Clover Springs Farm Subdivision

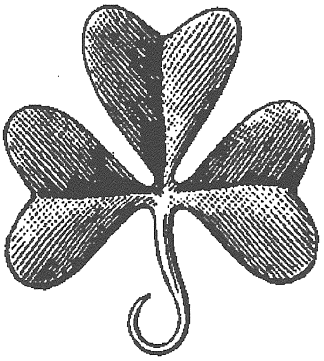
Willington, Connecticut

April 1993

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT

Eastern Connecticut Resource Conservation and Development Area, Inc.

Clover Springs Farm Subdivision
Willington, Connecticut



Review Date: January 26, 1993

Report Date: April, 1993

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM
EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.
P.O. BOX 70, 1066 SAYBROOK ROAD
HADDAM, CT 06438
(203) 345-3977

ENVIRONMENTAL REVIEW TEAM REPORT
ON

Clover Springs Farm Subdivision
Willington Connecticut

This report is an outgrowth of a request from the Willington Inland Wetlands and Watercourses Commission to the Tolland County Soil and Water Conservation District (SWCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Area Executive Council for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The ERT met and field checked the site on Tuesday, January 26, 1993. Team members participating on this review included:

◆ Nicholas Bellantoni	State Archaeologist CT Museum of Natural History 486-5248
◆ Alice Choquette	Soil Conservationist USDA - Soil Conservation Service 875-3881
◆ Carla Guerra	Wetland Specialist, EA III DEP - Inland Waters Resource Division 566-7160
◆ Stacey Kingsbury	Stacey Kingsbury, EA DEP - Natural Resources Center 566-3540
◆ Brian Murphy	Fisheries Biologist DEP - Eastern District Headquarters 295-9523
◆ James Parda	Forester DEP - Eastern District Headquarters 295-9523
◆ Peter Picone	Wildlife Biologist DEP - Wildlife Division 295-9523 or 584-9830
◆ Anthony Philpotts	Geologist UCONN - Department of Geology and Geophysics 486-1394
◆ Meg Reich	Planning Director Windham Regional Planning Agency 456-2221

◆ Elaine Sych

ERT Coordinator
Eastern CT Resource Conservation & Development Area, Inc.
345-3977

Prior to the review day, each Team member received a summary of the proposed project, a list of the town's concerns, a location map, a topographic map, and a soils map. During the field review the Team members were given a revised preliminary plan and additional information. The Team met with, and were accompanied by the Willington Land Use Agent the applicant and his engineers. 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 designs 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 landowner. This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the developer and the Town. 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 making your decisions on this proposed subdivision .

If you require additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P.O. Box 70
Haddam, Connecticut 06438
(203)345-3977

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Introduction

The Eastern Connecticut Environmental Review Team has been asked to assist the Town of Willington with review of the proposed "Clover Springs Farm Subdivision".

The project site is located north of the Willington/Mansfield town line, east of the Willimantic River and north of the Route 32/Route 195 intersection on Battye Road and Burt Latham Road.

The site is approximately 115 acres in size. The applicant has revised his original plans which showed 33 lots to a preliminary new plan which contains 25 lots. The subdivision is located in an R-80 zone which allows lots with a minimum size of approximately two acres. The plan provides for a through road, and stormwater detention will be provided on-site.

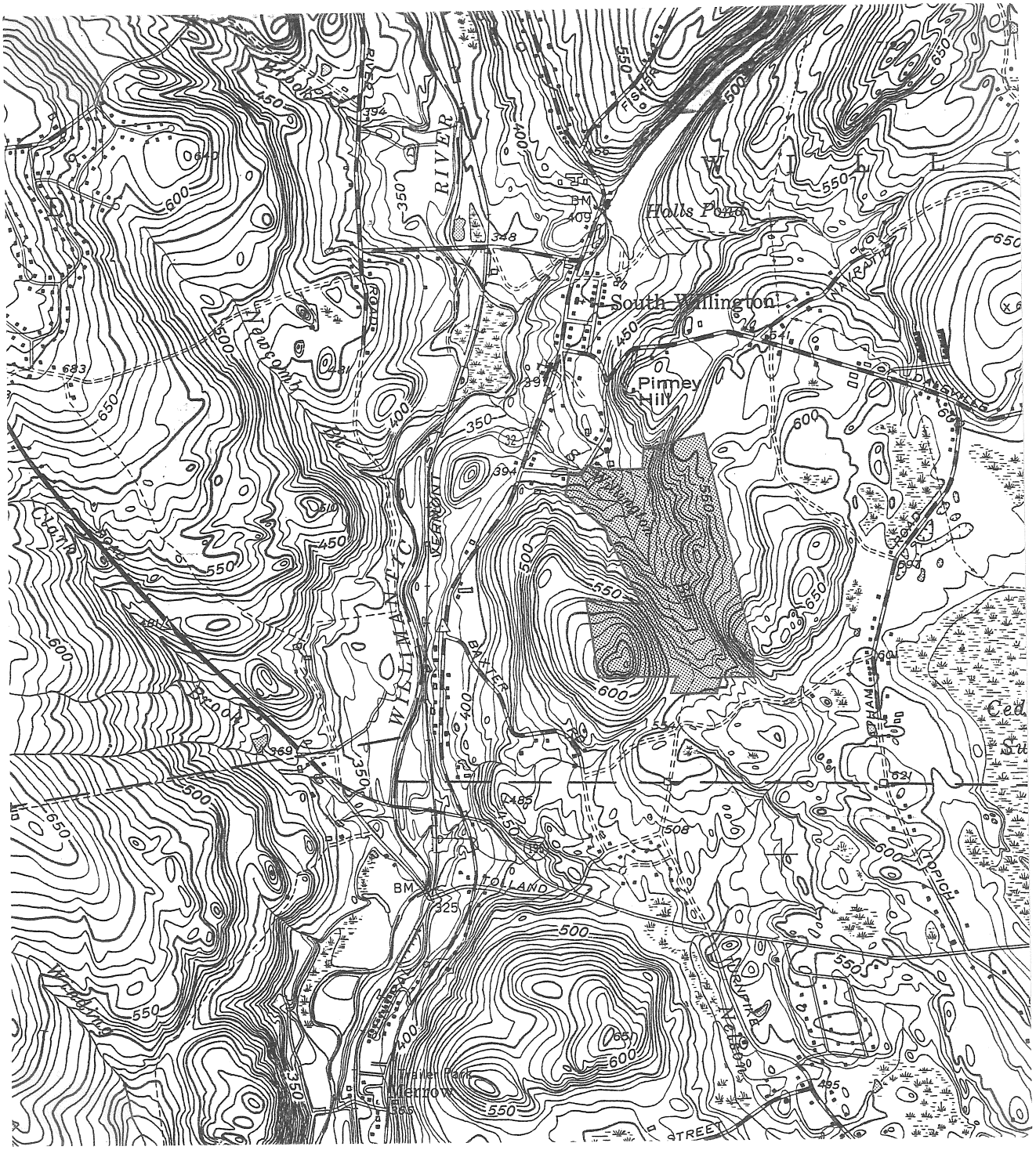
The Inland Wetlands and Watercourses Commission has requested assistance in order to assure that the subdivision be as environmentally compatible as possible before the plan's resubmission to the Town. Specific areas of concern includes:the density of lots, long, steep driveways, the cuts and fills that are needed, wildlife and fisheries habitat, streambelt protection and historic preservation opportunities.

The primary goal of this review is to inventory natural resources, review existing plans and to provide planning information.

Site Location Map

Scale 1" = 2000'

Approximate Site Location



Topography, Geology and Hydrology

Topography

The Clover Springs Farm Subdivision occupies the valley of the Willington Brook, which flows northwestward into the Willimantic River. The Willington Brook valley has a prominent north-northwest alignment, which coincides with the direction of the Willimantic River north of the town of South Willington. A prominent bedrock fracture system or fault probably controlled the direction of both of these rivers. In the proposed subdivision, this direction is most clearly seen where it forms the almost linear boundary on the southwest side of the wetlands that occupy the relatively flat bottom to Willington Brook. Another prominent northwesterly trending linear feature intersects the main Willington Brook valley at the point where the proposed subdivision road would cross the wetland. The intersection of these two topographic linear features is the narrowest part of the Willington Brook valley.

The land rises sharply from the relatively flat wetland in the valley bottom, with slopes being of the order of 1 in 10. To the east of the brook, where most of the lots are to be located, the land rises from approximately 450 feet to a relatively level but hummocky plain at 550 feet underlain by sands and gravels. Only in the southwestern corner of the subdivision is bedrock exposed on a hill which rises to 670 feet.

Geology

With the exception of the hill in the extreme southwest corner of the subdivision, which is formed of bedrock, the entire site is underlain by well-washed coarse sands and gravels. These form kames (small hummocks) and kame terraces on both sides of the valley. The sands and gravels were deposited by the melt water from the glacier that occupied this valley approximately 15,000 years ago. The large amounts of water from the glacier removed all the fine sediment. The remaining sands and gravels are consequently highly porous and permeable, and are thus well drained. This explains the almost complete lack of surface water except in the wetland in the valley bottom.

The steep slopes on the sides of the valley, which are typical kame deposits, reflect the angle of repose of the sands and gravels following the disappearance of the glaciers. Equally steep slopes could be expected to remain stable in man-made excavations in these sands and gravels. Slumping of cut areas should not be a problem.

Bedrock is exposed only on the hill in the southwestern corner of the subdivision. Here gray gneisses of the Brimfield schist dip predominantly to the west. The crest of a small fold causes these rocks to turn over and dip vertically along the eastern side of the outcrop at the crest of the ridge. Weathering along the crest of this fold has resulted in the formation of rounded cavities in the gneiss. These cavities, which are up to a foot in diameter and six inches deep, may mark the location of where a less resistant mineral may have been concentrated near the fold axis. In addition to outcrops of gneiss, there are a few of coarse-grained white pegmatite.

Hydrology

Because the land on which lots are to be developed is underlain entirely by kame deposits, drainage is excellent. The coarse sands and gravels are highly permeable. If there is a problem it will result from the permeability being so high that leachate from septic systems could emerge too rapidly at the surface in the wetlands. This could be a problem in lots 19-24. (Lot numbers from Map Plan 1/21/93.)

Reference

Fahey, R.S., and Pease, M.H., Jr., 1977. U.S. Geological Survey South Coventry Quad., Preliminary Bedrock Geologic Map.

Soils

Soils descriptions and maps from the Tolland County Soil Survey with the approximate area of the subdivision delineated are included for general reference (for soils descriptions see Appendix A). Test pits have been dug on proposed house lots, and site-specific data are included in the plan.

Wetland Boundaries

Wetlands have been delineated by a soil scientist and have been surveyed into the plan.

