The Courts at Birch Meadow

Stamford, Connecticut

King's Mark
Environmental Review Team Report

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

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Environmental Review Team Report

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

for the
Environmental Protection Board
Stamford, Connecticut

May 2003

CT Environmental Review Teams
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Acknowledgments

This report is an outgrowth of a request from the Stamford Environmental Protection Board to the Southwest Conservation District (SWCD). The SWCD referred this request to the King's Mark Resource Conservation and Development Area (RC&D) Executive Council for their consideration and approval. The request was approved and the measure reviewed by the King's Mark Environmental Review Team (ERT).

The King's Mark 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, Thursday, April 3, 2003.

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I would also like to thank David Emerson, director, Stamford Environmental Protection Board, and John Anderson and Jennifer Rzepka, representatives of the applicant 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, reports and related documents. Additional materials were mailed to Team members following the field review. 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 city and landowner/applicant. This report identifies the existing resource base and evaluates its significance to the proposed use, and also suggests considerations that should be of concern to the city. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The King's Mark RC&D Executive Council hopes you will find this report of value and assistance in the review of the proposed tennis facility.

If you require additional information please contact:

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Introduction

Introduction

The Stamford Environmental Protection Board has requested Environmental Review Team (ERT) assistance in reviewing an application to construct a private tennis club facility.

The ±74 acre site is located in northern Stamford on Erskine Road in a residential zone. Approximately 30% of the site is currently developed as a residential estate with four homes, accessory structures, landscaping, etc. On-site wetlands and watercourses make up approximately 10 acres of the site and include a large pond, two smaller ponds and several vernal pools. The applicant is proposing to donate 25 acres to the Stamford Land Conservation Trust. This land is undeveloped and abuts a large, off-site vernal pool complex to the northwest.

The tennis facility will consist of a series of new interconnected structures comprised of a main clubhouse and an athletic building including indoor tennis and squash courts and an all sports gymnasium with an indoor track. Additional modifications include the installation of additional outdoor tennis courts, construction of two new pools, renovation of one pool, landscaping, patios , paved driveways and parking areas. 275 parking spaces are being proposed based on current zoning regulations. The applicant would like to reduce the number of paved parking spaces and be allowed to construct grassed overflow parking to limit impervious surfaces.

Three of the four residences will remain and be used for offices, staff housing, storage and a children's playhouse/cabana. Existing structures will remain on individual septic systems and on-site wells. The new clubhouse/athletic building will be served by a new septic system which is under DEP review.

Objectives of the ERT Study

The Stamford Environmental Protection Board has requested that the ERT Team assist them by examining the natural resources on site, particularly the vernal pools and wetlands, and discuss their relationship to the larger upland habitat areas. Additional concerns include potential impacts to water quality from surface water runoff and strategies to control such impacts and management of stormwater increases from impervious surfaces.

The ERT Process

Through the efforts of the Stamford Environmental Protection Board this environmental review and report was prepared for the City of Stamford.

This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the city. Team members were able to review maps, plans and supporting documentation provided by the applicant. Team members did request copies of a potential subdivision plan which was discussed at the field review.

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 Thursday, April 3, 2003. 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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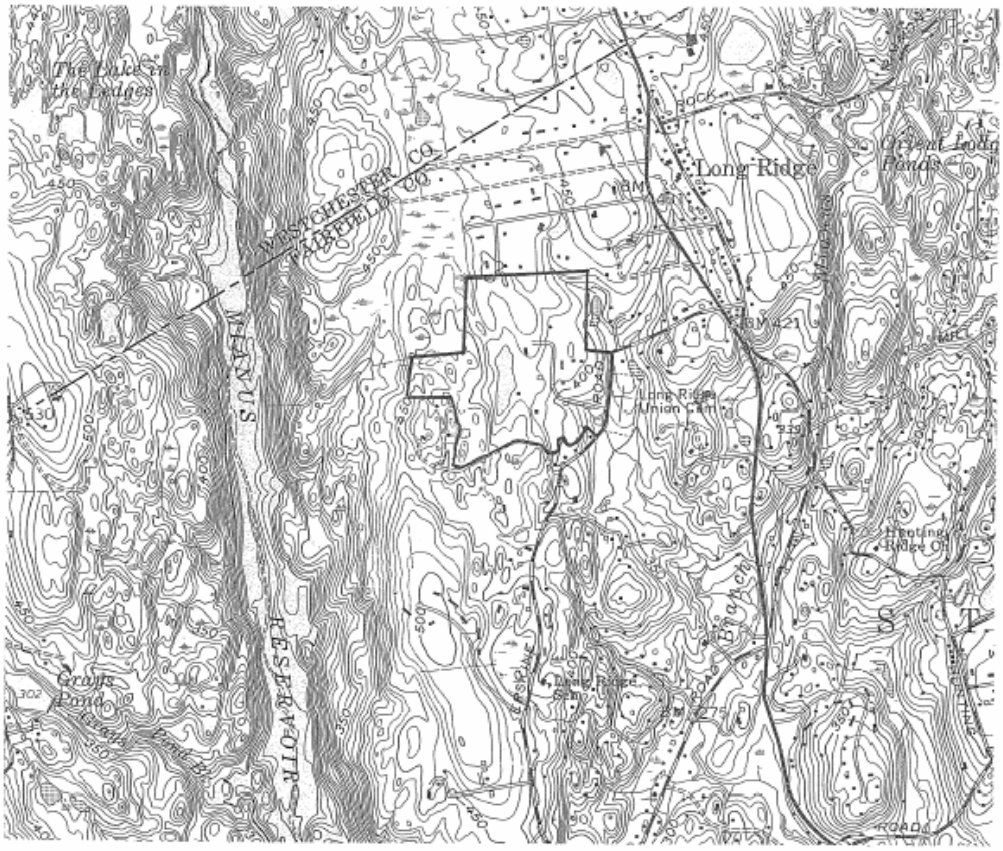
Location/Topographic Map

Scale 1" = 2000'



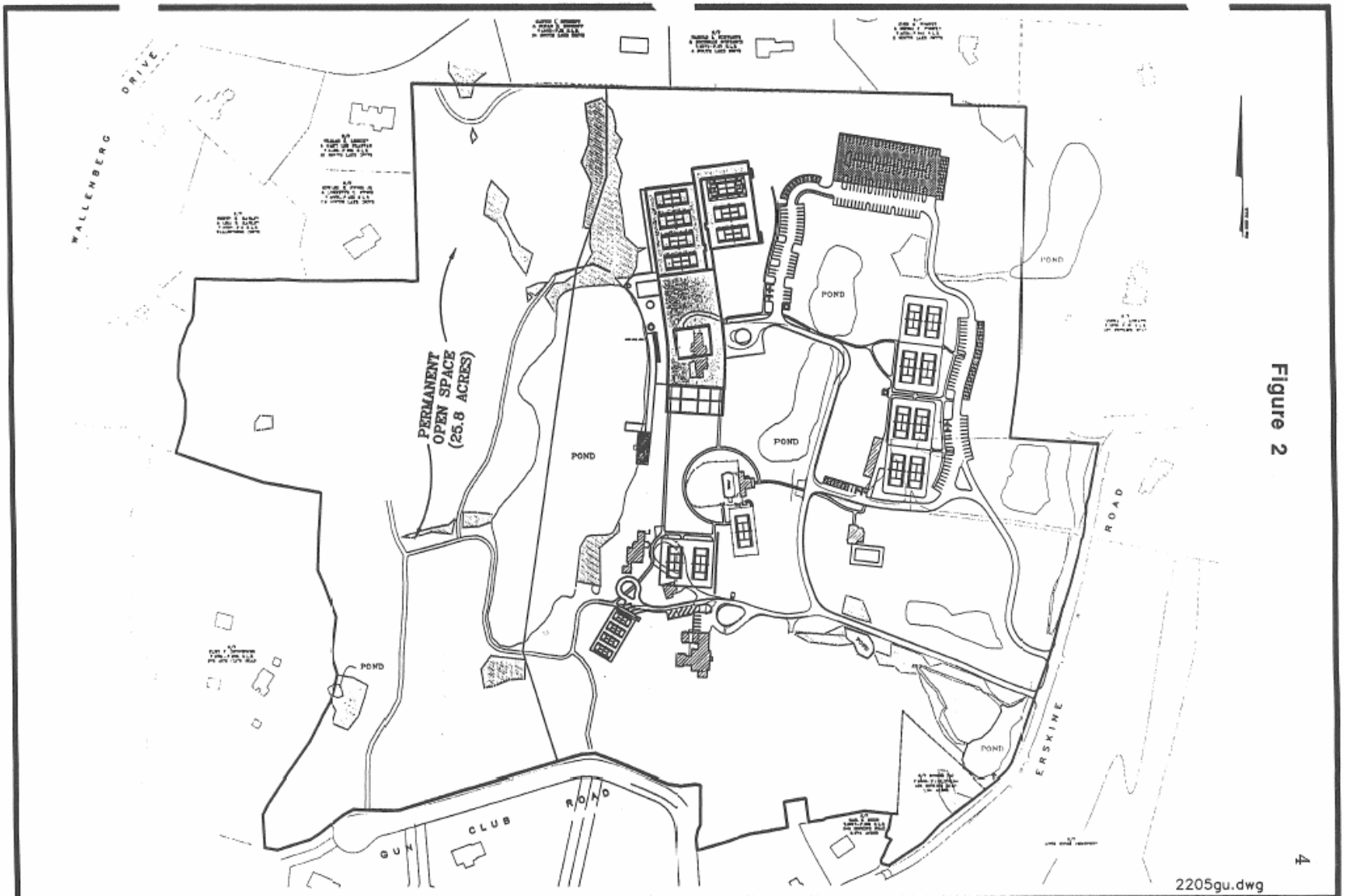


Figure 2

Redniss & Mead
ENGINEERS - PLANNERS - SURVEYORS - ENVIRONMENTAL CONSULTANTS
22 FIRST STREET - STAMFORD, CONNECTICUT 06905 - TEL: 327-0500 FAX: 357-1118

COMM. NO.:	DATE: 1/24/03	The Courts at Birch Meadows
2205D-1	SCALE: NOT TO SCALE	Stamford, CT

2205psub_eng.dwg

Figure 3

A Watershed Perspective

Introduction

From a watershed perspective, the most significant element of the proposed development is the potential effect upon water quality of both stormwater and treated wastewater discharges. This is especially relevant since the proposed facility is located in a public water supply watershed. The developer's report states that: "Water quality will be improved over existing conditions." Assurances that the proposed sub-surface wastewater discharge system will meet this goal are not provided at this time.

Stormwater can be addressed with appropriate Best Management Practices. Detention to allow settling of fine sediments as well as infiltration, and filtration through appropriately sized swirl concentrator treatment devices are the most appropriate best management practices. Catch basins with sumps are a first line of defense in drainage systems, but will not likely trap a significant fraction of silt, as implied in the designer's report. Wherever possible, drainage should be directed to sheet flow over grassy surfaces, and ultimately into grassy swales.

There are several parameters that will affect the functioning of the planned septic system including engineering design and the suitability of local soil conditions and groundwater hydrology. Post-construction management of the wastewater system can also have a significant impact upon its function. Management factors include operation and maintenance as well as the volume, seasonal distribution and timing of input to the system. Small systems of this type rely upon biological activity for treatment of pathogens and nutrients. Systems must be operated more or less continuously to maintain the biomat, which provides effective wastewater treatment. Large volumes of wastewater, that might occur as a result of a special event, may result in decreased residence time potentially overtaxing the system, resulting in release of pathogens to ground and ultimately surface water bodies downstream. Nutrients such as nitrogen are not generally removed by subsurface septic systems. Special care should be taken to avoid dumping of chemicals that may be harmful to that biomat into drains that lead to the septic system.

