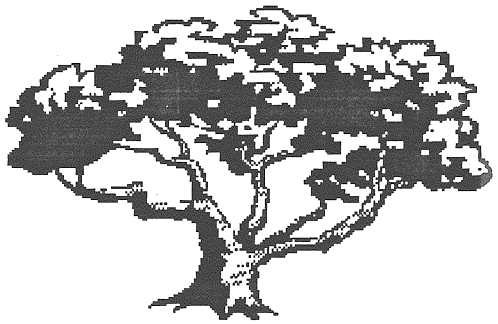
CHARTER OAK GOLF CLUB

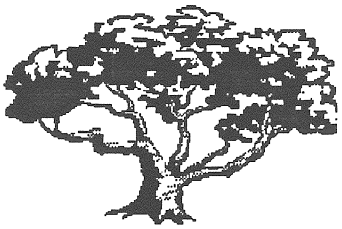
Goshen, Connecticut



King's Mark Environmental Review Team Report

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

CHARTER OAK GOLF CLUB



Goshen, Connecticut

Environmental Review Team Report

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

for the

Inland Wetlands Commission
Goshen, Connecticut

March 2002

CT Environmental Review Teams
1066 Saybrook Road, P.O. Box 70
Haddam, CT 06438
(860) 345-3977

King's Mark ERT Report #310

ACKNOWLEDGMENTS

This report is an outgrowth of a request from the Goshen Inland Wetlands Commission to the Litchfield County Soil and Water 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 Tuesday, October 23, 2001.

Nicholas Bellantoni	State Archaeologist Office of State Archaeology UCONN - CT Museum of Natural History (860) 486-5248
Sean Hayden	Resource Conservationist Litchfield County Soil & Water Conservation District (860) 626-7222
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*Don Mysling	Senior Fisheries Biologist DEP - Fisheries Division Habitat Conservation & Enhancement Program (860) 567-8998
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Judith Singer	Groundwater Hydrogeologist, RPG, CHMM Environmental Analyst III DEP - Pesticide Management Division Groundwater Protection Program (860) 424-3326
Randolph Steinen	Geologist UCONN - Department of Geology and Geophysics (860) 486-1390
Joseph Wettemann	Senior Sanitary Engineer DEP - Bureau of Water Management Permitting, Enforcement and Remediation (860) 424-3803
Judy Wilson	Wildlife Biologist DEP - Wildlife Division Sessions Woods Wildlife Management Area (860) 675-8130

*Report not yet received, anticipated mid/late March 2002.

I would also like to thank Tom Stansfield, chairman, Goshen inland wetlands commission, Martin Connor, town planner, Richard Calkins, consulting engineer for Goshen, Vince McDermott, project engineer, David Murphy, project hydrologist Bill Root, project consultant, Peter Herbst, attorney for 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 additional plans and information. Some Team members unable to attend the field review made visits on their own and others made additional field visits to the site. Following the review, reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the town and landowner. 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 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 King's Mark RC&D Executive Council hopes you will find this report of value and assistance in the review of this proposed golf course.

If you require additional information please contact:

Elaine Sych, ERT Coordinator
CT ERT Program
P. O. Box 70
Haddam, CT 06438
(860) 345-3977

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INTRODUCTION

Introduction

The Goshen Inland Wetlands Commission has requested assistance from the King's Mark Environmental Review Team in reviewing an 18 hole golf course proposed for a 625 acre parcel.

The Charter Oak Golf Club will consist of an 18-hole golf course, clubhouse with a restaurant, limited overnight accommodations, and associated maintenance and recreation (pool, tennis) facilities.

The site is located immediately south of Hageman Shean Road and west of East Street North. The parcel known as Ivy Mountain Farm was a dairy farmland is currently used for grazing a small number of beef cattle on a seasonal basis. Large properties that abut the parcel include Torrington Water Company lands, a DEP wildlife management area, and Ivy Mountain State Park. There are about 15 other smaller privately owned parcels that abut or are within 500 feet of the property boundary.

Approximately 225 acres consist of fields and former grazing areas with the remainder being forested. ±328 acres are designated as open space. Ivy Mountain Brook runs north to south through the property and divides it roughly in half. The brook has been dammed to create Ivy Mountain Pond, an ±6 acre impoundment. The golf course has been designed to use the fields and grasslands and to preserve as much of the forestland as possible.

The golf course will require irrigation water and potable water sources. Irrigation water will come from bedrock wells and Ivy Mountain Pond with additional storage in the reconstructed and expanded farm ponds. A subsurface sewage disposal system will serve the locker rooms, restaurant and overnight accommodations.

Objectives of the ERT Study

The commission has asked for assistance with the review of this project because of a concern with environmental impacts. The commission is requesting assistance in identifying site resources and factors that should be included in the evaluation of the proposed development. The ERT is asked to suggest measures that could be included to minimize adverse impacts on site resources and the surrounding area. Major concerns have focused on impacts to sensitive areas, ground and surface water quality issues, wetland and stream impacts, water supply, protection of inland wetlands and wildlife corridors and habitats, and an evaluation of traffic and access to the site and open space and recreational opportunities.

The ERT Process

Through the efforts of the Goshen Inland Wetlands Commission, this environmental review and report was prepared for the town of Goshen.

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

The review process consisted of four phases:

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

The data collection phase involved both literature and field research. The field review was conducted on Tuesday, October 23, 2001. 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. Some Team members made separate and/or additional site visits.

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

⇑

Approximate Location Map

Scale 1" = 2000

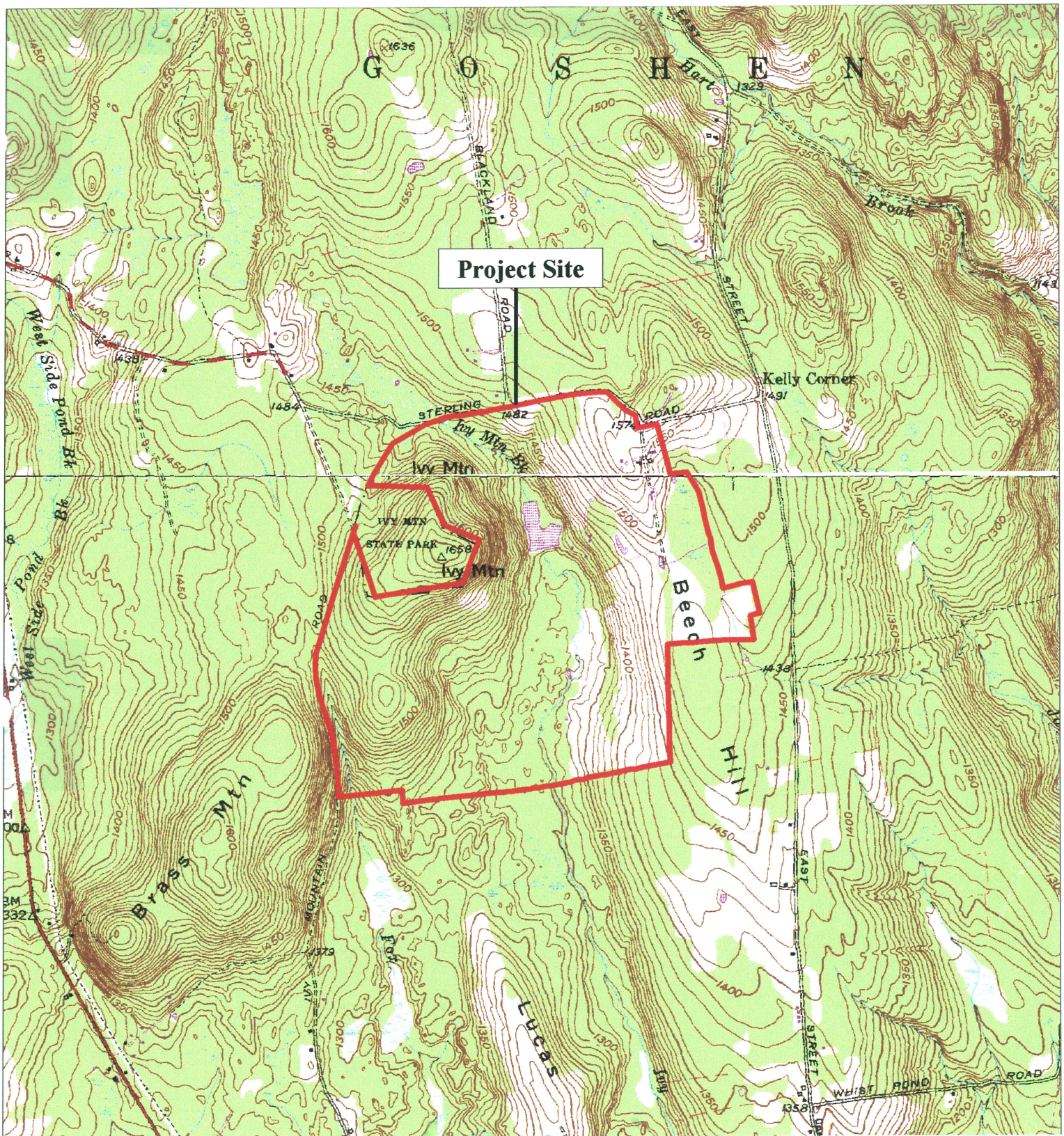

Figure 2
Topographic Survey
Not to Scale

N/F WILLIAM AND GAIL VARSELL
N/F ESTATE OF LUDWIG FIX
N/F TORRINGTON WATER CO.
N/F KERR
N/F NOVY
N/F SEPPLES
N/F ROY
BLOCK 5
N/F TORRINGTON WATER CO.
N/F WOODWARD
N/F KLING
N/F MASSINI
N/F LAVOIE
N/F JAMES MAZZARELLI
N/F STATE OF CONNECTICUT VOL. 29 PG. 152
IVY MOUNTAIN STATE PARK
WEST ROAD AKA IVY MOUNTAIN ROAD (DISCONTINUED)
N/F MICHAEL P. BUDNEY
200' BUILDING & GOLF COURSE SETBACK
EASEMENT FOR TRAIL TO GOSHEN LAND TRUST (PRECISE LOCATION TO BE DETERMINED AS PART OF SITE PLAN APPROVAL)
N/F HENRY BUDNEY
N/F ARCA, LLC (STRATFORD, CT)
RA-5
N/F MARINO
N/F FLORENCE M. DECKER VOL. 56 PG. 291
TOTAL SITE AREA
27,251,497± S.F.
625.608± ACRES
OPEN SPACE AREA
14,300,748.0± S.F.
328.8± ACRES
±52%
EXISTING ZONE
RA-5
PROPOSED ZONE
RURAL RECREATIONAL (RR)
APPROXIMATE LIMIT OF OPEN SPACE
WETLAND EDGE (TYP)
N/F THE ESTATE OF NASEF ABRAHA VOL. 99 PG. 480
SHEET 1
SHEET 2
SHEET 3
N/F TORRINGTON WATER COMPANY VOL. 29 PG. 91
RA-5
200' BUILDING & GOLF COURSE SETBACK
N/F TORRINGTON WATER COMPANY VOL. 29 PG. 91

LEGEND
PROPERTY LINE
EASEMENT LINE
EXISTING MONUMENT
EXISTING IRON PIN OR PIPE
DRILL HOLE
STONE BOUND
UTILITY POLE
AERIAL LOCATED UTILITY POLE
OLD WIRE FENCE
NEW WIRE FENCE
AERIAL LOCATED FENCE
VIRGINIA RAIL FENCE REMAINS
STONE WALL
REMAINS OF STONE WALL
FENCE POST
TREE WITH WIRE
AERIAL LOCATED TREE
AERIAL SPOT ELEVATION 147.46
EXISTING CONTOUR
AERIAL LOCATED TREELINE
EDGE OF POND
WATERCOURSE
AERIAL LOCATED RETAINING WALL
AERIAL LOCATED ROCK