Erosion and Sediment Control

This plan was reviewed for adequacy of soil erosion and stormwater management by the Tolland County Soil and Water Conservation District on June 16, 1992. The plan has since been revised to include fewer house lots. A map indicating the new boundaries and numbering of house lots was provided on the day of the ERT field review. However, locations, grades, and wetland crossings associated with any changed lots was not available. All subsequent references to lots will be made using the numbers as they appear on the map plan dated 01/21/93 unless otherwise specified. The following is a list of concerns and recommendations:

1) This plan lacks a narrative specific to the plan. A checklist of erosion and sediment control measures, location, and name and address of responsible party should also be developed for the site based on the detailed narrative. The Commission may want to require the following (or similar) statements on the plan which relate to implementation and inspection of the soil erosion and sediment control plan:

> "The contractor shall secure the services of a certified professional soil erosion and sediment control specialist or professional engineer who shall verify in the field that the controls required by this plan are properly installed, shall make inspection of such facilities not less frequently than weekly and within forty eight (48) hours of any significant rainfall, and shall by written report, inform the owner or his agent not less frequently than weekly and the Town Planning and Zoning Commission not less frequently than monthly of observations, maintenance, and corrective activities undertaken. An approved checklist may be used to document the inspection findings."
>
> "There shall be a pre-construction meeting with the Town soil erosion and sediment control agent, the Town wetlands agent, the contractor, and the contractor's professional soil erosion and sediment control specialist to discuss the plan and inspection and report requirements."

2) This plan has been broken up into construction phases. It is very important that this phased plan be adhered to in order to limit the amount of area disturbed at any one time. Flagging of disturbance limits will prevent the occurrence of errors.

3) Reverse-slope (Diversion) Benches should be constructed on 2:1 through 5:1 slopes whose vertical interval exceeds 15 feet, such as road cuts on lots 8, 13, and 14 *(see chapter 7, Guidelines for Soil Erosion and Sediment Control,- CT, 1985)*. Erosion matting should be placed on slopes greater than 15 vertical feet that do not have diversion benches planned, and can be used as additional protection for roadways at the toe of slopes. This might be considered for driveway cuts on lots 5, 8, 12, and 13.

4) Long driveways with grades of 8% or greater will pose an ongoing stabilization problem until they are paved. Water bars along intervals will divert water from channeling along the entire length of the driveway, which will add to the water and sediment load on the access road.

5) A vegetative plan with seeding rates and dates is included in the plan. Mulching and netting guidelines for critical slopes should be added. A plan for treetop disposal might include chipping and utilization as a mulch.

6) Measures for stockpile protection are provided in the plan. However, there appears to be an inadequate amount of designated stockpile area for this project.

Stormwater Management

1) A summary of runoff from the site before and after development in CFS should be done for the 2, 10, and 100 year storms. If the peak discharges are increased by 15% for any of these storms, stormwater detention should be planned and sized in accordance with *Guidelines for Erosion and Sediment Control -CT, 1985*. An operation and maintenance plan should be developed for detention basins, and easements should be developed for routine maintenance access.

2) All runoff from this site will be directed to natural water courses. Runoff from roads contains salt and a number of other pollutants. In the interest of maintaining water quality, diverting runoff from highly salted areas into infiltration basins rather than water courses should be considered. Use of temporary sediment basins might also be considered during Phase I, the rough grading of the road.

3) Catch basins 320 and 21 should have haybales winged on their uphill sides.

4) Silt fencing protecting an outlet draining an area greater than one acre tends to "blow out" during a significant storm event. Placing the silt fence just above the headwall will minimize this occurrence. After the site is stabilized, the silt fence should be removed, especially from wetland areas.

5) Calculations and/or reference should be provided for plunge pool design.

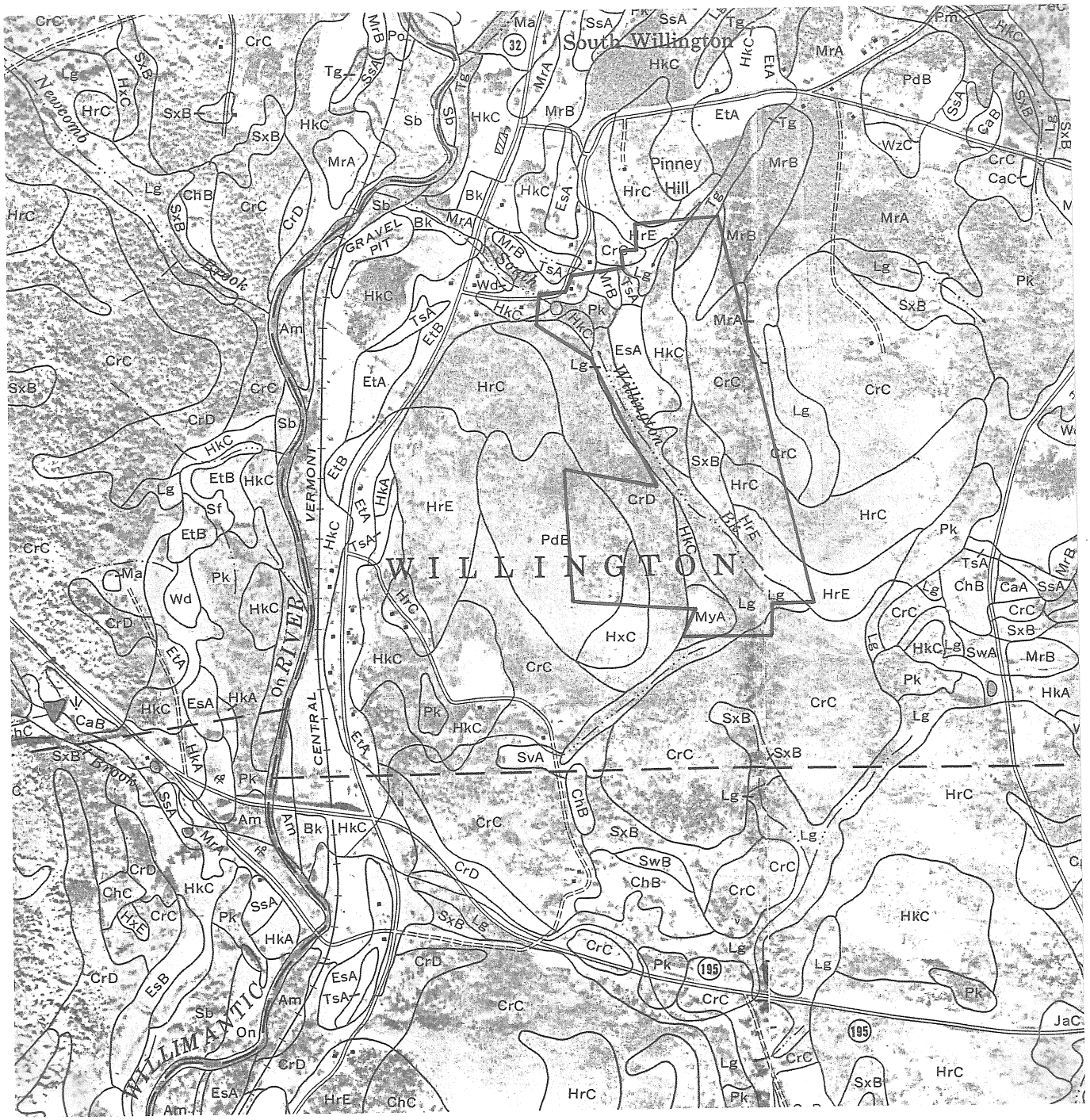
6) At station 28+15, the 24" RCP will slightly alter the course of the stream. This outlet should be armored to prevent scouring.

7) Proposed road and driveway crossings should be constructed in late summer when flows are low, in order to decrease water quality impact.

Soils Map

Scale 1" = 1320'

Approximate Site Boundary



NONTECHNICAL SOILS DESCRIPTION REPORT
FOR DESCRIPTION CATEGORY - SOI

Survey Area- TOLLAND COUNTY, CONNECTICUT

Map Symbol	Description
CrC	CHARLTON VERY STONY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES This map unit consists of gently sloping to sloping, well drained soils. The Canton soil formed in sandy deposits over friable sandy gravelly till and the Charlton soil formed in friable loamy till. It is on the side slopes of upland hills and ridges. Stones cover 10 to 35 percent of the surface. Bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of six feet. The permeability of the Canton soils is moderately rapid in the surface layer and subsoil, and rapid in the substratum. The permeability of the Charlton soils is moderate or moderately rapid throughout. Surface runoff is medium to rapid, and the available water capacity is moderate.
CrD	CHARLTON VERY STONY FINE SANDY LOAM, 15 TO 25 PERCENT SLOPES This map unit consists of deep and very deep moderately steep to steep, well drained soils on ridges, hills, and side slopes of glacial till uplands. The areas are mostly long and narrow in shape. Slopes are mostly smooth and convex and are mainly less than 200 feet long. Stones cover 8 to 25 percent of the surface. About 45 percent of the total acreage of this map unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. The water table in these Canton and Charlton soils is commonly at a depth of more than 6 feet. The permeability of the Canton soils is moderately rapid in the surface layer and subsoil and rapid in the substratum. The permeability of the Charlton soils is moderate or moderately rapid. Both soils have moderate available water capacity and rapid runoff.
EsA	ENFIELD SILT LOAM, 0 TO 3 PERCENT SLOPES These nearly level, well drained soils formed in silty mantled glacial outwash. They are on outwash terraces of stream valleys. Depth to bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of 6 feet. Permeability is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. Surface runoff is slow and the available water capacity is high.
HkC	HINCKLEY GRAVELLY SANDY LOAM, 3 TO 15 PERCENT SLOPES This rolling, excessively drained soil formed in sandy

