LEDGEWOOD GOLF COURSE

WATERFORD, CONNECTICUT

Review Date: September 20, 1990
Report Date: November 1990

Eastern Connecticut
Resource Conservation and Development Area, Inc.

Eastern Connecticut Environmental Review Team
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ENVIRONMENTAL REVIEW TEAM REPORT
ON

LEDGEWOOD GOLF COURSE
WATERFORD, CONNECTICUT

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

The ERT met and field checked the site on Thursday, September 20, 1990. Team members participating on this review included:

Patrice Beckwith	**Soil Conservationist** **USDA - Soil Conservation Service**
Nick Bellantoni	**State Archaeologist** **CT Museum of Natural History**
Carla Guerra	**Environmental Analyst** **DEP-Inland Water Resources Division**
Pete Merrill	**Forester** **DEP - Patchaug State Forest**
Tom Seidel	**Regional Planner** **Southeastern CT Regional Planning Agency**
Elaine Sych	**ERT Coordinator** **Eastern CT RC&D Area, Inc.**
Bill Warzecha	**Geologist/Sanitarian** **DEP - Natural Resources Center**

Prior to the review day, each Team member received a summary of the proposed project, a list of the town's concerns, a location map, a topographic map, and a soils map. During the field review the Team members were given preliminary plans. The Team met with, and were accompanied by the Waterford Environmental Planner, the Town Planner and the developer and his consultant. Following the review, reports from each Team member were submitted to the ERT Coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site designs or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project -- all final decisions rest with the Town and landowner. This report identifies the existing resource base and evaluates its significance to the proposed development, and also suggests considerations that should be of concern to the developer and the Town. The results of this Team action are oriented toward the development of better environmental quality and the long-term economics of land use.

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in making your decisions on this proposed golf course.

If you require additional information, please contact:

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1. LOCATION, ZONING AND LAND USE

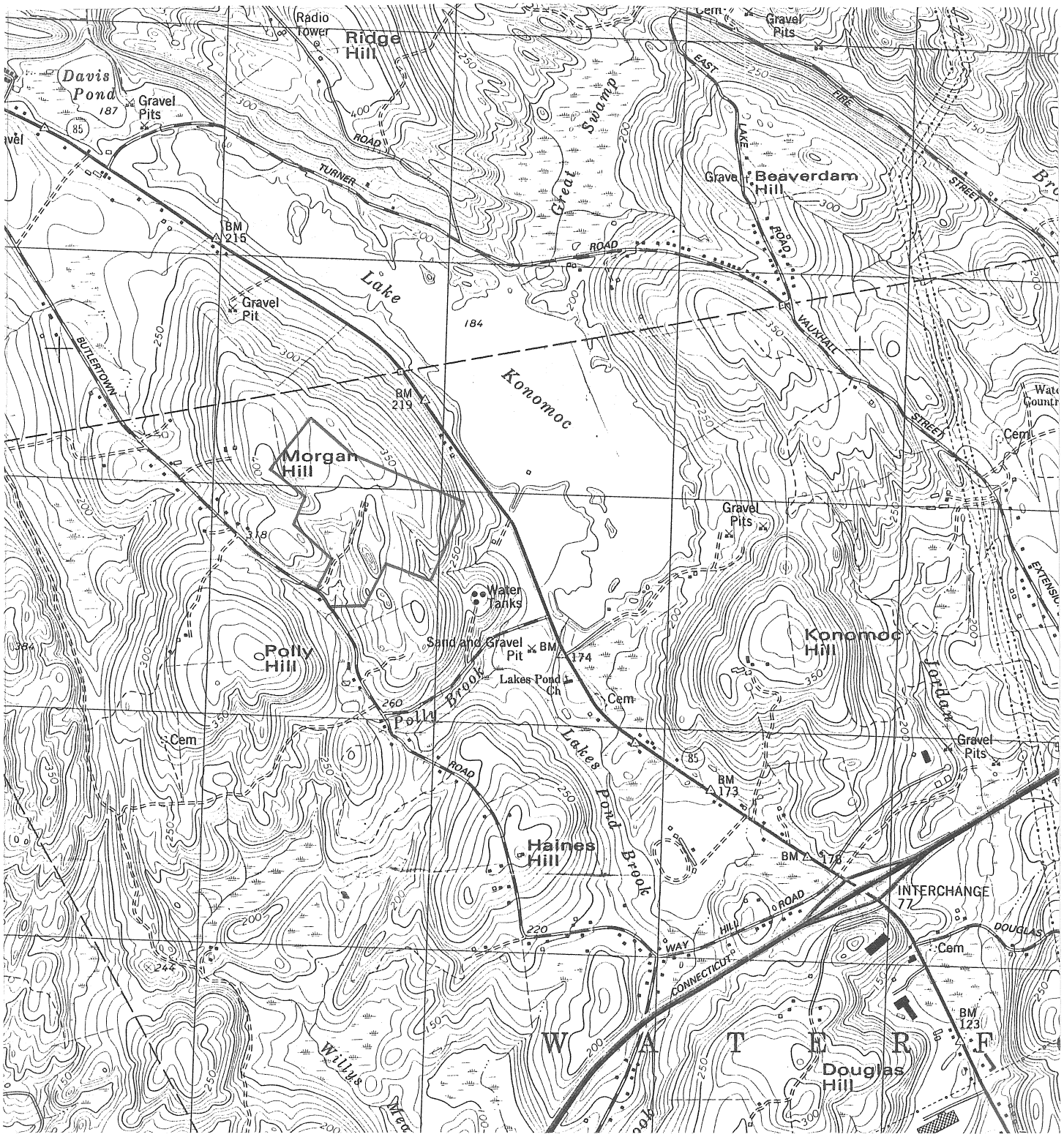
The approximately 93 acre site is located in northwestern Waterford. From its closest point, the site is about 500 feet from the Montville town line. The site is bordered by wooded, undeveloped land on the north, south, east and west. Several recently constructed residential properties occur to the southwest. Access to the site is available via a ±24 foot wide private road off Butlertown Road on the southwest.