GENERAL NOTES
1. THIS SURVEY AND MAP WAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996 AND CONFORMS TO THE STANDARDS OF A CLASS T-2 S
NOTES:
TYPE OF SURVEY: TOPOGRAPHIC SURVEY
BOUNDARY DETERMINATION CATEGORY:
RESURVEY – PROPERTY LINES ABUTTING LAND N/F TORRINGTON WATER COMPANY AND PRI
LINES ABUTTING LAND N/F THE STATE OF CONNECTICUT
DEPENDENT RESURVEY – PROPERTY LINES ABUTTING LANDS N/F THE ESTATE OF NASEF AB
ORIGINAL SURVEY – STREET LINES
2. OWNER OF RECORD: WAYNE & LORI BUDNEY
REFER TO VOLUME 104 PAGE 1004 OF THE GOSHEN LAND RECORDS.
3. REFER TO TOWN CLERK MAPS 33, 287, 383 AND 883-D OF THE GOSHEN LAND RECORDS.
4. REFER TO "MAP 2 PLAN OF LAND OWNED BY THE TORRINGTON WATER CO. SCALE 1"=200' MA
PREPARED BY DOUGLAS G. LITTLE.
5. REFER TO DEEDS 54/501, 79/174, 85/485 AND 104/1053 OF THE GOSHEN LAND RECORDS.
6. PARCEL IS SUBJECT TO A CONNECTICUT LIGHT AND POWER COMPANY EASEMENT AS RECORDED VOLUME 41 PAGE 130 OF THE GOSHEN LAND RECORDS.
7. THE LOCATION OF EAST ROAD AKA MOUNTAIN ROAD WAS TAKEN FROM OTHER PLANS AND W
FIELD LOCATED.
8. CONTOURS AND INTERIOR PLANIMETRICS PROVIDED BY GOLDEN AERIAL SURVEYS, WITH GROUND
9. VERTICAL DATUM: NGVD

TOPOGRAPHIC SURVEY
SHOWING LANDS OF
WAYNE & LORI BUDNEY
PREPARED FOR:

GEOLOGY

The location of the proposed golf club is atop the northern half of the crest of Beech Hill, located in scenic northwestern Connecticut. The view to the south is spectacular. The hilltops have a maximum elevation of greater than 1570 feet above sea level whereas the valley of Ivy Mountain Brook is less than 1300 feet above sea level where the brook exits the property to the south. Gentle to moderate slopes face mostly toward the west into the valley of Ivy Mountain Brook. The hill where the main farm buildings are located presents easterly slopes. Because of the moderate slopes, large areas may require extensive grading to construct a golf course.

The topography of the site is rather streamlined (smooth) due to the movement of glacial ice over the area during the last Ice Age. Beech Hill is a drumlin shaped (ice-sculpted) hill. The streamlining was caused both by erosion of the bedrock by the abrasive ice moving over it and the smearing out of the eroded debris carried along the base of the glacier and finally left there when the ice melted. Ice is an efficient erosional agent. Melted water (there are a variety of mechanisms that melt ice in a glacial regime) easily seeps into cracks in the bedrock, fragmenting the rock when it refreezes. Ice can also dislodge the fragments it creates, dragging them into the flow beneath the glacier. There they get crushed forming a range of fragment sizes from mud, to sand and gravel. When the glacier melts, the debris it contains gets left covering the ledge to a variable thickness. The unsorted (a mix of all sizes) material left behind is called glacial till. Till is very thin in the northeastern portion of the project area where there are numerous outcroppings of the bedrock. The till may be several tens of feet in thickness near the top of Beech Hill. Several melt-water channels, present on the east flank of Beech Hill, may have very thin till cover. Generally steeper slopes have thinner soils. Hence, much of the steeper westerly facing slopes may have thin soil cover also. This could present a problem if extensive grading is required.

Bedrock under the entire parcel is composed of micaceous granofels and amphibolite of the Waramaug Formation. It is a metamorphosed sedimentary and igneous rock formed in early Paleozoic Era and metamorphosed in mid- and late Paleozoic Era. It is near the surface in the area adjacent to the farm houses and numerous low outcrops of several square meters area are exposed. The rock is compact, gray to dark gray in color, contains compositional banding about 5 cm thick, and is composed of fine grains of biotite, amphibole, quartz and feldspar with several additional minerals in lesser amounts. It contains several rusty weathering areas, suggesting local concentration of an iron-bearing mineral, possibly pyrite. The foliation is steeply dipping and contains numerous low-amplitude, steeply-plunging minor folds with meter scale wave-lengths. The rock was notably lacking in fractures where observed in pasture adjacent to the farm houses: this is perhaps because of the rock's mica content and fine grain-size.

The geologic map of CT (Rodgers, 1985) shows a brittle fault, formed in the Mesozoic Era, that cuts roughly north-south across the state before dying-out in the valley of Ivy Mountain Brook. The Brook likely owes its existence to fractures generated during that period of faulting. (Glaciers more easily erode fractured bedrock than non-fractured rock.) It is likely that the bedrock beneath the brook still contains fractures in greater abundance that seen in bedrock exposed on the hilltop and as such, offers better opportunity to site a high-yielding water-well drilled to moderate depths.

Harwood (1979) infers low-angle thrust-faults exist greater than 2000 feet below the surface of the parcel. This thrusting occurred during ductile deformation in the Paleozoic Era and may not have well developed brittle-fractures. Although the ductile fault zones may have been reactivated during brittle deformation, the Team geologist would infer that deep possibilities for water development are not as great as properly located shallow prospects. This is said without having checked local drill records.

References

Cotton, R.B., 1968, Surficial geologic map of the West Torrington Quadrangle, Litchfield County, CT. U.S. Geol. Surv. Quadrangle Map #GQ-727.

Gates, R.M., and Christensen, N.I., 1965, Bedrock Geology of the West Torrington Quadrangle, CT. Geol. and Nat. Hist. Surv., Quadrangle Report #17, 38p.

Harwood, D.S., 1979, Bedrock geologic map of the Norfolk Quadrangle, CT. U.S. Geol. Surv. Geologic Quadrangle Map #GQ 1518.

Rodgers, John, 1985, Bedrock Geological Map of Connecticut. CT Geol. and Nat. Hist. Surv. and U.S. Geol. Surv., Natural Resources Atlas Series, 2 plates.

Warren, C.R., 1972, Surficial Geologic map of the Norfolk Quadrangle, Litchfield County, CT., U.S. Geol. Surv. Quadrangle Map #GQ-983.

A WATERSHED PERSPECTIVE

Introduction

These comments and recommendations to the Goshen Inland Wetlands Commission (Commission) are given from the perspective of improving and maintaining water quality and supporting designated uses of the State's waters per the State of Connecticut Water Quality Standards[1]. These comments also reflect the Connecticut Department of Environmental Protection's (CT DEP) growing commitment to address water resource concerns from a watershed perspective, taking into account the cumulative impact of numerous activities within a given watershed which may affect water quality and quantity.

Some of these comments may overlap with those of other Environmental Review Team (ERT) members who are dealing with more specialized aspects of the review (ie. - stormwater, fisheries, pesticides, etc.). In such cases, these comments are meant to support or supplement these specialized reviews, not supplant them. The Commission may also wish to refer to the FINAL DRAFT "Report of the Advisory Committee on Potential Best Management Practices for Golf Course Water" developed by the University of Connecticut - Connecticut Institute of Water Resources for guidance.[2] (For a copy of this draft document, contact CT DEP, Inland Water Resource Division at (860)424-3706.)

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[1] CT DEP Bureau of Water Management - Planning and Standards Division. Effective 1996 & 1997. Water Quality Standards. CT DEP, Hartford, CT.

[2] Connecticut Institute of Water Resources (University of Connecticut). October 4, 2001. FINAL DRAFT Report of the Advisory Committee on Potential Best Management Practices for Golf Course Water. (Special Report No.37). Submitted to Connecticut Department of Environmental Protection. Storrs, CT. 75 pp.

Watershed Context

As a way of describing Connecticut's water resources in terms of the landscape, CT DEP has divided the state along natural drainage divides into eight "major basins" or watersheds. These, in turn, are divided into increasingly smaller watersheds which are described as "regional", "subregional" and "local" drainage basins. At each level, these watersheds are named after the brook, river or waterbody into which all of the water within that topographically-defined area ultimately flows. Every water feature, no matter how small, has its own distinct watershed.

The proposed Charter Oak Golf Course project (Project) is located entirely within the Housatonic Major Basin (No. 6).[3] Of this, 80-90 per cent of the Project site falls within the Shepaug Regional Basin (No. 67) while only 10-20 per cent of the Project site falls within the Naugatuck Regional Basin (No. 69).

All of the Project land in the Naugatuck Regional Basin lies within the Hart Brook Subregional Basin (No. 6902). In the Shepaug Regional Basin, the majority of the Project land lies within the Bantam Subregional Basin (No. 6705), while a very small portion lies within the Marshepaug Subregional Basin (No. 6701). Overall, most of the Project site lies within the watershed of Ivy Mountain Brook (No. 6705-01), a local drainage basin within the Bantam Subregional Basin.

By examining water resource issues from a drainage basin or watershed perspective, one is better able to understand and assess the cumulative impacts that assorted land use activities or policies may have upon water quality and quantity. Specific concerns regarding this Project are discussed below.

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[3] Connecticut Geological and Natural History Survey. (Compiled by Marianne McElroy). 1981. Natural Drainage Basins in Connecticut (Map). CT DEP Natural Resources Center in cooperation with the USGS. Hartford, CT.

Water Quantity Concerns

Because of its location in the watershed, the Ivy Mountain Brook drainage basin is considered a headwater source for the Shepaug River. Headwater streams such as Ivy Mountain Brook are typically short in length and drain relatively small areas, but are important because they comprise the majority of the 8,400 stream and river miles in Connecticut. What happens in the local landscape is directly translated to headwater streams and major receiving waters are affected in turn. As rural areas of Goshen are developed, streams handle increasing amounts of runoff that degrades headwater streams as well as major tributaries. Focusing on the headwater stream level is important in watershed management for several reasons:

- Headwater streams are exceptionally vulnerable to watershed changes;
- Headwater streams are visible at the same geographic scale as development;
- The public intuitively understands streams and strongly supports their protection; and
- Headwater streams are good indicators of watershed quality.

Stream flow levels in the Shepaug River are currently being litigated in State Supreme Court due to major water utility diversions in another headwater area of the Shepaug River Regional Basin. While water needs for the proposed Charter Oak Golf Course are minor in comparison, and the water to be diverted will basically remain "on-site", it is still important to look at this Project in terms of its contribution to the collective impact of water use throughout the Shepaug basin.

According to Milone & MacBroom, consultant to International Golf Group, Inc. (Applicant), the amount of water needed for Project irrigation can only be generally estimated until such time that the golf course plan is further refined and a more accurate water estimate can be made.[4] In addition, the amount of water needed may be reduced through conservation practices, special irrigation equipment, choice of grass types, etc. In the meantime, they have used CT DEP guidelines and water use figures from other golf courses to calculate that the Project will require up to 250,000 gallons per day (gpd) for peak irrigation needs. As for the source of irrigation water, the "Preliminary Environmental Report and Development Plan" (Plan) states:

> Irrigation water will be withdrawn from a series of deep bedrock wells, Ivy Mountain Pond, and collected storm water. The wells will provide a base supply of 138,000 gpd. The pond and storm water will provide the balance (50,000 to 100,000 gpd) during peak irrigation weeks only (emphasis added). All irrigation water will be stored in the constructed and expanded farm ponds. Water will be withdrawn directly from the ponds into the irrigation system.[5]

It should be noted that the total available water supply estimated above adds up to a maximum of 238,000 gpd, leaving a shortfall of 12,000 gpd. Meanwhile, in a letter to International Golf Group, Inc., Milone & MacBroom states:

... we believe that there is a good chance for finding enough groundwater on the Ivy Mountain Farm site ... to supply constructed storage ponds and therefore maintain base irrigation in the summer, as long as the existing six-acre impoundment can be used as a peaking source (emphasis added). Even with wells, the impoundment,

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[4] Milone and MacBroom, Inc. October 2001. Preliminary Environmental Report and Development Plan, Charter Oak Golf Club, Ivy Mountain Farm Property, Goshen, CT. Prepared on behalf of International Golf Group, Inc. Cheshire, CT. p 4-2.

and storage ponds, it is unlikely that more than 200,000 to 225,000 gallons per day could be delivered from sources on this property. Of course, this conclusion needs to be verified with a program that includes testing the existing wells and drilling test holes.[6]

In this instance, the shortfall for water irrigation needs ranges from 25,000 to 50,000 gpd. These water use and availability estimates do not include the Project's potable water demand which is predicted to be less than 5,000 gpd.[7]

The Plan makes it clear that the estimates for the amount of water needed for irrigation versus the total amount of water available may change considerably once further planning and onsite testing is done. The Plan also points out that water withdrawals of greater than 50,000 gpd require a CT DEP Diversion Permit and must demonstrate that "the proposed withdrawals of ground water and pond water [do] not have significant adverse impacts on wetland water levels, instream flows, private wells, and other potentially affected components of the environment".[8] The following summarizes concerns that should be evaluated during CT DEP review of the diversion permit application.