NONTECHNICAL SOILS DESCRIPTION REPORT
FOR DESCRIPTION CATEGORY - SOI

Survey Area- TOLLAND COUNTY, CONNECTICUT

Map Symbol	Description
	and gravelly water-sorted materials. It is on terraces of stream valleys, outwash plains, kames and eskers. Bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of six feet. Permeability is rapid in the surface layer and subsoil, and very rapid in the substratum. Surface runoff is slow and the available water capacity is low.
HrC	HOLLIS VERY ROCKY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES This map unit consists of very deep and shallow gently sloping to sloping, well drained and somewhat excessively drained soils on hills and ridges of glacial till uplands. The areas of this map unit are mostly irregular in shape. Slopes are mostly complex and 100 to 200 feet long. Stones cover 1 to 8 percent of the surface, which is marked by a few narrow, intermittent drainageways and small, wet depressions. This map unit is about 55 percent Charlton soils, 20 percent Hollis soils, 15 percent other soils, and 10 percent exposed bedrock. The Charlton and Hollis soils are in such a complex pattern that it was not practical to map them separately. The water table in this unit is commonly at a depth of more than 6 feet. The available water capacity is moderate in the Charlton soils and very low or low in the Hollis soils. Both soils have moderate or moderately rapid permeability and medium to rapid runoff. Hard unweathered schist bedrock is at a depth of 14 inches in some areas.
HrE	HOLLIS VERY ROCKY FINE SANDY LOAM, 15 TO 35 PERCENT SLOPES This map unit consists of very deep and shallow gently sloping to sloping, well drained and somewhat excessively drained soils on hills and ridges of glacial till uplands. The areas of this map unit are mostly irregular in shape. Slopes are mostly complex and 100 to 200 feet long. Stones cover 1 to 8 percent of the surface, which is marked by a few narrow, intermittent drainageways and small, wet depressions. This map unit is about 55 percent Charlton soils, 20 percent Hollis soils, 15 percent other soils, and 10 percent exposed bedrock. The Charlton and Hollis soils are in such a complex pattern that it was not practical to map them separately. The water table in this unit is commonly at a depth of more than 6 feet. The available water capacity is moderate in the Charlton soils and very low or low in the Hollis soils. Both soils have

NONTECHNICAL SOILS DESCRIPTION REPORT
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Survey Area- TOLLAND COUNTY, CONNECTICUT

Map Symbol	Description
	moderate or moderately rapid permeability and medium to rapid runoff. Hard unweathered schist bedrock is at a depth of 14 inches in some areas.
HxC	HOLLIS EXTREMELY ROCKY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES This complex consists of gently sloping to sloping, somewhat excessively drained and well drained soils and areas of exposed bedrock. The soils of this complex formed in loamy glacial till. They are in long and narrow or irregularly shaped areas and on hills and ridges of glacial till uplands. Depth to bedrock varies from less than 20 inches to more than 60 inches below the surface. Stones and boulders cover 8 to 25 percent of the surface, which is marked by narrow, intermittent drainageways and a few small, wet depressions. These soils and the exposed rock are in such a complex pattern that it was not practical to map them separately. The water table in this complex is commonly below a depth of 6 feet. Permeability is moderate or moderately rapid in the surface, subsoil and substratum. Surface runoff is medium to rapid and the available water capacity is very low or low in the Hollis soils and moderate in the Charlton soils.
*Lg	LEICESTER-RIDGEBURY-WHITMAN VERY STONY COMPLEX This nearly level, poorly drained soil formed in compact loamy till. It is in depressions and small drainageways of upland hills and drumlins. Bedrock is commonly more than 60 inches below the surface. This soil has a perched, seasonal high water table at a depth of 0 to 18 inches from the fall through spring. Permeability is moderate or moderately rapid in the surface layer and subsoil, and slow to very slow in the dense substratum. Surface runoff is slow to medium, and the available water capacity is moderate.
MrA	MERRIMAC FINE SANDY LOAM, 0 TO 3 PERCENT SLOPES This nearly level, well drained soil formed in sandy water deposited materials. It is on outwash plains and stream terraces. Depth to bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of 6 feet. Permeability is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid or rapid in the lower part of the subsoil, and rapid in the substratum. Surface runoff is slow and the available water capacity is

NONTECHNICAL SOILS DESCRIPTION REPORT
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Survey Area- TOLLAND COUNTY, CONNECTICUT

Map Symbol	Description
	moderate.
MrB	MERRIMAC FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES This gently sloping, well drained soil formed in sandy water deposited materials. It is on outwash plains and stream terraces. Depth to bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of 6 feet. Permeability is moderately rapid in the surface layer and upper part of the subsoil, moderately rapid or rapid in the lower part of the subsoil, and rapid in the substratum. Surface runoff is medium and the available water capacity is moderate.
MyA	MERRIMAC SANDY LOAM, 0 TO 3 PERCENT SLOPES This nearly level, somewhat excessively drained soil formed in water-sorted sands and gravels. It is on terraces and outwash plains. Bedrock is commonly more than 60 inches below the surface. The water table is commonly below a depth of six feet. Permeability is moderately rapid or rapid in the surface layer and subsoil, and rapid or very rapid in the substratum. The surface runoff is slow and the available water capacity is moderate.
PdB	PAXTON STONY FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES This nearly level to gently sloping, well drained soil formed in compact loamy till. It is on the side slopes of drumlins and upland hills. Stones and boulders cover 2 to 10 percent of the surface. Bedrock is commonly more than 60 inches below the surface. This soil has a perched, seasonal high water table at 18 to 30 inches for brief periods during the early spring. Permeability is moderate in the surface layer and subsoil, and slow to very slow in the dense substratum. Surface runoff is slow to medium, and the available water capacity is moderate.
* Pk	PEAT AND MUCK This nearly level, very poorly drained soil formed in deep organic materials. It is in low depressions on outwash terraces and glacial till plains. Bedrock is commonly more than 60 inches below the surface. The soil has a water table at or near the surface during most of the year, and water is ponded on some areas in the fall through spring and after heavy rains. Permeability is slow to moderately rapid. Surface runoff is very slow and the available water

NONTECHNICAL SOILS DESCRIPTION REPORT
FOR DESCRIPTION CATEGORY - SOI

Survey Area- TOLLAND COUNTY, CONNECTICUT

Map Symbol	Description
	capacity is high.
SxB	SUTTON VERY STONY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES This nearly level to sloping, moderately well drained soil formed in loamy glacial till. It is at the base of slopes, in slight depressions and on side slopes in glacial till uplands. Depth to bedrock is commonly more than 60 inches below the surface. From 8 to 25 percent of the soil surface is covered with stones and boulders. The soil has a seasonal high water table at a depth of about 20 inches from fall to spring. Permeability is moderate in the surface layers and subsoil and moderately rapid in the substratum. Surface runoff is medium to rapid and the available water capacity is moderate.
TsA	TISBURY SILT LOAM, 0 TO 3 PERCENT SLOPES This nearly level, moderately well drained soil formed in silty deposits over sandy and gravelly water-sorted materials. It is in depressions of outwash plains and terraces. Bedrock is commonly more than 60 inches below the surface. This soil has a seasonal high water table at a depth of 18 to 30 inches during the fall through spring. Permeability is moderate in the surface layer and subsoil, and rapid or very rapid in the substratum. Surface runoff is slow and the available water capacity is moderate.
Tg	Terrace Escarpments - See Description for HkC.

* Hydric Soils

Inland Wetland Review

Note: In the field review discussion with the applicant it was made known that several of the driveway crossings had been eliminated from the plans (plans dated 4/22/92, prepared by Gardener & Peterson Associates). Comments in this section related to wetland crossings, therefore, will be limited to the Clover Springs Road crossings. Lot numbers are from the Map Plan dated 1/21/93.

General Site Description

The property is located between Battye Road and Burt Latham Road, north of the Mansfield town line in Willington. Route 32 is to the west of the property. The topography of the site varies from nearly level to steeply sloping. Water from the property drains south into Willington Brook which then enters the Willimantic River. The prominent wetland corridor is located along the western boundary of the subdivision, then extends southeasterly into the interior portion of the site. Several narrow wetland corridors extend from the east into the property from the adjacent Deer Run Estates. A pocket of wetlands extends into Lot 14. The wetlands are primarily forested, however, there are small pockets of standing water and marsh vegetation. The wetland area adjacent to Battye Road contains more scrub/shrub vegetation. The Tolland County Soil Survey recognizes two wetland soil types on the property. The first is Leicester-Ridgebury-Whitman very stony complex (Lg). This mapping unit consists of poorly drained Leicester and Ridgebury and very poorly drained Whitman soils. These soils are nearly level or very gently sloping. Because of the stoniness and wetness, they have been used mainly for forestry, wildlife habitat and unimproved pasture. The second wetland soil type is Peat and Muck (Pk). Peat and Muck consists of organic deposits which are derived from decaying vegetation. In Tolland County, the depth of these deposits ranges from about 18 inches to 25 feet.

Wetland and Watercourse Functions

Wetlands serve to collect and store overland runoff prior to the water's entrance into the numerous permanent and intermittent waterways. By the nature of the soils, vegetation and topography, wetlands have the potential to store significant volumes of water by permitting floodwaters to spread out. The gradual release of water over time reduces peak flows. Vegetation and meandering streams physically slow the passage of flood waters. This storage function becomes increasingly important upon the removal of vegetation and construction of impervious and grassed surfaces which increases the rate of runoff.

In addition to their water storage capabilities, wetlands also provide pollution abatement functions. Sediments and other pollutants entering wetlands through runoff are filtered by the vegetation and allowed to settle out prior to entrance into major streams. With the addition of chemical fertilizers, pesticides and herbicides for the maintenance of manicured lawns, this pollution abatement function becomes very important.

Freshwater wetlands constitute the principle habitat for waterfowl such as ducks, geese and swans, and for fur bearing animals such as mink, muskrat, otter and beaver and for fish. Other game species including deer, rabbits, grouse, quail, pheasant and turkeys also use wetlands as do marsh birds and songbirds. The basic needs of water, food and cover are supplied to wildlife. The wetlands exist in association with numerous watercourse corridors resulting in narrow bands of wetlands traversing the property. These narrow expanses of wetlands provide travel corridors for the passage of wildlife. They also serve as a connection to neighboring wetland systems.

Clover Springs Road

Starting at Battye Road, the first wetland crossing for the proposed Clover Springs Road is located just southwest of the existing woods road crossing, between stations 5+00 and 6+00 and will involve filling for the roadway embankment. The crossing is proposed at the narrowest portion of the wetlands. This crossing should not significantly impact the functions of the larger wetland system downstream, however, it will isolate the wetland area directly to the northeast.

The second crossing occurs at a narrow wetland corridor, between stations 19+00 and 20+00. Again, filling will be required for the roadway embankment and the potential for erosion and sedimentation into the wetlands and watercourse is great. Erosion control measures must be installed properly and prior to any earth moving and filling activities.

The third and largest crossing for Clover Springs Road occurs between stations 28+00 and 31+00 and involves a significant amount of filling and drainage work within wetlands. This crossing will have the result of fragmenting an area of wetlands on the east side of Clover Springs Road, isolating it from the rest of the wetland system. Additional impacts associated with this crossing include the utilization of the wetland area on the east side of the road for stormwater detention. It was discussed that an undersized culvert would be installed to allow water to back up into the wetland and be detained for certain storm events. The impacts to the existing wetland vegetation cannot be determined without knowing the degree of flooding the wetland may experience and the duration of the flooding.

