees such as hickory provide mast. Mast is an important food source for many types of wildlife, especially during the fall and winter when other food sources are not available and/or in short supply. In some places where the understory is thick, good cover for mammals and birds is provided.

Conifer or evergreen trees such as hemlocks can provide valuable cover and food to a variety of species. Crows, grouse, turkey vultures, some raptors and many songbirds use conifers as preferred roosting and/or loafing sites. Some species such as the mourning dove, goshawk, sharp-shinned hawk and robin may frequently use conifer stands for cover.

The snag trees (dead trees) on the property provide insects for a variety of wildlife including woodpeckers, chickadees and other insect eating birds. The den trees (trees with holes) found scattered throughout the property provide cavities for nesting owls, swallows, etc. The cavities also provide denning sites for raccoons, etc.

Old Fields/Open Fields: The old fields and open fields found on the site provide early successional stage habitat, an important type of habitat because it contains a variety of plant communities including grass, herbaceous plants, shrubs and young trees. These areas provide food and cover to wildlife. The grass and herbaceous areas provide habitat for small mammals. Birds of prey utilize these areas to hunt. Predators such as the fox also use open and old fields to hunt for small mammals.

Areas which are frequently used as pasture and have a very short grass covering year-round have correspondingly lower habitat value for most species. Cover and food is limited in the immediate areas of heavy grazing. Birds such as the killdeer and field sparrow can utilize areas such as this to forage for insects and seeds.

The abundant growth of a variety of shrubs such as blueberry, multi-flora rose, honeysuckle, cherry and sumac in the older more overgrown fields provides abundant cover and food for a variety of wildlife. These areas also provide a wide array of nest sites for various songbirds. The rich growth of vines in some areas increases the value of these areas for wildlife.

Open and old field cover type is diminishing as development increases and farming decreases. These areas not only increase the overall diversity of the area, they also increase the "edge" or "edge effect." Edge effect is the phenomena that occurs where vegetational types meet with a high degree of interspersion, and vegetational diversity or richness is achieved. Because of this phenomena, the needs of a wide variety of wildlife can best be met.

Wetlands/Ponds: Because wetlands increase the habitat diversity of an area and offer a variety of food and cover to wildlife, they are important areas to consider for conservation. Acre for acre, wetlands and their associated riparian zones exceed all other land types in wildlife productivity. In addition to their value as wildlife habitat, wetlands serve other valuable functions including water recharge, sediment filtering, flood storage, etc. For these reasons, the development of, filling in and/or crossing of wetlands should be avoided or limited whenever possible.

The wetlands found on this site include the wetlands associated with the drainage swales, the wetland area from the breached farm pond, the small wetland area in the old field and the wetland area found in the open pasture area. An additional pond is located off-site, but will be incorporated into the site's drainage plan.

The wetland pond located off-site is small, but provides good open water/wetland habitat for a variety of wildlife species including various reptiles and amphibians and provides a feeding place for wading birds and ducks. Mammals such as raccoons often forage along the edges of ponds in search of frogs, salamanders and

other food items. The pond provides some habitat diversity because it contains open water, some emergent vegetation and sedges. Its use is somewhat limited by its small size.

The breached pond site, which is characterized by sedge/grass tussocks and other herbaceous vegetation, contains little water. Birds and some small mammals probably find this area attractive because of the abundant seeds produced by the grasses and sedges. Some amphibians and reptiles probably use this site, despite the low water conditions.

Adjacent to this breached pond is a wetland area contained in the old reverting field. This area provides habitat for a variety of birds and small mammals. This area would be useful to a wider array of wildlife if the pond could hold some level of water.

The drainage swales/gulleys vary in their habitat value. Areas where there is little vegetation in or around the swale probably have quite limited value. Areas where there is more vegetation in and around these drainage swales are more useful to a variety of birds, amphibians, reptiles and mammals.

The drained wetlands that are now part of the open pasture essentially have the same habitat value as the non-wetland open pasture areas.

Although some wetlands may be more valuable than others, all wetlands are important because they add diversity to an area. The more diverse a wetland, the more valuable it is as wildlife habitat, although specific types of wetlands can be very important or crucial to specific species and less important to others. For example, small vernal pools are extremely important to certain reptiles and amphibians, but not nearly as useful to waterfowl as some other types of wetlands. Because of the overall value of wetlands, their destruction, alteration, crossing and filling should be avoided where and whenever possible.