Until these water use and availability estimates are refined and a more accurate water budget can be determined, the potential impacts that water use may have on water resources, both onsite and off, must be considered under the current

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[5] Milone and MacBroom, Inc. October 2001. Preliminary Environemntal Report and Development Plan, Charter Oak Golf Club, Ivy Mountain Farm Property, Goshen, CT. Prepared on behalf of International Golf Group, Inc. Cheshire, CT. p 4-2.

[6] Letter dated December 5, 2000 from David Murphy and Vincent C. McDermott (Milone and MacBroom) to David A. Rosow, Jr. (International Golf Group, Inc.) in: Attachment G - Bedrock Aquifer and Water Budget Analysis (December 4, 2000) in: Milone and MacBroom, Inc. October 2001. Preliminary Environmental Report and Development Plan, Charter Oak Golf Club, Ivy Mountain Farm Property, Goshen, CT. Prepared on behalf of International Golf Group, Inc. Cheshire, CT Attachment G - Bedrock Aquifer and Water Budget Analysis (December 4, 2000).

[7] Milone and MacBroom, Inc. Preliminary Environmental Report and Development Plan, Charter Oak Golf Club, Ivy Mountain Farm Property, Goshen, CT. Prepared on behalf of International Golf Group, Inc. Cheshire, CT p 4-1.

scenario. One of the first concerns should be that of maintaining adequate stream flow within Ivy Mountain Brook especially since it is considered a headwater source. Particularly, during drier months of the year, groundwater is important for supplying a regular source of water to a river to maintain what is called "base flow". The Project will be relying primarily on deep groundwater wells to supply its irrigation needs. Recognizing this potential impact, the Applicant had aquifer pump tests conducted and the stream and wetlands were monitored over a five day period in August 2001. According to the Plan, initial evaluation of the pump test data indicates that drawdown of the water table in the wetlands or beneath watercourses did not occur.[9] It is important that the final evaluation of pump test data be carefully examined to make sure that pumping over a longer period of time (i.e. - during late summer, early fall) would not negatively impact the stream or wetlands. The potential impact of pumping during extended periods of drought such as that which the state is currently experiencing should also be taken into account.

In addition to groundwater, the Plan proposes that surface water runoff be collected into expanded farm ponds and withdrawals be made from Ivy Mountain Pond to supplement groundwater sources during times of peak irrigation needs. The impact of diverting surface water runoff which might normally supplement flow to Ivy Mountain Brook should be examined more closely. Withdrawing water from Ivy Mountain Pond which helps maintain flow to the brook should also be evaluated more carefully. Although the Applicant performed groundwater monitoring to determine impact, it is unclear from the Plan if similar studies were conducted with regard to diverting surface water flow. Although it may be argued that the surface and ground water diverted for this Project will be used onsite and therefore theoretically remain within the local watersheds, it must be kept in mind that much

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[8] Milone and MacBroom, Inc. October 2001. Preliminary Environmental Report and Development Plan, Charter Oak Golf Club, Ivy Mountain Farm Property, Goshen, CT. Prepared on behalf of International Golf Group, Inc. Cheshire, CT. p 4-3.

of the water used for irrigation may be lost through evapotranspiration and will not necessarily replenish onsite wetlands or the brook.

It is important to bear in mind that golf course peak irrigation needs may coincide with the periods when Ivy Mountain Brook and wetland areas are also most stressed for water. The Applicant should be required to sufficiently demonstrate that water needs for the golf course versus those of the brook and wetlands are balanced and that there is an adequate safety margin to protect the integrity of the latter. If water supply during drought periods is deemed inadequate, the Applicant should be required to develop a conservation plan that will go into affect at such times. This might include the requirement of not irrigating all or parts of the golf course. These measures would also necessitate the establishment of a long-term watercourse and wetland monitoring program which is incorporated into the regular management plan for the golf course. The Plan currently calls for a five year monitoring period following Project completion that could be continued depending on monitoring results.[10] Otherwise, monitoring would be terminated at this time. The decision as to whether or not regular, long term monitoring should be continued beyond five years should be made by the CT DEP through the diversion permit process or the Commission under its Inland Wetlands authority. This decision should not rest with the Applicant.

With regard to the hydrology issues identified above, the Commission may wish to consider having the Applicant's water supply and use plans reviewed by an independent hydrologist, selected by the Commission but paid for by the Applicant. In addition, if CT DEP deems it appropriate to issue a diversion permit for this Project, the Commission may wish to review and comment on the draft permit to insure that the hydrology issues outlined above have been adequately addressed.

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[9] Milone & MacBroom, Inc. October 2001. Preliminary Environmental Report and Development Plan, Charter Oak Golf Club, Ivy Mountain Farm Property, Goshen , CT. Prepared on behalf of International golf Group, Inc. Cheshire, CT. p 4-4.

Water Quality Concerns

Per Connecticut's Clean Water Act, the State has adopted Water Quality Standards which establish policy for water quality management throughout the state. The State's surface and ground water quality classifications are based upon these standards. Among other things, the standards describe the designated uses and criteria associated with each water quality class. Within the proposed Project area, surface waters are classified as Class AA; ground waters are classified as GAA and GAA_s.

Class AA surface waters have overall excellent water quality and the following designated uses: existing or potential drinking water supply; fish and wildlife habitat; recreational use; agricultural, industrial supply and other purposes, (recreational uses may be restricted). Class GAA ground waters have overall excellent water quality and the following designated uses: existing or potential public supply of water suitable for drinking without treatment; baseflow for hydraulically-connected surface water bodies. The Hart Brook local drainage basin is classified as GAA_s, with the "s" indicating that the groundwater in this area feeds to an active public surface water supply source.[11]

As described above, the Ivy Mountain Brook watershed is classified as AA surface water quality and GAA groundwater quality. This designation identifies this basin, as well as downstream portions of the Bantam River, as potential future water supply watershed. It has this designation based on the historic identification (~1970s) by the Connecticut Water Resources Planning Program as a potential surface water supply. The Ivy Mountain Brook and Bantam watersheds, however, are not known to have been officially proposed as a future water supply source by a water supplier in an individual or regional water supply plan.

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[10] Milone & MacBroom, Inc. October 2001. Preliminary Environemntal Report and Development Plan, Charter Oak Golf Club, Ivy Mountain Farm Property, Goshen, CT. Prepared on behalf of International Golf Group, Inc. Cheshire, CT. p 8-5.

[11] The Hart Brook local drainage basin lies within the Hart Brook Subregional Basin.

The AA surface and GAA, GA_s ground water classifications also imply that no waste discharges other than domestic wastewater to the ground can occur on the property. In addition, there should be no floor drains in maintenance or storage areas. Likewise, the application of fertilizers or pesticides on the golf course, itself, should be minimized and Best Management Practices (BMPs) should be applied.[12] Basically, any activities taking place on this property should not degrade surface or ground water below the water quality standards established for this area. In addition, the Applicant should avoid the Hart Brook water supply watershed by designing major buildings, storage areas, etc. outside of this area.

Viewing water quality from a watershed perspective, it is also relevant to note that Bantam Lake, which lies 12+ miles downstream of the Project, is classified as a eutrophic lake in Connecticut's Water Quality Standards.[13] To improve water quality in Bantam Lake, CT DEP has eliminated point source discharges treated sewage effluent from the upstream water courses which feed the lake. Although the distance of the golf course from the lake as well as the presumed implementation of BMPs with regard to fertilizer application should nullify any effects that the Project would have on lake water quality, it is still important to acknowledge the cumulative impact that many small sources of nutrient-laden runoff could have on downstream water bodies. This just emphasizes the need for the Applicant to adopt and implement appropriate BMPs.

To further water quality protection, it is highly recommended that the Applicant maintain an adequate setback or buffer area along the eastern side as well as the western side of Ivy Mountain Brook and its associated wetlands. Adequate buffers should also be maintained around other wetlands on the property. The importance of vegetated streamside buffers has been well documented in the scientific literature. Buffers play a major role in helping to maintain the overall health and

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[12] The FINAL DRAFT "Report of the Advisory Committee on Potential Best Management Practices for Golf Course Water" is one source that can be consulted for BMP recommendations.

[13] CT DEP Bureau of Water Management - Planning and Standards Division. Effective 1996 & 1997. Water Quality Standards. CT DEP. Hartford, CT. p. 18.

integrity of a watershed. Determining the appropriate width of a buffer is site-specific and is dependent upon the geography of the land and the intended function of the buffer. The CT DEP Fisheries Division recommends a 100 foot buffer zone along perennial streams, and a 50 foot buffer zone along intermittent streams.[14] DEP Fisheries further recommends that this buffer zone remain in a naturally vegetated and undisturbed condition. Further information on buffers can be found in the FINAL DRAFT "Report of the Advisory Committee on Potential Best Management Practices for Golf Course Water" cited earlier.

Establishing a protective buffer on both sides of Ivy Mountain Brook would also complement the work of the Connecticut Chapter of The Nature Conservancy (TNC) and others. According to the CT DEP property data base, TNC has purchased property or acquired easements along considerable stretches of the Bantam River and West Branch of the Bantam River as part of the Bantam River Preserve. The Town of Goshen (Town) has also acquired and preserved open space along the Bantam River. Because it is a headwater tributary to the Bantam River, creating a protective buffer along Ivy Mountain Brook would be a natural extension of the buffer being created along the river further downstream. According to comments made during the ERT site review (10/23/01), the Town requires that at least 50 per cent of the property be maintained as open space. As part of this requirement, the Commission may consider requesting the Applicant to establish a buffer area on either side of Ivy Mountain Brook, to be placed under a conservation easement held by either the Goshen Land Trust or TNC. The buffer area should exclude any greens, tees or fairways and/or be designated as a "pesticide-and-fertilizer-free zone".

A buffer along Ivy Mountain Brook as well as wetland areas on this property should be considered for several reasons. First, a buffer would help protect water quality by helping to dissipate and capture stormwater runoff that might contain fertilizers,

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[14] CT DEP Fisheries Division, 1991. Policy Statement - Riparian Corridor Protection; Position Statement - Utilization of 100 Foot Buffer Zones to Protect Riparian Areas in Connecticut.

pesticides, sediments or other materials as a result of golf course activities. The relatively steep western-facing fields on the eastern side of Ivy Mountain Brook makes this a particular concern because of the potentially rapid rate that stormwater may flow off of this area. Flow rate is a function of many variables including land slope, soils and underlying surface materials. These same hillside fields also contain vertical drainage ditches or eroding gullies related to past farming activities. In addition to continuing to erode and cause sediment deposition, these gullies may act as conduits for golf course stormwater conveying undesirable materials to the wetlands and stream below. Eliminating these ditches and gullies or otherwise addressing the potential problems associated with them should addressed by the Applicant.

During the site visit (10/23/02), it was also indicated that the belt of trees halfway down this same hillside would be partially cleared for play-through. While it may be necessary to clear some trees for this purpose, this wooded area should also be considered in terms of the protective function it may play as a stormwater flow dissipater and filter.

The Commission may wish to ask the Applicant to provide more information on the potential water quality issues discussed above. The Commission may then choose to have this information reviewed by an independent water quality specialist, chosen by the Commission but paid for by the Applicant.

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HYDROGEOLOGIC SETTING AND POTENTIAL IMPACT BY PESTICIDES TO THE WATER RESOURCES ENVIRONMENT

Introduction

This section of the ERT Report is entitled, "Hydrogeologic Setting and Potential Impact by Pesticides to the Water Resources Environment". It was prepared as a part of the overall Environmental Review Team (ERT) report in response to the request by the Goshen, Connecticut Inland Wetlands Commission to conduct an evaluation of the proposal, "Charter Oak Golf Club" at the Ivy Mountain Farm Property. Additionally, Martin Connor, town planner for Goshen, described the town's particular concern for potential water quality impacts as a result of the golf course proposal.

Purpose

The purpose of this section in the ERT report is to examine the site area's hydrogeology as the pathways and receptor of the effects of potential pesticide usage and migration. It is important to evaluate this type of situation since, historically, golf courses have used abundant quantities of pesticides. The hydrogeology refers to all surface and subsurface manifestations of the water cycle, i.e., surface water in the form of streams, ponds and wetlands and all groundwater ubiquitous to the site, in perched conditions as well as in the principal bedrock aquifer moving slowly under vertical and horizontal hydraulic gradients.