Stormwater Management

It was discussed at the ERT field review meeting that on-site detention was being evaluated at two locations. The first, as mentioned above, is on the east side of the third Clover Springs Farm Road wetland crossing. The second location is on Lot 14. A berm would be constructed across the narrow section of the wetlands, backing water up behind it. In any case when the utilization of wetlands to manage stormwater runoff is contemplated the following strategies should be implemented:

1) The excavation of wetlands or disturbance of vegetative cover to provide detention or storage should be avoided or minimized.

2) The discharge of stormwaters to wetlands shall be accomplished in a fashion which utilizes best available techniques to minimize erosion, siltation, water quality degradation and disruption of natural habitats.

3) The period of inundation of a wetland shall be analyzed for its potential impact upon the wetland flora and fauna and the ability of the wetland to support desirable biological life. This is particularly important if a retention basin is contemplated.

4) Alternatives which provide commensurate stormwater management value without impacting directly upon wetlands or which can be accomplished while increasing the wetland resource base should be given serious consideration.

Utilizing wetlands for stormwater detention is generally discouraged. Wetlands, in their unaltered state, provide natural detention and, if overtaxed, may lose some of their other beneficial functions. Alternative upland locations for on-site detention should be considered before utilizing wetlands for this purpose.

There are several locations where roadway runoff is to be directly discharged into wetlands. While riprap splash pads serve to dissipate the energy resulting from increase flow velocities and provide protection against erosion, they do provide an adequate pollution filter for discharges entering a wetland or watercourse. The larger particulate matter such as sand or gravel may settle out in the splash

pad, however oils and greases and smaller particles may flow into the watercourses and degrade water quality.

General Comments

In addition to direct impacts to wetlands, secondary impacts associated with residential development are of concern. First, the magnitude of cuts and fills required to construct the roadway and several of the driveways greatly increases the potential for erosion and sedimentation into the wetlands. Special attention should be concentrated on the correct installation and maintenance of the erosion control plan. Adhering to the construction phasing schedule will also minimize erosion.

While the number of lots in this subdivision has already been reduced, it appears that alternatives exist that would reduce the amount of direct and indirect impacts to wetlands. One alternative that should be investigated (and was discussed at the ERT field review meeting) is constructing two cul-de-sacs on either side of the large wetland crossing. Even though planning and zoning may prefer a through road for emergency vehicle passage, cul-de-sacs are allowed, with a maximum number of fifteen lots. This alternative would almost certainly dictate that the current number of lots in the subdivision be reduced. However, the wetland agency is bound by State statute to find that no feasible and prudent alternatives exist prior to issuing a wetlands permit.

In summary, this property appears to be suitable for subdivision development, provided that the design is sensitive to the wetland resources and steep grades. The importance of correct installation of erosion and sediment control devices, and regular maintenance, cannot be stressed enough. Additionally, the DEP Dam Safety Unit should be contacted (566-7245) relative to the proposed berm construction for a permit determination. A Section 401 Water Quality Certificate may also be required by the DEP Inland Wetlands Resources Division (566-7280).

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 no known extant populations of Federal or State Endangered, Threatened or Special Concern Species occurring at the site in question.

Natural Diversity Data Base information includes all information regarding critical biologic 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. 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. Such new information is incorporated into the Data Base as it becomes available.

Forestry and Vegetation

Environmental Considerations

The techniques outlined in this review can reduce erosion problems, help control storm water, save valuable vegetation and utilize certain timber resources. Woodlands provide a protective influence on soil stability and water quality. The forest also provides habitat for a variety of wildlife from amphibians and reptiles to small mammals, a variety of birds, predators and larger mammals. They depend on woodland for food, water, shelter and breeding habitat. Trees also have a positive influence on air quality as they convert carbon dioxide to oxygen and act as terrestrial sinks (collectors) to reduce airborne particulate and gaseous pollutants. Forests also provide a cool ecosystem from shade that is absent in open areas.

Vegetative Types

TYPE 1: HARDWOOD SWAMP, approximately 15 acres. Characterized by poletimber sized (5" - 11" d.b.h. [diameter at breast height]) red maple, yellow birch, white ash, with blueberry, ironwood, spice bush, witch hazel, winter berry, silky dogwood and speckled alder.

TYPE 2: OLD FIELD, 8 acres of grasses, autumn olive, multi-flora rose, grey dogwood, planted white spruce, scattered white pine (sapling size) with golden rod, hazel nut, barberry, apple, honeysuckle, grape, black locust seedlings, and steeple bush.

TYPE 3: OAK-HICKORY, 39 acres, generally located on upper slopes on the southern half of the property. This is a poletimber sawtimber (11" + d.b.h.) sized stand of trees composed of black oak, pignut hickory, white oak, red oak, with red maple, white pine, hemlock as associated species. The understory is generally open with some low shrub growth such as blueberry and viburnum.

TYPE 4: SOFTWOOD-HARDWOOD. 51 acres generally located on lower, moister slopes and in the northeast corner of the property. This poletimber-sawtimber stand features a combination of white pine, hemlock, white oak, shagbark hickory, black oak, red and sugar maple, scarlet oak, and white ash.

TYPE 5: SOFTWOOD, 2 acres of natural white pine, predominantly sawtimber.

Discussion

Trees grown in a crowded forest environment rely on each other for stability and side support. Openings from roads and houselots which allow wind to pass through them will result in broken off or up rooted trees. Also contributing to wind throw is construction equipment which cuts root systems and thereby reduces the tree's own capacity to support itself. Machinery should not get closer than 25 feet from the base of the trees along road or houselot edges. Due to the size of the houses proposed in this subdivision trees left on road edge or house sites should be no closer than the height of the tree from the edge of the house or the edge of the roads. This will require cleared lots of at least one-half acre in size.

When highly absorptive forest soils are disturbed (grades on hills cut and filled to create roads, driveways, lawns and houselots) the overland flow of water increases because the sponge-like effect of the litter and humus layer is lost. The resulting soil compaction prevents rain from soaking into the soil surface as it falls. This causes water to collect and run over the lawns and roads. The run off has the potential to build erosive power in short distances, tear soil loose and result in sedimentation and siltation. The greatest impact on water quality from loss of absorptive forest soils is during, or just after, construction. The increased erosion can cause sediment accumulation in streams, ponds or reservoirs, destruction of aquatic wildlife habitat by siltation and reduction of water quality from turbidity. Forested areas contribute little sediment to streamflow. Converting a forest environment to an urban one could

affect water relations drastically. Peak flows may increase as well as sedimentation. One set of estimates has shown run off increasing by 15, 29, and 41 percent by paving 25, 50, and 75 percent of a forested watershed. This is because urbanization reduces interception of rain, infiltration, soil moisture storage, and evapotranspiration, and increased overland flow and run off. Forestland is also beneficial in protecting water quality by minimizing eutrophying nutrients, such as phosphorus, and soil-borne contaminants. Phosphorous is generally the limiting nutrient for aquatic ecosystems and usually tightly held by forest ecosystems. However, on-site sewage disposal generates large quantities of phosphorous, which can enter aquatic systems and accelerate eutrophication. Phosphorous export from forested land is estimated to be one-seventeenth that of urban land. In the Clover Springs Farm subdivision stream water quality may be adversely affected by erosion, sedimentation, and/or nutrient inputs from houselot clearing and main road construction during and after development. Exposed soils on the steep slopes created by road construction should be minimized during and after construction.

When making road and grade cuts, remove trees back from the cut for a distance of two feet for each foot of depth of cut, e.g. 20 feet back for a 10 foot cut. This will be very important in vegetative type **Stand(s) 3** and **4** where slopes exceed 7%.

Due to the high value of trees today proper forest management is essential before, during and after construction. A forester views a proposed subdivision as a group of plant communities. Each of these communities (commonly called a "stand") have developed to accommodate the existing environmental restrictions of light, soil, moisture and nutrients. Each plant community will react differently to changes caused by construction. A professional forester is essential in evaluating tree health and vigor, insect and disease problems, species longevity, potential mortality, management of open space for recreational opportunities and wildlife habitat. Management recommendations are not only based on present tree condition, but also on expected future conditions of the trees in 10, 20 or 30 years. A pre-development thinning in **Stand(s) 3** and **4** and along the main road right of way could serve to strengthen trees in these areas against breakage and windthrow while raising revenue for future plantings along roads, on houselots and other woodland improvements, i.e. hiking trails. A forester should be involved in the overall development plan to advise on individual tree retention, tree island retention, erosion and sedimentation control and site limitations which can create future hazards.

Conclusion

Trees have value in reducing climatic extremes, controlling runoff, filtering out polluting particles from air and water, reducing noise, providing aesthetic enjoyment, creating wildlife habitat, recharging aquifers, supplying wood fiber and functioning as a carbon sink. Healthy vegetation provides the long term amenities. Therefore a good relationship between urban growth and forest lands must exist. Trees around houses can be healthy, long lived and valuable if treated properly in the conversion from forested habitat to subdivision. What is lost due to development is the wildlife carrying capacity of the forest and its ability to produce wood fiber for generations in the next century and beyond.

Vegetation Type Map

Scale 1" = 1000'