The parcel of land is currently classified under the town's zoning regulations as RU-120, which allows single-family homes on lots of 120,000 square feet or about 3 acres. Construction of a 9-hole golf course and ancillary buildings (small restaurant, clubhouse, and maintenance building) on the parcel would require a special permit.

Approximately 16 acres of the site comprise open field area that is mowed. The remainder consists of wooded land. Historically speaking, the site was used for agricultural and residential purposes. Other than keeping the open field mowed and planting Christmas trees, the site no longer appears to be actively farmed. An excavated area (borrow pit) occurs south of the residential buildings on the site. According to the property owner, the material was mined for road base materials during the construction of residential properties to the southwest. Existing land use in proximity to the site is largely residential. Lake Konomoc, a public water supply reservoir for New London and Waterford, lies east of the site. From its easternmost point, the site is about 450 feet from the reservoir. It is estimated that about 6 acres which are mainly along the northern property line drain northeast to the reservoir.

LOCATION MAP

Scale 1" = 2000



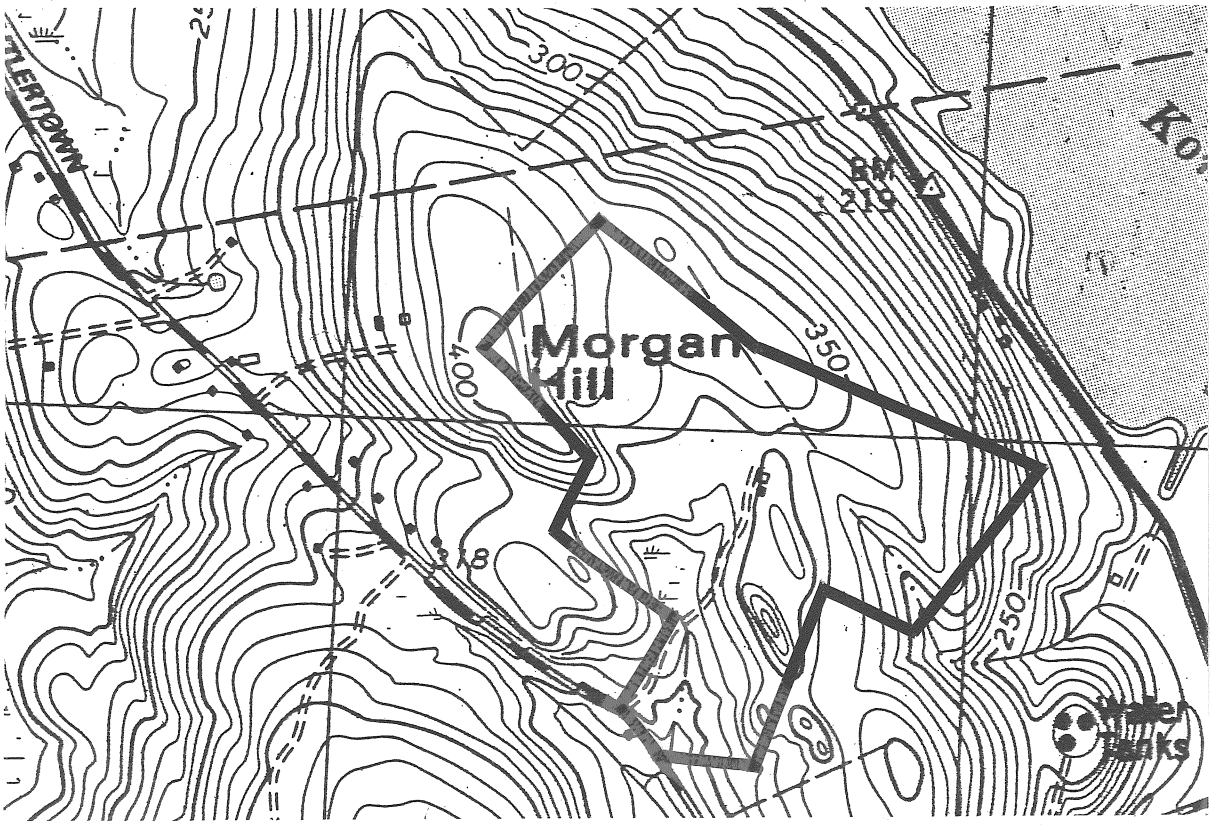
2. TOPOGRAPHY

The site is encompassed, in part, by Morgan Hill, a rock-cored hill whose main axis is orientated in a northwest/southeast direction. Another rock-cored hill, Polly Hill is southeast of the site. As such, the site's topography is controlled by the underlying bedrock. Slopes on the site range from gentle to steep but the majority are moderate. Steepest slopes, controlled by the underlying bedrock, occur in the western and eastern parts. The open field areas are mostly gently to moderately sloping. North and east of the site, the land surface slopes steeply to very steeply to Lake Konomoc. Due to these conditions, it is prudent to take measures (strict erosion and sediment control devices, little or no land clearing or disturbance, etc.) for the land area that drains to the reservoir. This would involve only about 6 acres mainly along the northern limits of the site.

TOPOGRAPHIC MAP

Scale 1" = 1000'

Approximate Site Boundary



3. PROJECT DESCRIPTION

The proposed project would consist of a 9-hole golf course on a ±93 acre parcel of wooded land and open fields. In addition, a clubhouse and small restaurant, which will probably be housed in the existing residence on the site, parking facilities and a teaching and practice area would be included as part of the development. The latter would be located in the southern parts. Two ponds, which will be used for golf course aesthetics and irrigation purposes, are proposed in the central and eastcentral parts of the site. The development will be served by an on-site septic system and well(s).