Site Description and Resources

The site is a 74-acre parcel west of Erskine Road in Stamford, CT. Approximately 30% of the site is currently developed as a residential estate with four residences, accessory structures, landscaping etc.

Most of the site development drains to the watershed of the East Branch of the Mianus River (Subregional Basin Number 7406), which is tributary to the Mianus River (Subregional Basin Number 7407). There is a public water supply diversion

located downstream from this site at Mianus Mill Pond. The surface water quality designation for the East Branch of the Mianus River is AA. Groundwater at the site is classified as GAAs. AA and GAAs waters have designated uses as water tributary to public water supply reservoirs, existing or potential public drinking water supplies, and as baseflow for hydraulically connected surface water bodies. Water quality is generally good and at a minimum should be suitable for drinking or other domestic use without treatment. Most of the area near the proposed development is served by on-site private or small community wells. Review of state waste sources inventory and the on-site review did not find any known potential pollution sources within this water-supply watershed. Wastewater discharges to the ground in GAAs areas are limited to approved treated domestic sewage.

Redniss and Meade, with assistance from Michael Kline and Michael Klemens, have assessed the natural resources including wetlands and watercourses and soils and parent materials. Some of the resources described as vernal pools appear to be of moderate to high value. These vernal pools appear to have recovered from past disturbances and adjacent land uses, with the exception of some eutrophication in Pond F, and evidence of waste disposal near Wetland J.

As part of the federal Clean Water Action Plan, the CT DEP and the USDA-Natural Resources Conservation Service conducted a Unified Watershed Assessment for all CT waterbodies in 1998. Based on existing documents and other available water resources information, the overall health of the East Branch Mianus River sub-regional watershed appears to be good. It should be a goal of the state, regional and local watershed stakeholders to **protect** the overall health of this sub regional watershed. As stated previously, the watershed is nested within the larger Southwest Western Regional Complex. Small coastal streams contribute nutrient loads from nonpoint sources to Long Island Sound, which has been identified with water quality impairments.

Proposed Project and Land Use

The proposed development will include an 80,000 square foot central tennis club facility including a main clubhouse, gymnasium and tennis and squash courts. The site will also include outdoor tennis courts, paddle tennis courts, pools, and patios.

Wetland impacts for the site amount to 4458 ft^2 total including 3068 ft^2 temporary impact. Palustrine and riparian wetlands provide valuable wildlife habitat, flood attenuation, water quality renovation, and groundwater recharge, so it is important to minimize impacts.

Potential Water Quality Issues

The following comments on the proposed septic system were compiled by Jennifer L. Perry, P.E., Sanitary Engineer III, CTDEP:

The site is proposed to be served by onsite subsurface sewage treatment and disposal systems. The proposed development will result in a design flow of approximately 13,000 gallons per day of domestic sewage. Because the design flow exceeds 5,000 gallons per day, a Discharge Permit from the Department of Environmental Protection is required pursuant to Section 22a-430 of the Connecticut General Statutes and regulations adopted thereunder, as amended.

The site is located in the East Branch of the Mianus River watershed. The groundwater classification for the site is GAAs, which represents groundwater that is tributary to a public water supply watershed. A discharge of treated domestic sewage as defined in Section 22a-430-1 of the Regulations of Connecticut State Agencies is permittable upon the Commissioners decision that the proposed system to treat the discharge will protect the waters of the state from pollution.

In accordance with the previously mentioned statutes and regulations, the design engineer must demonstrate that the system will function hydraulically and that the subject discharge will meet the pertinent Water Quality Standards prior to reaching any surface water bodies, wells, or crossing the applicant's property line. These goals must be reached with reasonable analyses and safety factors. This includes a system and site hydraulic analysis and an analysis of pollutant renovation including nitrates, phosphorus, and virus and bacterial pathogens.

To date, site testing including deep test pits, borings and permeability sampling has been performed. An application for a permit to discharge has been submitted with supporting documentation. The Department has commented on the conceptual design included and has a number of outstanding issues that must be addressed. The issues include hydraulic reserve capacity of the soils underlying the proposed system area, depth of seasonal high ground water table, and area available for nitrogen dilution.

Once the engineer has adequately addressed all remaining issues, the Department would issue a Tentative Determination to issue a permit to discharge. This determination would be published in the local newspaper and provide an opportunity for public comment or a request for public hearing. Following the public process, a Final Determination would be made by the Commissioner to allow Department staff to review and approve plans and specifications for the construction of the subsurface sewage treatment and disposal system.

A professional engineer must oversee actual construction of any sewage treatment and disposal system approved by the Department of Environmental Protection. Additionally, a detailed construction sequence must be provided and approved in advance to avoid potential construction

problems. Severe problems can occur during construction of subsurface sewage treatment and disposal systems in fill. These problems could include improper surface preparation, the use of improper fill material, improper fill placement, erosion, etc. Therefore, stringent controls must be placed on the design and construction of such systems.

Once construction of the system is completed, in accordance with plans and specifications approved by the Department of Environmental Protection, a permit to operate the system would be issued. Regular monitoring and maintenance will be required, with results and verification submitted quarterly to the Department of Environmental Protection and the local Health Department.

Sediments, pathogens, and nutrients like nitrogen and phosphorus are the pollutants of concern to water quality. Excessive sedimentation from sources such as unchecked erosion sites and unmanaged road sanding operations can lead to degradation of stream bottom habitat. Temporary sedimentation basins and other stormwater control structures (i.e. siltation fence and staked hay or straw bales) employed during construction should be inspected and maintained weekly, and within 24 hours of receiving a 0.1" or greater rainfall event.

Alternatives, Recommendations and Special Considerations

The DEP supports and recommends the use of buffers to protect wetlands and watercourses from environmental impacts. Buffers trap road sands, contaminants and other pollutants contained in stormwater runoff generated from roadways, parking lots, roof tops, and other impervious surfaces, as well as eroded sediments occurring from natural scour or land moving activities such as site development and other soil disturbances, including farming activities. The importance of forested streamside buffers has been well documented in the scientific literature. In addition to the benefits described above, these riparian buffers also help moderate the temperature of stormwater runoff before it enters the watercourse, thereby reducing thermal impacts on aquatic wildlife. Maintaining or enhancing naturalized streambank vegetation on all watercourses will shade the water, limiting temperature changes and supporting higher dissolved-oxygen levels. Consider providing native plantings to enhance or extend the buffer zones around all wetlands and watercourses and/or adopting a no-mow zone to allow these areas to revegetate naturally.

Wetland Review

The Team walked and observed the ±74 acres on the site of the proposed development to review a variety of resources. Below are the comments regarding the wetland areas.

The majority of the wetlands were found in two main locations: 1) the network of vernal pools northwest of the "Courts" site, and 2) the pond and stream complex that exists in and around the current development.

Vernal Pool Area Discussion

The system of vernal pools in the north and west of this parcel is located in the Mianus River drainage that flows locally into the Mianus Reservoir to the west. The system has seen a reported decline in amphibian breeding productivity in the last 12 to 14 months.

Based on observations of the Team on April 3, 2003 very little evidence of breeding showed itself on our walk. Only two pools showed evidence of use for breeding. This contrasts sharply with the verbal reports from John Anderson, Engineer, Redniss & Mead. Mr. Anderson stated that in the vernal period of 2002 (one year ago) the series of pools the Team visited had large concentrations of egg masses, and that later in the spring he observed the waters of these pools as being prolific with polliwogs. It is notable that construction of new homes and roads was taking place near these pools at the time of the Team's visit.

While this Team member defers to Dr. Michael Klemens report on the vernal pools, a few issues regarding vernal pools are apparent and need to be explored before any new impacts to these areas begin. These points are discussed below.

- The largest integral part of the vernal pool system is the upland area neighboring the pool. This typically extends away from the pool uphill or upslope to drier soil types. The slopes can vary from gentle to steep. In places some slopes can approach 45 or more degrees. Often, the drainage areas for these pools found on typical till based soils are 2 or 3 to 5-6 acres. Thus, impacts that are local can be dramatically damaging to the vernal pool ecology.

- There is extensive knowledge in print about vernal pools. Much of it points to the fact that the reduction of more than a certain percentage of critical habitat and adjacent upland could have telling impacts on the pool ecology.

The USGS's Northeast Amphibian Research and Monitoring Initiative produced a document for their vernal pool survey method protocol entitled: *Wood Frog and Spotted Salamander Egg Mass Counts and Percent Vernal Pools Occupied by Amphibian Species on DOI Lands in the Northern United States.* In it they state that .. . "spotted salamanders require both wetlands (usually vernal pools) for breeding and surrounding upland woodlands, where they spend about 95% of their lifetime burrowed underground, for survival."

(This document may be obtained via - http://www.mp2- pwrc.usgs.gov/nearmi/projects/#eggmasscounts.)

Further, in personal communication with Dr. Michael Klemens (April 9, 2003) he stated, in part, that ". . . *salamanders often gravitate towards slopes. Better drained habitat for subterranean lifestyles."* Thus, the value of the upland slopes for vernal pool species is critical.

Dr. Klemens also suggests in his recent book co-authored with Dr. Aram J.K. Calhoun entitled: *"Best Development Practices - Conserving Pool Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States"* that the upland use by various vernal pool amphibians can range from 386 feet from the pool for spotted salamanders to 1550 feet from the pool for juvenile wood frogs (3835 feet for adults). Indeed, he suggests there be no development in the 100 foot buffer around the vernal pool and no more than 25% in the critical terrestrial habitat, that is, the distance from 100 feet to 750 feet away from the pool.

- Stamford itself has the most recent subdivision plans from neighboring parcels. They need only review their own regulations and "as built" plans to establish if these commonly recognized ecological needs of the vernal pools are being met. Vernal pools by their very nature are delicate systems. Encroachment on critical vernal pool habitat will likely cost the vernal pool environment in species diversity.

The Pond Drainage Discussion

The complex of ponds and streams that dominate the Eastern section of this parcel has been greatly altered by the existing development. These local tributaries including the large pond and its drainage, flow off-site to the southeast and are headwaters streams ultimately flowing into the east branch of the Mianus River. Now partially in culverts and partially channelized, the flow from both the large pond and the southern of the smaller ponds is vulnerable to the non-point or surface runoff of lawn fertilizer and pesticides.

On the day of ERT review, the stream and pond complex just south of the entrance road had over-bank flow braiding across and through some of the

wooded areas as it passed down gradient. Dropoffs of several inches had the visual effect of cascades stepping downhill.

There is now little buffer for these small streams that flow through lawns and have grass nearly abutting to the streamsides. The addition of even 12-15 inches of longer grass, like the rough on a golf course, would help filter surface flow and protect these waters from the residues of lawn care.

Care should be taken to preserve the integrity of the springtime runoff network. The flow through the wooded "forest" floor helps to filter the waters and the cascading aids in the aeration of the flow.

All of these waters make up the headwaters of their respective drainages. They feature excellent (mapped) water quality and the landowners have the obligation to maintain this as the waters pass downstream.

Water Quality

The surface water quality (which includes the wetlands and watercourses) of the area has been mapped by the DEP as being AA. Although not all of these locations can be field tested, the assumption of quality is made based on a variety of indicators that point to excellent surface water quality in the drainage.

The same is true for the ground water quality. The entire parcel is classified as GAA which is the highest classification given in the state. As with the surface water, not all of this was field checked for the creation of the water quality mapping, but indications point to, and the result is mapped as, excellent water quality.

The water quality classifications as described in the; *Summary of the Water Quality Standards and Classifications* (1997) are as follows:

Inland surface water classifications

Class AA
Designated uses: existing or proposed drinking water supply, fish and wildlife habitat, recreational use (may be restricted,) agricultural and industrial supply. Discharge restricted to: discharges from public or private drinking water treatment systems, dredging and dewatering, emergency and clean water discharges.

