CHESTER FOREST ESTATES

CHESTER, CONNECTICUT

Eastern Connecticut Environmental Review Team Report

Eastern Connecticut Resource Conservation & Development Area, Inc.

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Environmental Review Team Report

Prepared by the
Eastern Connecticut Environmental Review Team
of the
Eastern Connecticut
Resource Conservation and Development Area, Inc.

for the
Chester Inland Wetlands Commission
and
Chester Planning and Zoning Commission

May 2003

CT Environmental Review Teams
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ACKNOWLEDGMENTS

This report is an outgrowth of a request from the Chester Inland Wetlands and Planning and Zoning Commissions to the Connecticut River and Coastal Conservation District (CRCD). The CRCD referred this request to the Eastern Connecticut Resource Conservation and Development Area (RC&D) Executive Council for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The Eastern Connecticut Environmental Review Team Coordinator, Elaine Sych, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this report.

The field review took place on Tuesday, March 25, 2003.

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*Report not yet received, completion date unknown, please call directly with immediate concerns.

I would also like to thank Anna Sweeney, inland wetlands officer, Keith Nolin, town sanitarian, Lisa Wahle, inland wetlands commission, Janet Good and Jeffrey Ridgway, planning & zoning commission, Clinton Hughes, conservation commission, Alan Williams, applicant, and David Erlandson, project engineer, for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location and soils maps. During the field review Team members were given plans and additional information. Some Team members made individual or additional visits to the project site. Following the review, reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the town and applicant. This report identifies the existing resource base and evaluates its significance to potential and existing development, and also suggests considerations that should

be of concern to the town. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in reviewing this proposed residential subdivision.

If you require additional information please contact:

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TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

INTRODUCTION

The Chester Inland Wetlands and Planning and Zoning Commissions have requested assistance from the Eastern Connecticut Environmental Review Team in conducting a review of a proposed residential subdivision.

The ±92 acre site is located on Hoop Pole Hill Road off of Route 148 near Exit 6 on Route 9. The site is proposed for 22 single family house lots to be served by on site sewage disposal and individual water supply wells. The lots range in size from 2 acres to 5.6 acres. A new cul-de-sac road is planned with two wetland crossings. A third wetland crossing will be needed for a shared driveway access. Almost 14 acres of open space is being provided, as well as a 40′ equestrian easement.

An ERT was conducted on this site in 1984 for a 25 lot residential subdivision known as "Evergreen." *(Evergreen Environmental Review Team Report, October 1984).*

OBJECTIVES OF THE ERT STUDY

The Town of Chester has requested assistance in evaluating this new proposal for the site. Major concerns include: soils and erosion and sediment control, hydrology and stormwater drainage, wetland impacts, sewage disposal and land use and site design compatibility.

THE ERT PROCESS

Through the efforts of the inland wetlands and planning and zoning commissions this environmental review and report was prepared for the Town of Chester.

This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the commissions. Team members were able to review maps, plans and supporting documentation provided by the town and applicant.

The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of plans; and
4. Presentation of education, management and land use guidelines.

The data collection phase involved both literature and field research. The field review was conducted on Tuesday, March 25, 2003. Some Team members made individual and/or additional site visits. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.

Figure 1

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Location Map

Scale 1" = 1000'