Town Roads

Approximate Site Boundary

Old Woods Road

Intermittent Stream

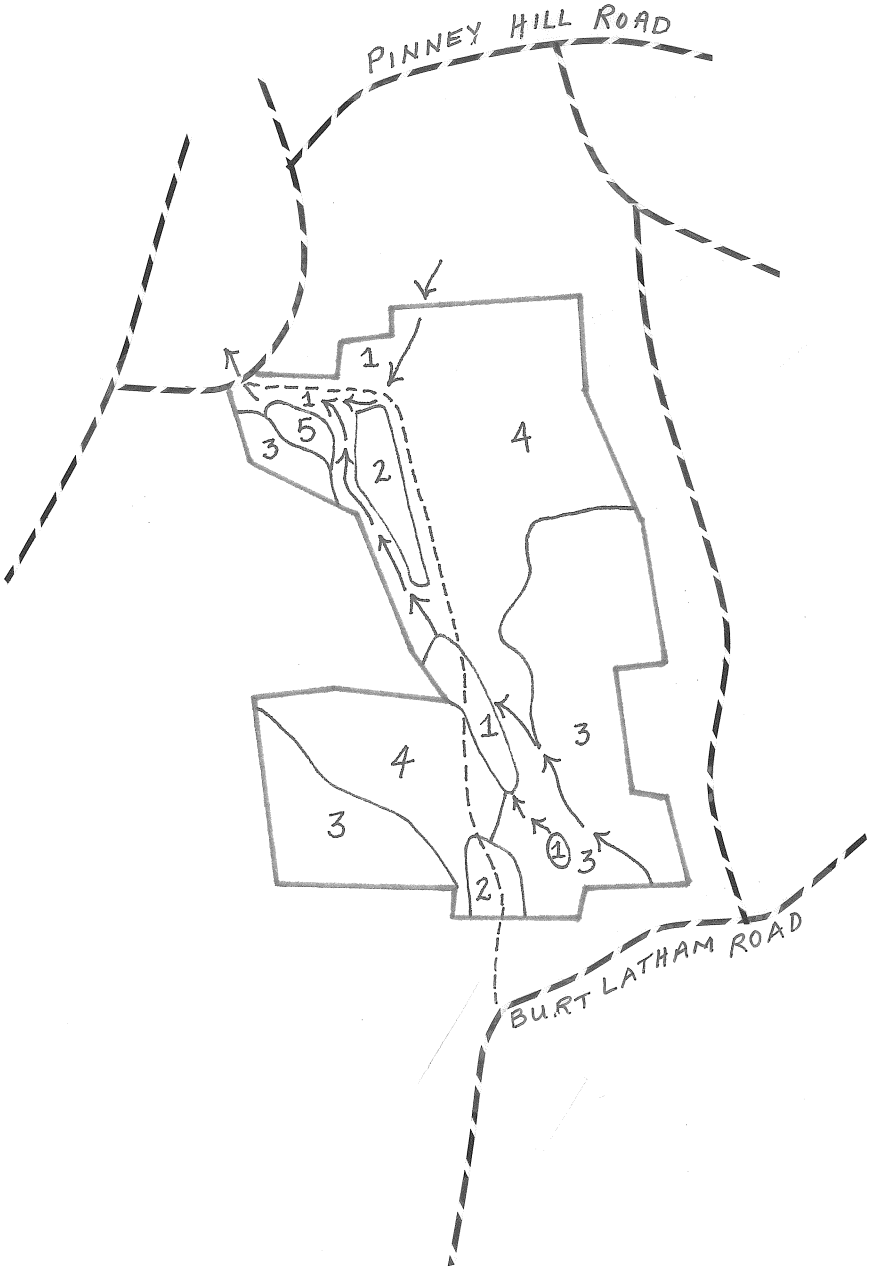
1 - Hardwood Swamp

2 - Old Field

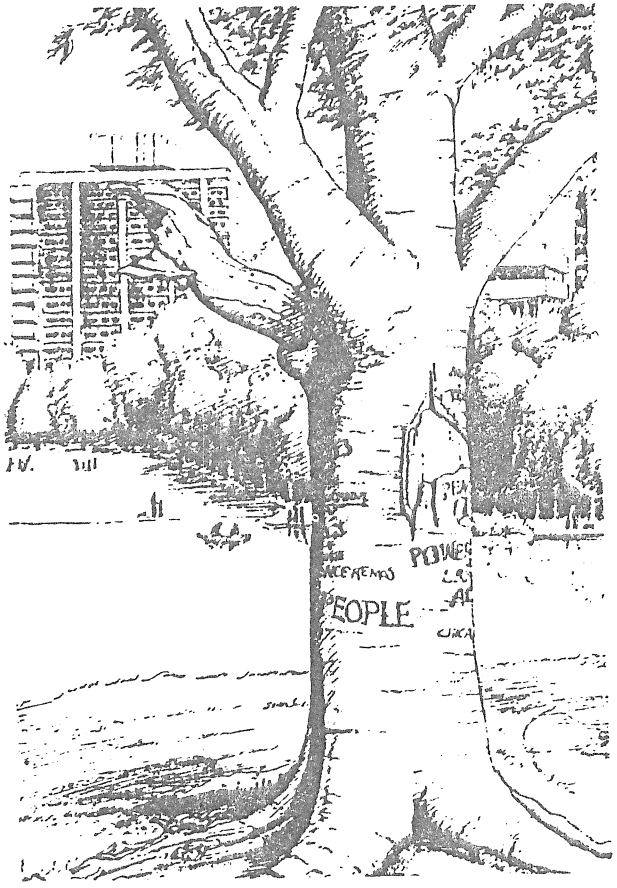
3 - Oak Hickey

4 - Softwood/Hardwood

5 - Softwood



WHAT'S WRONG WITH THIS PICTURE?



Yankee Forest
COOPERATIVE PROJECT
P.O. Box 760 Chepachet, RI 02814

A Cooperative Natural Resource Management Agreement

1-800-367-3802
MASSACHUSETTS: USFS (603) 868-5935

Ernest W. DeRosa
Assistant Chief
Bureau of Shade Tree Mgt.& Pest Control
Mass. Department of Environmental Management
Division of Forests & Parks
100 Cambridge Street, 19th Floor
Boston, MA 02202
Tel: (617) 727-8893

RHODE ISLAND:

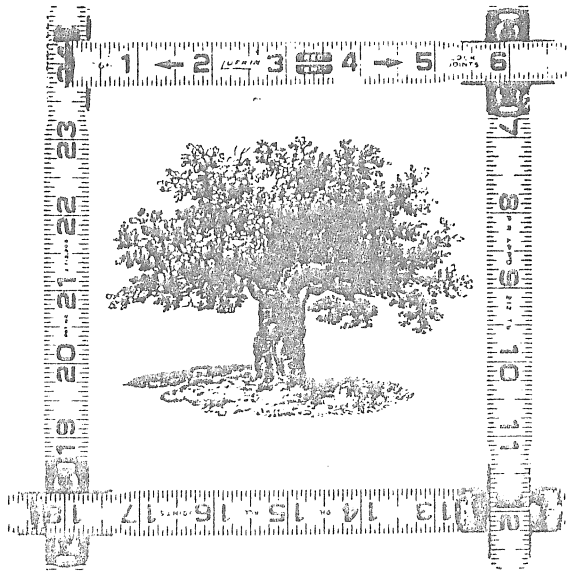
Bruce P. Payton
CFM Supervisor
Department of Environmental Management
Division of Forests & Parks
1037 Hartford Pike
North Scituate, RI 02857
Tel: (401) 647-3367

CONNECTICUT:

Fred Borman III
Urban Forester
Department of Environmental Protection
Bureau of Forests & Parks
165 Capitol Ave., Rm. 260
Hartford, CT 06106
Tel: (203) 566-5348

USDA Forest Service,
Northeastern Area
State & Private Forestry

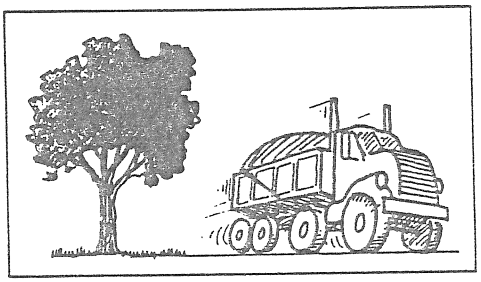
PROTECTING SHADE TREES DURING HOME CONSTRUCTION



PROTECTING SHADE TREES DURING HOME CONSTRUCTION

Should trees be removed from residential property before home construction or should they be saved?

Shade trees can add thousands of dollars to the value of residential property -- yet developers and home building contractors often remove them before starting construction. It's a known fact that saving trees can increase a developer's profit margin. Site preparation, landscaping and maintenance costs can be lower, and by saving existing trees one will increase the value -- and selling price -- of the property. Sound environmental planning is good for a developer's public image as well.



Many trees can be saved with little effort or expense; many are valuable enough to justify considerable effort and expense in protecting them. Besides, saving trees can mean savings on . . .

- **Tree removal costs:** escalating costs of fuel, labor and machinery make site preparation economy a necessity; leaving solid areas of native vegetation, with only minimal clearing, is especially economical.
- **Landscaping costs:** leaving trees can reduce expensive grading, planting, and follow up watering and maintenance.
- **Maintenance of unsold areas:** remember, landscaping and lawns require constant care.
- **Installation costs of drainage systems:** utilizing natural drainage patterns, leaving natural vegetation in place along streams, ponds and swampy areas can eliminate expensive site work to handle runoff and retention requirements. Where allowable and feasible, sheet drainage -- using wide right-of-way in a natural state to absorb runoff from streets, etc. -- is cheaper, more attractive, and requires less maintenance than curb and gutter installation.

Saving established, healthy, well developed trees on construction sites will also increase consumer demand for the property, lower energy consumption for heating and cooling costs, create quieter and more private living conditions, and improve the environmental quality of the area following construction.

IS THE TREE WORTH SAVING?

Some trees may be worth less than realized by the average homeowner and may not warrant the time, effort, and expense of attempting to protect them. One must evaluate each tree carefully by considering its location, type of tree or species, age, and condition. One must also consider what type of protection will be necessary to save the tree, how much work it will involve and how much it will cost.

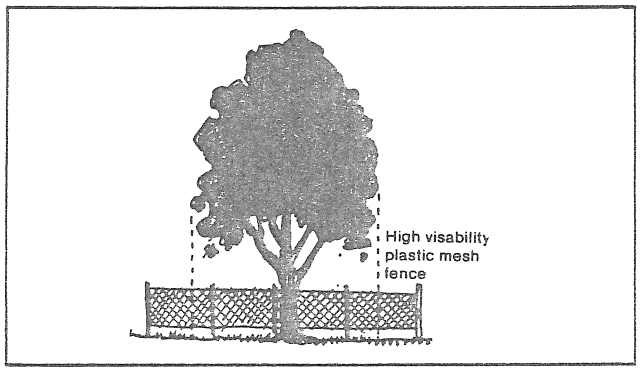
Whatever the size and scope of the development, to make the most of what you have it pays to bring in a professional, qualified arborist, urban forester, environmental planner, or landscape architect who knows and understands trees. This professional should be able to determine:

- which trees are desirable, healthy, which need pruning or removal.
- which will survive anticipated changes in grade, drainage, etc. and how to accomplish these changes.
- which trees should be removed from near buildings, weak root systems make trees prone to wind throw, invasive roots cause problems with sewer lines, shallow roots may upheave driveways, sidewalks, etc.
- which trees are relatively pest and disease resistant, and those that cause major problems in this respect.
- which areas of the site, from the standpoint of economy, ecology and beauty, would best be left natural or minimally cleared.
- how to protect single trees, groups of trees, or natural areas of vegetation before, during and after construction.
- where and what trees should be planted, or transplanted, and how to do it.
- whether you can market trees that must be removed for timber, firewood, etc.

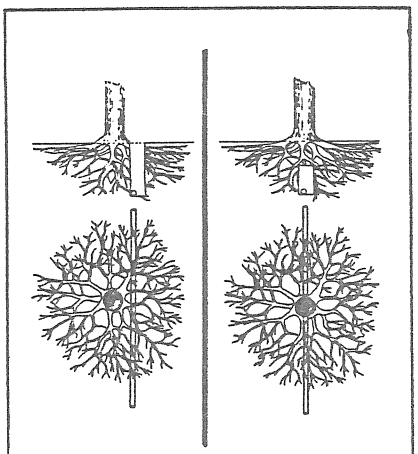
WHY IS PROTECTION NECESSARY?