Groundwater Classifications

Class GAA

Designated uses: existing or potential public supply of water suitable for drinking without treatment; baseflow for hydraulically connected surface water bodies. Discharges limited to; treated domestic sewage, certain agricultural wastes, certain water treatment wastewaters.

Discussion of the Two Different Proposals

The eastern section of the parcel is developed now. The western section remains free from new development. The concept of the donation of nearly 26 acres of open space is one to be weighed carefully against everything else. The plan for "The Courts" builds upon what, for the most part, has already been impacted by previous development. While there is proposed construction within the bounds of the wetland setback (northwestern most tennis court, and a road crossing of intermittent water to access parking in the northeast, building on the east shore of the large pond), these impacts will likely be of little relative consequence. Certainly more impact has been made by the existing structures and roadways than by any additions proposed to be built.

The alternate potential proposal to build residences in what has been offered as open space then would have more telling effects on the nature of this parcel than the tennis club proposal. Through the use of subdivisions, the areas of impervious surface would greatly increase when road surface, driveway surface, roof tops and garage roofs are combined. All but two of the 21 lots would abut or include water or wetland. Time and again we have seen residences making use of these areas on their property to dump yard wastes, occasionally more than just grasses and leaves. A typical example of this is the refuse on the hill sloping down to the wetland along the western boundary of proposed residential lot eight.

In the area of Stamford north of the Merritt Parkway there are 24 properties listed as "municipal" on the DEP's Geographic Information System. Of these, five are cemeteries, four are Park and/or Recreation, four private golf and swim clubs, one school, one nature center, two bird sanctuaries, four Nature Conservancy (TNC) properties, and three Land Trust properties. Of these, the latter three (most likely the truest open space) total about 239 acres. Of note here is one tract of TNC land, which is larger than 150 acres. The next largest is 19.4 acres.

This proposed open space contribution of 25.8 acres would be the second largest in the area and increase true open space by 11%. In this area of about 12,300 acres, where only 239 acres (less than two per cent) are set aside as true open space, the addition of 25.8 acres would be welcome.

Other Discussion

Care must be taken during and after construction to ensure erosion of loose soil does not enter the water bodies. Ultimately, the energy dissipaters from impervious surface drainage will need to be maintained and the club may want to provide Stamford with a maintenance schedule. The two dissipaters that discharge into the ponds are important, as they should provide for the maintaining of the AA water quality these headwater streams provide.

To the east side of the parcel are proposed two detention basins. The planting plan for those areas should concur with known sources of wildlife-friendly vegetation. (Such information available in the book entitled: *Enhancing Your Backyard Habitat for Wildlife* which is available at the DEP Store - under the Gardening heading on the Web at: http://www.whereeverythingis.com/depstore/).

The plan should show the location of soil stock piles once a decision is made as to which plan will be implemented. Proper erosion and sedimentation procedures will control loose sediments during construction from getting into the ponds or streams.

If applicable, the location of stump piles from removed trees should be noted.

Ecoregions

The Team was asked on-site to look at the eco-system as a whole. What follows is the ecoregion description as taken from the *Ecoregions of Connecticut,* 1976, Dowhan and Craig.

The area is known as the Southwest Hills Ecoregion and is described as follows:

Southwest Hills Ecoregion (IV-A)

A coastal upland, lying within 25 miles of Long Island Sound, characterized by low, rolling to locally rugged hills of moderate elevation, broad areas of upland, and local areas of steep and rugged topography.

Elevations are generally greater than 250 feet and less than 750 feet; the maximum elevation is almost 1,000 feet. The greatest topographic relief, 400-500 feet, is adjacent to the Southern Marble Valley in the western part of the region, along the Housatonic and Naugatuck river valleys, and adjacent to the South-Central Lowlands in the eastern part of the region.

The bedrock is primarily metamorphic; Paleozoic gneisses and schists complexly folded into north-trending belts. Triassic sedimentary and igneous

rocks, similar to those in the Central Lowlands regions underlie the Pomperaug Valley in the north-central part of the region. Soils are developed on glacial till in the upland areas and on locally extensive stratified deposits of sand, gravel, silt, and some clay in valleys and in several upland areas.

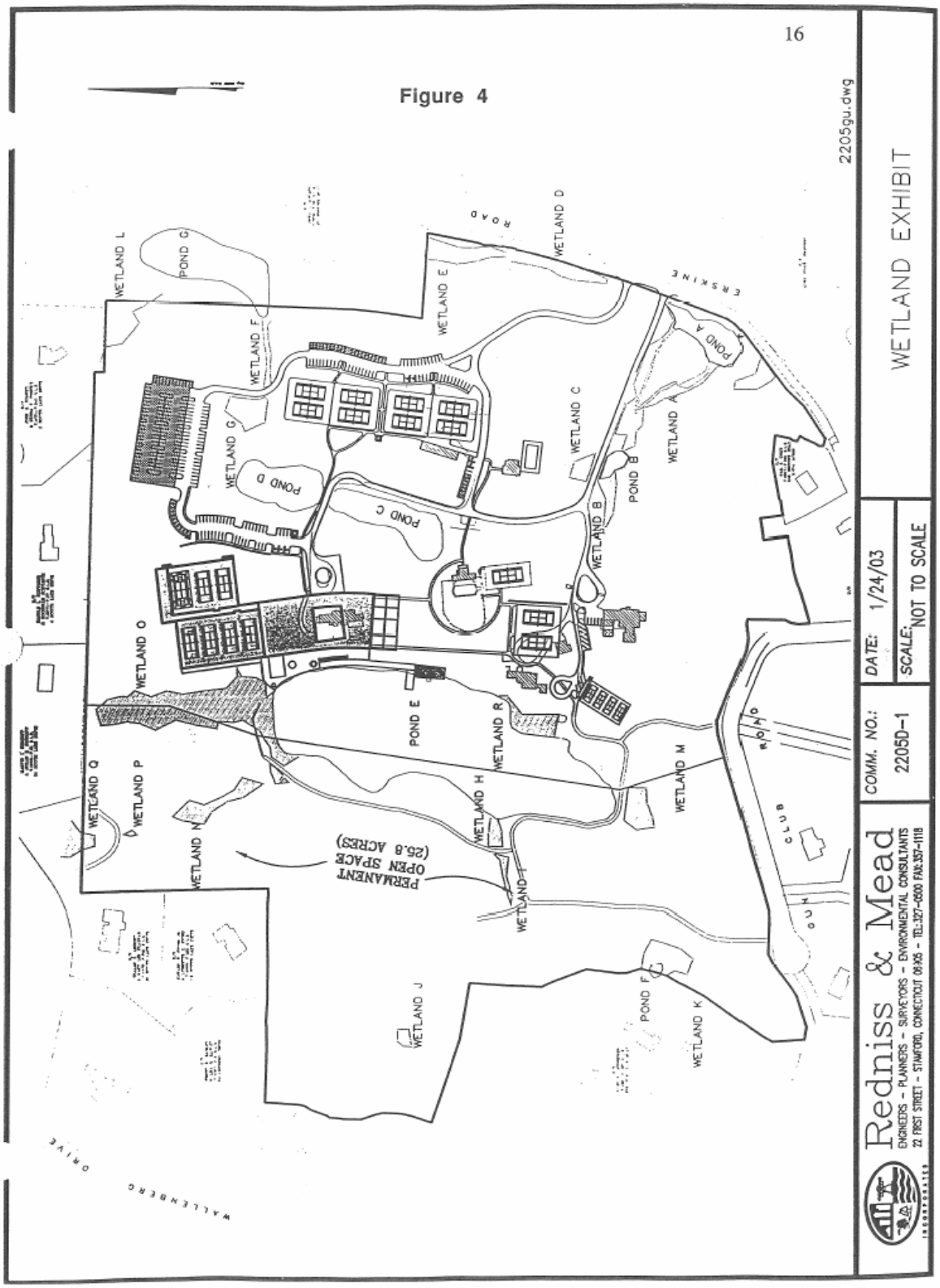
The mean annual temperature is 49.5°F. The average winter temperature (December - February) is about 29.5°F with a monthly mean minimum temperature in the coldest month of about 19°F. Mean annual minimum temperature is about -5°F. Seasonal snowfall accumulation averages 40 inches. The average frost-free season is about 160 days. The average summer temperature (June-August) is about 70°F, with a monthly mean temperature for the warmest month of 85°F, one of the highest in the state. Average annual precipitation is about 45 inches.

On well-drained soils the major forest vegetation is Central Hardwoods-Hemlock, formerly considered part of the Oak-Chestnut forest region and later the Oak-Hickory or Oak-Yellow Poplar region. Characteristic dominant tree species are White, Red, and Black Oaks (*Quercus alba, Q. rubra, and Q. velutina*), Hickories (*Carya ovata, C. cordiformis, and C.glabra/ovalis* complex), Tulip or Yellow Poplar (*Liriodendron tulipifera*), Black Birch (*Betula lenta*), White Ash (*Fraxinus americana*), and Hemlock (*Tsuga canadensis*). Scarlet and Chestnut Oaks (*Quercus coccinea and q. prinus*) are locally abundant on dry ridges and sandy soils, in places associated with White Pine (*Pinus strobus*). White Pine, however, is generally absent to scarce in this region. Dogwood (*Cornus florida*) is a common understory tree. Red Cedar (*Juniperus virginiana*) is dominant in early phases of old-field vegetation development. There is a pronounced Southeastern Piedmont and Midwestern influence in the flora and fauna Some rather rare plant species of this region are the Green Violet (*Hybanthus concolor*), Small Whorled Pogonia (*Isotria medeoloides*), Virginia Snakeroot (*Aristolochia serpentana*), Green Milkweed (*Asclepias viridiflora*), Vasey's Pondweed (*Potamogeton vaseyi*), Side-Oats Grama (*Bouteloua curtipendula*), and False Mermaid (*Loerkea proserpinacoides*).

The avifauna is not especially distinctive and can be found over much of the state.

Rare Connecticut vertebrates found in this region are the Five-lined Skink (*Eurneces fasciatus*) and the Bog Turtle (*Clemmys muhlenbergii*).

Figure 4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WETLAND EXHIBIT
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WETLAND A
POND B
WETLAND B
WETLAND O
POND E
WETLAND R
WETLAND M
WETLAND Q
WETLAND P
WETLAND N
WETLAND H
WETLAND I
PERMANENT OPEN SPACE (26.8 ACRES)
CLUB
WETLAND J
POND F
WETLAND K
WALLENBERG DRIVE

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 that occur 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 Environmental & Geographic Information 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 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.

Conservation District Review

Soil and Water Resources Conservation Considerations

The initial ERT meeting for this development proposal included discussion about a residential subdivision as a possible alternative development for this site - a hypothetical design based on existing town regulations. Other possible Conservation Subdivision designs are also theoretically possible, as exampled by Arendt[1] and others (See http://www.plannersweb.com/articles/are015.html), which could reduce the impacts of development by limiting the areas of disturbance and minimizing fragmentation of natural habitats, while still allowing for a similar number of housing units.

Not withstanding the theoretical possibility of a conservation subdivision design which preserves a substantial (e.g. 25 acres or more) amount of open space on this development parcel, the proposed development is, from a conservation point of view, preferable to a subdivision development. As is suggested in "Birch Meadow Subdivision Preliminary Site Plan", included with the review material for the ERT Team, any residential subdivision would likely include a larger site disturbance of soils. Also, at the regional scale, conservation of soil and water is better obtained by concentrating residential development in existing centers and along transportation corridors. (Yaro & Hiss, 1996).

This development as proposed does not require subdivision of land ownership, but provides a single management structure for the property, increasing the likelihood of sustained protection of the natural resources through a site management plan. Even if there were to be a future subdivision of land, the 25 acres proposed for transfer to the land trust would still be preserved.