4. GEOLOGY

The site is located entirely in the Montville topographic quadrangle. A bedrock geologic map (GQ-609, by R. Goldsmith, 1967) and a surficial geologic map (GQ-148, by R. Goldsmith, 1962) for the quadrangle have been published by the U.S. Geological Survey.

Depth to bedrock across the central parts (east-west direction) of the site is relatively shallow, and contains several areas of bedrock outcrops. Goldsmith identified two bedrock units beneath the site; a Plainfield Formation subunit in the northern half and the Potter Hill Granite Gneiss in the southern half. The Plainfield Formation subunit is described as white and light gray quartzite that occurs in layers as much as two feet thick. A "quartzite" refers to a rock that is rich in quartz, light-colored and has a sugary texture. It formed from quartz rich beach sand that was geologically altered by high heat and pressure within the earth's crust following deposition. The Potter Hill Granite Gneiss is described as a light-pink to gray, tan-weathering, fine to medium-grained, well foliated granitic gneiss. Like the quartzite, the gneiss rock was also subjected to high heat and pressure which caused minerals in the rock to align into light and dark layers. This mineral arrangement gives the rock a banded appearance.

In the shallow to bedrock areas, difficult excavations may be required in places in order to achieve desired grades. If bedrock is encountered, it may be necessary to blast.

The bedrock aquifer is the principal source of water to many homes in Waterford and

will likely be the source of water to the proposed development. Additionally, it may need to be a source of irrigation water to the golf course. (See WATER SUPPLY Section)

Glacial till is the predominant unconsolidated material covering bedrock on the site. It generally consists of an unstratified, unsorted mixture of sediments that range from clay to boulders, but is predominantly silt and fine sand. The till was transported and deposited directly by glacial ice as it moved across the bedrock surface from north to southeast.

The texture of till varies across the site from sandy, stony to very stony and loose to a silty, non-stony to very stony and compact variety. The latter variety of till, which is characterized by a compact soil zone which occurs about 2-3 feet below ground surface bisects the interior parts of the site in a northwest/southeast direction. The presence of a compact soil zone commonly results in a seasonally high water table condition. The seasonally high water table can result in soggy conditions during the late winter/spring months and following heavy periods of rainfall and is a hindrance for on-site sewage disposal. Buildings constructed with basements on these soils should be protected by building foot drains which will hopefully keep basements dry.

According to the Soil Survey of New London County, Connecticut and site plans made available to Team members, the principal areas of regulated wetland soils on the site parallel seasonal streamcourses in the southern and eastern parts. Small isolated pockets also occur in the northern parts. The Soil Survey identifies these soils as Ridgebury, Leicester and Whitman extremely stony fine sandy loams (Rn). This undifferentiated unit comprises deep, loamy soils that formed in glacial till. The Ridgebury and Whitman soils developed in compact till, while the Leicester soils developed in more friable till. They range from poorly drained (Leicester and Ridgebury) to very poorly drained (Whitman). In general, the Leicester and Ridgebury soils are nearly level to gently sloping soils in drainageways and low lying positions of till-covered uplands. The Whitman soils occur on nearly level to gently sloping depressions and drainageways on till-covered uplands. From an engineering standpoint, the major limitation of these soils is the seasonally high water table (wetness). A high water table condition is at or near ground surface in the Leicester and Ridgebury soils generally between November and May. In the Whitman soils, a high water table condition, at or above ground surface, occurs September through June.

According to present plans, regulated wetlands may potentially be impacted (i.e., filled, excavated and/or disturbed) by the following:

1) the construction of a pedestrian bridge, which will span a wetland corridor in the eastern limits;

2) the construction of two ponds, which will be used for golf course aesthetics and irrigation, in the headwater region of the two principal streamcourses on the site;

3) soil erosion and sedimentation during construction; and

4) line-of-site vegetation clearing for fairways.

These activities will require a permit and ultimate approval by the Waterford Inland Wetland Commission. In reviewing the proposal, the Commission must determine the impact that the proposed activity will have on the wetlands. If Commission members determine that the wetland is serving an important hydrological or ecological function and that the impact of the proposed activity will be significant, they may deny the activity altogether, or at least require measures that would minimize the impact. All alternatives should be carefully studied and considered by the applicant and the town.

According to the plans, one wetland crossing, about 90 feet wide, is proposed for a pedestrian pathway from hole 8 to hole 9. It appears that the applicant has designed this wetland crossing to avoid wetland disturbance to the greatest extent practicable by locating the crossing at narrow section and using a wooden bridge to span the wetlands. This should minimize the wetland impacts in the area. This work (wetland crossing and bridge construction) as well as any other work within or in proximity to wetlands should be done during the dry time of the year and should include provisions for effective erosion and sediment (E&S) control. Any unstable, organic or mucky material should be removed and replaced with a gravelly-based material.

Two ponds are proposed for the golf course and would be used for irrigation and aesthetics. One pond would be created by enlarging and deepening an existing farm pond located in the central parts. The other pond located in the east-central parts would be created by excavating unconsolidated materials below the water table. Both ponds are proposed in the headwater region of the two principal streamcourses on the site. The proposed surface area of the ponds is about 1 acre and .2 acres, respectively. Due to shallow bedrock conditions in the area of the two ponds, it is likely that they will not exceed more than 10 feet in depth. Potential hydrologic impacts