Once the decision has been made to save certain trees on the construction site they must be protected from one or more of the following:

* **Construction equipment and machinery:** impact injuries from heavy equipment like trucks, bulldozers, etc; cutting of roots, soil compaction over roots, wounds to trunk, roots, and low-hanging branches.
  - all are hazards that can be avoided. Areas of vegetation, single trees, or groups of trees should be fenced with **barricades.** These should be:
  - large enough to include everything inside the spread of the branches or dripline of the tree.
  - constructed of sturdy scrap wood (4 X 4 or 2 X 4 stock is ideal).

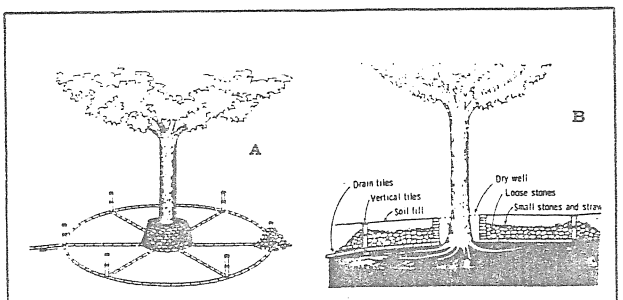


* **Chemical poisoning:** run off from washing down equipment, petroleum products, lime and mortar, misuse (including overuse) of fertilizers, insecticides, herbicides or soil sterilands; residue of chemicals like calcium chloride used to keep down dust on dirt roads -- all can harm or kill trees. Such dangers can be avoided by keeping the area within the dripline of trees free of building materials and run off; by seeing that chemicals are used only by trained personnel and strictly according to directions, and by having closely controlled disposal of excess chemical materials. Preferably off the site.
* **Excavations:** trenching for utility lines, etc., can remove vital tree roots, change drainage patterns. Where possible, trenches should be routed away from trees and outside the dripline. If this is impossible, the next best approach is tunneling under roots, using a power driven soil auger. Tunneling should be offset to one side of the truck to protect major roots. Excavations should be filled immediately, leaving no air pockets.

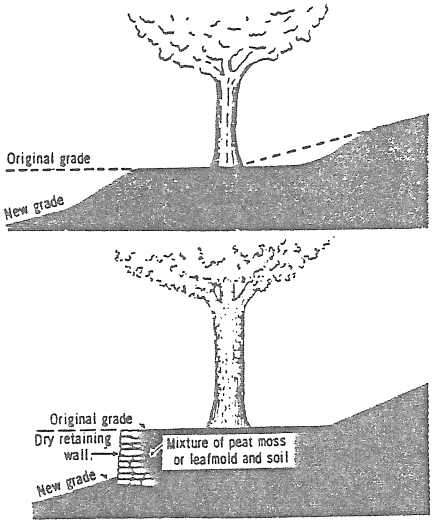


Tunnel beneath root systems. Drawings at left show trenching that would probably kill the tree. Drawings at right show how tunneling under the tree will preserve many of the important, feeder roots.

* **Grade Changes:** there are two types of grade changes that can be detrimental to tree health. One is raising the grade; the other is lowering it. Tree roots need air, water, and minerals to survive. When the grade level is changed by removing soil from the top of roots or by adding soil or filling over the top of roots, the tree has difficulty obtaining its normal amount of air, water, or minerals. Cutting away or smothering of tree roots affects their water and oxygen supply, often with fatal results. A light fill up to 4 inches of porous gravelly material or good topsoil high in organic matter and loamy in texture usually does little harm to healthy trees.

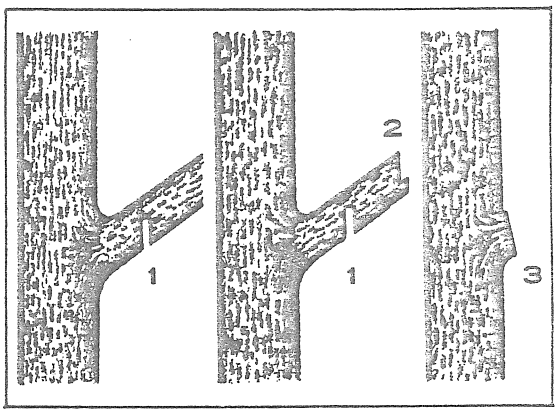


A tile system protects a tree from a raised grade. A, The tile is laid out on the original grade, leading from a dry well around the tree trunk. B, The tile system is covered with small stones to allow air to circulate over the root area.



A retaining wall protects a tree from a lowered grade.

Proper tree maintenance including watering, soil aeration, pruning or thinning of the crown to compensate for root injury, wound treatment and fertilization will help trees survive grade changes.



To prevent splitting wood and stripping bark on large limbs, make the first cut part way through from below (1.) Cut off the limb from above (2.) Remove stub with a smooth cut (3.)

More severe grade changes will require you to supply air to the roots of the tree. This is usually done by installing drainage tiles and constructing a drywell under the spread of the tree before gravel and porous fill is added. The tiles are laid on the original grade; they form a wagon wheel shape with the spokes of the wheel opening into a dry well built around the tree trunk. The dry well acts as the hub of the tile system and holds fill away from the tree trunk.

It may also be necessary to place a series of bell tiles vertically over the roots and connected to the wagon wheel system to allow for additional air and water circulation.

For shallow fills, the fill material may be gently sloped down to the level of tree roots, leaving the tree in a depression larger than the spread of its crown.

Deep grade lowering around a tree or group of trees means building a retaining wall at a sufficient distance from the trunk to save most of the roots -- out at the dripline should be adequate.

For shallow grade lowering, the soil may be sloped gently away from the tree roots down to the level desired, leaving the tree on a sort of island a bit larger than the dripline.

* **Transplanting existing plant materials:** with modern tree moving equipment, it may be possible to move especially desirable native trees and shrubs from construction sites to other locations in the landscape. when selecting native trees for transplanting, choose those that are healthy, young, vigorous specimens of species that move successfully. It is important to get professional advice on all aspects of tree protection during construction!

* **Adding new trees to the construction site:** after all site changes have been completed the final stage of the construction plan may be to add new trees and shrubs to the landscape. Proper plant selection for particular sites is of utmost importance. Select plant materials that will be assets as they mature instead of liabilities. Carefully consider the growing conditions, diversity of plant materials in the area, insect and disease resistance of plant materials and maintenance requirements. Be sure new trees and shrubs are properly planted and watered when necessary.

Wildlife Resources

General Habitat Description

This report will address some potential wildlife impacts and recommendations for lessening the developmental impacts and enhancing wildlife habitat on the 114.68 acre subdivision.

There are five major vegetative types (see Forestry and Vegetation section) on the property that provide habitat for a diverse number of 'wildlife species. This report will focus on the importance of the wetland-related habitats.

Wildlife Sign Observed

During a field investigation the author noted the presence of white-tailed deer, coyote, and wild turkey. Snow-tracking revealed that the deer were feeding on the hemlock; wild turkey were feeding on winterberry (Ilex verticillata) berries and stopping at numerous wetland seeps picking at the exposed green vegetation; one set of coyote tracks traversed the site, but no evidence of hunting down prey was observed.

Wetland Habitats and Associated Wildlife

Wetlands support a high diversity of wildlife due to the complexity of the vegetative structure, high productivity and abundant food supply which allows for a high carrying capacity (Brown et al. 1978). There are many species of wildlife that require access to streams or water body margins for survival even though they spend much of their time in other habitats (Milligan and Raedeke 1986). Part of the food supply for many vertebrates is the high abundance and diversity of insect populations that are typical of wetland ecosystems (Brown et al 1978).

Vegetation removal in wetlands may have severe impacts on wildlife especially reptiles and amphibians. One or several of the cover, food, breeding habitat are eliminated and more adaptable species are reduced in numbers (Campbell 1973).

On this particular property, there are wetland seeps, intermittent streams, and other riparian zones that may need additional attention and more careful delineation to avoid destruction or degradation from the development activities. House lots and their associated driveways should be laid out in a fashion to avoid wetlands and their buffer areas as much as possible.

Possible Impacts and Recommendations for Reducing Impacts of the Proposed Development

IMPACT 1

Potential impact on wetland habitat and water quality due to construction activities or adverse land use practices. Orser and Shure (1972) documented negative impacts of urbanization (i.e. presence of houses or paved roads in close proximity to wetlands) on salamander populations. Existing amphibian populations are not known and the winter season does not allow a census to occur, however the wetlands are prime habitat for reptiles and amphibians. Impact to wetlands and their associated buffer zones should be minimized as much as possible.

RECOMMENDATION 1

A - Utilize the best available techniques and materials for preventing erosion and silt transport.

B - Field inspect and more carefully delineate wetland seeps and intermittent stream pockets.

C - Lots numbered 5, 7, 14, 18, 22, 26 (from Map Plan dated 1/21/93) should be reconfigured to lessen the impact to wetland and buffer zone habitats.

Several examples are:

Lot 14 is configured in a fashion that does not allow a driveway access without going through wetlands or the buffer zone.

Lot 5, although a large lot, has all wetland frontage to the road which makes access impossible without going through the wetlands.

Lot 26 cannot be accessed by driveway without wetland buffer impact.

IMPACT 2

Where are the engineered septic systems going to placed? Is there enough non-wetland area to accommodate them? Potential degradation of the wetlands may occur if houselots do not have enough suitable upland soils to accommodate the engineered septic systems.

RECOMMENDATION 2

Do a feasibility analysis for septic systems for each proposed house lot to minimize impact to wetlands. Maintaining the ecological integrity of the wetlands is paramount to the long term existence of wildlife especially reptiles and amphibians.

Discussion and Summary

This report has focused on the potential impacts on wildlife (specifically wetland associated) from the proposed development and made recommendations for lessening those impacts.

Houselots should include enough land outside the wetlands and buffer habitat to allow driveway access, house, and septic system placement so as to minimize degradation of the wetland resources which ultimately impact the wildlife. In general, the lot configurations should be modified to lessen the impact to wetlands and buffer zone.

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FISH RESOURCES

This section of the report will address impacts to aquatic resources on the property and delineate measures necessary to effectively mitigate impacts.

Fish Population

The specific freshwater fish assemblage of South Willington Brook, a coldwater tributary of the Willimantic River is unknown. The headwaters of this watercourse are formed within the 115 acre parcel. Stream flows are intermittent and instream habitat is predominantly shallow riffles with small gravels. Transitional fish habitat, or areas of the stream which are of seasonal importance, can be found adjacent to proposed building lots 15 through 17 (Lot numbers from Map Plan dated 1/21/93). This stretch of stream contains viable fish habitat in the form of pools and undercut streambanks.