Impacts of a non-residential use of this site in an area zoned residential must also be considered, specifically traffic impacts, and other noise and visual impacts. The development plan addresses some of the noise and visual impacts through the use of on-site vegetated earthen berms. Optimally, creation of these berms would involve as little disturbance to surrounding soils as possible, as well as be fully vegetated. To enhance buffering between use areas and natural areas, vegetation should include both understory and canopy vegetation, with plantings adequate enough to inhibit the establishment of invasive species. These areas can then be no-mow or low- mow, minimizing maintenance, increasing storm water retention, and increasing wildlife habitat.

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[1] Arendt, Randall G. Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks, Island Press. 1996.

Water Quality

Maintaining water quality in the watershed is of concern since it is a public drinking water supply watershed. On site and locally potable water is supplied by wells. Surface and ground water quality are related to the amount of impervious surfaces as a percentage of land area in a watershed. Research indicates negative impacts on wetlands, for example, when the amount of impervious surfaces exceed 2 to 4 percent[2]. Therefore, minimizing impervious surface on this development site would contribute to the overall integrity of the watershed's environment.

Impervious surfaces include rooftops and parking lots. It should also be considered that lawns are less pervious then woodland or un-mowed fields. Low mow areas and timing of mowing can be specified in maintenance plans.

Runoff from impervious surfaces can also carry pollutants into surface water bodies on and off site. During construction water quality can be maintained by adhering to the standards outlined in the Connecticut Guidelines for Soil Erosion and Sedimentation Control. The Drainage Narrative supplied with this proposal states, under Water Quality 5), that this is the standard to be used. A mechanism for periodic monitoring of installation and maintenance is necessary in order to insure that measures are functioning properly.

Impervious paved roads and parking lot surfaces can be reduced by 1) minimizing road widths and total lengths, which the proposal addresses, and 2) avoiding over sizing parking lots, and 3) using permeable surfaces for parking such as grass overflow parking as suggested in the current proposal or by using an engineered permeable paving product which allows for infiltration of storm water while providing for a surface which can adequately hold the weight of vehicles without disturbing soils. See Figure 5. Roofs can also be vegetated, with the larger initial costs offset by long-term energy savings on heating and cooling (Also see the Appendix).

Manufacture's site for information on pervious pavement products:
http://www.invisiblestructures.com/

Technical Information on "Green" roofing options:
http://www.communityresources.org/greenroof.html

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[2] Hicks, A.L. and J.S. Larsen. 1997. Aquatic invertebrates as an index for estimating the impacts of urbanization on freshwater wetlands. The Environmental Institute, University of Amherst, MA. Report submitted to U.S. Environmental Protection Agency, Corvallis, OR. Reinelt, L.E. and R.R. Horner, 1991. Urban storm water impacts on the hydrology and water quality of palustrine wetlands in the Puget Sound region. In: *Puget Sound Research '91 Proceedings*, Puget Sound Water Quality Authority, Vol. 1, pp. 33-42.

Reducing Storm Water Impacts

Curbing can be removed from the perimeter of paved areas, allowing sheet flow of stormwater over vegetated areas or through vegetated swales that can filter and infiltrate the runoff.

Storm water runoff can be directed to sunken vegetated islands (typically raised and curbed) that can filter and infiltrate storm water (raingardens or bio-retention areas). For more information on raingardens visit www.raingardens.org.

Perforated pipe can be utilized between catch basins to encourage infiltration. Stormwater leaching fields can be designed beneath paved areas.

Stormwater can be directed to an on-site infiltration basin or through a series of wet ponds that will filter out pollutants and can attenuate hydrologic impacts (stormwater "treatment train").

To minimize heat island effects, use light colored materials for paving (such as white gravel, grass pavers or natural soil pavement) and/or landscape to create a tree canopy.

(http://nemo.uconn.edu/reducing_runoff/parking_lots.htm)

Grid Pavers

Key Considerations for Grid Pavers

The type of sub-base used will determine the amount of infiltration the pavers provide.

Grid Pavers: Case Studies | Product Info | Photos

Plastic grid pavers are made mainly out of recycled plastic materials that provide a high porous surface using grass and gravel to make the area more attractive. These pavers are also flexible, allowing them to be used on uneven sites. This system is environmentally friendly because it uses recycled plastic, reduces stormwater runoff, helps prevent flooding, reduces non-point source pollution, reduces imperviousness of the area, and minimizes site disturbance.

They do not require curbs, certain drains, detention or retention ponds or any other associated drainage facility. This makes them competitively priced asphalt and concrete paving when their required drainage costs are factored in.

These pavers are recommended for use as sidewalks, parking areas, golf cart paths, residential driveways, fire lanes, emergency access roads, and others that are product specific.

(From National Education for Municipal Officials Website- http://nemo.uconn.edu/index.htm).

Figure 5 - Parking Lot Alternatives

Porous paving, green roofs can ease impact of development on water supplies
Tuesday, June 04, 2002
By Bill Bergstrom, Associated Press
http://www.enn.com/news/wire-stories/2002/06/06042002/ap_47426.asp

Using Depressed Vegetated Rain Gardens to Intercept Runoff

http://nemo.uconn.edu/reducing_runoff/index.htm
(See Figures 5, 9, 10, 11 and 12). By eliminating curbing and allowing for sheet flow of runoff to vegetated areas, the storm water runoff then contributes to vegetation growth instead of being conveyed towards a single point and then off the site. It is also possible to connect islands with overflows to, in effect, create a multi-cell infiltration and pollution mitigation system. Using light colored material to minimize heat absorption. (See Figure 9).

Landscaping and Site Maintenance

Excessive fertilizer on lawn areas can increase the eutrophication of ponds and pesticides can degrade aquatic habitats. Developing a landscape management plan which utilizes organic land conservation standards can minimize these impacts. The Northeast Organic Farming Associationís recent publication: "Standards for Organic Land Care" addresses some of these issues:
http://www.organiclandcare.net/publications/index.php

Other site maintenance activities that should be addressed as part of a site management plan include storage of chemicals used for landscaping, vehicle maintenance, pool maintenance; use of "pressure treated" lumber, on-site vehicle washing, and snow removal operations.

The proposal document "Drainage Narrative" states " The owner intends to use non-toxic/organic fertilizers to treat landscaping." A management structure must be in place so that it can be determined if standards remain in use over time.

Refer to Connecticut Regulations Sec. 19-13-B32. Sanitation of Watersheds and Proposed Aquifer Protection Regulations and
http://www.dep.state.ct.us/wtr/aquiprot/aparegs.pdf
for necessary procedures concerning site management for the protection of drinking supply watersheds.

The proposal document "Drainage Narrative" states that a "Drainage Maintenance Agreement will be established for the proposed development and filed on the city of Stamford Land Records to ensure the stormwater management system is properly maintained and functioning." There must sufficient continuous management oversight in order to ensure implementation of this plan over time.

Buffering Critical Soil & Water Resources

1) Buffers for protection of wetland and vernal pool resources

- Land Trust proposed 25 acres - The proposal calls for 25 contiguous acres to be turned over to the Land Trust. This guarantees buffers for wetlands and vernal pools located within most of this area, namely wetlands P,N,J,H,I,and F.

- Wetlands O,G,F,R,B,A,E and M, areas outside the 25 acres proposed for permanent open space, could be subject to disturbance in the near or far future. Wetland O is only partly within the preservation area, and wetland M is very close to the border of the developed area. The rest of the wetlands are within the area already, or to be, developed.

- Rock Outcrop areas provide unique plant and animal habitat. These areas and associated soils, especially immediately up or down slope, should be left undisturbed whenever possible.(See Figure 13).

- Establishing adequate buffers and establishing criteria which guarantees these buffers into the future would be essential for continued protection. One method is to establish conservation zones around wetlands and critical habitats, such as rock outcrop areas, which focus special site management conservation activities. These activities can include organic landscaping techniques, "low mow" areas, removal of invasive species and habitat enhancement projects. Developing defined conservations areas can make keeping track of sensitive areas easier and can be educational opportunities by clearly indicating areas of critical importance, thus reducing the possibility of encroachment of activities deleterious to the natural resources. (See Figure 8).

- Maintain a 100 foot buffer for a "Vernal Pool Envelop" (Calhoun & Klemens,2002), adjacent to the Vernal Pool in wetlands O (See Figure 8). The buffer should not only include vegetation as a buffer for erosion prevention and light pollution, but also to inhibit intrusion of pedestrian traffic, litter and the like. A dense line of vegetation in conjunction with a stone wall, rail fence or swale could be used. Management recommendations from Calhoun & Klemens Best Development Practices, for a Vernal Pool Envelop are:

  Maintain an undeveloped forested habitat around the pool, including both canopy and understory.

  Avoid barriers to amphibian dispersal

Protect and maintain pool hydrology and water quality

Maintain a pesticide free environment

2) Septic Systems. The large "built up" septic system construction should be monitored closely and engineering design adjustments made in the field as needed. The Charlton soils found in this area can have included soils with slow or very slow permeability in the substratum.(See the soils section under CfB) Lenses of impermeable soil can exist in small isolated areas (i.e. in locations that fall between the locations of the soil test pits), contributing to system failure over time if adequate engineering adjustments are not accomplished in the field at the time of construction.

Other Conservation Considerations

One of the houses is slated for unspecified removal as part of this project.(See Figure 6). Current constraints on construction and demolition waste disposal, the developing used building materials market and the recently developed building deconstruction businesses (some of whom will provide a cost estimate for a complete deconstruction process) now provide an opportunity to save 80-95% of the materials of a structure. The environmental and economic implications of this alternative to typical demolition are far reaching and indirectly effect soil and water conservation on a large scale. A cost benefit analysis that considers a basic option protocol is warranted. Deconstruction, particularly on older buildings in good condition, is now often less expensive than typical demolition.

Roughly that protocol is:

1. Use the building in its current form and location
2. Use the building in its current form as close to the current location as possible (relocate it to an adjacent site).
3. Deconstruct the building and use as much material as possible on site
4. Deconstruct the building and market the materials for their highest and best use.
5. Recycle what cannot be reused
6. Dispose what cannot be recycled.

http://www.cce.ufl.edu/past/deconstruction/conclusion.html

http://www.ilsr.org/recycling/selectedprojects.htm

Some municipalities are now requiring demolition companies to include deconstruction cost comparisons as part of the demolition contract bid.

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Calhoun, Aram J. K., Klemens, Micheal W. Best Development Practices Conserving Pool- Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States. Metropolitan Conservation Alliance. Rye, New York.

Doenges, James M.; Allan; Christopher P.; Benson, James; Jontos, Robert J., Jr. Protecting Connecticut's Water-Supply Watersheds: A Guide For Local Officials. Land Tech Consultants, Southbury ,Ct. January, 1993.

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Wolf, Barrie L. Soil Survey of Fairfield County, Connecticut United States Department of Agriculture, Soil Conservation Service. 1979.

Yaro & Hiss. "A Region at Risk: The Third Regional Plan for the New York-New Jersey-Connecticut Metropolitan Area" Regional Plan Association, 1996.

Figure 6 - House to be removed according to proposal.