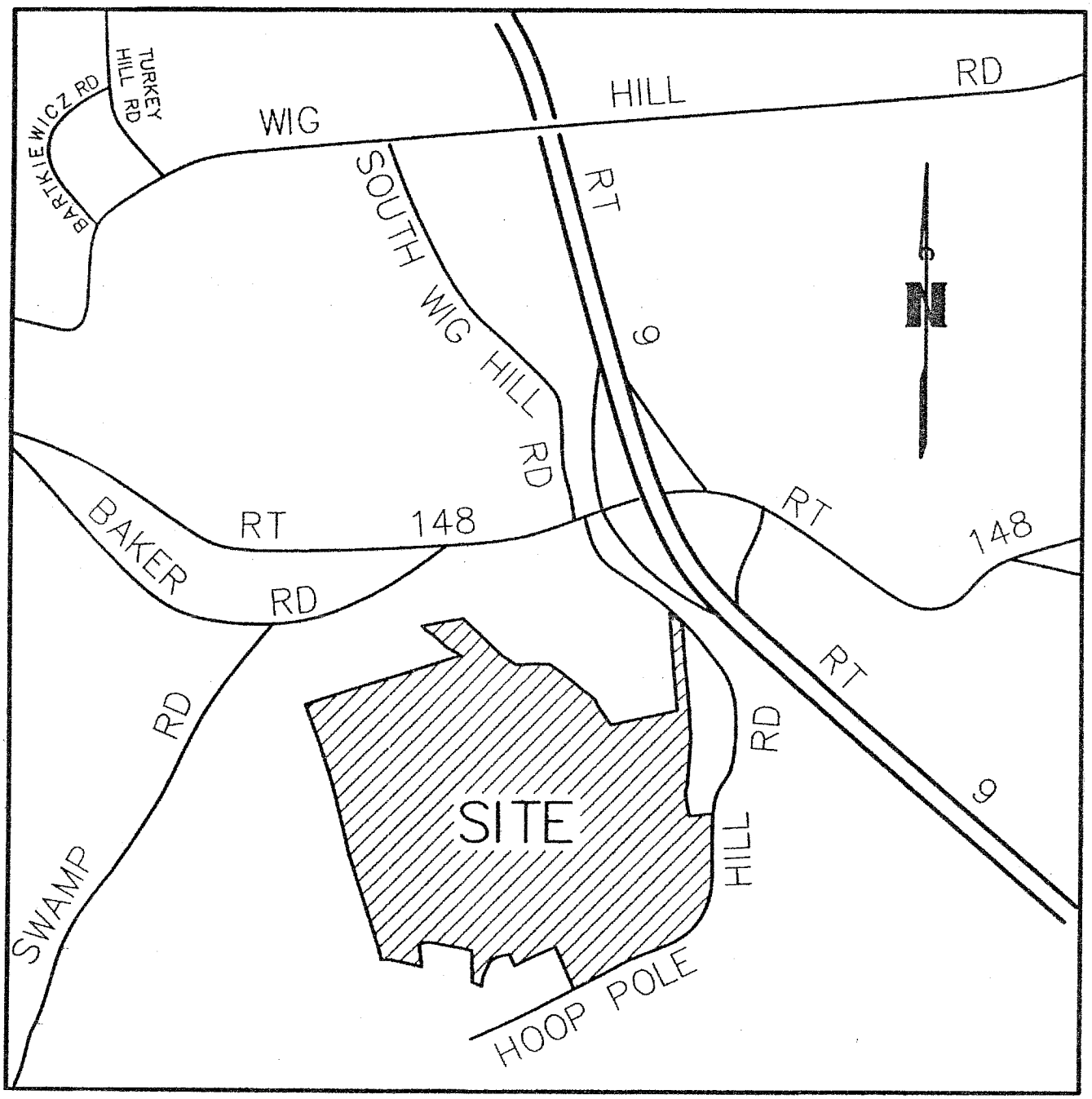

Figure 2

Topographic Map

Scale 1″ = 2000′

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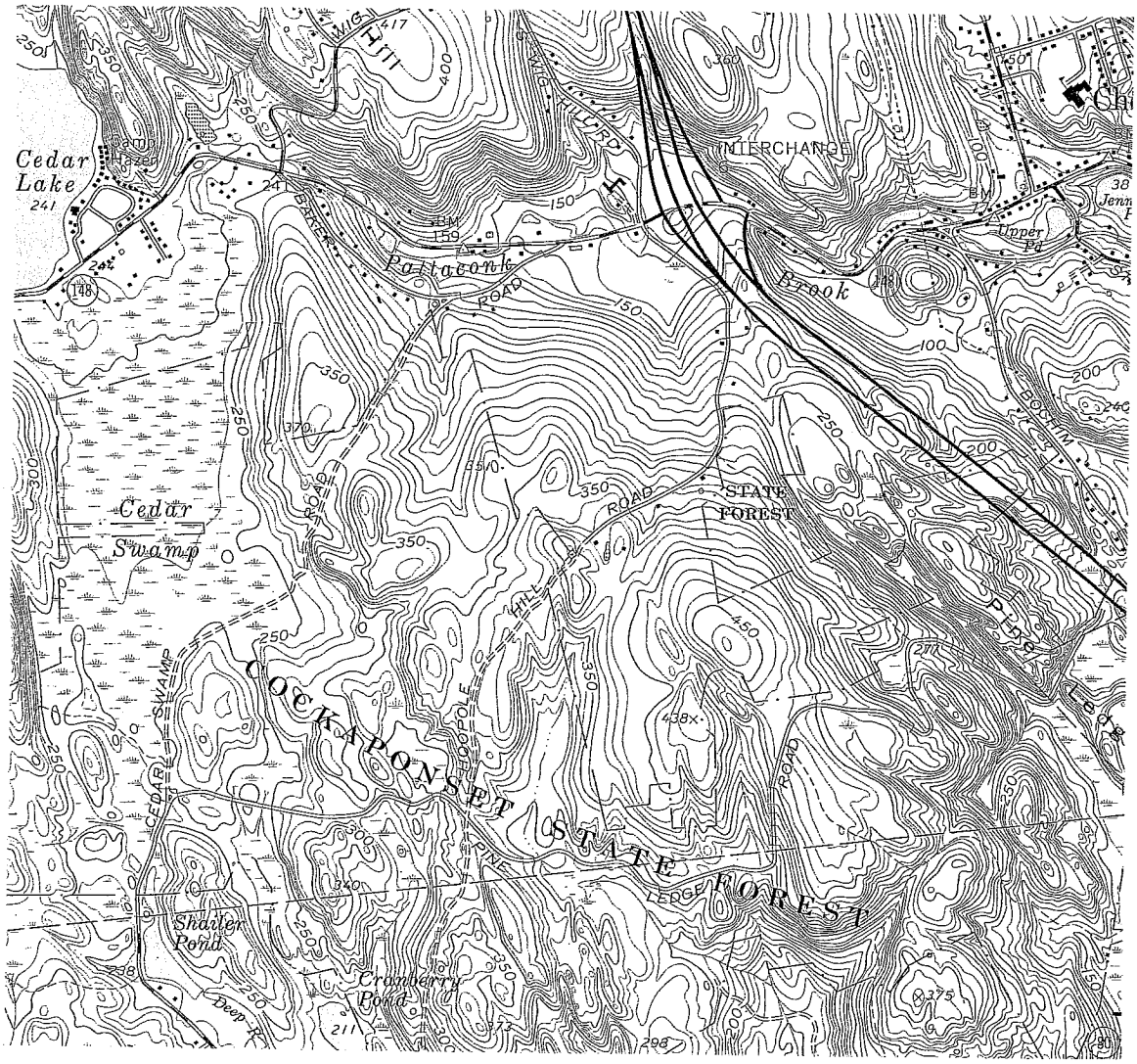