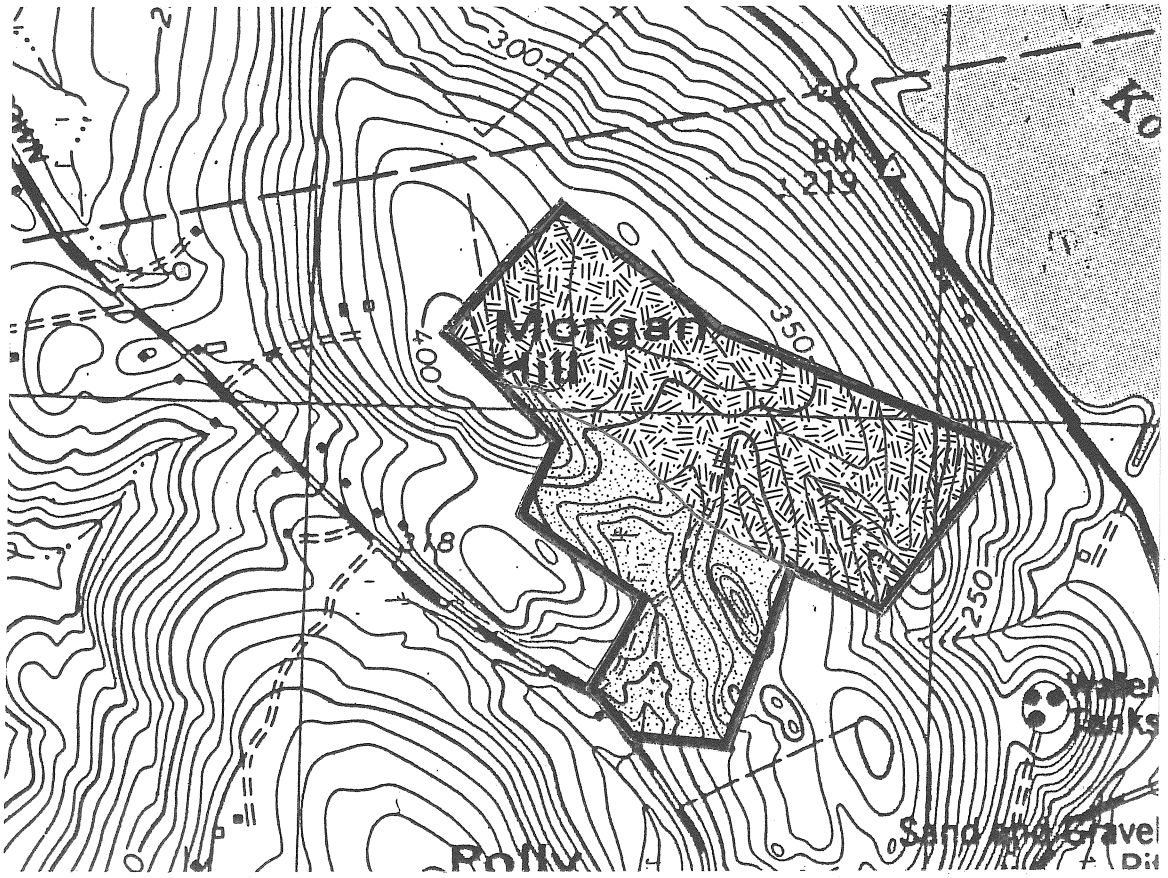
due to pond construction will be discussed in more detail in the HYDROLOGY section of the report. (Also, see WETLAND REVIEW section)

Providing that the wetland hydrology is not affected, i.e., diverted or disturbed by machinery, etc., it seems likely that site-of-line vegetation clearing for fairways could be accomplished without adversely impacting the wetland corridors on the site but this impact should also be evaluated by the Team's wetland specialist, and forester. This type of work (tree cutting) should also be done during the dry time of the year, which will help to minimize the potential for erosion and siltation problems and surface water degradation on and off-site.

BEDROCK GEOLOGIC MAP

Scale 1" = 1000'