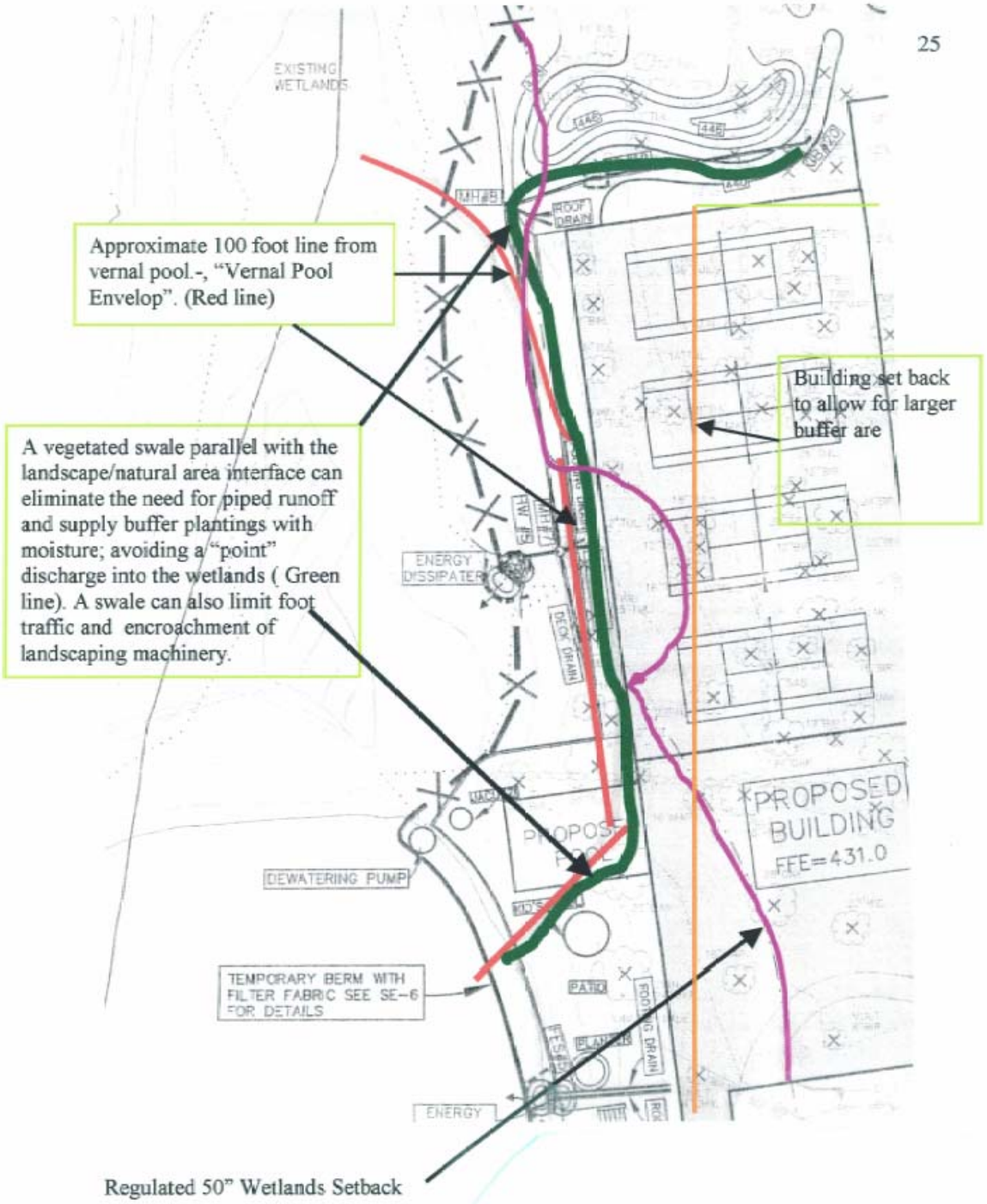


Figure 7 - Suggested Buffer at Wetlands O

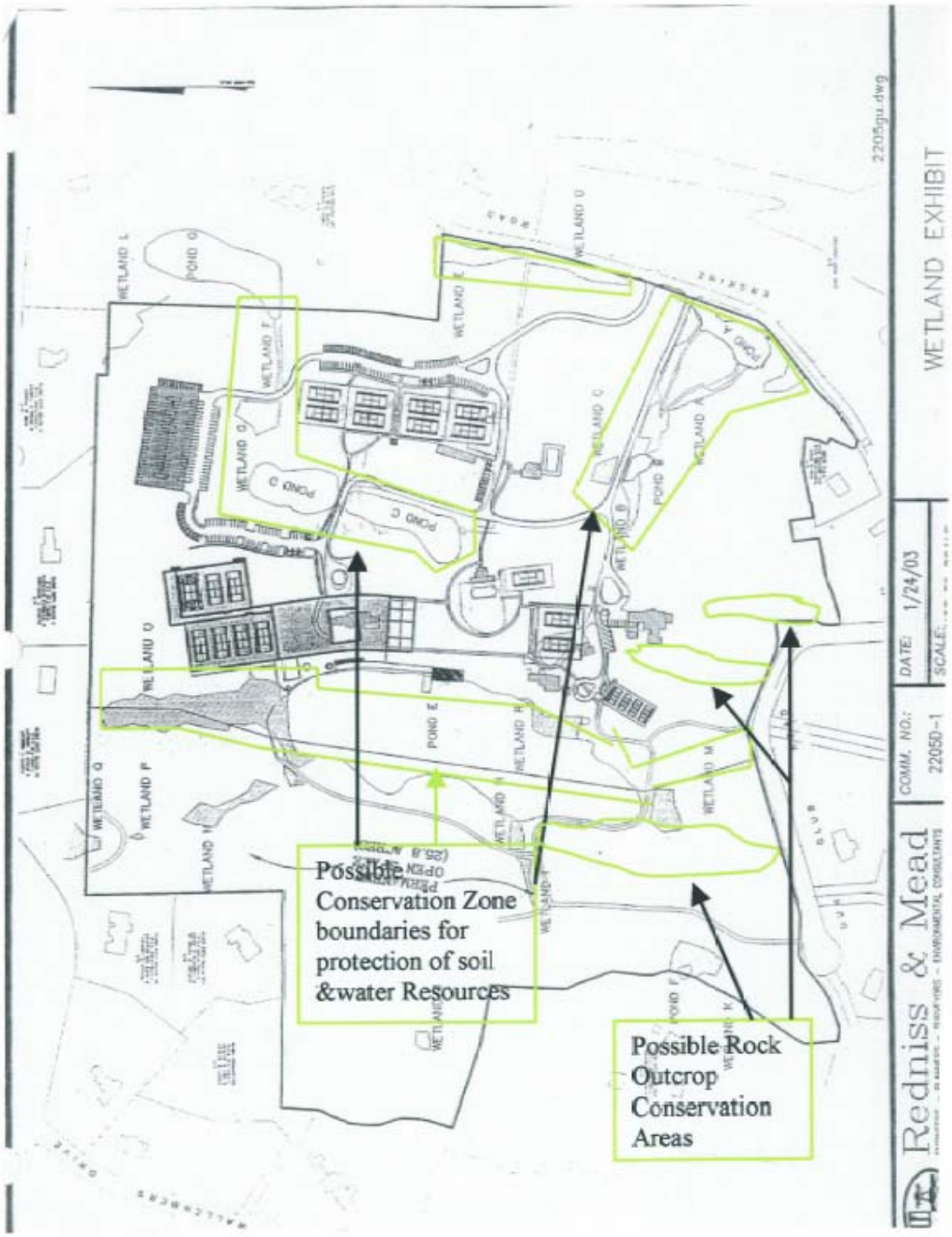


Figure 8 - Suggested Conservation Area

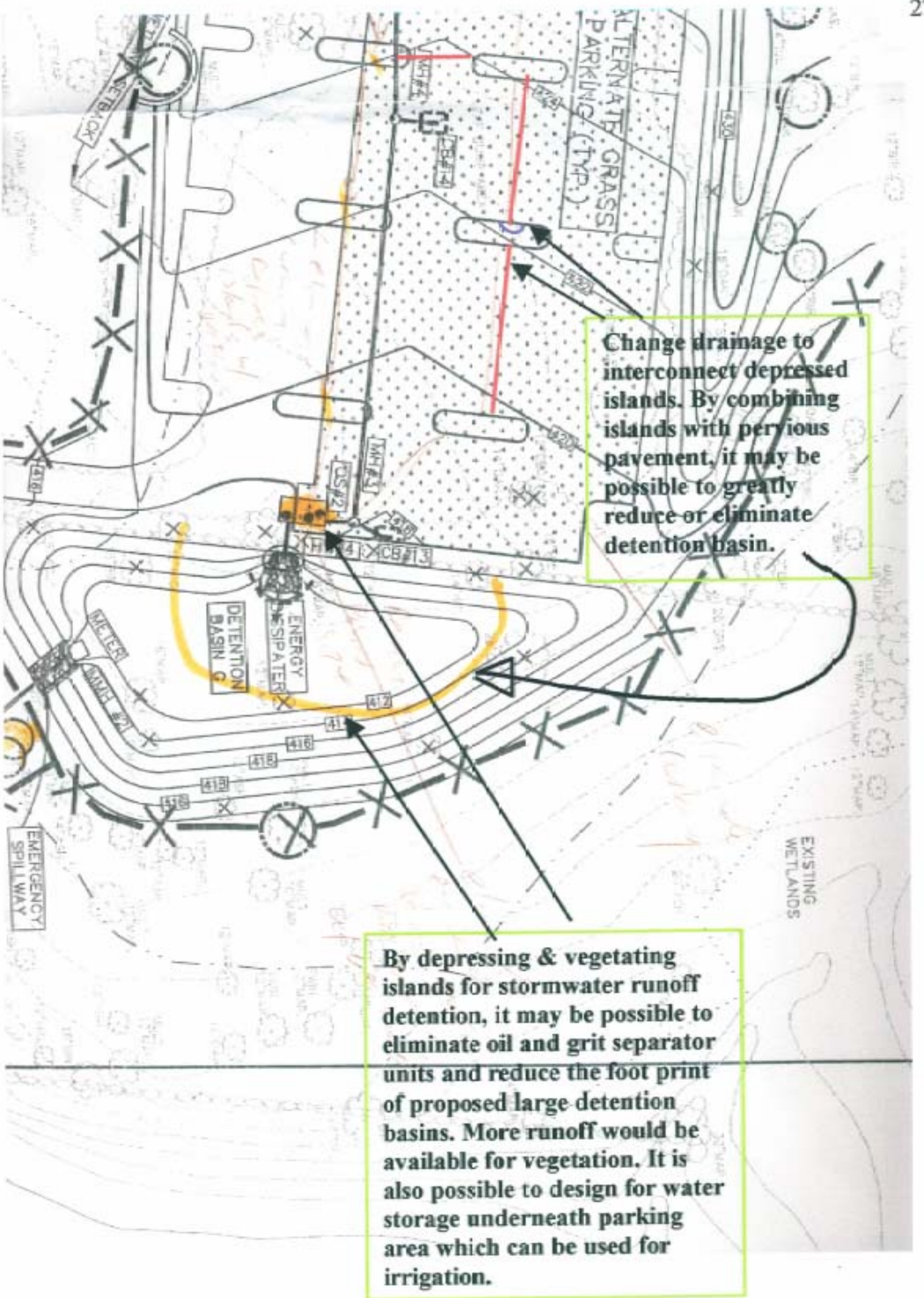


Figure 9 - Parking Lot Configuration for Stormwater Control

Figure 10 - Depressed Parking Lot Island Concept

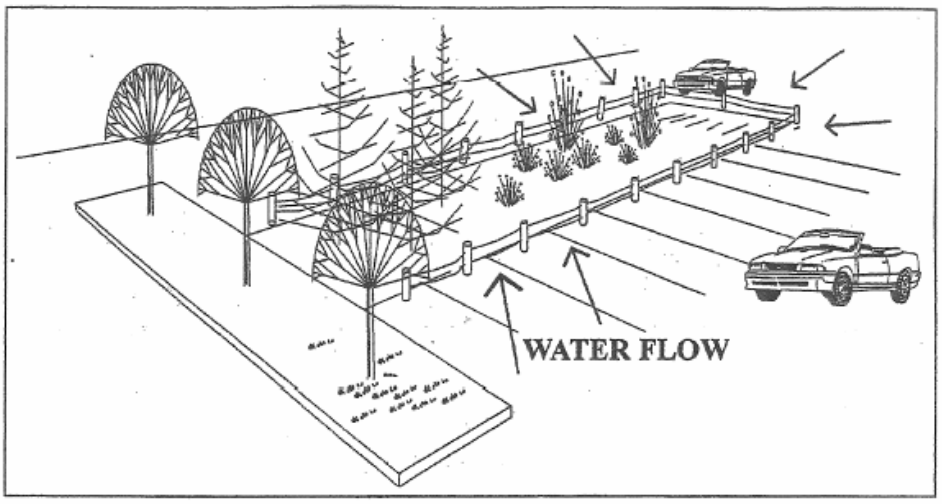


FIGURE 6. Sunken vegetated parking lot "islands" intercept and treat runoff.
Source: John Alexopoulos, University of Connecticut