Figure 3

Topographic Map

Scale 1″ = 660′

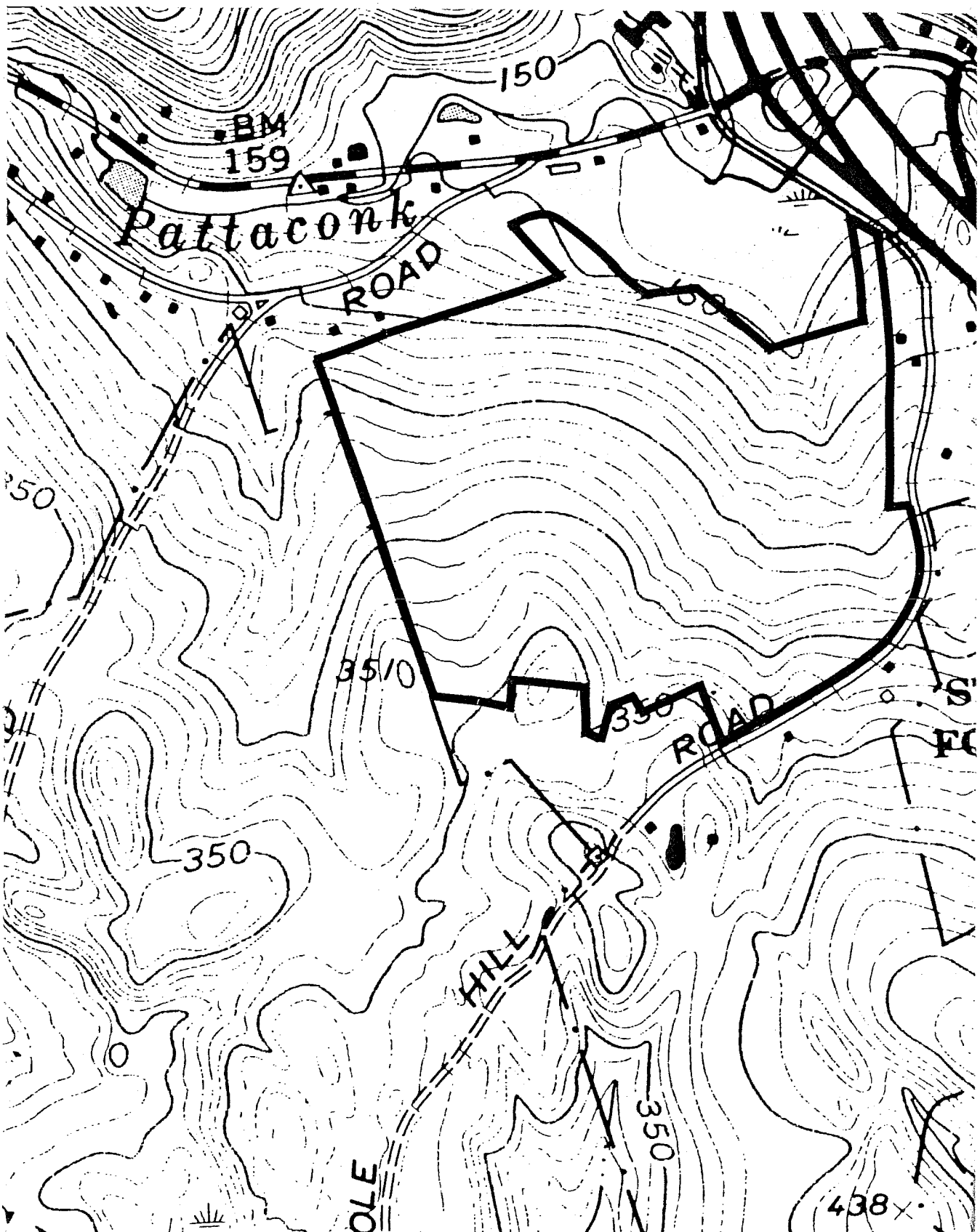

Figure 4
Site Plan
Not to Scale

CONSERVATION DISTRICT REVIEW

The following are general comments and recommendations regarding the proposed Chester Forest Estates subdivision. Activities proposed include the development of 22 residential building lots, a subdivision road and cul de sac, two wetland road crossings, a shared driveway wetland crossing and detention structure, a road drainage system, two biofiltration basins, and a 40' equestrian easement in favor of the Town of Chester.

Comments in this section are based on a review of:

- a series of site plans (45 sheets) dated 1/2/03;
- a summary report for the ERT dated 3/04/03;
- a fax from Megson and Heagle dated 3/26/03 showing the limits of flooding behind the proposed detention structure at the driveway crossing;
- an ERT report for Evergreen, Chester, CT dated October 1984;
- and, a site visit conducted on 3/25/03.

The comments below are advisory in nature and are intended to assist municipal land use commissioners in their charge.

CURRENT SITE CONDITIONS

The site consists of wooded upland and wetlands with slopes ranging from 3-15%. Upland and wetland soils shown in the project area on the Soil Survey Maps for Middlesex County (USDA/Soil Conservation Service) are very stony

and extremely stony fine sandy loams (see Table 1). These soil survey maps are at a 1:15,840 scale, which means that the smallest area delineated is approximately 2.5 acres. Caution should be taken when using the soil survey maps for site-level planning since at this scale soils in a single mapped unit can differ in slope, depth, drainage, and stoniness.

Three areas of natural seepage slope were identified on site (11/15/02 field survey report from Frank Dirrigl, Jr., no map supplied). These areas are described as stony, sloping hillsides that serve to collect and drain water to adjacent wetlands.

Upland soils in the western and central portion of the parcel include Canton and Charlton very and extremely stony fine sandy loams (CcC and CdC) that are found on hills and ridges of glacial till plains. These soils are both well drained, with medium to rapid runoff, and moderate to rapid permeability in the surface and substratum. In addition, associated with upland drumlins and glacial till plains are Paxton and Montauk extremely stony fine sandy loams (PeC). These soils are both well drained, with medium runoff, moderate surface permeability, but slow to very slow permeability in the substratum. Shallow compact layers may underlie Paxton soils.

Upland soils in the southern and northern portion of the parcel include Charlton-Hollis very stony fine sandy loams (CrC) found on upland glacial till plains and on ridges where the relief is affected by underlying bedrock. The CrC soils complex is comprised of intricate patterns of Charlton (50%), Hollis (30%), bedrock outcrops and other soils (20%) that cannot be mapped separately. Charlton soils are as described above - well drained, moderately permeable soils. Hollis soils are shallow, with hard unweathered schist found at a depths of 14 inches. Above the bedrock, permeability is moderate to rapid and runoff is medium to rapid.

Adjacent to the on-site wetlands are moderately well drained Woodbridge extremely stony fine sandy loams (WzC) associated with side slopes of drumlins and glacial till uplands. This soil has a seasonally high water table at about 18 inches, with moderate surface permeability, slow to very slow substratum permeability, and medium runoff.

On-site wetlands are comprised of Leicester, Ridgebury, and Whitman extremely stony fine sandy loams (LG) that are mapped together because they react similarly to most land use and management practices. These poorly and very poorly drained soils are found in drainageways and depressions of glacial till uplands and are limited by stoniness and wetness. Most mapped areas are gently sloping to nearly level, however LG soils on this site were also delineated in areas of greater than 10% slope.

Test pit information provided on the site development plans suggests that subsurface mottling and compact layers are present at 17 of the 22 building sites. Restrictive layers at depths of 22 to 30 inches were noted for the primary septic field locations for 17 of the proposed lots. Soils in the areas with restrictive layers were generally mapped as Paxton and Montauk (PeC), Charlton-Hollis (CrC), and Woodbridge (WzC), although five test sites were located in Canton and Charlton soils (CdC).

GENERAL RECOMMENDATIONS

The design of the proposed subdivision is incompatible with existing site conditions. The site consists of steep, stony slopes in soils with moderate to severe limitations on development. While these limitations can be overcome with engineering solutions, the nature of the on-site wetlands and identified seepage slopes that drain to the wetland systems should not be irreversibly impacted.

Activities potentially impacting natural resources include the three wetland crossings; stormwater detention in a wetland; and clearing, grading, and excavating within the 100-foot regulated wetland review area for driveways and/or structures for 7 of the 22 lots. All of the proposed lots contain either wetlands or 100-foot regulated wetland review area.