Plainfield Formation
Potter Hill Granite Gneiss

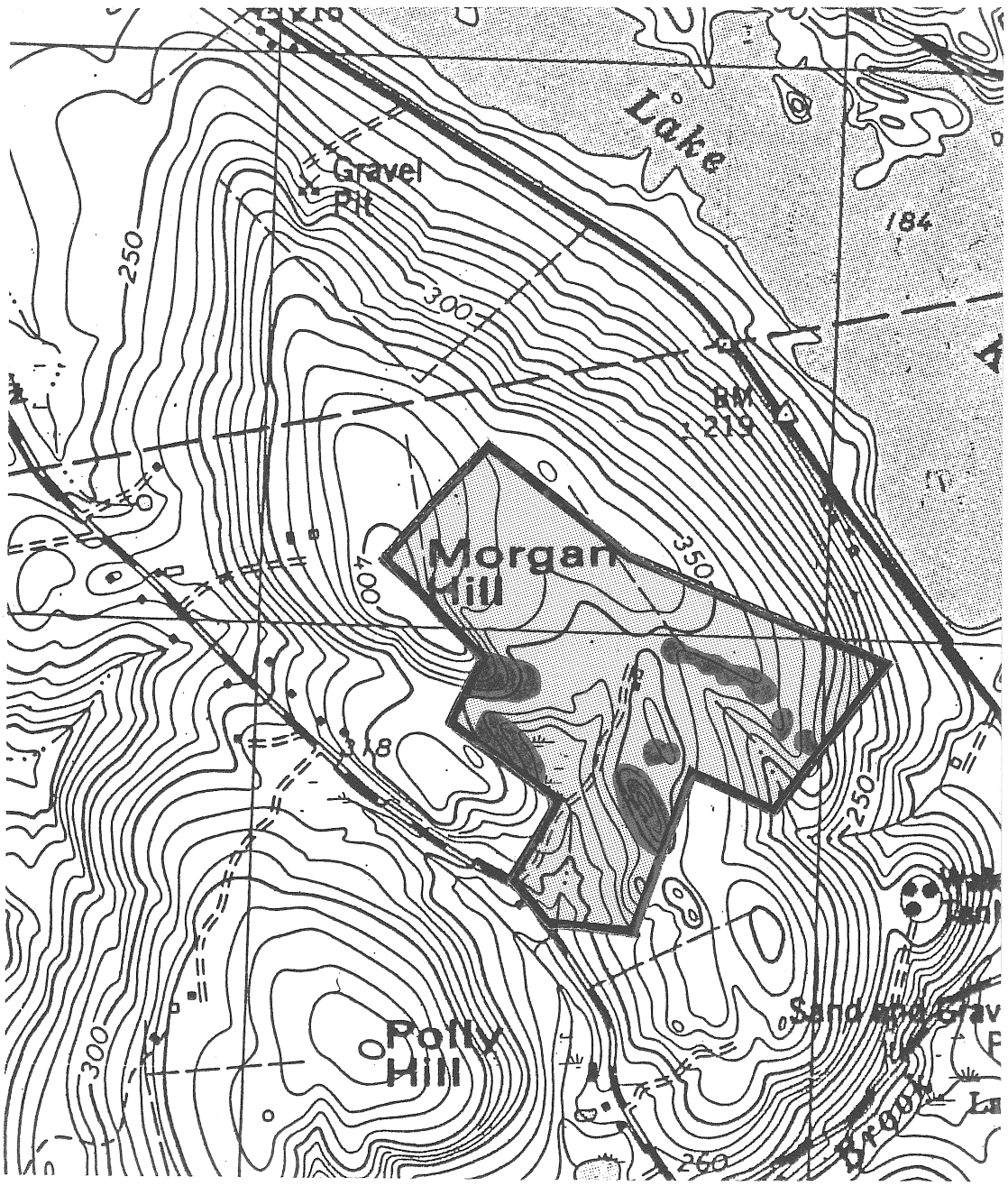


SURFICIAL GEOLOGIC MAP

Scale 1" = 1000'

Till

Shallow to Bedrock Areas



5. SOILS RESOURCES

The majority of the parcel is well suited to the proposed development as the land is gentle to moderately sloping. There is little grading proposed except in the southeast portion of the site. This is the area of the seventh tee, the eighth green and the ninth tee. This is where the terrain is steeper, more stony and contains wetlands. The wetland area will be crossed for a golf cart path. A great deal of activity and grading is proposed in a small area that is in close proximity to a wetland. It will be difficult controlling erosion and sedimentation on these steeper slopes. An alternative arrangement of greens, to alleviate the congestion in the section of the course should be considered.

A particular concern with golf courses is the amount of herbicides and fertilizers that are used. If the applications are done in accordance with the manufacturers directions and there is not a high water table the potential for ground water pollution is reduced. Some fertilizers tend to adhere to soil particles with high humus or clay content and will tend not to leach through the soil. Sandy loams such as Canton and Charlton are soils that have moderate leaching potentials. Soils such as Paxton and Montauk have a moderately low leaching potential.

There is also a concern with surface water contamination when the soil particles are mobilized by water during the erosion process. The chemicals and fertilizers that are attached to the soil particles can be translocated to the point of deposition, usually to a wetlands or waterbody. This is why controlling erosion on areas such as a green, can be of particular concern.

A 50 foot vegetative buffer should be maintained around wetlands and water bodies. Types of trees that will tolerate wet areas are birches, red maple, eastern red cedar, honey locust, and pin oak. Shrubs that tolerate somewhat poorly drained and poorly drained soils are American Cranberry Bush*, Amur Honeysuckle*, Gray Dogwood, Elderberry*, Winterberry* and Red Oiser Dogwood. Ground covers which would adapt well would be Daylilies, Lily-turf, and Lily-of-the-valley. A seed mixture of 20 Lbs Creeping red fescue, 2 Lbs. Redtop and 20 Lbs. Tall fescue or Smooth bromegrass to the acre would be well suited for a area of somewhat poorly drained to variably drained soils around wetlands.

*** - Wildlife Plantings**

The site is locate primarily on Charlton-Hollis and Paxton Montauk series soils. Some of the soil units are stony and exhibit medium to rapid run-off. Permeability is moderate to moderately rapid in the surface layer and subsoil.

One of the town's concerns is maintaining the water quality in the reservoir, nearby Lake Konomac. The topography of the area is such that a large portion of surface flow will lead downstream of the reservoir to Polly Brook. Other drainage leads to a wetland area within the confines of the project. This area is dominated by Ridgebury series soils which demonstrate very slow or slow run-off and moderate permeability in the surface layer and subsoil. If the hydrogeologic setting of the site is such that the groundwater flow mimics the surface flow, the reservoir water quality should not be disturbed.

Run-off from fairways laden with pesticides and fertilizers should be carefully studied, however, to ensure that surface and groundwaters on and off-site (other than Lake Konomac) are not contaminated. The DEP Pesticides Unit should be contacted to discuss the following:

(1) The types of pesticides to be used at the golf course;
(2) The location of pesticide and fertilizer storage facilities;
(3) Period of operation and application rates of pesticides and fertilizers; and
(4) The need for groundwater impact assessment.

The Soil Survey for New London County indicates that the wetland soils on the site consist of Rn (Ridgebury, Leicester, and Whitman Soils). Based on the present golf course layout, fairways and/or golf cart paths will cross regulated wetlands in three areas. Efforts should be made to avoid wetland disturbances. All wetland activity that takes place on the site should be done during the dry time of year, be properly engineered, and include provisions for effective erosion and sediment control. Classified inland-wetland soils in Connecticut are regulated under General Statute Section 22a-36 et. seq. Any activity which involves modification, fillings, removal of soils, etc. will require a permit and ultimate approval by the Town's Inland Wetland Commission.

Additionally, it should be noted that a portion of the drive leading up to the golf course presently passes through wetlands and that this drive must be widened from 14 feet to 24 feet as mandated by town law.

The Construction Notes should state that siltation barriers are in place before the start of construction. It is recommended that a long-lived, UV protected silt fence be used. There should be a proposed time table for the start and completion of construction activities. Construction phasing is recommended with a large project which involves extensive land clearing and grading necessary for developing a golf course. Area stabilization is preferred before moving on to the next phase.

The developers should be specific about the methods of land clearing. Burying tree stumps and other woody vegetation is not a preferred method of disposal due to the creation of "sink holes" during decomposition. Excessive erosion may accompany this disturbed area. Areas for stockpiling topsoil should be delineated and protected from erosion.