Figure 11 - Drainage Alternatives

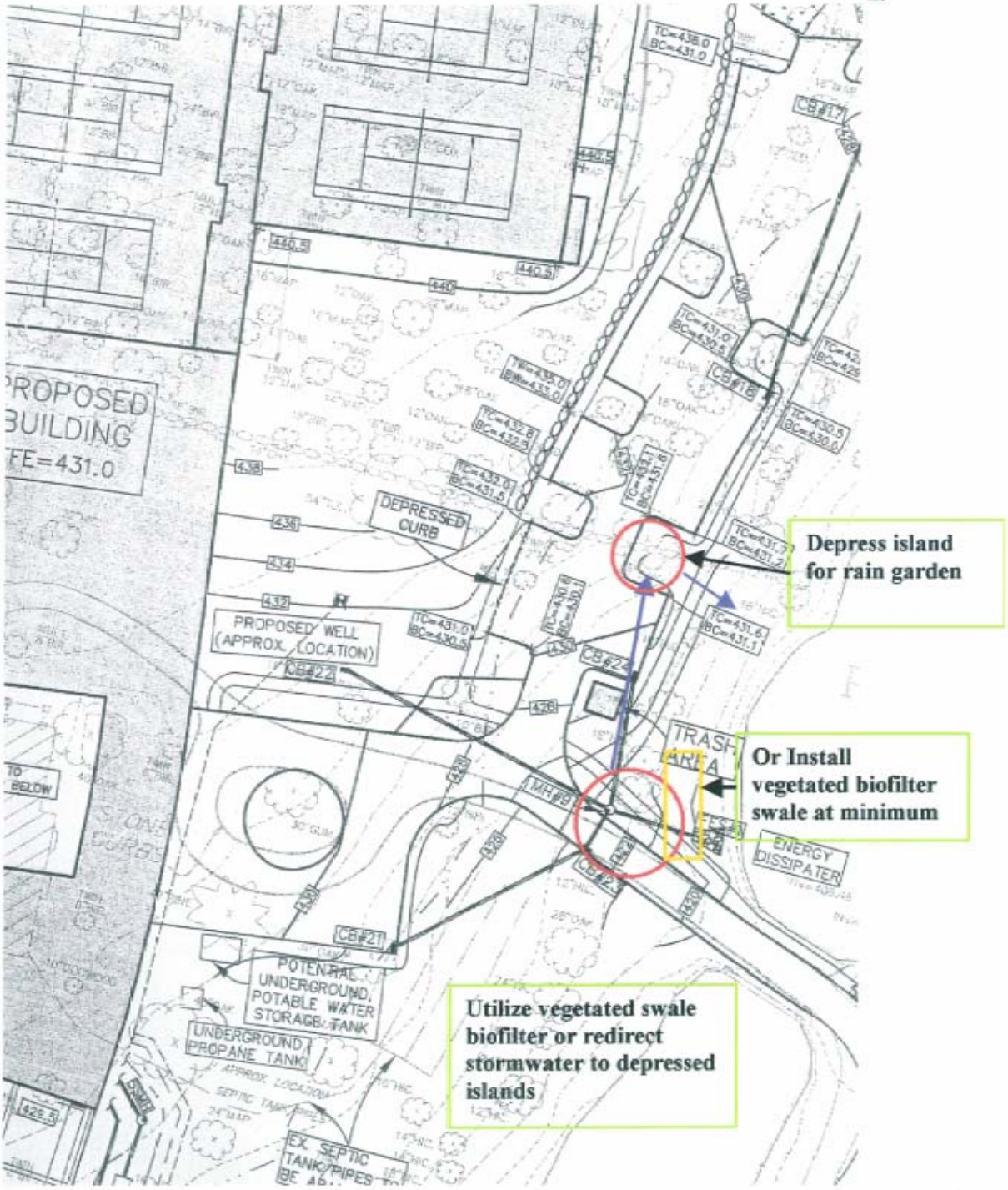


Figure 12 - Drainage Alterations - 2

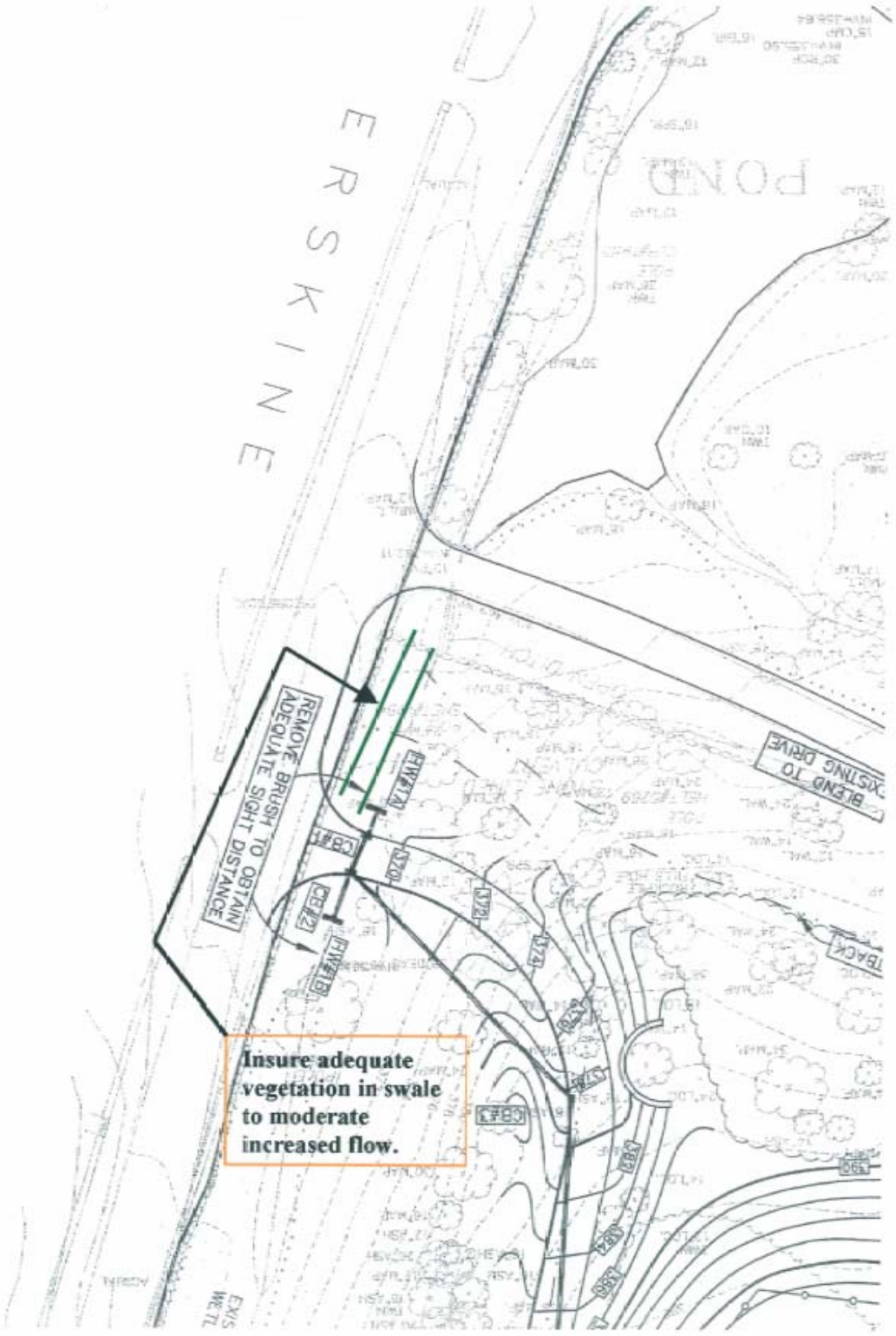
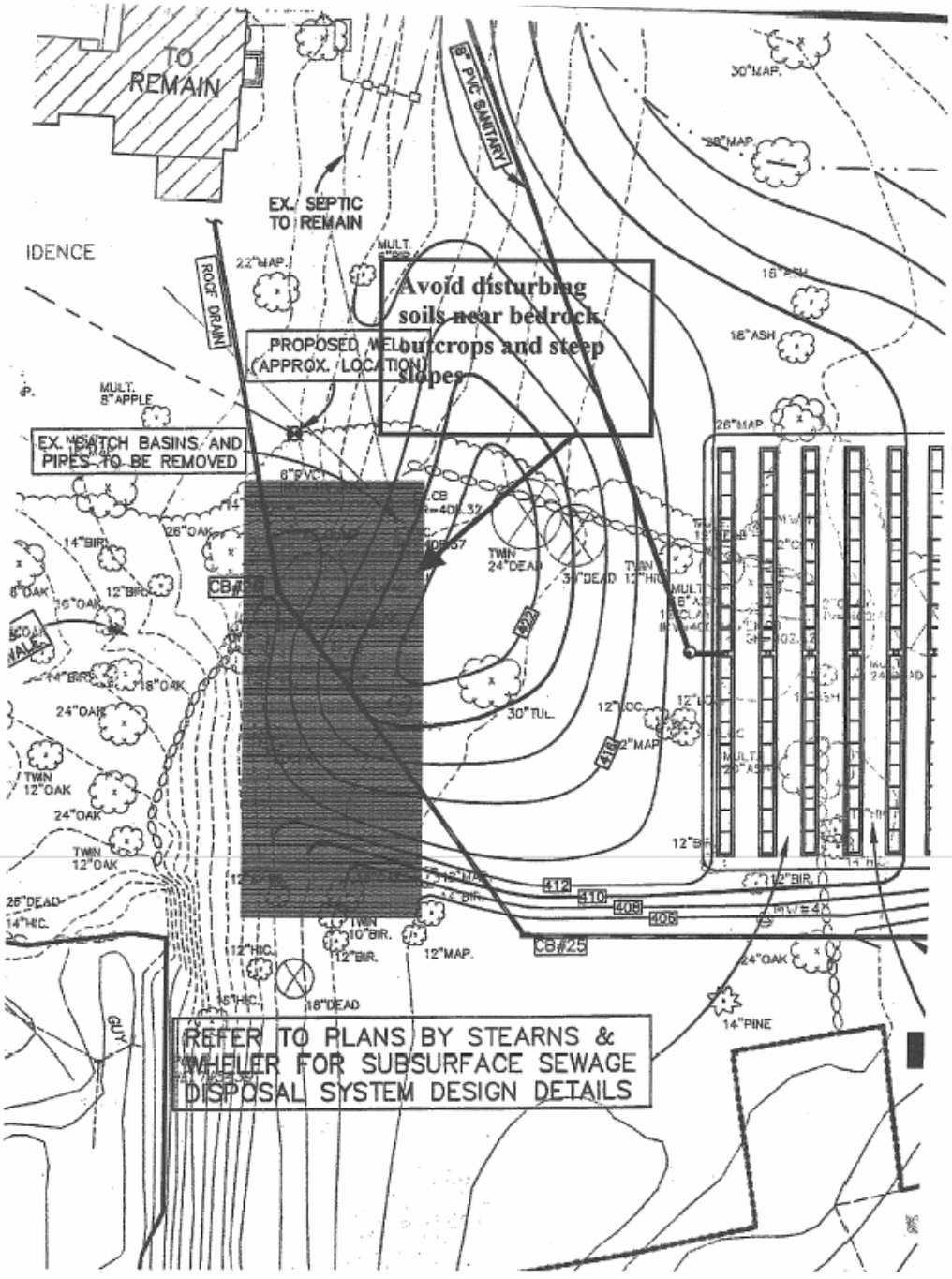


Figure 13 - Bedrock Outcropping



Soils

Wetland Soils

Rn - Ridgebury, Leicester, and Whitman extremely stony fine sandy loams. This unit consists of poorly drained and very poorly drained soils in depressions and drainageways on uplands and in valleys. Stones and boulders cover 5 to 35 percent of the surface. The areas are irregularly shaped or long and narrow and mostly range from 3 to 50 acres. Slopes range from 0 to 8 percent but are dominantly less than 3 percent.