The proposed subdivision road will cross two wetlands; the first will cross 80 feet of wetland with 92 feet of 24" culvert at a 12.5% slope and the second will cross 40 feet of wetland with 70 feet of 24" culvert at a 10% slope. A third crossing to access lots 20-21 with a shared driveway will cross 90 feet of wetland with 50 feet of 30" pipe at a 7.6% slope. A stormwater detention system sized to detain water from a 100-year storm to achieve zero net runoff is proposed at this crossing. The height of the detention berm created by the driveway crossing will be 6 feet above the existing grade, and a multi-phase outlet structure will allow passage of stormwater during different storm events.

The following issues pertaining to the proposed site development plans should be thoroughly considered:

1. Alternatives to the subdivision design that limit proposed driveways and structures within the regulated 100-foot wetland review area (especially on slopes that grade towards wetlands) should be evaluated, i.e., proposed lots 4, 5, 17, 18, 19, 20, 21, 22.

2. A mechanism to impose and enforce proposed clearing limits shown on the site development plans should be evaluated. Undisturbed wooded uplands support wetland hydrology and provide soil erosion and sedimentation protection. Limiting the amount of clearing for the subdivision road and individual lot development will be critical to minimizing impacts to site wetlands. The amount of clearing shown for buildings, driveways, and lawn

areas is also important in relation to the calculated post-development stormwater flows. Excessive clearing for lawns and gardens may cause future on or off site flooding, drainage issues, or wetlands impacts.

3. An alternative subdivision road design to minimize the total amount of wetland and 100-foot regulated wetland review area disturbed should be evaluated. The potential to move the road crossings to narrower wetland areas with shallower slopes should be evaluated, i.e., between lots 16 and 18 at wetland flags 42-46 and 102-105.

4. Stormwater should be detained in upland areas, not in wetlands as proposed. Although the area and duration of the flooding behind the detention structure may be limited, the size and nature of the structure may permanently impact the wetland. The size and permanent impact of the detention berm crossing should be compared to the size (height and width) of a standard driveway crossing. In addition, the necessity of providing detention for the 100-year storm should be evaluated with respect to the size and impact of the proposed detention structure.

5. Proposed discharge locations of roof leaders, footing drains, or curtain drains should be shown on the site development plans. These sources of clean stormwater or groundwater should be disconnected from the road drainage system and should be encouraged to infiltrate through bioretention or underground infiltrators.

6. Any proposed improvements (clearing, path creation, etc.) for the 40-foot equestrian easement should be specified on the site development plans.

7. The plans to construct, plant, monitor, and maintain the proposed biofilters should include:

a) A schedule to inspect plant establishment and survivability, water levels, slope stability (recommended twice per year for first five years).
b) The name and number of the individual/organization responsible for the inspections.
c) Optimal planting dates for the proposed plantings.
d) Details on invasive species monitoring and removal.
e) Requirements for maintaining the constructed biofilter, and the name and number of the individual or organization responsible for routine maintenance.

EROSION AND SEDIMENTATION CONTROL RECOMMENDATIONS

The proposed erosion and Sedimentation (E&S) control plan includes a construction entrance anti-tracking pad at the intersection of Hoop Pole Hill Road, geotextile silt fence, hay bale barriers, and water bar diversions for the proposed subdivision road construction; geotextile silt fence for septic fields and building lots; and rip rap splash pads for outlet protection. The E&S control plan should be developed and implemented in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Controls (2002 Guidelines).

1. The combination of topography and soil type increases the hazard of erosion and sedimentation on this site. The amount and duration that land is disturbed should be kept to a minimum during the construction of the subdivision road, driveways, stormwater management structures, and residential lots. Phasing should be used to divide the project into distinct sections each with its own construction sequence. Each phase should be relatively independent, and should be completed before the next phase is initiated.

2. Construction sequencing is provided for the road only. Construction sequencing should be provided for the development of individual building lots as well.

3. All wetlands flagging should be re-established prior to beginning clearing, grubbing, or grading activities. If individual lots are developed separately, wetlands flagging should be re-established on each lot prior to the beginning of any construction activities.

4. Construction entrance anti-tracking pads should be indicated at the driveway entrance to lots 1, 2, and 3 on Hoop Pole Hill Road.

5. There is a holding tank ("HT") specified at the subdivision entrance. If clearing, grading, or excavating is required in this area an appropriate sediment barrier measure should be specified on the site plans.

6. An appropriate sediment barrier measure must be shown for the rip rap splash pad at the outlet of the first wetland crossing (at lot 2) of the subdivision road and at the third crossing at the shared driveway to lots 20-22. The site plans show a geotextile silt fence transecting the splash pad at the first crossing.

7. Perpendicular wings should be specified for geotextile silt fence to break the velocity of water flowing along the fence where it crosses contours. In general, for slopes of 5:1 or flatter perpendicular wings are placed every 100 feet; for 3: 1 to 5:1 slopes every 75 feet; and for 2: 1 to 3:1 slopes every 50 feet (per 2002 Guidelines).

8. If the individual lots and driveways will be constructed after the subdivision road is completed (and sedimentation protection is removed from the road drainage system), construction entrance anti-tracking pads should be specified for

each individual or shared driveway where they intersect with the subdivision road.

9. A method to intercept or divert potential erosive flows or sediment from driveways that grade towards the subdivision road (lots 4-10) should be evaluated. Measures should be provided to control material from the driveway construction from getting onto the subdivision road (especially after it is completed and sedimentation protection is removed from the road drainage system).

10. Sedimentation barriers or filters (geotextile silt fence or hay bales) should be used on the downslope sides of driveways, parking areas, and houses to protect undisturbed areas and remaining vegetation from sedimentation. Measures should be provided to control sediment until the area is stabilized. (e.g., driveways to lots 7, 11, 12, 13, 14, 20, 21; parking pad of lot 17, north side of house on lot 1, northeast side of house on lot 20, north of house on lot 21).

11. Adequate E&S protection and access to the primary septic fields needs to be shown for lot 7 (overlap in fence needed) and lot 16 (a break in the fence needed). Overlapping lengths of silt fence can be placed on the contour with 20 feet vertical separation on the slope.

12. Twin, U-shaped hay bale check dams (one upslope and one downslope) should be shown for all catch basins on slopes (see 2002 Guidelines), or hay bale barriers or geotextile should be shown ringing each catch basin, especially in low-lying areas.