Vegetative measures for soil and erosion control are available in the Connecticut Guidelines. Recommended seeding dates for New London County are April 15 - June 15 and August 15 - October 1. There are specific methods of protecting and planting trees outlined in the Connecticut Guidelines. Consult the Guidelines to keep desired species on this property.

The site plan shows three new ponds will be used for irrigation and aesthetic purposes. The ponds should ideally be placed so that run-off is captured from the fairways and re-used on the golf course where possible. (Please refer to WETLAND REVIEW section for further information)

Two of the three ponds will be constructed in regulated wetland soils and will require a permit from the town's Inland Wetland Commission.

The Soil Conservation Service (SCS) handbook on Pond Design should be used as a guide in planning each pond. Each site is specific and requires its own design. The design should include the grading plan, stabilization plan, and details concerning where excavated materials will go.

For reasons discussed above, sediment and erosion control measures are particularly important. An Erosion and Sediment Control Plan Worksheet is included in this report for the developer's use. It is paramount that wetland areas be protected.

The club-house is situated above the PbB soil (Paxton and Montauk fine sandy loams). This soil demonstrates very slow, slow, or moderately slow permeability in the substratum. On-site septic systems need special design and installation to prevent effluent from seeping to the surface. If flows range from 2,000 to 5,000 gallons per day (g.p.d.), the plan for subsurface sewage disposal needs to be submitted for review and approval by the State Department of Health Services. Based on present plans, it seems unlikely that wastewater flows would exceed 5,000 g.p.d. (Above this level requires the DEP Water Compliance Unit to issue a permit).

Lastly, the Soil Survey of New London County cites that the major limitations of constructing fairways on the planned areas are slope and large stones.

Soil Types

CcB - Canton and Charlton very stony fine sandy loams, 3 - 8 percent slopes

These gently sloping, well drained soils are on glacial till upland hills, plains, and ridges. Stones and boulders cover 1 8 percent of the surface. Permeability of the Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Permeability of the Charlton soil is moderate or moderately rapid. The available water capacity of these soils is moderate. Runoff is medium. These soils warm up and dry out rapidly in the spring. The soil is strongly acid or medium acid. These soils are not suited to cultivated crops. These soils are suited to trees.

These soils are in capability subclass VIs.

CrC - Charlton-Hollis fine sandy loams, very rocky, 3 - 15 percent slope

This gently sloping to sloping complex consists of somewhat excessively drained and well drained soils on glacial till uplands. Rock outcrops cover up to 10 percent of the surface. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Charlton soil is moderate or moderately rapid, the available water capacity is moderate. Permeability of the Hollis soil is moderate or moderately rapid above the bedrock, the available water capacity is low. The runoff of this complex is medium or rapid. It warms up and dries out rapidly in the spring. It is strongly acid or medium acid. These soils are not suited to cultivated crops. The hazard of erosion is moderate to severe. These soils are suited to trees. Windthrow is common on the Hollis soil because of the shallow rooting depth. The major limiting factor for community development is the shallow depth to bedrock.

These soils are in capability subclass VIs.

CrD - Charlton-Hollis fine sandy loams, very rocky, 15 - 45 percent slopes

This moderately steep to steep complex consists of somewhat excessively drained and well drained soils on glacial till uplands. Rock outcrops cover up to 10 percent of the surface. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Charlton soil is moderate or moderately rapid, the available water capacity is moderate. Permeability of the Hollis soil is moderate or moderately rapid above the bedrock, the available water capacity is low. Runoff of these soils is rapid or very rapid. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. These soils are not suited to cultivated crops. The Hollis soil has a shallow rooting depth and is droughty. These soils are suited to trees. Windthrow is common on the Hollis soil because of the shallow rooting depth. The major limiting factors for community development are steepness of slope, shallow depth to bedrock, and rock outcrops.

These soils are in capability subclass VIIs.

HrC - Hollis-Charlton-Rock outcrop complex, 3 - 15 percent slopes

This gently sloping to sloping complex consists of somewhat excessively drained and well drained soils and rock outcrop on glacial till uplands. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Hollis soil is moderate or moderately rapid above the bedrock, the available water capacity is low. Permeability of the Charlton soil is moderate or moderately rapid, the available water capacity is moderate. Runoff of these soils is medium or rapid. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. These soils are not suited to cultivated crops. The hazard of erosion is moderate to severe. These soils is suited to trees. Windthrow is common on the Hollis soil because of the shallow rooting depth. The major limiting factors for community development are the shallow depth to bedrock in many places, and rock outcrop. The Hollis soil is droughty.

These soils are in capability subclass VIIs.

HrD - Hollis-Charlton-Rock outcrop complex, 15 - 45 percent slopes

This moderately steep to very steep complex consists of somewhat excessively drained and well drained soils and rock outcrop on glacial till uplands. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Hollis soil is moderate or moderately rapid above the bedrock, the available water capacity is low. Permeability of the Charlton soil is moderate or moderately rapid, the available water capacity is moderate. Runoff of these soils is rapid or very rapid. These soils warm up and dry out rapidly in the spring. They are strongly acid or medium acid. The soils in this complex are not suited to cultivated crops. The soils in this complex are suited to trees. Windthrow is common on the Hollis soil because of the shallow rooting depth. The major limiting factors for community development are the steep slopes, shallow depth to bedrock and rock outcrop.

The soils in this complex are in capability subclass VIIs.

PbB - Paxton and Montauk fine sandy loams, 3 - 8 percent slopes

These gently sloping, well drained soils are on drumloidal, glacial till, upland landforms. Permeability of the Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Permeability of the Montauk soil is moderate or moderately rapid in the surface layer and subsoil and slow or moderately slow in the substratum. The available water capacity for these soils is moderate. Runoff is medium. These soils warm up and dry out rapidly in the spring. Unless limed, these soils are strongly acid or medium acid. These soils are well suited to cultivated crops. The hazard of erosion is moderate. These soils are suited to trees. The major limiting factor for community development is the very slow, slow, or moderately slow permeability in the substratum.