Background

Considering the issue of pesticide usage for a newly proposed golf course is critical for a number of reasons. Although registered pesticides are legal to use for

labeled pest control reasons, their routine usage has resulted in the unintended migration of pesticides to the water resources environment - groundwater and surface water. This has caused the degradation of water quality since pesticides are contaminants. These water quality impacts can affect two broad categories of receptors: 1) the public health when water is used for consumption, irrigation or other domestic uses and, 2) the ambient water resources environment, on which biological life depends.

Growing interest in groundwater and surface water quality together with increasingly more refined laboratory analytical techniques have resulted in more studies and detections of pesticide residues in waters across the country. As a consequence, golf course maintenance, lawn care practices, agriculture and many other instances of pesticide usage have come under increasing scrutiny.

Even when pesticides are used according to label directions, certain factors, such as site conditions, a pesticide's particular properties and applicator practices may increase the risk of groundwater and surface water contamination. Improper seals around well casings and pumps are thought to provide a conduit for pesticides infiltrating through the ground with rainwater. (1)

An applicator or user of a pesticide product is the person who is ultimately responsible for the effects caused by the pesticide use at the site of application and for any downstream and downgradient impacts.

The competing interests of protecting the quality of drinking water versus chemical control of pests causes a dilemma when, for example, a pesticide user contaminates his own well.

Hydrogeology

• ***Bedrock Geology***

Bedrock controls are the dominant feature of the 225 acre site proposed for the Charter Oak Golf Club. Bedrock, mapped as the Waramaug Formation is a massive, poorly layered granofels with abundant areas of amphibolitic gneiss. (2) The bedrock is exposed at the surface and occurs near the surface over much of the area. It is very durable and competent rock. Surface weathering of the rock and fracturing were not observed in any rock exposures at the site. The hydraulic conductivity of this type of rock is dependent on the abundance and the linearity of fractures within the rock mass and the degree to which any fractures are interconnected. These characteristics define the rock's porosity and its hydraulic conductivity and transmissibility as a rock aquifer. These are the terms used to describe the ability of the rock mass to transport groundwater and its constituents. The hydraulic conductivity of unfractured metamorphic rocks can range from 0.0001 to 0.000001 feet per day. The specific yield of the rock here is about 0.09% and represents the amount of groundwater in storage that is available to supply a well or a spring. (3) These numbers for specific yield and hydraulic conductivity are extremely low.

• ***Surficial Geology***

Till is a Pleistocene glacial deposit consisting of an unsorted mixture of angular rock clasts, silt, sand and gravel. The till thinly and irregularly mantles portions of the upland monoclinal rock structure. Although the till may at times contain some perched water conditions, the principal aquifer at this location is the bedrock aquifer.

Beech Hill on which most of the golf course is proposed for construction is an elongate bedrock-cored drumlin hill oriented north-northwest/south-southeast. (4)

• Additional Hydrogeologic Data

Data on site location pump tests, borehole and well construction data were not available to the reviewer at the time of report writing but are part of preparations by the consultants for the water diversion permit application required for the project. However, a review of Goshen well completion records for the last three years indicates that virtually all wells, many of which are several hundred feet deep, have yields in single digits, typical of wells in metamorphic rock. The issues of water availability and adequate water quantity are critical since the golf course irrigation requirements alone are estimated at 250,000 gallons per day. The rock's specific yield and the recent well completion records in Goshen suggest inadequate water availability for the project even when combined with farm pond storage to meet the volume of water needed.

Significant Glacial Geologic Feature

A large glacial erratic exhibiting glacial polish, striae, and plucking features is located at the proposed site. This erratic should remain undisturbed. It is dominantly composed of the white Stockbridge marble likely containing the mineral tremolite.

Water Quality Classification at the Proposed Site

Groundwater at the site is classified as GAA which means that an existing or potential public supply of water is suitable for drinking without any treatment or that the groundwater is tributary to a public water supply reservoir. According to Connecticut's non degradation policy, GAA quality water must remain at the highest quality level and not become impaired. (5) Most pesticide products and their active ingredients as well as some inerts are classified as hazardous materials in the toxic or acutely toxic category.

Pesticide Usage at Golf Courses

Typical pesticide usage at an 18-hole golf course can amount to several hundred gallons of liquid products and a few to several tons of granular products per year according to annual summary sheets maintained by golf course supervisory pesticide applicators and submitted to the Connecticut Department of Environmental Protection. Upwards of 50 or more products are routinely used at many individual golf courses.

Before the change to organic practices, pesticide usage was analyzed for 52 golf courses on Long Island, NY, to determine that the average golf course application rate is 18 pounds per treated acre per year. This is about seven times the agricultural rate of 2.7 pounds per treated acre per year. (6)

Issues of Concern

- ***Metabolites***

The concern about pesticides migrating into the surface water and groundwater at, under or near golf courses has become a prominent issue as laboratory analytical capability has improved and expanded. New methods to detect pesticide compounds are continually under development. Importantly, this analytical capability is also expanding for metabolites or the degradation products of pesticides. Previously, in some cases, metabolites were not even identified let alone tested for. A metabolite may be the same toxicity or even more toxic than the parent compound. One example is the metabolite tetrachloroterephthalic acid, (TCPA) a metabolite of the parent compound, dacthal. In this case, the TCPA is more readily found to leach to groundwater. (7)

Because metabolites as well as many parent compounds do not have specific drinking water standards, a generic MCL (maximum contaminant level) of 50

micrograms per liter can be applied and the compounds categorized as Unspecified Organic Contaminants (UOCs). (7)

• ***Screening Tools Less Useful***

Previously, screening tools were employed to ascertain the relative tendency of a pesticide to either leach or be adsorbed onto soil particles. These screening methods are now less valuable since products once determined to be non-leachers are now discovered in groundwater.

• ***Combination Effects Unknown***

Another important consideration when evaluating pesticide usage and potential impact to the environment is the fact that very little is known about the combination effect of several or more than one pesticide in usage.

• ***Inerts***

Inerts are the products used to formulate the pesticide together with the primary chemical, the "active ingredient". The active ingredient is the component of the pesticide that causes the controlling or eliminating effect. Frequently, inert information can be difficult to obtain because the manufacturer will claim proprietary knowledge of a trade secret. The key point is that many inerts are in themselves toxic or contaminating to the environment. The Material Safety Data Sheet (MSDS) required for pesticide compounds should reveal the identification of the inert in the product.

• ***Shallow Depth to Groundwater***

One important condition prevalent virtually everywhere in Connecticut, shallow depth to groundwater, makes many areas especially susceptible to the migration of pesticides to groundwater. Depth from the ground surface to groundwater at the water table is almost everywhere less than 35 feet and frequently less than 15 feet from the land surface. (8)

Organic Alternatives

Reportedly the world's first publication of a comprehensive Standards for Organic Land Care has been published in the fall of year 2001. The full title of the publication is **Standards for Organic Land Care, Practices for Design and Maintenance of Ecological Landscapes.** The full publication is included here in the ERT report (see Appendix A) since these principles can easily be applied to golf course turf management. This publication and its authors were presented a Connecticut Department of Environmental Protection Green Circle Award for Pollution Prevention. As the nation's and possibly the world's first guidelines for organic land care, the document is expected to become a model for organic land care throughout the United States.

"Organic golf" means that courses are built with a substrate of compost, are planted with water efficient grasses and the use of fertilizer, insecticides, herbicides and fungicides are eliminated or greatly reduced.

The "greens" acreage of a golf course generally receives the most amount of pesticides in the form of fungicides. Ironically, the construction of a typical golf green uses layers of permeable sand. This design feature and the textural composition are thus very conducive to vertical infiltration and horizontal permeability. In other words, rainwater, pesticides and fertilizers will migrate quite readily downward and laterally.

As of 1998, all county golf courses in Suffolk County, Long Island, New York were using some organic maintenance. There are also pesticide-free golf courses on Long Island as well. (9)

Water Treatment Ineffective

One critically important final point is to note that conventional water treatments such as, filtration, coagulation, flocculation, and sedimentation have little to no effect on the removal of mobile (hydrophilic) pesticides from water supplies. More advanced water treatment technologies, like granular activated carbon (GAC) and powdered activated carbon (PAC) are rarely used in smaller water systems. (10)

Disinfection, as with chlorine, can alter the chemical structure of a pesticide. This is referred to as the transformation of the pesticide into a different chemical which may have its own toxicity apart from the original pesticide.

Glyphosate, the commonly-used herbicide known as Round-up, is not removed from water supplies by the conventional treatments and furthermore is not removed with ultrafiltration membranes or with powdered-activated carbon (PAC) . Granular activated carbon (GAC) appears to remove glyphosate but only if organic matter is present, an alum coagulant is used and turbidity units fall to near zero. (11)

Conclusion

In summary, an organic approach to golf course maintenance for a new golf course makes economic and environmental good sense. It is the preferred option when weighing the potential irreversible effects of pesticide migration to the water resources and the high costs of ineffective, incomplete treatment options, against the measures necessary to maintain the integrity and potability of the Ivy Mountain Farm property water supply.

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(7) Suffolk County Department of Health Services, Water Quality Monitoring Program to Detect Pesticide Contamination in Groundwaters of Nassau and Suffolk Counties, New York, 1999, 2000.

(8) Singer, J. "Pesticides" in Protecting Connecticut's Water Supply Watersheds: A Guide for Local Officials, CT DEP, 2000.

(9) New York Times, Metro 4-20-99.

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STORMWATER MANAGEMENT REVIEW

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"). 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 off site.

Please note that while this review is based primarily on the State Permit, many of the erosion and sedimentation issues are included in the Connecticut Guidelines for Soil Erosion and Sediment Control (the "guidelines") and, 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. Any areas with discharge points that serve an area greater than 5 acres must have a sediment basin, which is designed in accordance with the guidelines.

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.

The Plan must include a site map as described in Section 6(b)(6)(A) of the Permit and a copy of the erosion and sedimentation (E & S) control plan for the site. If the

Town in conjunction with the CTDEP Inland Water Resources Division (IWRD) and the local Soil and Water Conservation District have approved the E & S plan, it 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 to be protected and the adjacent State Park, which will make ongoing inspections and adjustments of controls an important aspect of this project. The Permit (Section 6(b)(6)(D)) requires inspections of all areas at least once every seven calendar days and after every storm of 0.1 inches or greater (this is in contrast to some statements in the submitted reports.) The plan must also allow for the inspector to have the authority to require additional control measures if the inspection finds them necessary. Qualified personnel must conduct inspections.

In addition, the plan must include monthly inspections of stabilized areas for at least three months following stabilization. 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.

Erosion and Sediment Control Notes

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

Structural practices including sedimentation basins are required for any discharge point that serves an area greater than 5 disturbed acres at one time. The basin must be designed in accordance with the guidelines and provide a minimum of 134 cubic yards of water storage per acre drained. Please keep in mind if existing ponds will be used at part of the system to provide water storage the ponds must be modified to provide adequate control. Particular care must be taken for any runoff directed towards Ivy Mountain Brook and Ivy Mountain Pond. 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.

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. Special attention with respect to post-construction stormwater treatment because of the use of pesticides and fertilizers by the golf course will be needed. A turf management plan will be needed to ensure proper attention to pollutants caused by runoff from the golf course.