13. Hay bale barriers are not recommended for use in drainageways, and therefore the drainageway detail should be revised on sheet 38 (per 2002 Guidelines).

14. The location and proposed E&S control measures of all temporary stockpiles (for the subdivision road, stormwater management system, and individual lots) needs to be shown.

15. Temporary sediment traps (contributing drainage area < 5 acres) or basins (contributing drainage area > 5 acres) are not shown on the site development plans. If a sediment impounding trap or basin will be proposed, the site development plans should detail the location, size, maintenance requirements, and re-naturalization strategies for each structure.

16. The E&S control plan should specify:

a) Temporary seeding or non-vegetated protection of all exposed soils and slopes will be initiated within the first 7-days of suspending work in any area that will be left longer than 30 days.
b) Non-living soil protection measures to be used when conditions prohibit the use of vegetative establishment.
c) Organic matter content of topsoil should be between 6-20%.
d) Use of surface roughening as necessary to ensure topsoil bonds to disturbed ground.
e) The appropriate location for disposing material removed during maintenance of sediment impoundments, barriers, or filters. Material should not be deposited in wetlands or in exposed areas.
f) Dust control chemicals (other than water) should not be used in wetland crossing areas on in the 100-foot upland review buffer.
g) Maintenance requirements of permanent E&S control measures.
h) The name and contact information of the person or organization responsible for maintaining the permanent E&S control measures.

Table 1. Summary of Upland Soils Mapped on the Proposed Project Site

	Soil Map Unit				
	CcC	**CdC**	**CrC**	**WzC**	**PeC**
Soil Type	Canton and Charlton very stony fine sandy loam	Canton and Charlton extremely stony fine sandy loam	Charlton-Hollis very stony fine sandy loam	Woodbridge extremely stony fine sandy loam	Paxton and Montauk very stony fine sandy loam
Slope	8-15%	3-15%	3-15%	3-15%	8-15%
Lot location	4 & 5	8, 9, 10, 16, 17, 20, 21, 22, 15	6 & 7	1, 2, 3, 13, 18, 19	11, 12, 14, 15
Hydrologic group	B – high infiltration/low runoff			C – low infiltration/high runoff	
Drainage	Well	Well	Well to Excessive	Well	Moderately Well
Erosion Potential	Severe	Moderate to severe	Moderate to severe	Moderate[1]	Moderate[1]
Principal Limitations	Steep & stony	Steep & stony	Steep, stony, shallow depth to bedrock, & outcrops (Hollis)	Stony, wet, slow permeability, & frost action	Steep, stony, wet, slow permeability, & frost action
Buildings w/ or w/out basements	Moderate	Severe	Moderate for Charlton, Severe for Hollis	Severe[2]	Severe[2]
Lawns and gardens	Moderate	Moderate	Moderate for Charlton, Severe for Hollis	Severe[2]	Moderate[2]
Shallow excavations	Severe[3]	Severe[3]	Moderate for Charlton, Severe for Hollis	Severe	Severe
On-site septic	Moderate - stoniness	Moderate - stoniness	Severe in Hollis - shallow depth to bedrock	Severe - slow percolation rates	Severe - slow percolation rates

[1]*steep slopes of excavations slump when saturated*
[2]*wet, may require artificial drainage*
[3]*cutbanks cave*

Figure 5

Soils Map

Scale 1″ = 1320′

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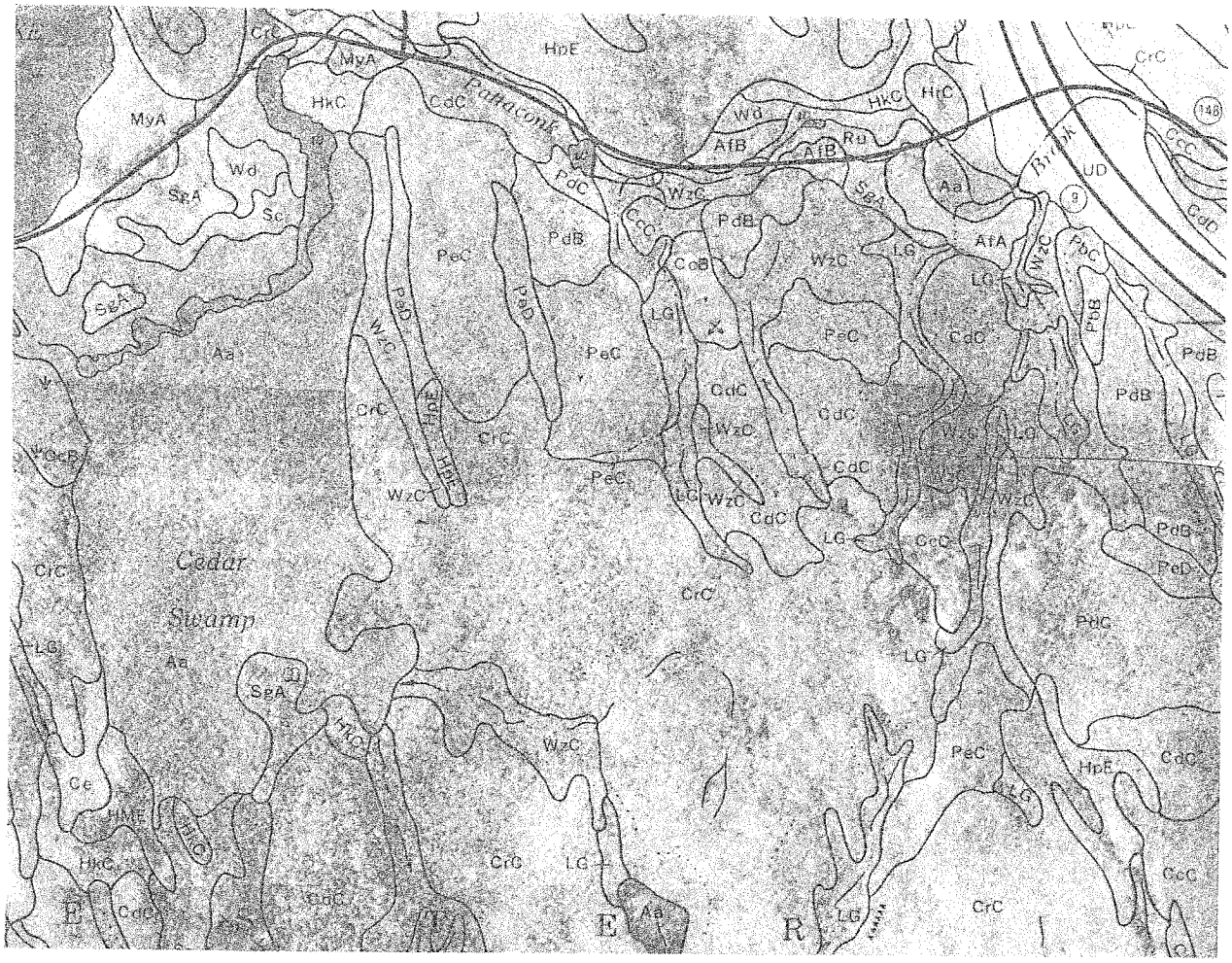