### Wildlife Habitat Recommendations

As with any development, the impact on wildlife habitat will be negative. The impact to wildlife at this site will probably be extensive because of the density of the development plan. Large portions of habitat will be broken up and lost in the construction of homes, garages, roads, parking lots and walkways. Additionally, habitat will be lost where cover is cleared for lawns and landscaping. Another impact is the increased human presence, vehicular traffic and number of free roaming dogs and cats. This could drive the less tolerant species from the site, even in areas where there has been no physical change. The value of the site for wildlife habitat correspondingly decreases as the amount of development in the area increases.

Certain species which are adaptable to man's activities may increase due to his presence, and associated nuisances may occur. Typical species which can become a nuisance include pigeons, starlings and raccoons. Species sensitive to man's presence will either move away or perish. Because of the importance of wetlands to wildlife and because wetlands are limited in quantity and continue to dwindle on an almost daily basis in the State of Connecticut, it is always preferable to choose the option or path of development that least impacts wetlands. The value of wetlands increases as the quantity of the resource diminishes. A buffer of at least 100 feet is recommended around any wetland to preserve its value and use by wildlife.

Several retention basins are proposed for the site. Shallow grassed-in basins provide little wildlife habitat. Rip-rapped basins with no vegetation provide no wildlife habitat. Basins replanted with wetland vegetation may offer something to a few species of wildlife, but typically will not duplicate the function of a naturally created wetland with its own unique hydrology and vegetational diversity. If the detention basins are not maintained and became silted in, growth of planted vegetation can be limited or stopped. Because detention basins are usually designed

to only retain water after periods of heavy runoff, and then retain that water only for a short period, they do not provide a reliable source of water for wildlife. Even if some wetlands vegetation is restored via detention basins, there is great uncertainty as to the extent of habitat value.

Further Recommendations: In planning and constructing a development, there are steps that should be considered to minimize adverse impacts on wildlife. Despite these measures, wildlife habitat will increasingly be adversely impacted as the amount of development increases on a site. These measures include:

- 1) Maintain a 100-foot (minimum) wide buffer zone of natural vegetation around all wetland/riparian areas to filter and trap silt and sediments and to provide some habitat for wildlife.
- 2) Utilize natural landscaping techniques (avoiding lawns and chemical runoff) to lessen acreage of habitat lost and possible wetland contamination.
- 3) Stone walls, shrubs and trees should be maintained along field borders.
- 4) Early successional stage vegetation (i.e., field) is an important habitat type and should be maintained if possible.
- 5) During land clearing, care should be taken to maintain certain forest wildlife requirements:
  - a) Encourage mast producing trees (i.e., oak, hickory, beech). A minimum of 5 oaks per acre, 14 inches dbh or greater should remain.
  - b) Leave 5 to 7 snag/den trees per acre because they are used by birds and mammals for nesting, roosting and feeding.
  - c) Exceptionally tall trees, used by raptors as perching and nesting sites, should be encouraged.
  - d) Trees with vines (i.e., fruit producers) should be encouraged (or can be planted as part of the landscaping in conjunction with the development), especially those that produce fruit which persists through the winter (winterberry). See Appendix 1 for a list of suggested shrub and tree species that can be encouraged and/or planted to benefit wildlife.
  - e) Brush debris from tree clearing should be piled to provide cover for small mammals, birds, amphibians and reptiles.

## THREATENED AND ENDANGERED PLANT AND ANIMAL SPECIES

According to The Natural Diversity Data Base, there are no Federal Endangered and Threatened Species or Connecticut "Species of Special Concern" that occur at the site.

Natural Diversity Data Base information includes all information regarding critical biologic resources available at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultation with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern as well as enhance existing data. New information is incorporated into the Data Base as it becomes available.

# LAND USE AND PLANNING CONSIDERATIONS





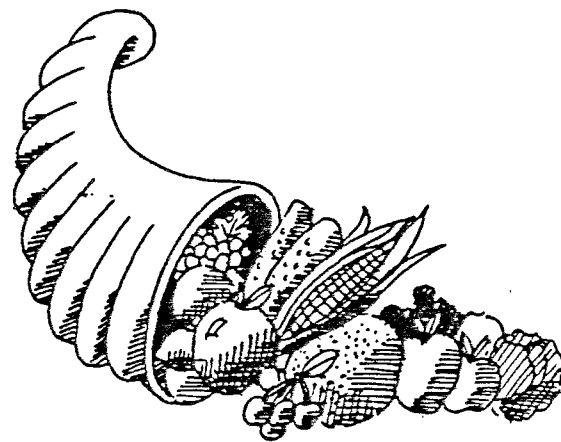
## PLANNING CONSIDERATIONS

The site is zoned R-25 by the City of Bristol. Lots must be at least 25,000 square feet in size. The lots in this subdivision meet or exceed this requirement. The development is compatible with the single-family residential character of the surrounding neighborhoods.