South Willington Brook near its confluence with the Willimantic River may serve as a thermal refuge during the summer when coldwater fish such as trout temporarily move into the stream when mainstem ambient conditions reach stressful levels.

The Willimantic River is a highly prized and productive trout stream. The Willimantic River is annually stocked by the Department of Environmental Protection, Fisheries Division with over 8,000 rainbow, brook, and brown trout in the towns of Tolland, Willington, Coventry, and Mansfield. The river also supports a native (wild) brown trout fishery and a designated Trout Management Area in which all angled fish are released unharmed.

Impacts

The following impacts of the proposed subdivision on aquatic ecosystems can be expected if proper mitigation measures are not implemented:

1) Construction site soil erosion and sedimentation of streams through increased runoff from unvegetated areas. During housing/road construction, topsoil will be exposed and susceptible to runoff events, especially if erosion and sediment controls are not properly installed and maintained. Extensive cut and fill activities on steep slopes will increase the risk of sediment runoff. Specifically, the following impacts to fisheries could be expected if erosion and sedimentation occurs:

(a) Sediment reduces the survival of resident fish eggs and hinders the emergence of newly hatched fry. Adequate water flow, free of excess sediment particles is required for fish egg respiration and successful hatching.

(b) Sediment reduces the survival of aquatic macroinvertebrates. Since aquatic insects are important food items in fish diets, reduced insect populations levels in turn will adversely affect fish growth and survival. Fish require an excessive output of energy to locate preferred prey when aquatic insect levels decrease.

(c) Sediment reduces the amount of usable habitat required for spawning purposes. Excessive fines can clog and even cement gravels and other desirable substrate together. Resident fish may be forced to disperse to other areas not impacted by siltation.

(d) Sediment reduces stream pool depth. Pools are invaluable stream components since they provide necessary cover, shelter, and resting areas for resident fish. A reduction of usable fish habitat can effectively limit fish population levels.

(e) Turbid waters impair gill functions of fish and normal feeding activities of fish. High concentrations of sediment can cause mortality in adult fish by clogging the opercular cavity and gill filaments.

(f) Sediment encourages the growth of filamentous algae and nuisance proportions of aquatic

macrophytes. Eroded soils contain plant nutrients such as phosphorous and nitrogen. Once introduced into aquatic habitats, these nutrients function as fertilizers resulting in accelerated plant growth.

(g) Sediment contributes to the depletion of dissolved oxygen. Organic matter associated with soil particles is readily decomposed by microorganisms thereby effectively reducing oxygen levels.

2) Road construction. Culvert placement in concert with placement of fill for road construction may result in stream sedimentation problems if proper erosion and sedimentation controls are not followed. Impacts due to stream sedimentation were previously discussed.

3) Percolation of septic effluent into watercourses. A failure of individual septic systems to operate properly would be potentially dangerous to South Willington Brook and associated riparian wetlands. Nutrients and assorted chemicals that may be placed in septic systems could possibly enter wetlands or stream waters in the event of a septic system failure or infiltrate the groundwater during the spring when water tables are close to the surface. Failure of septic systems could inflict long-term damage to local aquatic environments since the introduction of septic effluent could result in a major threat to fish habitat, public health, and overall water quality conditions.

4) Transport of lawn fertilizers and chemicals. Runoff and leaching of nutrients from fertilizers on lawns will stimulate filamentous algae growth in streams and degrade water quality. Introduction of lawn herbicides can result in "fish kills" and overall water quality degradation. Rooted or floating aquatic vegetation may proliferate in slower moving stream reaches.

5) Impacts to downstream environments. Any water quality problems and habitat degradation that occurs within South Willington Brook will eventually affect the Willimantic River.

The protection of the Willimantic River trout fisheries is contingent upon the maintenance of existing water quality standards and instream habitat conditions.

Recommendations

The following recommendations are provided to assist with the mitigation of the previously outlined impacts.

1) It is highly recommended that a riparian buffer be maintained along South Willington Brook. See enclosed DEP Fisheries Division policy on riparian corridor protection for specifics (See Appendix B).

2) Develop an aggressive and effective erosion and sediment control plan. Proper installation and maintenance of erosion/sediment controls is critical to environmental well being. This includes such mitigative measures as filter fabric barrier fences, staked hay bales, and sediment catch basins. Land disturbance and clearing should be kept to a minimum and all disturbed areas should be restabilized as soon as possible. Exposed, unvegetated areas should be protected from storm events. Proper installation and maintenance of controls is particularly important on the project site since all surface water drains immediately downslope to South Willington Brook and the Willimantic River.

3) The road crossing over South Willington Brook should take place during low flow periods. This will help minimize the impact to the aquatic resources. Reduced streamflows and rainfall during the summer and early fall provide the least hazardous conditions in which to work near sensitive aquatic environments.

4) Limit liming, fertilization, and the introduction of chemicals to subdivision lawns. This will help abate the amount of additional nutrients to aquatic resources. Non-phosphorus lawn fertilizers are currently available from various lawn care distribution centers.

5) Properly design and locate individual septic systems. It is crucial that all septic systems be placed in areas that will effectively renovate septic effluent. All septic systems should be maintained on a regular basis. It is also important to prevent the disposal of harmful chemicals into septic systems which may

negatively affect operation and possibly result in system failure.

6) Local land planning commissions should maximize their authority when extracting open space from subdivisions. Open space efforts should be made to secure environmentally sensitive areas. Appropriate locations for open space acquired for the purpose of environmental protection should include areas adjacent to streams, wetlands, and steep slopes adjacent to these resources.

DEPARTMENT OF ENVIRONMENTAL PROTECTION
INLAND FISHERIES DIVISION

POLICY STATEMENT
RIPARIAN CORRIDOR PROTECTION

I. INTRODUCTION, GOALS, AND OBJECTIVE

Alteration and exploitation of riparian corridors in Connecticut is a common event that significantly degrades stream water quality and quantity. Inasmuch as riparian ecosystems play a critical role in maintaining aquatic resource productivity and diversity, the Inland Fisheries Division (Division) recognizes that rigorous efforts are required to preserve, protect, and restore these valuable resources. Consequently, a riparian corridor protection policy has been developed to achieve the following goals and objective:

Goals

Maintain Biologically Diverse Stream and Riparian Ecosystems, and

Maintain and Improve Stream Water Quality and Water Quantity.

Objective

Establish Uniform Riparian Corridor Buffer Zone Guidelines.

II. DEFINITIONS

For the purpose of implementing a statewide riparian corridor protection policy, the following definitions are established:

Riparian Corridor: A land area contiguous with and parallel to an intermittent or perennial stream.

Buffer Zone: An undisturbed, naturally vegetated area adjacent to or contained within a riparian corridor that serves to attenuate the effects of development.

Perennial Stream: A stream that maintains a constant perceptible flow of water within its channel throughout the year.

Intermittent Stream: A stream that flows only in direct response to precipitation or which is seasonally dry.

III. RIPARIAN FUNCTION

Naturally vegetated riparian ecosystems perform a variety of unique functions essential to a healthy instream aquatic environment. The delineation and importance of riparian functions are herein described. Vegetated riparian ecosystems:

* Naturally filter sediments, nutrients, fertilizers, and other nonpoint source pollutants from overland runoff.

* Maintain stream water temperatures suitable for spawning, egg and fry incubation, and rearing of resident finfish.

* Stabilize stream banks and stream channels thereby reducing instream erosion and aquatic habitat degradation.

* Supply large woody debris to streams providing critical instream habitat features for aquatic organisms.

* Provide a substantial food source for aquatic insects which represent a significant proportion of food for resident finfish.

* Serve as a reservoir, storing surplus runoff for gradual release into streams during summer and early fall base flow periods.

IV. RIPARIAN CORRIDOR BUFFER ZONE GUIDELINES

Recognizing the critical roles of riparian corridors, the Division provides buffer zone guidelines that are designed to bring uniformity and consistency to environmental review. The guidelines are simple, effective, and easy to administer. The following standard setting procedure should be used to calculate buffer zone widths.

Perennial Stream: A buffer zone 100 feet in width should be maintained along each side.

Intermittent Stream: A buffer zone 50 feet in width should be maintained along each side.

Buffer zone boundaries should be measured from either, (1) edge of riparian inland wetland as determined by Connecticut inland wetland soil delineation methods or (2) in the absence of a riparian wetland, the edge of the stream bank based on bank–full flow conditions.

The riparian corridor buffer zone should be retained in a naturally vegetated and undisturbed condition. All activities that pose a significant pollution threat to the stream ecosystem should be prohibited.

Where the Division policy is not in consonance with local regulations and policies regarding riparian corridor buffer zone widths and allowable development uses within these areas, local authorities should be encouraged to adopt the more restrictive regulations and policies.

12/13/91
Date

James C. Moulton
Acting Director

Planning Concerns

Consistency With State, Regional and Local Plans

State Plan

The Conservation and Development Policies Plan for Connecticut 1992 - 1997 seems to include this property in the "Rural Land" category, according to the 1:200,000 scale map accompanying the plan. The plan summarizes the recommendations for rural land as follows:

Rural Lands

State Action Strategy

Avoiding support of structural development forms and intensities which exceed on-site carrying capacity for water supply and sewage disposal and therefore cannot function indefinitely on a permanent basis and are inconsistent with adjacent open rural character or conservation areas or which are more appropriately located in Rural Community Centers.

Definitional Criteria

Generally remote from existing urban areas and lacking public water and sewer services as well as industrial, commercial, or residential concentrations.

Forest resources, wildlife habitat, and scenic values of general concern. Single-family housing with basic water supply and waste disposal provided by on-lot systems.

No outstanding single character which warrants inclusion in either a development or conservation classification.

The proposed subdivision seems to generally comply with this plan. The plan is utilized by the state for very specific and limited purposes having to do with the expenditure of state and federal funds. It is not known by this reviewer if any state or federal funding would be involved with the development of this subdivision. If no state or federal funds are involved then compliance with this plan is not relevant.

Regional Plans

Land Use

The Regional Growth and Preservation Guide Plan for the Windham Region classifies this property within the "Low Density Rural" category which recommends, at minimum, two acre lot sizes for single family homes which are to be served by on-site wells and subsurface sewage disposal systems. Clustered residential developments are recommended to preserve open space and rural character.

This subdivision plan is consistent with the region's plan indicating large lots in the development (although two acres is technically 87,120 square feet, Willington zoning allows 80,000 square feet or two "builders" acres, and some of the proposed lots are under two "full" acres. Most of the lots are

larger than two acres, however, with 30 lots proposed on 114.68 acres or an average lot of 3.82 acres.) A clustered plan might be aesthetically preferable, but with the property's wetlands, steep topography and lack of public sewer and water infrastructure, land on which to cluster dwellings and place subsurface sewage disposal facilities is limited by physical constraints.