WETLAND REVIEW

The ERT Team visited the site of the Chester Forest Estate development proposal on March 25, 2003. Members walked through the site on the main road corridor - the future Pinnacle Lane - and then from the cul-de sac at the end of Pinnacle Lane down the path of the driveway proposed to service lots 20, 21 and 22. This route brought the Team members to the sites of the three proposed wetland crossings. These three crossings, together with the long, narrow band of wetland behind proposed lots 7 through 12 are the wetlands that will be commented on in this section.

Taken together, the three wetland crossings impact less than 1/2 acre. Crossing #1 impacts .18 acre, crossing #2 .1 acre, and crossing #3 .15 acre. This totals .43 acres or approximately 18,731 square feet. These three crossings vary in width and somewhat in character. All pass over soils mapped as Lg which is the Leicester, Whitman, Ridgebury complex soils. Richard Snarski is the soil scientist responsible for the wetland soils mapping on site.

In description, Lg soils typically have areas which are long and narrow or irregular in shape on the landscape. Lg soils have moderate or moderately rapid permeability. Runoff is slow, with drainage being classed as poorly or very poorly drained. These are found in drainage ways and depressions of glacial till uplands. Stoniness and wetness are typically the major limitations Slow downslope surface water movement through the woodlands generally drain these soils. Intermittent watercourses often appear when the surface drainage accumulates enough moisture to flow.

The water quality on the site as mapped by the DEP and assessed from the wells in the general vicinity shows a surface water quality of A and a groundwater quality as AA. This latter ranking is the highest rank the state applies to its water.

Reportedly all three of these wetlands at the crossing areas are dry in the summer months. Certainly, the drought-like conditions in the summer of 2002 would have dried many of these upland wetland areas.

At the time of the Team's visit all three had flowing water. The streambeds were made up of glacially rounded rock, cobble to boulder in size, with sediments that appeared sandy, but were likely eroded rock fragments. Organics were common in pooled areas and those areas of lesser slope. Coarse woody debris one to three or four inches in diameter often lay perpendicular to the flow of the water.

There must have been varied degrees of dryness last summer, however, or some of these flow paths remained more damp than others. For instance, the first crossing by lots 4 and 19 exhibited pools of water 8 -10 inches deep. There were remnants of ferns and sphagnum moss on rocks that were dead and appeared to be dried or burned up, apparent artifacts of last years dryness Only a small amount of moss now appears on the rocks at this crossing.

The second crossing at lots 6 and 17 was similar to the first in that there was little moss, and no ferns, but showed boulders of one to three feet in diameter.

The third crossing near the intersection of lots 15 and 22, however, was different from the first two. Here the distinct channel was two to three feet wide with a visually "sand," rocky and cobbly bottom. Its flow has swept much of the organics from the bottom or stream bed. This due to flow rates which exceed the other two crossing areas. Indeed, this waterway drains approximately 32 acres *above* Hoop Pole Road. This acreage is half again the drainage size of the first crossing, and nearly double the drainage of the second crossing. The area was seemingly alive with the sphagnum mosses that covered the rocks. These had suffered no burn off in last year's drought but seem to have made it through that stress period and now show their typical lush growth. All things being equal regarding

shade and tree cover there was likely more moisture at this location to get through the summer months.

Crossings number one and two appear to be seasonal of status. Therefore, the proposed culverts under the roadway at these locations should suffice. But, crossing three varies from the first two for two reasons. First, during construction, quite a lot of fill would be needed to build the berm over which the driveway will pass to the three rear lots. And secondly, additional construction would be needed to create and install the impounding structure and prepare the area for the post storm impoundment site upslope of this configuration. The nature of what essentially would be an impounding structure with storm based ponding behind it seems to beg the question of alternatives.

It is probable that the goal of this proposal is to keep large-storm runoff from overtopping the driveway or damaging the berm. But it would also seem that the use of a single or side-by-side, sunken bottom, box-culvert(s) would allow the runoff to pass downslope as it does now. This would minimize the use of construction fill for the berm (the culvert boxes taking up several cubic feet) and eliminate the need to construct the proposed multilevel impounding structure at this location.

The long finger of wetland behind lots 7 through twelve should be protected through title restrictions. These will be easy targets for the dumping of yard and landscaping wastes, especially with the lack of on-site neighbors (the State of Connecticut state forest land).

MITIGATION

Nearly a half an acre of wetland will be lost during the construction as proposed. The town may want to consider either a wetlands enhancement project for the

amount lost here on the site if applicable, or possibly off site but still in the same regional watershed. Many communities have small mitigation projects on town wide "to-do" lists and have been able to work with developers to mitigate wetland loss from current proposals.

STOCKPILE LOCATIONS

Stockpile locations should be depicted on the plan drawings. Stockpiles can contribute large amounts of sediment to wetland areas if not planned and executed correctly. The planned location and erosion and sediment controls should be stated before the beginning of construction.

ROOF RUNOFF

Roof runoff should be directed either into the ground or away from the house lot and into each structure's neighboring wooded areas. This serves the two-fold goal of minimizing the burden on the storm drain system of storm runoff and to allow as much runoff as possible to take its pre-construction path downslope and serve as groundwater recharge. Information on the subject can be reviewed at the NEMO* Website: http://nemo.uconn.edu/reducing_runoff/roof_page.htm.

*Nonpoint Education for Municipal Officials

STORMWATER MANAGEMENT REVIEW

Since the site construction involves the disturbance of over five acres, Connecticut's General Permit for the Discharge of Stormwater and dewatering Wastewaters (the "Permit") will cover the project. The permit requires that the site register with the Department of Environmental Protection (CTDEP) at least 30 days before the start of construction. The registrant must also prepare, submit and keep on site during the construction project a Stormwater Pollution Control Plan (the "Plan").