The State Policies Plan for the Conservation and Development of Connecticut has classified this land as a Conservation Area bordering an area of urban growth. The Central Connecticut Regional Planning Agency's Regional Development Plan has classified this area for future land use as residential with a low to medium density, 1 to 4 units per acre. The subdivision conforms to the minimum size land use suggested by this Plan. The City of Bristol's Plan of Development has classified the area as Low Density Single-family Residential (R-25 and R-40) with lot sizes 25,000 square feet or larger.

By extending the long cul-de-sac to Perkins Street, shortening and dead-ending the first road loop so it does not cross the wetland and connecting the road to Westwood Road to the south, this project would have acceptable traffic flow, while protecting wetland areas. To be more compatible with the various plans of development for the area, some provision for open space, especially around the detention basins and wetland areas, should be included. This can be accomplished by designating areas of open space or by increasing the size and decreasing the number of lots. Some of the lots may be too steep for easy development. Regrading and erosion and sediment control plans for house construction should be carefully prepared and maintained. One of the goals of the Regional Development Plan is to preserve and minimize any potential adverse impacts in sensitive areas such as slopes in excess of 15%. Careful engineering techniques should be considered when construction takes place on slopes in excess of 15%.

# APPENDICIES



Appendix A: Soil Limitations Chart

LIMITATIONS TO THE DEVELOPMENT OF:

DEPTH  
(FT) TO  
HIGH  
WATER  
TABLE

GENERAL  
SOIL  
PROPERTIES  
%  
SLOPE

TYPE  
WATER  
TABLE

SEPTIC TANK  
ABSORPTION

DWELLINGS  
WITH  
BASEMENTS

ROADS  
AND  
STREETS

LAWN AND  
LANDSCAPING

LdA	Loamy glacial till	0-5	+1-1.5	Apparent, perched	Severe W, Ps, Pd	Severe W	Severe W, Fa	Severe W
PbB	Loamy glacial till	3-8	1.5-2.5	Perched	Severe Ps, Sl	Moderate W	Moderate Fa	Moderate St
PbC	Loamy glacial till	8-15	1.5-2.5	Perched	Severe Ps, Sl	Moderate W, Sl	Moderate Fa, Sl	Moderate St
PeC	Very stony glacial till	3-15	1.5-2.5	Perched	Severe Ps, Sl	Moderate W, Sl	Moderate Fa, Sl	Moderate St, Sl
PeD	Very stony glacial till	15-35	1.5-2.5	Perched	Severe Ps, Sl	Severe Sl	Severe Sl	Severe Sl
WxB	Loamy glacial till	3-8	1.5-2.5	Perched	Severe W, Ps	Severe W	Severe Pa	Moderate W
WzBc	Very stony glacial till	3-15	1.5-2.5	Perched	Severe W, Ps	Severe W	Severe Fa	Moderate St

Fa - Risk of Frost Action      Pd - Ponding      Ps - Percs Slowly      Sl - Slope      St - Large stones      W - Wetness

**Appendix B: Suitable Planting Materials for Wildlife Food and Cover**

## SUITABLE PLANTING MATERIALS FOR WILDLIFE FOOD AND COVER

### Herbaceous/Vines

Panicgrass  
Timothy  
Trumpet creeper  
Grape  
Birdsfoot trefoil  
Virginia creeper  
Switchgrass  
Lespedeza  
Bittersweet  
Boston ivy

### Shrubs

Sumac  
Dogwood  
Elderberry  
Winterberry  
Autumn olive  
Blackberry  
Raspberry  
Honeysuckle  
Cranberrybush

### Small Trees

Hawthorn  
Cherry  
Serviceberry  
Cedar  
Crabapple

## 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 - an 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 through 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 land owner/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 approximately 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 RC&D Area, 322 North Main Street, Wallingford, Connecticut 06492. King's Mark ERT phone number is 265-6695.