Transportation

The most current Regional Transportation Plan for Windham Region (FY '90 and FY '91 updates) indicates the following regarding transportation issues in the vicinity of this project:

◆ The town's highest long range transportation priority involves the section of Route 32 that passes through South Willington. This road bisects this heavily developed village, has steep elevation changes, sharp horizontal curves, no shoulders, many driveways and frequent pedestrian use. The reconstruction of Route 32 from the Route 6 expressway to I-84 has long been included in the State's concept plan for the trade-in of I-84 funds. In the 1993 Connecticut Master Transportation Plan this project is still listed to take place in the late 1990's or early in the next century.

◆ One of Willington's short range priorities is the re-alignment of of the intersection at Pinney Hill Road, South Street and Battye Road.

◆ Improvements to Burt Latham and Baxter Roads in both Willington and Mansfield would facilitate the UConn apartment shuttle service, allowing it to more easily access Barbara Manor Apartments in Willington as well as Rockwood Condominiums in Mansfield.

This subdivision is just off Route 32, at the south end of the village of South Willington. The new subdivision road, Clover Springs Drive intersects Battye Road approximately 1000 feet from the Pinney Hill/South Street, Battye Road intersection. Most of the residents of this subdivision will use Route 32 and some will use the Pinney Hill/South Street/Battye Road intersection, making the need for improvements more urgent as more traffic utilizes these facilities.

If Burt Latham and Baxter Roads were improved to provide direct access to Route 195, as has long been recommended for the unpaved sections, residents of this new subdivision would most likely use it, as would residents of the adjacent Deer Run subdivision, Barbara Manor Apartments and residents in this general area of town.

Willington Plan of Development

The Planning and Zoning Commission must determine if this, or any development proposal, complies with it's Town Plan (6/80). This proposal does seem to meet the plan's recommendations particularly regarding:

Housing

◆ Development plan and lot sizes are based on natural limitations of the land, with some very large house lots of three to six acres proposed in areas with more limitations, as recommended in the plan.

Transportation

◆ The plan indicates right-of-way on Battye Road to be deeded to the town, and the proposed new road seems to generally meet design standards.

Recreation and Open Space

◆ The open space proposed to be dedicated was not finalized when the ERT met to review this site. Options discussed included:

- Dedication of conservation easements/restrictive covenants on a steeply sloped rock outcrop area for rock climbing and geological exploration and along wetland corridors.

- Dedication of appropriate flat land for an active recreation area, potentially a ball field.

- Payment of fees-in-lieu of open space.

The Town Plan encourages easements and donations, among other open space preservation techniques. Donation of land as a requirement of subdivision approval is recommended to be accepted only if needed for playground, playing fields or neighborhood parks in the area of this subdivision. If there sis sufficient recreation land or open space nearby, the Town Plan recommends payment of fees-in-lieu of open space dedication. The Plan also recommends the Planning and Zoning Commissions and Recreation Commissions prioritize a list of acquisitions needs for open space and recreation land.

Since there are playing fields at the town's elementary school, are more needed so nearby? The Town Plan recommends a passive recreation area along the Willimantic River, just north of the Mansfield Town line. It also recommends recreation areas for the nearby Barbara Manor Apartments. Should any open space in this subdivision be used for active recreation available to all town residents? Is there land in this subdivision particularly suited for a ball field and the related parking needed? Would a ball field in this area become a nuisance to the residents of the subdivision? The Commissions need to evaluate these issues. If there is other property in the southwestern quarter of town which would prove more suitable for recreation, then fees-in-lieu of open space should be considered. Conservation easements and restrictive covenants on the steep rock slopes and wetland corridors should be acquired as well.

Consistency with Town Zoning and Subdivision Regulations

The proposed lots all conform to zoning minimum lot size requirements of 80,000 square feet for single family homes and 200 foot frontage requirements, except those lots proposed as rear lots. Rear lots all have at least 25 feet of road frontage, as required by zoning, which allows (per section 5.5.1) the "use of an occasional [rear] lot to accomplish the best use of the land" in subdivisions where unusual topography or shape of the property lends itself.

The proposed subdivision generally complies with the town's subdivision regulations.

It is not clear if the following are proposed or needed. (Reviewer did not have the full plans). The Commission should review these issues and indicate the need for the following:

- school bus accommodations (3.2.11)
- curbs (3.2.13)
- sidewalks (3.2.14)
- fire pond (3.2.12)
  There is one on Battye Road. There are opportunities for others throughout the subdivision.
- street lights (3.10)

The large lot sizes will allow passive solar house designs (3.9) to be used on most if not all the proposed lots, but plans should indicate proposed house orientation. A tree planting plan is required (2.2.14) which minimizes the felling of existing trees and requires at lest two naturally growing of 3 inch caliper in the front yard of each lot (or that two trees be planted). While trees and solar access can easily co-exist, plans should indicate not only optional house locations for solar access but also what natural

vegetation should be left in place and what needs to be cut in order to provide both summer and shade and solar access in winter.

The subdivision regulations discourage through traffic on "local" streets (3.2.16). Cul-de-sac streets are limited as sole access to ten building lots. The ERT members were informed at the site that various town commissions hold differing positions on whether this subdivision should have a through road, connecting Battye Road and Burt Latham Roads, to accommodate fire access and traffic circulation (both for this subdivision and for this section of town) or alternately, two cul-de-sacs to limit wetland crossings and, in effect, also limit traffic circulation.

There are reasons to favor either alternative. With proper design, either would be appropriate. The adjacent Deer Run subdivision provides a relatively new through road between Pinney Hill and Burt Latham Roads. Is another through road warranted here? What are the future plans for roads in this section of town?

If Baxter Road in Mansfield were to be improved and connect Burt Latham directly with Route 195, would it be preferable to have a through road in this subdivision connecting Battye Road or not? Will Baxter Road in Willington ever be extended beyond the Willington Ridge Condominiums to connect into Mansfield? How many, if any, of these three through road options should be implemented in this corner of Willington, and should the accomplishment of one preclude one or both others? This long term planning issue needs to be discussed in order to determine whether this subdivision should have a through road or not.

Estimated Population

If 30 house lots are created, approximately 100 new residents can be anticipated, using average multipliers for a blend of two, three, four and five bedroom homes. The 1990 U.S. Census indicates Willington had a population of 5,979 persons in 2,193 households (occupied dwelling units), with an average of 2.7 persons per household (including single person households). There are 1,405 families with an average of 3.12 persons per family.

About 25 additional school children can be expected, again using average multipliers for the New England region. State projections expect Willington's population to grow to 6,250 by 1995 and to 6,420 by the year 2000.

Traffic Impacts

The average single family home generates an average of 10.6 vehicle trips per dwelling per day, which includes not only trips made by household members but also mail and other deliveries and visitors. The proposed 30 dwellings would be expected to generate 318 vehicle trips per day. Ultimately the number of trips actually generated will depend on the sizes and prices of homes, the age, size and economic class of the residents, the number of vehicles they own and whether any destinations can be reached by walking, biking, or carpooling.

Most traffic can be expected to access this subdivision via Route 32 and Battye Road. If however, Clover Springs Drive is a through road and Baxter Road is a through road, a substantial portion of the traffic could use Burt Latham, Baxter and Route 195, particularly if residents work at the University of Connecticut.

Improvements to Battye Road, notably widening and straightening may be necessary if this is the main approach to the subdivision. Traffic from this development will also contribute to the need to upgrade Route 32 and the Pinney Hill Road/South Street/Battye Road intersection.

Surrounding Land Uses

Surrounding land uses include the Deer Run Subdivision, similar to that proposed, a 100 unit apartment complex, a 34 unit condominium complex, undeveloped land, single family homes on existing town and state roads and the village of South Willington.

A subdivision of the nature proposed and large lot sizes should ensure the indefinite functioning of these facilities.

Willington's ability to accommodate additional students should be coordinated with the Board of Education. Volunteer fire services are located nearby in South Willington, Village Hill and the Eagleville station in Mansfield. Need for fire ponds for water supply should be coordinated with the fire marshall. Police services in the entire town are provided by the State Police barracks out of Stafford.

Note: ERT reports were prepared for properties adjacent to the Clover Springs Farm subdivision. They may be useful to consult.

ERT Report	Baxter Road Condominiums Willington, CT 07/83
ERT Report	Deer Run Estates Willington, CT 02/83

ARCHAEOLOGICAL REVIEW

Note: Original plans dated 4/22/92 were used in this review. The reviewer was not present at the ERT field review meeting so any lot changes or reductions or changes in road locations may not be reflected in this report.

The Clover Springs Farm site has environmental and topographic features that suggest sensitivity to prehistoric and historic archaeological resources.

Prehistoric Indian sites

Four areas of the subdivision have landform characteristics that suggest a high probability for prehistoric Native American settlement. Lots 35 and 36 has the "ledges", or outcroppings of bedrock with a high elevation that could have been utilized as rock shelter sites. This feature is designed as open space so there should be no impact to the possible sites at the ledges. Nonetheless, it is recommended that a reference to this possibility be written into the land deed to ensure that future land owners do not blast the rockshelter without an archaeological review beforehand.

Other portions of the project area contain the topographic and environmental features associated with open camp sites. That is, features consisting of elevated knolls of well-drained soils with areas of no or little slope adjacent to wetlands are highly sensitive to Indian sites. Such features are found on Lots 37 (Chimney Lot), Lot 5 (High Knoll), Lots 8 and 28 (West Bank Knoll), Lot 21 (Upper Meadow Knoll), Lot 19 (Lower Meadow Knoll). It is requested that archaeological testing be conducted in these areas to identify any prehistoric resources which may exist. This testing can be accomplished working within the construction schedule outlined by the applicant/property owner.

In addition, Lot 17 contains a large boulder that could well have served as another rockshelter site by Native Americans. This site is designed as open space and should have no impact.

Historic Sites

Lot 17 has the ruins of a spring house. The existing house lot has the standing structures of the Thomas Peck House (ca. 1730's) and the ice house with the original stone foundations intact. It is recommended that these historic site areas be photographed and mapped. They, too, will not be effected by the proposed construction and no other recording or excavating is necessary.

Recommendations

The Office of State Archaeology recommends an archaeological survey of the property and has received cooperation from the property owner. Areas of site locations that can be feasibly maintained as open space will preserve these resources for future generations. Sites that will be developed can be excavated by the Office of State Archaeology for its research potential. As the project will be developed in phases, the Office would coordinate with the property owner to test areas of concern prior to construction activities.

The Office of State Archaeology looks forward to working with the applicant/owner and the Town of Willington on this project.

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: 203-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.