The major soils in this unit have a seasonal high water table at or near the surface from fall through spring. The permeability of the Ridgebury and Whitman soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The permeability of the Leicester soils is moderate or moderately rapid throughout. Available water capacity is moderate in all three soils. Runoff is slow on all three, and water is ponded on the surface of some areas of the Whitman soils. The Ridgebury and Leicester soils very strongly acid to medium acid, and the Whitman soils are very strongly acid to slightly acid. These soils dry out and warm up slowly in the spring.

The high water table, ponding, and the stones and boulders on the surface limit these soils for community development. Onsite septic systems require extensive filling and special design and installation because of the high water table. Excavations are commonly filled with water, and many areas do not have suitable drainage outlets. Quickly establishing plant cover and using siltation basins help to control erosion and sedimentation during construction.

This unit has fair suitability for use as woodland. The Ridgebury soils have moderate productivity. These soils are limited mainly by their wetness and stoniness. Seedling mortality is high and windthrow is common because the high water table restricts the rooting depth for trees during much of the year. Woodland may, however, be one of the best uses of this unit. Trees to favor in existing woodlots are eastern white pine, sugar maple, red maple, and northern red oak. Trees to plant are eastern white pine and white spruce.

AQ - Aquent soils. This map unit consist primarily of man-made or man-disturbed cut and/or fill areas that are wet. These soils have a seasonally high watertable at less than 2 feet; have an acquent moisture regime and can be expected to support hydrophytic vegetation. Typically, these soils are in places where a less than 2 foot thick layer of earthy material has been placed over poorly and very poorly drained soils; or where the natural soils have been

mixed so that the natural soil layers are not identifiable; or where the soil materials have been excavated to the ground watertable. These soils are inland wetland soils.

Non Wetland Soils

Charlton Series

CrC - Charlton - Hollis fine sandy loams, 3 to 15 percent slopes. This complex consists of gently sloping and sloping, well drained soils on uplands where the relief is affected by the underlying bedrock Slopes are concave or convex and mostly 50 to 300 feet long. The areas have a rough surface with bedrock outcrops and a few narrow intermittent drainageways and small wet depressions. In most areas, 3 to 25 percent of the surface is covered with stones and boulders. The areas are mostly 5 to 125 acres in size. Approximately 45 percent of these areas is Charlton fine sandy loam, 30 percent is Hollis fine sandy loam, and about 25 percent is other soils.

The Charlton and Hollis soils are in such a complex and intermingled pattern that they could not be separated in mapping. Included with this complex in mapping are small areas, generally less than 1 acre in size, of moderately well drained Sutton soils, well drained Paxton and Agawam soils, and poorly drained Leicester soils. Also included are many small and intermingled areas where the bedrock is 20 to 40 inches from the surface. Included areas make up 5 to 20 percent of this map unit.

The Charlton soil has moderate or moderately rapid permeability. It has high available water capacity. Runoff is medium to rapid. This soil has a low shrink-swell potential.This complex has fair to poor potential for community development. It is limited mainly by the steepness of slopes and stoniness. The included Hollis, Sutton, Leicester and Paxton soils all have limitations for community development (see descriptions above and below).

This soil complex is suitable for growing trees. Most of this complex is presently in woodland. The Charlton soil has moderate productivity. The Hollis soil has low productivity because of a severe hazard of seedling mortality and a moderate hazard of tree windthrow caused by the shallow rooting zone above the bedrock. Machine planting is somewhat difficult but feasible in areas without stones and boulders; however, it is not feasible in most areas because of stoniness, rock outcrops, and shallowness to bedrock. Tress to favor in existing woodlots are eastern white pine, northern red oak, sugar maple, and red maple. Trees to plant are eastern white pine, white spruce, European larch, and eastern hemlock.

CnC - Charlton extremely stony fine sandy loam, 3 to 15 percent slopes. This gently sloping to sloping, well rained soil is on hills and rides. Stones and boulders cover 5 to 35 percent of the surface. The areas are mostly irregular in shape and range from 5 to 150 acres.

Typically , the surface layer is very dark brown fine sandy loam 6 inches thick. The subsoil is strong brown and yellowish brown fine sandy loam 23 inches thick. The substratum is light olive brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat excessively drained Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils and small area of soils with bedrock at a depth of 20 to 40 inches. Included areas make up about 15 percent of this map unit.

The permeability of this Charlton soil is moderate or moderately rapid. Runoff is rapid, and available water capacity is moderate. The soil dries out and warms up early in spring. It is very strongly acid to medium acid. The hazard of erosion is moderate.

Slope and the stones and boulders on the surface are main limitations of this soil for community development. Slope makes careful design and installation of onsite septic systems necessary to prevent effluent from seeping to the surface. The removal of stones and boulders is necessary for landscaping. Quickly establishing plant cover, mulching, and using siltation basins and diversions help to control erosion and sedimentation during construction. The soil is suitable for trees, but the stones and boulders make machine planting impractical.

CnD - Charlton extremely stony fine sandy loam, 15 to 35 percent slopes. This moderately steep and steep, well drained soil is on hills and ridges. This Charlton soil has a severe erosion hazard

CfB - Charlton fine sandy loam, 3 to 8 percent slopes. This gently sloping, well drained soil is on hills and ridges. The areas are mostly irregular in shape and range from 4 to 100 acres The permeability of this Charlton soil is moderate or moderately rapid. Runoff is medium, and available water capacity is moderate. This soil is generally suitable for community development. Quickly establishing plant cover, mulching, and using siltation basins help control erosion during construction.

Included with this soil in mapping are small areas of somewhat excessively drained Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils and small areas od soils with bedrock at a depth of 20 to 40 inches. Included areas make up about 15 percent of this map unit.

PdB - Paxton very stoney fine sandy loam, 3 to 8 percent slopes. This gently sloping , well drained soil is on drumlins and hills. Stones and boulders cover 1 to 5 percent of the surface. The areas are irregularly shaped and mostly range from 4 to 50 acres. Typically , this soil has a surface layer of dark brown fine sandy loam 6 inches thick. The subsoil is brown fine sandy loam 22 inches thick. The substratum is very firm, brittle, grayish brown gravelly sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Charlton and Stockbridge soils, moderately well drained Georgia and Woodbridge soils, and poorly drained Ridgebury soils. Included areas make up about 15 percent of this map unit.

The permeability of this Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Runoff is medium, and available water capacity is moderate. The soil is very strongly acid to slightly acid.

The slow or very slow permeability in the substratum is the main limitation of this soil for community development; onsite septic systems require special design and installation to prevent effluent from seeping to the surface. Quickly establishing a plant cover, mulching, and using siltation basins help to control erosion and sedimentation during construction.

Hollis Series

HrE - Hollis-Rock outcrop- Charlton complex, 15 to 45 percent slopes.

The Hollis series consists of somewhat excessively drained, nonstony to extremely stony soils that formed in a thin mantle of loamy glacial till derived mainly from gneiss and schist.This complex consists of moderately steep to very steep soils on hills and ridges. The areas are irregularly shaped and mostly range from 5 to 300 acres. They have an undulating topography marked with exposed bedrock, a few narrow drainage ways, and a few small, wet depressions. Stones and boulders cover 1 to 5 percent of the surface.

The complex is about 40 percent somewhat excessively drained Hollis soils, 25 percent exposed bedrock, 20 percent well drained Charlton soils, and 15 percent other soils. The Hollis and Charlton soils and the areas of exposed bedrock are so intermingled that it was not practical to map them separately.

Typically, the Hollis soils have a surface layer of very dark grayish brown fine sandy loam 3 inches thick. The subsoil is dark brown and dark yellowish brown gravelly fine sandy loam and fine sandy loam that extends to bedrock at a depth of 17 inches.

Typically, the Charlton soils have a surface layer of very dark brown fine sandy loam 4 inches thick. The subsoil is strong brown and yellowish brown fine sandy loam 25 inches thick. The substratum is light olive brown gravelly sandy loam to a depth of 60 inches or more.

Included with this complex in mapping are small areas of moderately drained Sutton and Woodbridge soils, poorly drained Leicester soils, and very poorly drained Adrian soils. Also included are small areas of soils with bedrock at a depth of 20 to 40 inches. A few small areas have slopes of as much as 90 percent, and a few areas stones and boulders cover more than 5 percent of the surface.

These Hollis and Charlton soils have moderate or moderately rapid permeability. Runoff is medium to rapid. The available water capacity is low in the Hollis soils and moderate in the Charlton soils. Both soils dry out and warm up early in spring. Both are very strongly acid to medium acid.

These soils are considered having severe conditions for building site development and septic systems (soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required). The major limitations of this complex for community development are the shallow depth to bedrock in the Hollis soils and the areas of exposed bedrock. The shallow depth to bedrock causes the uprooting of many trees during windy periods. Quickly establishing plant cover, mulching, and using siltation basins and diversions help to control erosion and sedimentation during construction

The stones and boulders on the surface restrict the use of farming equipment and make the soil unsuitable for cultivated crops. Although the stones and boulders hinder machine planting, the soil is well suited to trees, and machine planting is practical in most areas.

HpC - Hollis - Charlton-Rock outcrop complex, 3 to 15 percent slopes.

This complex consists of gently sloping and sloping soils on hills and ridges. The areas are irregularly shaped and mostly range from 5 to 200 acres. They have an undulating topography marked with exposed bedrock, a few narrow drainageways, and a few small, wet depressions. Stones and boulders cover 1 to 5 percent of the surface. The complex is about 35 percent somewhat excessively drained Hollis soils, 20 percent well drained Charlteon soils, 20percent exposed bedrock, and 25 percent other soils. The Hollis and Charlton soils and exposed bedrock are so intermingled on the landscape that it was not practical to map them separately.

The major limitations of this complex for community development are the shallow depth to bedrock in the Hollis soils and the areas of exposed bedrock. Quickly establishing plant cover, mulching, and using siltation basins and diversions help to control erosion and sedimentation during construction.

The complex is unsuitable for cultivated crops and poorly suited for trees. The major limitations for both uses are the areas of exposed bedrock, the shallow depth to bedrock in the Hollis soils, and the stones on the surface. The shallow depth to bedrock causes the uprooting of many trees during windy periods.