Specific Comments on the Sedimentation and Erosion Control Specifications Page N 1

Under the section called Temporary Sediment Basin Maintenance and Pond Construction, it states that sedimentation basins will be inspected on a weekly basis during the wet season and after rainfall events in excess of ?" or greater. *However, the Permit requires structural controls be inspected at least once every seven days and within 24 hours of the end of a storm that is 0.1 inches or greater (at any time during the year).*

Under the section Sedimentation and Erosion Control Notes, it states that erosion control measures will be inspected on a weekly basis during the spring months and monthly during the summer months and when following rain storms of greater than 1/2 inch. *However, the Permit requires erosion and sediment control measure be inspected at least once every seven days and within 24 hours of the end of a storm that is 0.1 inches or greater (at any time during the year).*

SOIL AND WATER CONSERVATION DISTRICT REVIEW

Soil Capabilities and Limitations

The following are comments and recommendations addressed to The Preliminary Environmental Report and Plan of Development for the Charter Oak Golf Club, (Milone and MacBroom, October 2001). There were seven soil types identified by Soil Science and Environmental Services, Inc. (page 2-7 of the Preliminary Report). All the upland soils have a high erosion hazard (USDA, 1970) and the two soil types (Pb and Wx) that encompass most of the construction area are classified as Highly Erodible Soil (USDA, 1986). The other soil types identified do not have the Highly Erodible Soil designation, however once the topsoil and the upper soil horizons are removed the subsurface horizons are exposed. Once exposed these lower soil horizons then have all the properties of a Highly Erodible Soil. Observations during the site visit also indicated that in many locations the soil was just a thin fragile layer on top of bedrock or dense till. Therefore, extreme care is needed when stabilizing exposed soils (see the section on Sediment and Soil Erosion Control Plan below). For a more detailed review of on site soil properties and how they are effected by specific management practices, the following capabilities and limitations information for each soil type found on site is contained in Appendix B.

- Soil Map Legend - This section interprets the soil map symbol .
- Soil Features - This section details depth, potential frost action and corrosion hazard.
- Physical Properties of Soils - This section describes soil properties such as percent clay, permeability, available moisture and organic matter content.
- Water Features - This section details the potential for flooding, ponding and a high water table.

- Non-technical Soils Description Report Building and Site Development - This section describes the soils capabilities and limitations as they relate to construction.
- Non-technical Soils Description Report - This section describes soil capabilities and limitations as they relate to growing crops (this data can be helpful when choosing grass species).
- Construction Materials - This section describes the soil capabilities and limitations as related to use as building and construction material.
- Hydric Soil List, Soil Map Units With Hydric Components
- Sanitary Facilities - This section describes the soil capabilities and limitations as related to use for septic disposal.

Sediment and Soil Erosion Control Plan

It is understood that the site plan drawings to-date do not include sediment and erosion control structures and project phase locations. Therefore, comments will address the larger issues associated with the control of soil movement when large areas of highly erodible soil (USDA, 1970) are exposed. In Appendix C please note the "Erosion and Sediment Control Stormwater Measurement Plan Worksheet." This worksheet/checklist can be used as a reference when illustrating the erosion and sediment control plan. The "checklist" can assist to assure that the drawings are complete. The Litchfield County Soil and Water Conservation District welcomes the opportunity to review the sediment and erosion control site plan drawings once they have been drafted. They would also welcome an invitation from the Town of Goshen to assist in the inspection of sediment and erosion control practices on-site throughout the construction and stabilization phases.

Sheet N1 of the Charter Oak Golf Club Site Plan

The following are recommendations associated with the Sediment and Erosion Control Specifications (sheet N1 of the site plan). Appendix C has a check list to assure that the details of a complete sediment and erosion control plan have been addressed. Sheet N1 does an excellent job of narrating practices that will keep soil movement to a minimum. Listed below are a just few recommendations that could be added to the narrative.

Sediment and Erosion Control Specification Principals (comments)

- Section E, #3. Sediment basins should be inspected after rainfall events in excess of 0.1 inch or greater at any time during the year.

- Section E, #6. Here is a suggestion on how this task could read. "The pond construction shall not be complete until all exposed soils within the catchment area have been seeded and stabilized."

- Section E, #7. The "roadside mix" used to seed exposed soil should not have any plants that are considered invasive by the Connecticut Department of Environmental Protection (see Appendix D for listed species).

Sediment and Erosion Control Notes (Comments)

- Section A, #8. Sediment and erosion control practices should also be inspected before predicted storm events.

Attachment J of the Preliminary Environmental Report and Plan of Development

Attachment J of the Preliminary Report (Milone and MacBroom, 2001) details the sequence of construction. Sub-task number 4 should also include the monitoring of sediment and erosion control structures before predicted rainstorm events. The final detail work on the hole sub-sets (i.e. finish grade, complete irrigation systems) is sequenced appropriately. However, primary cutting and grading and filling (sub-task 1-14) should also occur in the same manner. As a general rule it is our recommendation that construction practices that expose soil and sub soil should be performed in ~5 acre parcels. Once construction is complete and all soils are completely stabilized, then construction can begin on the next set of holes or next ~5 acre parcel. This type of sequencing is very important because of extreme erosion hazard associated with soils in the construction area (see Soil Capabilities and Limitations), and because the project site is located very high in the watershed. Movement of large amounts of soil has the potential of effecting a large segment of the upper Bantam River.

It is also very important to control stormwater runoff. If possible the stormwater control system should be designed to mimic the hydrologic characteristics of the site pre-construction. This is important because large increases in runoff volume over shorter periods of time will amplify down through the watershed and adversely effect off-site areas lower in the watershed.

Conclusions

Sediment, Stormwater and Erosion control practices on site need to be vigorously planned constructed and maintained. The Sediment and Erosion Control Specification Narrative is an excellent first step toward the final goal of minimizing soil movement and controlling stormwater on site. Below is a summary of why sediment, stormwater and erosion control is so important on this project.

- The soils and sub-soils on site are highly erodible.
- Much of the site has steep slopes.
- The site is located high in the Bantam River Watershed.
- There will be large areas of exposed soil during construction.
- Severe erosion will take away valuable soil and nutrient resources well suited for the final stages of hole construction.

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WETLAND RESOURCES REVIEW

Site overview

The site is located in the north central part of town and encompasses 620 plus acres. Of this total approximately 300 acres is proposed for development. The main parcel is bisected by Ivy Mountain Brook north to south. The eastern half of the parcel is where the development has been proposed. Nearly all of this eastern land is now in pasture or hayfield and is open. The western half of the parcel is to remain untouched and is predominantly forested.

Ivy Mountain Brook is the dominating watercourse in the study area. Entering the parcel from the northwest the brook floods an impoundment measuring over 6 acres and continues south off the property. The brook valley is the lowest spot on the parcel and the stream is the recipient of overland flow from the hills that make up the parcel. Where the Brook enters the parcel its elevation is approximately 1,435 feet above sea level and it leaves the parcel at about 1,305 feet. The length of flow is approximately 7,360 feet along the property (including through the impoundment) yielding a gradient of ±1.8%. Ivy Mountain Brook drains into Bantam River then the Shepaug and ultimately into the Housatonic. An extreme eastern section of the parcel is drained by Hart Brook which empties in to the Naugatuck and then the Housatonic.

The highest elevation on the entire parcel is west of Ivy Mountain Brook on Ivy Mountain about 1,625 feet above sea level. On the eastern side of the parcel it is along Hageman Shean Road in the Northeast corner at 1,574 feet above sea level.

The wet areas most easily observed from air photos and topographic maps are the brook and the impoundment. Somewhat less noticeable are the wetlands on the east side of the parcel to the east and the southeast of the impoundment. These

appear to be farm ponds and are the likely result of previous landscape manipulation. A series of ditching and altering of watercourse channels seems to have taken place historically at this immediate area altering and/or intercepting surface flow across this area as it drains west towards Ivy Mountain Brook. A larger wetland area at the eastern border is mapped on the topographic map and unimpacted by the proposal. In addition, a few smaller ponds are present on the landscape.

The wetland soils were mapped by Kenneth C. Stevens. His mapping and wetland reports showed the presence of large areas of what could be described as wet meadow wetlands west of the farm ponds, especially around the area that is proposed to become fairways numbered 3 and 2. These are likely perched wet areas that, if left alone, would feature surface flow down gradient. It is to drain these areas that some of the ditching was likely applied to the landscape. Other areas of wetland incursion are along fairway number 9 which impacts some Ivy Mountain Brook floodplain wetlands and along the path and play areas of holes 16, 17 and 18.

The U.S. Fish and Wildlife Service has mapped and classified the wetlands and watercourses using a system of codes for all the topographic maps in the state. This parcel occurs in part on both the Norfolk and the West Torrington quadrangle National Wetland Inventory maps. Ivy Mountain Brook and its associated wetlands comprise the largest wetland system on the parcel. All of the wetlands on the site are mapped as palustrine wetlands. Palustrine is defined as: *of or pertaining to a swamp; marshy.*

As Ivy Mountain Brook enters the parcel from the northwest its classification goes as follows: PFO1E which is Palustrine (P), Forested (FO), Broad leafed deciduous (1), Seasonally saturated (E). The stream then bends south towards the impoundment and the classification changes to PFO4E. This is Palustrine, forested, needle leaved evergreen (4), seasonally saturated. The impoundment is classified

as POWHh - Palustrine, Open water (OW), Permanent (H), diked (h). Below the dam and running off the parcel, with one exception, the classification is PFO1/4E. This is palustrine, forested, mixed broad leafed deciduous and needle leaved evergreen (1/4), seasonally saturated. The exception to this is the broad flood plain which begins about 600 feet below the dam and runs south for about 1,500 feet and is mapped PSS1/EMZb. This is palustrine floodplain dominated by Deciduous Scrub Shrub (SS1) and Emergent vegetation (EM), intermittently exposed/permanent (Z), with some beaver activity (b).

Away from the brook the farm ponds are mapped POWHh as described above and connected by a stream PEME. The large mapped wetland located on the extreme eastern border of the parcel is PFO1Ed. This is Palustrine, Forested, broad leafed deciduous, seasonally saturated, and partially drained or ditched (d). This area measures on the NWI maps as about 17 acres and is avoided by the proposed development.

Water Quality

The surface water quality (which includes the wetlands and watercourses) of the area have been mapped by the DEP as follows:

- Ivy Mountain Brook and all of the tributaries and wetlands in the area are classified as AA. Although not all of these locations have been 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 Area 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 map but indications point to, and the result is mapped as, excellent ground 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.

Soils

The soils have been mapped by Kenneth C. Stevens, Jr. on the site plans and well documented with plant inventories by the applicant in the report entitled: *Preliminary Environmental Report and Development Plan Charter Oak Golf Club Ivy Mountain Farm Property.* Reportedly, the wetland mapping which resulted from Mr. Stevens' fieldwork has caused the layout of the golf course to change to accommodate these wetland soils by avoidance.

Water Resource Issues

Much credit is due the wetland mapper for locating the wetlands along hole 3. Though difficult to appreciate visually, these wetlands are currently functioning as contributors to the surface runoff and drainage into Ivy Mountain Brook through a system of farmer created ditches and channelized waterways that drain the area.

How are the wetlands on the hillside contributing to the water regime on site?

History

The history of the wetlands in the area of the small farm ponds and fairways 2 and 3 appears to be one of manipulated land use by the farmer. Downslope of these areas there are gully/ditching systems in many places that serve to intercept and to mask the natural drainage of the area These wetlands seem to be perched on top of glacial till and therefore add to the surface water runoff. They are likely not contributing to the groundwater of the area.

Greens

However, one of the potential surface water issues that is pertinent has to do with the drainage of the putting greens.

There are 18 proposed greens and one practice green on the plans. Each of these greens is a highly engineered area that typically has great permeability to pass the water that falls both as sprinkler irrigation and as rainfall. The town should be familiar with the type of putting green construction that is proposed and understand the treatment, quantity and implications of the surface runoff and subsurface hydrology that will result from these 19 areas. For instance, if there is the

subsurface flow through the greens will it be controlled underground?, i.e.: directed to swales for uptake by plants.

New Pond Construction

If the various proposed water quality basins and the ponds that are proposed are to be home to wetland plants they should offer a shelf to allow a tiered or stepped down effect into the deepest part of the pond. Depending upon the number of tiered levels employed, a variety of wetland plants can be planted. The shallow water tier (the one closest to the surface) often consists of species that prefer or will tolerate a range of hydrologic conditions. This is especially important in this top range where the water levels are likely to fluctuate. Succeeding lower tiers can be planted with species more capable of being inundated at all times.

Some designs offer a small berm on the deep water side of the tier to hold in moisture when the water surface drops below the tier level. No matter what the design it is generally recognized that having plantings in the pond(s) aid in the maintenance of water quality.

The ponded areas can add an aspect of biofiltering by maintaining a "no-mow" zone around the pond. These areas, generally up to ten feet in width, can help to filter surface runoff before it enters the pond and would serve to help maintain the AA water quality classification on the site. The Connecticut Joint River Commissions in their *Part of the Living with the River Series* on riparian buffers suggests, "The first goal is to avoid planting lawn to the water's edge . . . this is the worst and most common mistake . . . and deliver(s) lawn chemicals directly to the stream".