These soils are in capability subclass IIe.

PdB - Paxton and Montauk very stony fine sandy loams, 3 - 8 percent slopes

These gently sloping, well drained soils are on drumloidal, glacial till, upland landforms. Stones and boulders cover 1 - 8 percent of the surface. Permeability of the Paxton soil is moderate in the surface layer and subsoil and slow or very slow in the substratum. Permeability of the Montauk soil is moderate or moderately rapid in the surface layer and subsoil and slow or moderately slow in the substratum. The available water capacity of these soils is moderate. Runoff is medium. These soils warm up and dry out rapidly in the spring. Unless limed, they are strongly acid or medium acid. These soils are not suited to cultivated crops. The hazard of erosion is moderate. These soils are suited to trees. The major limiting factor for community development is very slow, slow, and moderately slow permeability in the substratum.

These soils are in capability subclass VIs.

*** Rn - Ridgebury, Leicester, and Whitman extremely stony fine sandy loams

These nearly level, poorly drained and very poorly drained soils are in drainageways and depressions of glacial till upland hills, ridges, plains, and drumloidal landforms. Stones and boulders cover 8 - 25 percent of the surface. The Ridgebury and Leicester soils have a seasonal high water table at a depth of about 6 inches. The Whitman soil has a high water table at or near the surface for most of the year. Permeability of Ridgebury and Whitman soils is moderate or moderately rapid in the surface layer and subsoil and slow or very slow in the substratum. The Ridgebury and Whitman soils are strongly acid through slightly acid. Permeability of Leicester soil is moderate or moderately rapid, it is very strongly acid through medium acid. Runoff for the Ridgebury and Leicester soil is very slow or slow. Whitman soil runoff is very slow, or the soil is ponded. The available water capacity for these soils is moderate. These soils are not suited to cultivated crops. The erosion hazard is slight. These soils are suited to trees. Windthrow is common because of the shallow rooting

depth above the high water table. The major limiting factors for community development are the high water table and the slow or very slow permeability in the substratum.

These soils are in capability subclass VIIs.

*** - Prime Agricultural Farmland**

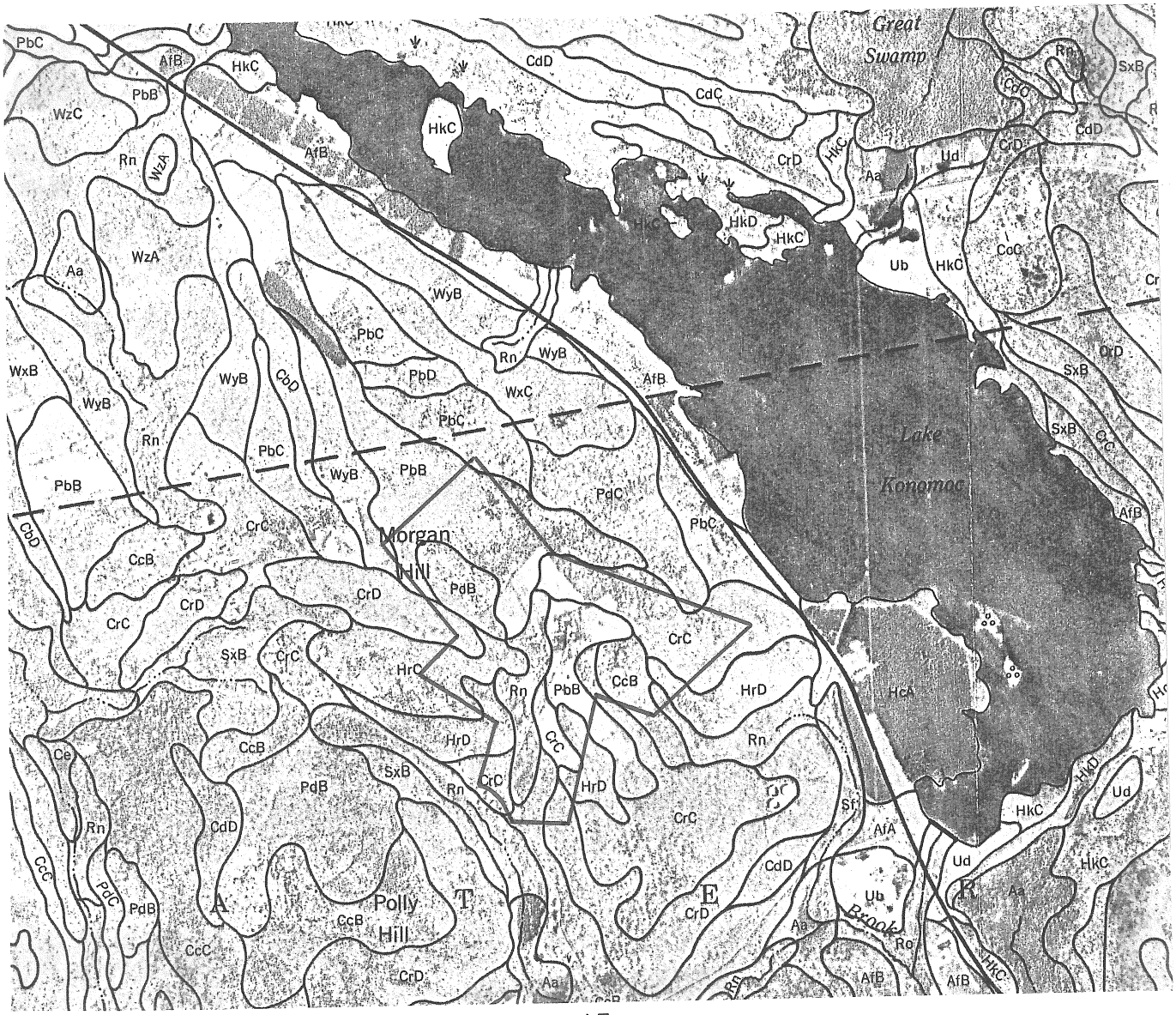
**** - Farmland of Statewide Importance**

***** - Wetlands**

SOILS MAP

Scale 1" = 1320'

Approximate Site Boundary



EROSION AND SEDIMENT CONTROL PLAN WORKSHEET

EROSION AND SEDIMENT CONTROL PLAN WORKSHEET

This is a guide for the development and review of erosion and sediment control plans. Local commissions should be consulted for regulatory requirements concerning erosion and sediment planning.