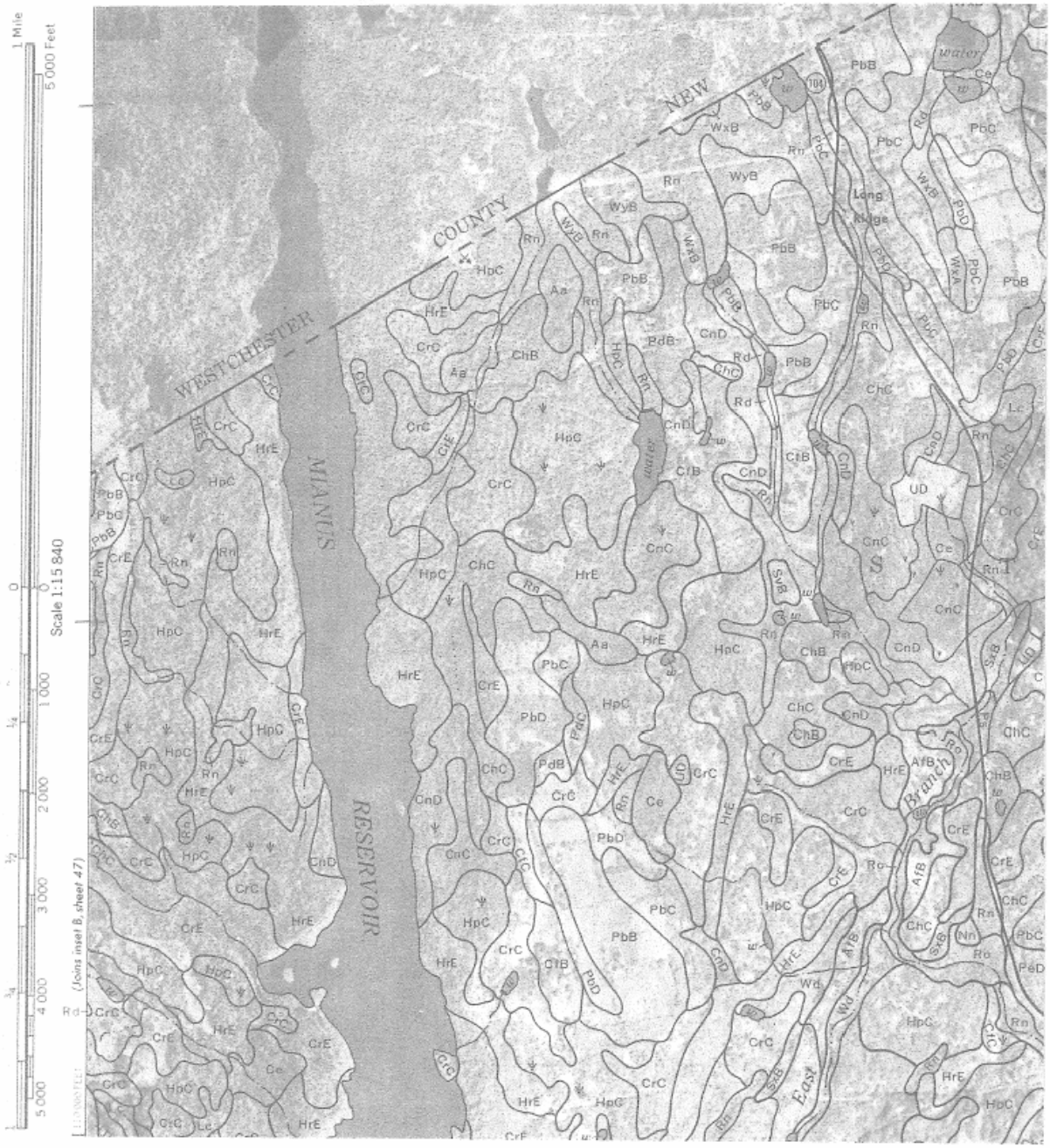
Ud - Udorthents, smoothed. This unit consists of areas that have been altered by cutting or filling. The areas are commonly rectangular and mostly range from 5 to 100 acres. Slopes are mainly 0 to 25 percent. The material in these areas is mostly loamy, and in the filled areas are on flood plains, in tidal marshes, and on areas of poorly drained and very poorly drained soils.

Included with this unit in mapping are small areas of soils that have not been cut or filled. Also included are a few larger urbanized areas and a few small areas containing material such as logs, tree stumps, concrete, and industrial wastes. A few areas have exposed bedrock. Included areas make up about 30 percent of this map unit. The properties and characteristic of this unit are variable, and the unit requires onsite investigation and evaluation for most uses.

Figure 14

Soils Map

Scale 1" = 1320'



Stormwater Management

The Courts at Birch Meadow

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

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. Silt fence installation must comply with the guidelines, and may be used only in drainage areas of one acre or less.

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 Consenation Distict 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.

This project has numerous wetland areas (both on-site and in close proximity off-site) 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. 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.

In addition, the plan must include monthly inspections of stabilized areas for at least the months following stabiliztion. There must be someone available to

design and adjust E&S controls for changing site conditions, who has the authority and resources to ensure that such necessary changes are implemented.

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.

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 accordane with the guidelines and provide a minimum of 134 cubic yards of water storage per acre drained. Particular care must be taken near the swimming pond in the center of the site and at the location of vernal pool(s). Leave as large a vegetative buffer as possible in these areas. Maintenance of all structural controls shall be performed in accordance with guidelines and the Plan must identify these practices.

The permit (Section 6(b)(6)(C)(iii)) requires that the plan include a design for post-construction stormwter treatment of 80% of total suspended solids from the completed site. In order to comply with this requirernent, the Department recommends incorporating swirl concentrator technology.

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.

Other Issues

Upon completion of construct;on, if the site has more than five acres of impervious surface construction, it may be necessary to register for the General Permit for Discharge of Stormwater Associated with Commercial Activity and prepare a stormwater management plan.

The executive summary plan mentions a maintenance agreement and refers to Planting Plans Sheet L-3 and L-4 prepared by Brown-Sardina but does not give enough detail and does not include maintenance of post-construction stormwater devices (basins and oil-water separators). The maintenance agreement must include the party responsible for maintenance.

Several areas on-site which appear to have been used as a dumpsite for leaves and bottles must be cleaned before construction commences.

The maintenance garage must be thoroughly evaluated to determine the purpose and the discharge point of the floor drains. The drains will need to be

clean or the discharges may need permit if the garage will be used as a maintenance area.

Potential Birch Meadow Subdivision

Stormwater Permitting

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").

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. It should also be noted that the permit requires compliance with the guidelines. The developer must register for the permit, and the contractor and any subcontractors involved in grading must sign the contractor certification statement in the permit. Any registration submitted by anyone other than the developer will be rejected.

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 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. The permit requires that "the plan shall ensure and demonstrate compliance with" the guidelines.

The Plan must be flexible to account for adjustment of controls as necessary to meet field conditions. At a minimum, the plan must include interior controls appropriate to different phases of construction.

This project has steep slopes and a large amount of wetlands that must be protected, which will makes weekly inspections and modifications to erosion controls an important part 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. 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.
In addition, the plan must include monthly inspections of stabilized areas for at least three months following stabilization and the end of construction. Due to the scope and potential wetland and stream impacts of this project, there must be someone available to design and adjust E&S controls for changing site conditions, who has the authority and resources to ensure that such necessary changes are implemented.

Section 6(b)(6)(C)(ii) of the permit requires the plan to address dewatering wastewaters that this site may generate. If wetland crossings are necessary, specific details for construction control during installation of all crossings must be provided.

Post-construction Stormwater Treatment

The permit (Section 6(b)(6)(C)(iii)) requires that the plan include a design for post- construction stormwater treatment of 80% of total suspended solids from the completed site. In order to comply with this requirement, the Department recommends incorporating swirl concentrator technology. Although swirl concentrators are effective at removing sediments they require a long-term maintenance commitment from the town or a homeowners association greater than that required for a basin once it is fully grown-in and stabilized. If an in-ground, "black box" solution is used, swirl concentrator technology is a minimum requirement. Some newer generation swirl concentrators also incorporate filtration systems to address other pollutant issues, but these also require long-term maintenance plans.

Erosion and Sediment Control Notes

General permit stabilization requirements include the following "where construction activities have permanently ceased or have temporarily been suspended for more than seven days or where final grades are reached in any portion of the site, stabilization practices shall be implemented within three days."

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, *the developer* is still responsible for erosion control and maintenance of all control structures for three months after final stabilization of the site.

Several areas on-site which appear to have been used as a dumpsite for leaves and bottles must be cleaned before construction commences.
The maintenance garage must be thoroughly evaluated to determine the purpose and the discharge point of the floor drains. The drains will need to be clean or the discharges may need a permit if the garage will be used as a maintenance area.

Since the plan for the subdivision is only in its preliminary form, this section of the ERT report addresses only some of the major issues concerning the project and does not constitute a complete review of the project for permitting purposes.

Archaeological Review

A review of the state of Connecticut Archeological Site Files and Maps show no known archaeological site on the project area. However, the project boundaries are located to the southwest of the Long Ridge Village Historic district, which is listed on the National Register of Historic Places. Due to the short distance between the proposed development and the Long Ridge Village Historic District, the State Historic Preservation Office and the Office of State Archaeology expects that the Courts at Birch Meadow will not alter the historic ambiance of the national register historic district.

While no prehistoric and historic archaeological resources have been previously identified or reported from the project area, our offices believe that the 74-acre development parcel possesses moderate to high sensitivity for prehistoric archeological resources based upon environmental and topographic setting. As a result, the Office of State Archaeology and the State Historic Preservation Office 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 effected by construction activities. All archaeological studies should be conduced in accordance with the Connecticut Historical Commission's *Environmental Review Primer for Connecticut's Archaeological Resources.* In addition, our offices are prepared to offer any technical assistance in conducting the survey.

Appendix

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POUROUS PAVEMEN

Grasspave^2

Grasspave^2 is an "invisible" porous paving technology that combines recycled raw materials, sound structural engineering, efficient production techniques and proven horticultural methods to give designers a living turfgrass alternative to asphalt for traffic-bearing project applications.

Grasspave^2 has thin-walled independent plastic rings connected by an interlocking geogrid structure, which, when installed below the surface, is invisible in the completed project. While the rings are rigid, the grid itself is flexible, which makes it easy to install on uneven grades, and reduces usual cut and fill requirements.

The rings transfer loads from the surface to the grid structure and engineered base course materials below, thus preventing compaction of the upper root zone of the grass.

The rings also act to contain the root zone medium (usually sand) and prevent lateral migration away from tires, feet or other loads. This protects the grass root system, enabling roots to grow deep into the porous base course.

The result is healthy, green turf at the surface.

Features and Benefits:

- Allows 100% grass coverage instead of asphalt
- Made from 100% post-consumer recycled plastic
- High strength to weight load-bearing capacity
- Supports vehicular and pedestrian traffic

About the Team

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, soil scientists, foresters, climatologists and landscape architects, recreational specialists, engineers and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - an 83 town area serving western Connecticut.

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

Purpose of the Environmental Review Team

The Environmental Review Team is available to assist towns in the review of sites proposed for major land use activities or natural resource inventories for critical areas. For example, the ERT has been involved in the review of a wide range of significant land use activities including subdivisions, sanitary landfills, commercial and industrial developments and recreation/open space projects.

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

Requesting an Environmental Review

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of an administrative agency such as planning and zoning, conservation or inland wetlands. Environmental Review Request Forms are available at your local Soil and Water Conservation District and through the King's Mark ERT Coordinator. This request form must include a summary of the proposed project, a location map of the project site, written permission from the landowner/developer allowing the Team to enter the property for the purposes of a review and a statement identifying the specific areas of concern the Team members should investigate. When this request is reviewed by the local Soil and Water Conservation District and approved by the King's Mark RC&D Executive Council, the Team will undertake the review. At present, the ERT can undertake approximately two reviews per month depending on scheduling and Team member availability.

For additional information regarding the Environmental Review Team, please contact the King's Mark ERT Coordinator, Connecticut Environmental Review Team, P.O. Box 70, Haddam, CT 06438. The telephone number is 860-345-3977.