Buffers

While the ten foot wide "no-mow" zone or mini buffer around the ponds will help to filter the nutrients before entering the ponds, typical buffers around other mapped wetland areas are greater in width. Wetland buffer widths are frequently 50 to 75

feet. Some communities demand greater distances. On this proposal there are locations where the area of play is quite close to or actually abuts the wetland boundary. This can be seen at fairway numbers 5, 7 and 12. Buffer areas act to filter a variety of nutrients, pesticides and sediments. Their width is based on the potential for degradation, slope and the susceptibility of the threatened/neighboring wetland or water body. The town will need to establish the best buffer width on a location by location basis. For instance a wet meadow that is dominated by grasses would not necessarily need the same width buffer (since its own vegetation is grassy at the wetland edge) as the buffer needed by an open or standing water regime.

Mitigation

Mitigated wetlands attempt to replace the wetland acreage lost to proposed development with created wetlands. As described above one of the wetlands to be impacted most directly are wet meadow, grassy wetlands around the areas of fairways 2 and 3. Likely these are perched and offer functional values that include, since they are grassy, nutrient and sediment trapping, and habitat for ground nesting birds. They also contribute or shed their surface water as runoff to Ivy Mountain Brook. Other large areas of impact are the hillier wetlands on fairway number 9, and on the southeast corner of the parcel at the tee boxes for holes 17 and 18 and the green for hole 16. Together these last three areas total ± 2.48 acres. While the developer has already reconfigured the original layout to avoid these areas as much as possible and has proposed mitigating these wetland losses, the town may want to consider the mitigation of wetlands (with a minimum 1 to 1 ratio of lost acres to replacement acres) in the following sequence of consideration:

- 1. Understand the area and function lost for each of the impacted wetland sites on the parcel.
- 2. Revisit the proposed development plan to try to further minimize the existing proposed wetland loss.

- 3. Replace the lost wetland acreage and functions (including hydrologic connection) of each impacted site on the parcel.
- 4. Replace the lost wetland acreage and functions (including hydrologic connection) of each impacted site off the parcel but in the same Ivy Mountain Brook drainage basin.
- 5. Lastly, and only lastly, consider the mitigated wetlands be allowed with no hydrologic connection to any of the existing wetland systems on the property.

The town will have to ask itself how do the mitigation wetlands add to or enhance this existing wetland system? Any mitigation work should be valued at what it adds to the existing water regime versus just suspending a perched wetland on the landscape to make up for the wetlands lost. The town needs to choose between the alternatives of a few acres of disjointed, perched wetlands or a hydrologically connected open water body that would offer habitat and hydrologic connection to the wetland system that exists there now. This latter mitigation concept could exist, at least in part, in the area near Ivy Mountain Brook northwest of the 12th fairway.

Gully Wall Erosion

In the area of the large polished white rock (glacial erratic) and northwest of it there is gullying that appears to result from the previous manipulation (ditching) of the watercourses.

In the area west of fairway number 3 down to level grade of Ivy Mountain Brook the plan shows one of these existing drainage ditches. In many places this particular ditch showed signs of water-caused erosion that no doubt has been contributing sediments to the flood plain if not the waters of Ivy Mountain Brook. This drainage ditch and others on the property with these same signs of erosive side wall and down-cutting gullying should be stabilized by whatever means deemed most appropriate for both the calculations of water quantity during storm events and for the down-the-hill slope which appears to be in the general range of 15-16%. There

were also bare side walls on some of the dirt road cuts that should also be stabilized to minimize downslope sedimentation.

WILDLIFE RESOURCES REVIEW

A cursory field inspection of the property was made with the other members of the Environmental Review Team and consultants on October 23, 2001. The document prepared by Milone & MacBroom, Inc. titled "Preliminary Environmental Report and Development Plan - Charter Oak Golf Club Ivy Mountain Farm Property - Goshen, Connecticut, October 2001," may be referred to as "the report" hereafter.

Existing Wildlife Habitats and Values

Two hundred twenty five acres of the 625 acre site (36%), is composed of pasture, hayfields and old fields. These fields range in size from approximately 6 acres to 53 acres and straddle the north south ridge known as Beech Hill. In addition to the open land, the property contains forestland, a variety of wetlands including Ivy Mountain Pond, Ivy Mountain Brook, intermittent watercourses, wet meadow/farm field areas, and forest wetland. The site provides excellent wildlife habitat especially for species dependent on large open fields or grasslands.

This piece of property is located in a section of Litchfield County that is still very rural. The surrounding landscape is dominated by extensive areas of forestland, wetlands and farmland. Thousands of acres of protected land lie in close proximity to this site. These areas include the Goshen Wildlife Management Area, the Torrington Water Company properties, the Connecticut Audubon property and the Great Mountain Forest (protected through the Forest Legacy Program) along with others. Because this site lies embedded in a rural landscape providing large amounts of quality wildlife habitat and lies adjacent to so much protected land that provides outstanding wildlife habitat, its value for all wildlife is highly augmented.

Agricultural Areas - Active/Inactive Hayfields/Pastures/Old Fields

The pastures and hay fields, far from being an agricultural monoculture as stated during the field visit, contain a mix of cool season grasses, flowers and forbs. Some of the fields have multiflora rose, blackberry, autumn olive and other shrubs and woody saplings invading, especially around rocks. There are a number of apple trees scattered in the pastures and in the hedgerows between the fields. Some of the fields have been used in the recent past as pasture by a small herd of beef cattle, so they contain areas of short grazed grass interspersed with patches of taller, less preferred grass/forbs. Some of the fields have been used for hay and are dominated largely by grasses. Old field habitat exists where regular mowing has ceased and grazing has been interrupted. These areas are characterized by taller grasses, herbaceous plants, forbs, interspersed with saplings, shrubs and small trees.

The variety of grass/forb/flower species combined with the structural diversity of the field habitats makes for very desirable conditions for many species of wildlife. Such species include bluebird, American goldfinch, field sparrow, tree swallow, indigo bunting, eastern cottontail, woodchuck, deer, fox, coyote and turkey, to name just a few.

Fields, because they are open to the sun, are areas of high production for sun loving insects. These insects provide an important food source for swallows, bats, turkeys, grouse, turtles and snakes. The insects produced in open areas like this are especially important for grouse and turkey chicks and poults, which meet their high protein requirements by feeding on insects. Small mammals like mice, voles and moles find food and cover here and in turn provide food for hawks, owls, coyotes and foxes. In general, the more diverse the structure and vegetation in hayfields and old fields, the more desirable they are for wildlife. Those containing

wild flowers are attractive to insects and butterflies that feed on the nectar provided by flowering plants.

This mosaic of large, structurally diverse fields provides habitat for two Connecticut state listed species as reported by the consultants, the Savannah sparrow, and the American kestrel, both listed as species of "special concern" here in Connecticut. As stated in the publication "Connecticut's Endangered, Threatened and Special Concern Species 1998," "Species of Special Concern means any native plant species or any native nonharvested wildlife species documented by scientific research and inventory to have a naturally restricted range or habitat in the state, to be at a low population level, to be in such high demand by man that its unregulated taking would be detrimental to the conservation of its population or has been extirpated from the state."

The Savannah sparrow and American kestrel both belong to a guild of birds commonly referred to as "grassland specialists." Grassland specialists include species that are highly dependent on both natural grasslands, and those created by man mainly through agriculture. Natural grasslands while not abundant prior to European colonization did exist along river floodplains, wetlands, beaver meadow, salt marshes, coastal sandplains and heathlands. Native American also played a role in creating and maintaining grasslands and open areas through agriculture and burning. Grassland birds, along with many other species of wildlife utilized these habitats.

Agriculture reached its height in New England during the mid 1800's, when roughly 60 percent of Connecticut was cleared of forest for agricultural purposes. Most experts agree that this great shift towards more open habitats, coupled with the farming practices of the day (late season mowing, fallow areas, large amounts of land in hay and pasture) resulted in a hey day for grassland birds. With the movement of farmers westward in the late 1800's, a shift to intensive agriculture and the increase in the human populations and subsequent loss and fragmentation

of natural and agricultural habitats, many wildlife species dependent on these habitats have declined. It is for this reason that the remaining existing large expanses of agricultural hay fields/pastures/grasslands like those found at Ivy Mountain Farm are so important in the conservation efforts of these birds and the many other species of wildlife that benefit from them. This is especially true of those areas that currently support populations of state listed species of special concern.

Forest Habitat

The site contains an area of mature, second growth mixed hardwood forest, containing oaks, beeches, maples, hickories, pines and hemlocks. Hardwood forests provide an abundance of food in the form of mast (nuts, berries, buds, insects, and catkins). Cover value for wildlife is greatly enhanced by the presence of snags (dead standing trees), cavity trees and large diameter den trees (trees with a large hole). Wildlife likely using the mature hardwood forest include scarlet tanager, white-breasted nuthatch, black-capped chickadee, black and white warbler, eastern wood-peewee, American redstart, barred owl, broad winged hawk, red-backed salamander and gray squirrel, along with many others. Mast produced by oaks, beeches and hickories provides forage for a variety of animals such as white-tailed deer, gray squirrel, wild turkey, blue jay, white footed mouse and eastern chipmunk.

The forested area contains some major areas of conifer stands. Areas of conifer provide food in the form of cones for squirrels, chipmunks and small mammals. They provide year round cover for songbirds, hawks, owls, turkeys, deer and many other species. This cover is of particular importance during the winter because it provides shelter from severe weather.

Wetlands

As stated in the consultant's report, the site contains a variety of wetlands (palustrine type) including scrub shrub, forested, aquatic bed and persistent emergent. Open water habitats include Ivy Mountain Pond, four small farm ponds and Ivy Mountain brook. The wide variety of wetlands scattered over the site increase the habitat diversity and provides for the needs of a variety of wildlife.

Wetland Number 1

As described in the consultants report, wetland #1 refers to the system located along the east side of the site, which includes the forested wetlands in between the farm fields, the farm pond and the tributary of Jake's Brook. This wetland complex, with its diversity of plants, open water (farm ponds) and connection to fields and upland forest habitat provides good to excellent wildlife habitat. As stated in the consultant's report, the wetland was noted to have an "abundance and diversity of fauna," and an "abundance and diversity of vegetation."

The vernal pool, reportedly found by the consultants, could not be located during the cursory inspection, as might be expected given the site walk was conducted in October. Vernal pools by definition, are those wetland that contain water for at least two months out of the growing season, dry out in most years, (usually by late summer), occur within a confined basin with no permanent outlet stream and lack a fish population. Because these ponds lack predatory fish, they provide critical breeding habitat for certain species of salamanders, toads and frogs. Species such as the spotted salamander, marbled salamander, Jefferson salamander and wood frog are considered vernal pool obligates, meaning that for these species to *successfully* breed, they need these special temporary pools. Other amphibians, such as the blue spotted salamander are called facultative species which means they will use vernal pools to breed but can also use other types of wetlands. The

report noted that the eggs of spotted salamanders and wood frogs (both considered obligates) were found in the vernal pool.

The amphibian species use the vernal pools for breeding, but also require upland habitat, typically forested habitat to return to after breeding is completed. Many of these amphibians such as the spotted salamander and spend most of their time in moist woods, under cover of stones, logs or piles of debris. Wood frogs also require moist wooded habitat or dry woods with moist microhabitats and will find cover under brush piles, grassy hummocks and logs. Because of this, it is imperative that vernal pools remain connected to quality upland forested sites.

During the field visit, an Eastern ribbon snake (*Thamnophis sauritus*) was found in the wet field area between the eastern property boundary and the forested wetland area. This species is a Connecticut State listed species and is listed as a species of "special concern."

The Eastern ribbon snake is considered semi-aquatic; stream edges, swampy areas, wet meadows, ponds, bogs and ditches provide habitat for this species. It prefers areas with brushy vegetation at the water's edge for concealment, and also uses moist hardwood or pine forested areas. Given current habitat conditions at the site, good to excellent habitat now exists for this species.

Wetland # 2

Wetland 2 refers to the system located along Ivy Mountain Brook, including Ivy Mountain Pond. Ivy Mountain Brook is a slow flowing perennial brook bordered by old fields and forestland. Brooks and waterways like this one can provide important travel corridors for wildlife, which use them to travel in or along. Ivy Mountain Pond provides habitat for beaver, ducks, geese and wading birds like blue herons. Swallows, kingbirds and bats would feed over Ivy Mountain Pond due to the flourishing insect production.