THE PLAN

The Plan must be followed and updated as needed during the course of construction. For example, if the single row of silt fence along the wetlands is inadequate then the erosion controls should be re-evaluated and updated to prevent pollutants from discharging off site.

Please note that while this review is based primarily on the State Permit, many of the erosion and sedimentation issues are included in the Connecticut Guidelines for Soil Erosion and Sediment Control (the "guidelines"), and are issues that must be dealt with on a local level before being included in the Plan.

The Plan must include a site map as described in Section 6(b)(6)(A) of the General Permit and a copy of the erosion and sedimentation (E &S) control plan for the site. The E&S plan that has been approved by the Town in conjunction with the CTDEP Inland Water Resources Division (IWRD) and the local Soil and Water Conservation District may be included in the Plan. This plan and site map must include specifics on controls and limits of disturbance that will be used during

each phase of construction. Specific site maps and controls must be described in the Plan, as well as construction details for each control used. Wherever possible, the site shall be phased to avoid the disturbance of over five acres at one time. The permit requires that "the plan shall ensure and demonstrate compliance with" the guidelines.

Silt fence installation must comply with the guidelines, and may be used only in drainage areas of one acre or less. Structural practices including sedimentation basins are required for any discharge point that serves an area greater than 5 disturbed acres at one time. The basin must be designed in accordance with the guidelines and provide a minimum of 134 cubic yards of water storage per acre drained. Maintenance of all structural controls shall be performed in accordance with guidelines and the Plan must identify these practices. The basins should not be located in wetland areas.

For construction activities which result in the disturbance of ten or more acres of land area at one time, the Plan shall be submitted to the commissioner no later than thirty days before the initiation of construction activities.

INSPECTIONS

This project has numerous wetland areas and intermittent watercourses to be protected, which will make ongoing inspections and adjustments of controls an important aspect of this project. The permit (Section 6(b)(6)(D)) requires inspections of all areas at least once every seven calendar days and after every storm of 0.1 inches or greater (this is in contrast to some statements in the submitted reports.) The plan must also allow for the inspector to require additional control measures if the inspection finds them necessary, and should note the qualifications of personnel doing the inspections. This may be difficult if the developer intends to sell off the lots to individual contractors.

In addition, the plan must include monthly inspections of stabilized areas for at least three months following stabilization. Again, this may be difficult if the developer intends to sell off the lots to individual contractors.

EROSION CONTROL NOTES

The permit (Section 6(C)(i)) requires when construction activities have permanently ceased or been temporarily suspended for more than seven days or when final grades are reached at any portion of the site, stabilization must occur within three days.

Silt fence installation must comply with the guidelines, and may be used only in drainage areas of one acre or less. Structural practices including sedimentation basins are required for any discharge point that serves an area greater than 5 disturbed acres at one time. The basin must be designed in accordance with the guidelines and provide a minimum of 134 cubic yards of water storage per acre drained. Maintenance of all structural controls shall be performed in accordance with guidelines and the Plan must identify these practices. The basins should not be located in wetland areas.

POST-CONSTRUCTION

The permit (Section 6(b)(6)(C)(iii)) requires that the plan include a design for post-construction stormwater treatment of 80% removal of total suspended solids from the completed site in order to comply with this requirement, the Department recommends incorporating swirl concentrator technology to reach this goal. However, if the developer can show adequate documentation that biofiltration would achieve this goal, it can be used.

OTHER ISSUES

It is strongly recommended that the local wetland and zoning commissions ensure that the bond required for this project be adequate to remediate all wetlands and watercourses in the event of control failures on this site. The developer should be aware that regardless of the storm event size, they would be responsible for remediation of any impacts. The developer must also be aware that if lots are sold off to individual homeowners, he will still be responsible to ensure the contractor complies with your erosion control plan until final stabilization of the last lot. The Stormwater General Permit covers the entire period of construction.

THE NATURAL DIVERSITY DATA BASE

The Natural Diversity Data Base maps and files regarding the project area have been reviewed. According to our information, there are known extant populations of State Threatened banded sunfish (*Enneacanthus obesus)* in Pattaconk Brook, which is the vicinity of this project.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us 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. Consultations with the Data Base should not be substitutes 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. Such new information is incorporated into the Data Base as it becomes available.

Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environment permit applications submitted to DEP for the proposed site.

FISHERIES RESOURCES

The DEP Natural Diversity Data Base noted the presence of State Threatened banded sunfish in nearby Pattaconk Brook. This reviewer has not done a site inspection of the subject property.

The proposal under review consists of a proposed 22 lot single family residential subdivision with onsite water and septic disposal, constructed on a 92 acre parcel located west of Hoop Pole Road and south of Rte. 148. It appears as though most if not all of the site slopes to the north in the direction of Pattaconk Brook, which is located nearby, but which does appear to course through the subject parcel. There are no perennial watercourses on the property, but wetlands and intermittent watercourses do exist.

In the absence of detailed information, which presumably exists within the application for the 401 Water Quality Certificate, the extent to which the proposed project may impact fisheries resources is unknown. However, since the site drains toward Pattaconk Brook, the greatest potential concerns are related to erosion and sedimentation control during construction, and long term stormwater management.

If erosion and sedimentation controls are ineffective, sediments may be transported to Pattaconk Brook, which could have adverse consequences to the fisheries resources of the brook. As such, effective E&S control should be designed, constructed, and maintained to ensure that Pattaconk Brook will not be adversely affected by construction-related sedimentation.

Effective stormwater management systems should be designed to attenuate nutrient loading from the proposed subdivision, thereby providing long-term protection to aquatic resources in Pattaconk Brook.

You are advised that this response is a preliminary assessment only. Senior Fisheries Biologist Brian Murphy will be reviewing the 401 Water Quality Certification submitted to the DEP Inland Water Resources Division for this project. Brian's review will evaluate potential impacts to the fisheries resources of Pattaconk Brook, including but not limited to banded sunfish in a more thorough and comprehensive manner than was provided herein.

ARCHAEOLOGICAL REVIEW

A review of the state of Connecticut Archaeological Site Files and Maps show no known archaeological site on the project area. However, our files do indicate Native American seasonal campsites located along the Pattaconk Brook and adjacent to Cedar Swamp. In addition, the field review of the property indicates the remnants of historic farming activities, especially in the northern portions near Route 148. As a result of these cultural factors, the property has a high sensitivity for undiscovered archaeological resources.