It should be noted that the state listed hoary bat (*Lasiurus cinereus*), a species of special concern, has been documented at the nearby Goshen Wildlife Management Area (WMA). Since it is not unusual for this species to travel a mile or more when foraging for insects at night, it most likely also forages over the open fields and wetlands at Ivy Mountain Farm.

This wetland system was noted by the consultants to have an "abundance and diversity of vegetation" and an "abundance and diversity of fauna and fish habitat." This wetland complex would provide habitat for otter, mink, muskrat, blue heron, and kingfisher, painted turtle and common yellowthroat to name just a few. This wetland system is extremely valuable given its connectivity to other areas of wetland and upland habitat both on site and off, its variety of open water, slow moving brook and structural and vegetative diversity.

Wetland System #3

Wetland 3 is in the central portion of the property on a steep wooded slope. This wooded wetland is just 3 acres in size. While all wetlands provide some value to wildlife, this wetland value is somewhat limited by its small size and lack of diversity. It would provide cover and food in the form of maple catkins; shagbark hickory nuts and cherries from the black cherry trees.

Wetland System #4

As noted in the report, wetland 4 encompasses nine separate wetland areas including the palustrine emergent wetlands that occur in pockets and swales within the open farm fields. The report also includes three small farm ponds within this unit. While these wetlands have been disturbed by historic drainage alterations, grazing, plowing and mowing, they provide a fairly uncommon type of wetland habitat, wet meadow/farm field. These open, wet farm field areas support plants

specifically adapted to wet conditions like rushes. This variety of plants increases the overall diversity of plants within the open fields in total, making them more desirable as wildlife habitat. These wet farm field areas provide for insect production, which in turn provides food for birds, reptiles and amphibians. The farm ponds provide habitat for snakes, frogs, salamanders and turtles and while small in size provide food, cover and a source of water for wildlife seasonally.

Wildlife and Wildlife Habitat Impacts

This site currently contains outstanding open field/pasture/grassland habitat, which is extremely valuable to a variety of species, including the three Connecticut State listed species of special concern. Many wildlife species will be negatively impacted by golf course construction but impacts to the state listed species of concern may be greatest.

Conversion of this site to a golf course, especially conversion of the extensive open field areas (which includes wetlands) will negatively impact the existing wildlife habitat because the area will be fragmented and quality habitat will be replaced with fairways, tees, greens and golf cart paths. Human disturbance will increase greatly, especially during the spring and summer months, when the majority of wildlife species are nesting or bearing and rearing young. The daily and seasonal movements of wildlife, especially amphibians, reptiles and mammals will be impacted by the fragmentation of existing habitat.

The golf course habitats of open greens, fairways and tees interspersed with small islands of existing habitat, will tend to attract the more common species like raccoon, woodchuck, Virginia opossum, striped skunk, house wren, European starling, brownheaded cowbird and Canada geese. Some of these species, like Canada geese, have the potential to cause "nuisance situations" to the users of the proposed golf course when they are attracted to the manicured grass and open water.

Predation rates on forest and grassland birds will increase on the site, as species like bluejays, crows, raccoons and skunks are even more attracted to the site because of the building development, dumpsters and garbage facilities associated with the operation. Increased predation rates due to an increase in these species could impact surrounding areas like the Goshen WMA.

Use of the existing ponds and Ivy Mountain Brook could result in altered hydrology, which could harm invertebrates, amphibians and reptiles using these wetlands. However well managed the herbicide and pesticide system is, there is always concern over entry of these chemicals into the wetlands on the site and their effect on invertebrates, amphibians, reptiles and fish. General spraying of pesticides will reduce insect populations, which an array of wildlife species including the American kestrel use as a food source.

Open Field/Grassland Habitat/Species of Special Concern

The golf course has been specifically designed to conserve the forested portion of the site and to develop the existing "previously disturbed agricultural areas." While these areas have been disturbed and used for agricultural, they are providing and have the potential to provide for critical habitat for grassland species of birds, as demonstrated by the presence of the both the Savannah sparrow and the American kestrel. With the decline in both natural and agricultural grasslands, existing, functioning habitat like that currently found at Ivy Mountain Farm are extremely important. Agricultural grasslands are and will continue to be an essential factor in the conservation of many of these uncommon grassland species.

The report states that grassland habitat will be maintained for the grassland specialists using the site. Given the conceptual layout of the 1 8-hole golf course, which utilizes much of the open field areas, and the area requirements of these species, this appears improbable. No specifics were given as to how this habitat

would be conserved. It is difficult to see how this will be done, without extensive reconfiguration of the golf course.

Both of the Savannah sparrow and the American kestrel have specific habitat needs. Savannah sparrows, while considered a grassland generalist, require a habitat patch size of grassland area of 20 to 40 acres, in which to successfully nest. Within this habitat patch they will establish a territory of 1 to 2 acres. This species uses hayfields and pastures as well as coastal grassland and blueberry barrens. These birds use fields of all ages and are able to tolerate some successional growth, breeding in areas with scattered saplings, shrubs and forbs. Total woody cover must be limited however or the birds will find the habitat unsuitable. Researchers have found that in Connecticut this species is most often found in grassy fields with damp soil and it tends to occupy the wettest sites. The fields on the property because of their large size, vegetative and structural diversity and scattered saplings and shrubs (used for perching) provide excellent habitat. Savannah sparrows are considered to be a good indicator species for quality grasslands that may be suitable for other grassland specialists.

Savannah sparrows show strong "philopatry" meaning adults and juveniles typically returning to the same breeding sites year after year. Because of this substantial geographic variation and genetic separation occurs across the breeding range. Maintaining existing populations of these birds throughout the northeast is important for maintaining the genetic diversity of the entire Savannah sparrow population. If construction is done during the breeding season (May through August 15th) disturbance to the site is likely to be so great that all nesting for that year will be thwarted.

In order to conserve habitat for this species, the minimum area of open field habitat must be 20 to 40 acres in size. Shape is important; the area should not be long and narrow, but rather concentrated and contiguous so that edge is not maximized. Long narrow fields and small fields are more susceptible to human disturbance

and/or wildlife depredation, because they provide no buffer. If grassland habitat were set aside on site as part of the mitigation for this project, it would need to be managed through mowing and/or grazing and/or prescribed burning or some combination thereof. It must be noted that even conserving only 20 to 40 acres of grassland habitat would likely result in the reduction of the number of pairs of grassland birds now using the site, since it was reported that "numerous Savannah sparrows were seen during the summer months."

According to Bevier (1994) the American kestrel has two primary requirements; open land for hunting and cavities or holes in trees for nesting. Its favored habitats are grassland or shrubland at the edge of forest or open country with scattered trees; urban sites may be used if suitable perches and nest sites are available. Kestrels usually capture prey on the ground or in short aerial attacks and either eat the item in its entirety or, during the breeding season, may cache it in one of several predetermined sites. Their diet consists largely of insects during the summer and small snakes. Given the current habitat conditions at the site, good to excellent habitat exists for this species of special concern. Large expanses of grassland would need to be conserved if the habitat requirements of this species were going to continue to be met at the site.

Nationwide, Breeding Bird Surveys (BBS) conducted by the Biological Resource Division of the United State Geological Service and volunteers, have shown alarming declines (Jones and Vickery 1997) for many species of grassland birds. Within New York and New England, nine species of grassland birds are recognized as regionally threatened or endangered in at least five states. In Connecticut, the following grassland species are state listed as species of special concern (SC), endangered (E) or threatened (T); upland sandpiper (E), horned lark (T) grasshopper sparrow (E), Northern harrier (E), American kestrel (SC), vesper sparrow (E), Eastern meadowlark (SC) and Savannah sparrow (SC). Savannah sparrows have been identified as one of the priority species for conservation throughout the northeast by the Partners In Flight (PIF). (PIF is an internationally

recognized effort involving partnerships among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community and private individuals. Among other accomplishments, PIF has been responsible for developing Bird Conservation Plans as a blueprint for the conservation of bird species.)

Bobolinks, while not a state listed species in Connecticut, are considered uncommon and are a species of regional concern throughout the northeast. Bobolinks nest just to the north of this site on the DEP Goshen Wildlife Management Area (as determined through annual bird surveys) and might be expected to use this site to the south as feeding and stopover habitat.

Connecticut's Endangered, Threatened and Species of Special Concern Act

Despite the fact that the consultants report states that the DEP's Natural Diversity Data Base was accessed in order to determine whether any known extant populations of Federal or State Endangered, Threatened, or Species of Special Concern occur at the site and files indicated that no such species are present, the consultant's report indicates that the American kestrel and the Savannah sparrow, both state listed species were observed on the site. Reports of these species are consistent with the habitat conditions found at the site and are further supported by verification of a Savannah sparrow at the Goshen WMA just to the north. The report of the Eastern ribbon snake was entered into the DEP Data Base on December 6, 2001, so it would not have shown up when the consultants accessed the DEP Data Base. The hoary bat capture at the Goshen WMA has not been entered into the DEP Data Base at this time, so it would also not have shown up during the consultants inquiry.

Regardless of the fact that the DEP Data Base did not indicate that any state listed species were on site or in the vicinity at the time of the inquiry, current reports, information and records now indicate otherwise. This fact will activate the

Connecticut Endangered, Threatened and Species of Special Concern Act. Under this Act, any project that requires a state permit will need to be reviewed for impacts to endangered, threatened and species of special concern present on a site. DEP Wildlife Division/Wildlife Diversity Unit Biologists will be asked to review the project and to consider impacts to the three species of special concern know to occur on the site. After consulting with the Wildlife Diversity Unit Supervising Wildlife Biologist, these conditions will at the minimum include: 1.) A grassland bird survey conducted by an expert during the nesting season (May 15th through July 1st, minimum) using accepted standard scientific methodology. 2.) This information will be reviewed prior to the issuance of any state permits and may result in additional assessment requirements or specific permit conditions.

Wetland Impacts/Mitigation

As stated in the report a total of 4.24 acres of direct wetland impacts will be made. Impacts include direct impacts, such as filling and crossing, disturbance from high human use and indirect impacts such as fragmentation, loss of connectivity to upland habitats and the potential degradation of water through runoff laden with chemicals.

In general, wetlands should remain connected to a variety of upland habitats, in order to provide the most benefit to wildlife, since wildlife species using wetlands commonly use uplands also. They should be buffered from disturbance as much as possible, by leaving areas of upland habitat between them and any developed portions of the golf course.

Wetland #1 will be impacted indirectly because there will be extensive fairways between it and the field areas to the west. Reptiles and amphibians using this wetland and the vernal pool associated with it may find their migration pathway back to the upland forested habitat fragmented and disrupted by the fairways. The wet old field area just east of the forested wetland was where the Eastern Ribbon

snake (species of special concern was found). Because this species would be utilizing the wetland areas, ponds, wet ditches and moist forested wetland areas, the available habitat would be greatly reduced when the golf course is constructed. Providing for a connection between the wetland areas and the adjacent forested and open field habitat would help provide for the habitat needs of this snake.

Wetland #2 containing Ivy Mountain Pond and Brook are very valuable for wildlife and should be protected to the greatest extent possible. Water levels should be maintained, especially in the brook to maintain maximum use by wildlife. Irrigation needs should not be allowed to negatively impact the hydrology of these wetlands or any others on the site.

While all construction is to the east of these wetlands generally, it comes very close to the wetland delineation line and the brook in many spots. A minimum 100 foot buffer should be maintained between this brook complex and the developed portions of the golf course to conserve wildlife habitat and limit human disturbance to the wetlands.

Impacts to Wetland #3 will be direct filling to facilitate the planned crossing. Crossing has been placed at the northern most tip of the wetland, which helps to limit the impact to this wetland.

Wetland #4 is composed of the nine (9) separate palustrine emergent wetlands found on the site and three small farm ponds. The majority of the 4.24 acres of wetland impacts will occur in these areas, mainly through filling and conversion to golf course. Because these areas are mainly wet meadow/farm fields, impacts will not be limited to the small mammals, reptiles and amphibians using these sites, but will extend to the grassland species using the entire field/grassland complex as a whole. Reconfiguring the golf course to conserve more open field/wet meadow would help to conserve this habitat.

Irrigation

Irrigation will have limited impacts on wildlife as long as water levels in brooks, ponds and the water table are unaffected. Use of ponds for irrigation reduces their value for wildlife greatly; as widely fluctuating water levels may leave amphibian and fish eggs exposed to the air and may also inhibit the growth of desirable wetland vegetation. Daily fluctuations should be held to a minimum (less than 6 inches).