The Office of State Archaeology recommends that a Phase I reconnaissance survey be conducted for the project area in order to identify and mitigate any cultural resources on the project area that would be affected by construction activities. This recommended survey should be conducted in accordance with he Connecticut Historical Commission's *Environmental Review Primer for Connecticut's Archaeological Resources.* In addition, the Office of State Archaeology is prepared to offer any technical assistance in conducting the survey.

PLANNING REVIEW

DESCRIPTION OF THE PROPERTY

The subject site is a 92+ acre site in Chester located off of Hoop Pole Hill Road in close proximity to Route 148 and the Exit 6 interchange of Route 9. The subject property is located on the northern side of Hoop Pole Hill Road and includes lands which slope moderately toward Pattaconk Brook. Elevations range from a high of approximately 370 feet MSL along the southern boundary to a low of approximately 140 feet MSL along the northern boundary. The property is traversed by at least three north-south oriented intermittent watercourses which ultimately drain to Pattaconk Brook.

As is the case with much of the this part of Connecticut, the site is predominantly covered by upwards of ten (10) feet of compacted glacial till - glacial debris deposited directly underneath the ice sheet and not substantially reworked by glacial meltwaters. As a result, the till is not well sorted and is comprised of particles ranging in size from clay to cobbles and larger. Other surface materials on the site include alluvium, the well-sorted sand and silt darkened by organic matter with beds of gray clay and gravel. These deposits are wetlands soils and are regulated by the Chester Inland Wetlands Commission. The 92+ acre site is proposed to include 22 residential lots ranging in size from 2 to 5.6 acres, consistent with the two (2) acre minimum lot size requirement of the R-2 Residential District. Fourteen of the twenty two lots exceed three (3) acres. The smallest proposed lot is 2.02 acres while the largest proposed is 5.60 acres. An open space dedication of 13.99 acres is proposed and a 40 foot equestrian easement is offered to the Town of Chester. Two wetlands crossing are proposed in order to construct a 1600 foot cul-de-sac and another wetland crossing is proposed for a shared driveway. The previous plan (1984) proposed establishing

25 residential lots accessed by a 2900 foot cul-de-sac. Although it is assumed, it is not clear from present submissions whether any open space was proposed with the 1984 proposal.

PLANNING REVIEW

In the 1984 ERT report, it was concluded that the proposal at that time was consistent with the neighborhood within which the development would occur. This is the case today as well - the area is still developed with residential, farming and state forest properties. From a planning perspective, issues of concern are similar to those that were summarized in the 1984 ERT report when the development was known as Evergreen. For the most part, planning concerns involve roadway design and access considerations. Outstanding issues are discussed below:

1. Cul-de sac Length

The length of the proposed cul-de-sac is 1600 feet, significantly less than the 2900 foot cul-de-sac that was proposed in 1984. Although the cul-de-sac length and related concerns have been minimized to a great extent by this redesign, it is noted that the proposed 1600 foot cul-de-sac is 100 foot in excess of that allowed in Section 5.5.7(d), Dead End Streets, of the Chester Subdivision Regulations. Subsection 2. of that section does allow for Commission approval of exceptions to the 1500 foot allowed length where they feel that safety considerations have been considered and met. It is not clear from submitted materials whether the applicant will request a waiver of that section or request that the Commission consider the noted exception.

2. Cul-de-sac Slope

As for the layout of the proposed cul-de-sac, the terminus is proposed in a location that is not level leading to traction concerns, especially during winter conditions. A 1984 recommendation to move a then-sloping cul-de-sac to a level

location (although in a different location on the property) is echoed here as a concern. In this case, however, it doesn't appear that there is a significantly more level place to move the terminus in the immediate vicinity. Leveling through "cutting" the southern entrance to the cul-de-sac won't apparently work due to increasing the slope of the roadway entering the terminus beyond that acceptable in regulations and potentially requiring more roadway "cut" operations. The cul-de-sac slope could, however, be minimized somewhat by filling underneath the its northern end. In this event, it is possible that driveway slopes will need to be adjusted so as not to exceed regulation standards as well.

3. Land Use and Site Design Capability

At issue with this topic would be whether or not there may be a more efficient way to develop the property and further minimize impacts to resources in and around the area. First, the significant area of wetlands to the east of the site dictates that the developable portion of the property be located up on the hill area to the west, an area which is traversed by streams flowing to the wetlands and Pattaconk Brook. From the perspective of lot and roadway layout, it appears that the major restriction or limitation is the aforementioned wetland belts that traverse the property in a north-south orientation. The applicant's design goal appeared to be to start with the minimization of impacts to wetlands by proposing to be as far west as possible and then design road and driveway crossings in the narrowest wetlands areas and in an orientation perpendicular to the axis of the stream. It is the easterly location of the wetlands and the resulting infrastructure design on the hillside that is the primary design criteria for the entire site.

In this respect, other than reducing the number of overall lots, it appears that the applicant has maximized design efficiency to a considerable degree. It doesn't appear to this reviewer that a different layout would significantly improve the design of this subdivision, especially when considering the considerable obstacles created by the wetland belts.

4. Soil Erosion and Sediment Control Issues

Anytime development is proposed for a sloping site adjacent to wetlands, care must be taken to insure that excavated soils are stabilized as soon as possible and that adequate sediment transport barriers are installed and maintained on a regular and frequent basis. In the case of Chester Forest Estates, it is anticipated that both the Inland Wetlands and Planning & Zoning Commissions will be looking closely at those lots where construction is planned in close proximity to wetland and within the 100-foot review buffer. Lots from which potential wetlands impact could emanate include numbers 5, 6, 17, 18, 19 and 22. Activities proposed to occur within the buffers include excavation and filling associated with the construction of primary septic system fields as well as construction of dwellings and driveways. In these cases, it may be wise to require that contractors install a double row sediment erosion control measures. Inspection of these installations by Town Officials should precede commencement of any work on the aforementioned lots.

SUMMARY

In the redesign of the subdivision proposal from 1984 to today, many of the concerns regarding planning issues appear to have been minimized to a great degree.

ABOUT THE TEAM

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a varety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, soil specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area — an 86 town region.

The services of the Team are available as a public service at no cost to Connecticut towns.

PURPOSE OF THE TEAM

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

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

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the chairman of your local Soil and Water Conservation District and the ERT Coordinator. A request form should be completely filled out and should include the required materials. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 860-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.