Conclusion

The golf course has been "specifically designed to utilize the existing fields for development, in order to preserve as much of the wooded area as possible." While this may sound like a conservation strategy, it in fact causes a habitat type for which drastic declines have been noted, to be converted into a golf course. While the forestland is important for wildlife, it is the open fields and pastures that give this site it's immense value for wildlife habitat.

Ivy Mountain Farm provides outstanding wildlife habitat for a variety of species, but especially those dependent on large expanses of fields and grasslands. The large expanses of grasslands, coupled with the forestland and variety of wetland provide for the needs of an array of reptiles, amphibian, birds, mammals and insects.

Three species of special concern, the Savannah sparrow, American kestrel and Eastern ribbon snake are known to occur on the site. The hoary bat, state listed species of special concern is known to occur nearby and likely utilizes this site as part of its home range. Conversion of the site to a golf course as proposed will result in a net loss of grassland habitat that will likely make the site unsuitable for the Savannah sparrow and the American kestrel. Conservation of contiguous grassland habitat at least 20 acres to 40 acres in size would need to be conserved and managed to provide for the needs of the existing Savannah sparrows and

kestrels using the site. However, a reduction in the number of breeding pairs utilizing this area is likely to occur. Providing for connected adjacent upland forested and open field habitat in conjunction with the wetlands and brook system would help to conserve habitat for the Eastern Ribbon snake.

References

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Jones, A.L. and P.D. Vickery. Undated. Conserving grassland birds; Managing agricultural land including hayfields, crop fields, and pasture for grassland birds. Massachusetts Audubon Society, Lincoln, Massachusetts. 18 pp.

Wildlife Management Institute Report. 2000. How much is enough for 2002? WMI Publications, Washington D.C. 36 pp.

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AQUATIC RESOURCES REVIEW

Report not yet recieved. Expected completion mid/late March 2002.

ARCHAEOLOGICAL REVIEW

A review of the State of Connecticut Archaeological Site files and maps show no known archaeological resource in the project area. However, we have a series of historic ruins associated with the early farming history of Goshen located to the northeast of Ivy Mountain. These historic ruins date from 1841 to 1923 and include house foundations, mills, school houses, and cemeteries associated with the Methodist Episcopal Church. This historic community is an extremely important cultural resource for understanding the 19th-century history of Goshen. While these particular structures do not appear to be located on the project area, they are close enough to suggest that similar historic stone ruins may exist there.

In addition, interior swamp/wetland areas were often used by Native Americans for thousands of years. Indian hunting and gathering economies required the movement of peoples through ecological territories on a seasonal basis, interior wetland areas would have provided an abundance of natural resources for exploitation, as well as areas of protection from winter elements. The project area has many potential ledges of rock outcropping that could have served as rockshelters for Indians during these seasonal rounds. The project area contains the topographic and environmental variables that allow us to predict prehistoric utilization.

The Office of State Archaeology strongly recommends an archaeological survey for the project area. This survey should be conducted in accordance with the Connecticut Historical Commission's "Environmental Review Primer for Connecticut's Archaeological Resources". The Office of State Archaeology is prepared to provide any technical assistance in conducting the recommended survey.

ON-SITE SEWAGE TREATMENT AND DISPOSAL

The proposed 18-hole golf course and amenities has a design flow of 4,700 gallons per day of domestic sewage that will be discharged to a subsurface treatment and disposal system. Although the proposed design flow is less than 5,000 gallons per day(5,000 gallons per day being the volume that triggers DEP jurisdiction), preliminary soils data indicates that a treatment plant and a constructed fill section are most likely needed. These components bring this project under Department of Environmental Protection (DEP) jurisdiction for the treatment and disposal of domestic sewage. A discharge permit from the DEP is required pursuant to section 22a-430 of the Connecticut General Statutes and regulations adopted thereunder, as amended.

In accordance with the aforementioned statute and regulations, the engineer representing Ivan Lendl & International Golf Group, Inc. (International Golf) must demonstrate that the septic system will function hydraulically and that the subject discharge will meet the pertinent Water Quality Standards prior to reaching any wetlands, surface water bodies, wells, property lines or points of environmental concern. These goals must be reached using reasonable analysis and appropriate safety factors. This would include a system and site hydraulic analysis, and pollutant renovation analysis for nitrogen, phosphorus, virus and bacterial pathogens.

The Water Quality Standards, published by the Department of Environmental Protection, updated in April of 1996, provides a clear statement for existing and future water quality. The groundwater classification for this property is GAA. The designated use of a GAA area is for existing and potential public water supply. Domestic sewage discharges can be considered consistent with this standard.

According to the Preliminary Environmental Report And Development Plan the proposed subsurface treatment and disposal system will be located in a Paxton fine sandy loam. The Soil Survey of Litchfield County describes this soil as having a slope of 3 to 8 percent with a restrictive layer at about 2 feet below grade. Test Holes were witnessed and logged by Department of Environmental Protection on November 16, 2000. This limited information is the basis for the following general statements. The site is not capable of supporting a subsurface treatment and disposal system for domestic sewage without a treatment plant and a constructed fill section. The system design must incorporate components to address low permeable soils and relatively shallow depth to groundwater.

International Golf has submitted a conceptual design report to Department of Environmental Protection. DEP forwarded comments to Milone & MacBroom, representing International Golf, in March of 2001. An application and a revised conceptual design report need to be submitted for review and approval. When Department staff is satisfied with the design, a tentative determination will be made on the application and the public given notice. After public comments are received through the notice period or through a public hearing a final determination will be made.

Construction of any sewage treatment and disposal system approved by the DEP must be overseen by a professional engineer licensed to practice in Connecticut. Record drawings must be completed and submitted for review to verify that the system constructed is in accordance with the approved contract plans and specifications.

When all conditions of the approval for construction have been met a permit to discharge domestic sewage to the treatment and disposal system would be issued. The permit will contain monitoring and maintenance requirements. Quarterly reports will be required with results and verification submitted to DEP.

PLANNING REVIEW

Zoning and Compatibility of Proposed Project with Surrounding Land Uses

The subject site is located in a Rural Recreational Zone that allows country clubs, restaurants, and country inns by special permit. The land surrounding the proposed development site is zoned for large lot residential use, with minimum lot sizes of 5 acres.

The landscape surrounding the project is characterized by wooded land, open fields, and residential development on large lots. The Torrington Water Company owns land to the north and east of the site. Ivy Mountain State Park is located on the western border of the property.

Provided sufficient environmental controls are implemented to protect the integrity of water quality, the project appears to be generally compatible with adjacent land uses and zoning. The proposed golf course playing area, clubhouse, parking lot, and maintenance building are separated by more than 200 feet from nearby roads and residences, as required under Goshen's special permit regulations. This will serve to soften the impact of the project on the surrounding area. Care should be taken, pursuant to Goshen's zoning regulations in the development of signage, outdoor lighting, and landscaping to ensure that the project enhances the character and appearance of this section of town.

Consistency of Project with State, Regional, and Local Plans

The "Conservation and Development Policies Plan for Connecticut, 1998-2003" classifies the subject site as a conservation area. The State strategy for conservation areas is to "Plan and manage, for the long-term benefit, the lands

contributing to the state's need for food, fiber, water and other resources, open space, recreation, and environmental quality and ensure that changes in use are compatible with the identified conservation values." The subject site is classified as a conservation area because it is located within either existing or proposed public water supply watersheds (i.e. Reuben Hart Reservoir, Shepaug Reservoir, and Shepaug River). Provided adequate water quality protection measures are defined and implemented with project construction, the proposed plan appears to be generally compatible with the goals established by the State Plan.

According to the "regional growth Policy Map", an advisory document prepared by the Litchfield Hills Council of Elected Officials(LHCEO), the proposed development site is classified as a rural watershed area. The proposed project is generally compatible with this regional plan designation provided care is taken to minimize disturbance to water quality with project implementation.

The LHCEO has also prepared a Regional Economic Development Plan. Although the development of additional outdoor recreational facilities is not specifically addressed in the Plan, the Plan does recognize the importance of maintaining the regions rural character while at the same time encouraging appropriate new business development for job creation and tax revenues. According to the applicant, the project is expected to employ 18 to 20 people for turf maintenance operations during the summer months, and additional people for the pro shop, restaurant facility, and recreational facilities (tennis and pool).

A goal of the "1994 Plan of Conservation and Development for the Town of Goshen, CT" is to "provide for businesses serving local and regional needs, both existing and future, in a manner that protects property values and is compatible in size, scale and appearance with the towns' "rural character"." The natural resources protection goal of the town plan is to "balance the need to protect drinking water supplies, natural resources and the objective of maintaining the town's rural appearance with the need to provide local policies and regulations

which will protect the general public and permit local businesses to operate in a responsible manner."

To conclude, the proposed project generally appears to be compatible with state, regional, and local plans provided the project is sensitively designed to maintain rural character and sufficient environmental controls are implemented to protect water quality.

Road and Access Considerations

The principal access to the site is available from East Street North Road and Hageman Shean Road. East Street North Road is classified by ConnDOT as a major rural collector, providing access directly between Route 4 and Route 272. Hageman Shean Road is classified as a local road, providing access between Route 63 and East Street North.

The average daily traffic on East Street North is 453 trips based on a traffic count conducted by the LHCEO on August 13, 2001. The peak hour during this traffic count was 53 bi-directional vehicle trips between 4:00 p.m. and 5:00 p.m. According to the "Traffic Summary" prepared by the applicant, "it is anticipated that the golf course will generate between 45 and 55 vehicle trips during the AM peak hour and between 50 to 70 trips during the PM peak hour". The Institute of Transportation Engineers "Trip Generation Manual" states that an 18-hole golf course will typically generate about 683 bi-directional trips on an average day.

Rural two-lane, two-way roadways such as East Street North can typically handle about 1,400 passenger cars per hour before congestion begins to be a problem. Thus there is substantial reserve capacity on East Street North Road to handle the traffic generated by the proposed project based on current and projected traffic volumes.

The applicant has coordinated with the Goshen Board of Selectmen and Road Supervisor regarding improvements to Hageman Shean Road that should be implemented as part of the proposed project. These improvements include drainage enhancements, paving of the roadway from East Street North to the golf course driveway, realignment of the sharp curve in the roadway in the vicinity of the proposed driveway, sightline improvements at the intersection with East Street North (particularly needed from Hageman Shean Road looking north), providing an adequate snow shelf at the entrance drive, and provision of drainage easements to the town for future maintenance. All of these improvements are important to help ensure safe and convenient access to the proposed project. In addition, due to the size of the proposed parking lot needed to service the golf course facility and associated restaurant, consideration should be given to using a pervious pavement surface to reduce stormwater runoff.

Open Space Protection

According to Goshen's Zoning Regulations, a minimum of 50% of the land included in an application for a principal use in a Rural Recreational Zone must be preserved as open space. As shown by the applicant's site plans, the eastern half of the 625 acre site is proposed for the golf course and related facilities. The western half of the property, encompassing 328 acres or 52% of the property, is not proposed for development under this application.

According to the conceptual site plan, the applicant has committed to providing an easement for a trail through this western portion of the property. The Goshen Land Trust has been identified as the holder of this easement. The proposed trail would roughly follow the ridgeline in the southwestern portion of the property, traverse through Ivy Mountain state Park, and then continue north to the intersection of Hageman Shean Road and Ivy Mountain Road.

The provision of the trail easement is a significant attribute of the proposed plan. The trail would offer scenic vistas, and excellent hiking, nature study, and passive recreation opportunities. In addition, the trail could provide a very critical link between the trail network on the Torrington Water Company land to the east and the 848 acre Blue Cross Blue Shield Goshen Realty Property to the north (a.k.a. Goshen Wildlife Management Area).

Consideration should be given to encouraging the applicant to permanently protect additional land (besides the trail easement) in the western half of the property. In addition to the potential for linkage to other protected land and passive recreational value, this land offers scenic vistas, diverse wildlife habitat, and prime natural features. It could offer a significant addition to the protected open space in Goshen. Consideration should also be given to seeking a modest endowment from the applicant to assist the Goshen Land Trust in creating and maintaining the proposed trail in the western half of the property.

Appendix A

Standards for Organic Lawn Care

For all Appendix Information A-D Please Contact the ERT Office at 860-345-3977

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.