Checked ( ) items are those that have been provided on the current erosion and sediment control plan. Items identified with a star (*) should be incorporated into final plans.

Name of development _____

Materials received _____

_____

_____

Total Area _____ Location _____

Engineer _____

Date Received _____ Site Visit _____ Reviewed by _____

Submitted by _____

NARRATIVE SECTION DESCRIBING:

_____ The development
_____ Major land uses of adjoining areas
_____ The number of total acres and acres to be disturbed in the project
_____ The schedule of grading and construction activities including start and completion dates
_____ Application sequence of all E&S control measures
_____ The design criteria for all proposed E&S control measures
_____ Construction details and installation procedures for all proposed E&S control measures
_____ The operations and maintenance program for all proposed E&S control measures
_____ The name of the person or organization that will be responsible for the installation and maintenance of the E&S control measures
_____ Organization or person responsible for maintenance of permanent measures when project is completed. Measures include: _____
_____

A SITE PLAN AT A SUFFICIENT SCALE SHOWING:

Natural Features

_____ Existing topography
_____ Existing vegetation
_____ Soils information, including test pit data if available
_____ Identification of wetlands, watercourses, major drainage ways and water bodies on the site
_____ Name of soil scientist who performed wetlands delineations and flag numbers
_____ Rock outcrop areas
_____ Seeps, springs
_____ Major aquifers
_____ Floodplains (100 year) and floodways
_____ Channel encroachment line (DEP permit required)
_____ Coastal zone boundary
_____ Public water supply watershed boundaries
_____ Possible Army Corps Sec. 404 or Sec. 10 Permit Areas (Contact Corps at 1-800-343-4789)

Project Features

_____ The location of the proposed development
_____ A plan legend
_____ Adjacent properties
_____ Property lines
_____ Lot lines and setback lines
_____ Lot and/or building numbers
_____ Planned and existing roads
_____ Proposed structures
_____ Location of existing and planned utilities
_____ Location of wells and septic systems
_____ Proposed topography
_____ North arrow

Clearing, Grading, Vegetative Stabilization

_____ The sequence of grading, construction, and sediment and erosion control activities
_____ The location of and construction details for all proposed E&S control measures
_____ Recommended measures include _____
_____
_____
_____ Limits of disturbed areas
_____ Extent of areas to be graded
_____ Disposal procedure for cleared material
_____ Location of stockpiled topsoil and subsoil
_____ Temporary erosion control method for protection of disturbed areas when time of year or weather prohibit establishment of permanent vegetative cover
_____ Seedbed preparation (including topsoiling specifications)
_____ Fertilizer and lime application rates
_____ Mulch application rate
_____ Mulch anchoring measures

Drainage System

_____ Existing and planned drainage pattern
_____ Drainage areas used in design of storm water management system
_____ Size and location of culverts and storm sewers
_____ Drainage calculations for review by town engineer
_____ Storm water management measures and construction details
_____ Groundwater control measures (footing drains, curtain drains)
_____ Planned water diversions and dams (DEP permit may be required)

House Site Developments

_____ Sediment and erosion control measures for individual lot development

Additional Comments

6. HYDROLOGY

The site, which contains two principal streamcourses, can be divided into 3 subwatershed areas (see attached Watershed Boundary map). Approximately 51 acres in the western half of the site drains to the unnamed streamcourse that originates from a man-made pond in the western parts. From the pond's outlet, it flows in a southerly direction, passing under Butlertown Road and ultimately discharging to Polly Brook, a Lake Pond Brook tributary. Lake Pond Brook is the outlet stream for Lake Konomoc. The existing pond is proposed to be expanded into a larger pond for irrigation purposes. Approximately 26 acres in the eastern parts drains to the other principal streamcourse found on the site. The streamcourse originates in a wetland pocket and generally flows in a southerly direction to Polly Brook. One of the proposed irrigation ponds is to be located in the headwater region of the wetland. Finally, runoff emanating along the northern and eastern limits of the site drains via topographic swales directly to Route 85 and Lake Konomoc.

The unnamed watercourses on the site have not been classified by the Department of Environmental Protection, but are presumed to be class A water resources. Class A water resources may be suitable for drinking, recreational or other uses and may be subject to absolute restrictions in the discharge of pollutants, although certain discharges may be allowed. The northern and eastern limits of the site (about 6 acres) are within the primary watershed for the Lake Konomoc reservoir. The reservoir is classified as an "AA" water resources indicating that an existing or proposed use as a public drinking water supply; "AA" water resources are regulated similarly to "A" resources.

Development of a 9-hole golf course, clubhouse and restaurant and parking facilities would not be expected to lead to significant increases in post-development runoff conditions. Except for the new parking lot areas and removal of trees and vegetation for fairways, greens and tees, the existing land cover would not be expected to change drastically under the proposed plan. Gravel-based parking lots and a conscientious vegetation removal plan should help to minimize post-development runoff impacts such as flooding, erosion and sedimentation and surface water degradation. The applicant should be required to prepare a stormwater management plan for the proposed development. Connecticut's Guidelines for Soil Erosion and Sediment Control which provides excellent discussions and methods for sediment and erosion

control should be referenced with respect to the plan.

Another potential water quality concern that needs to be addressed involves the application of fertilizers and pesticides to tees, fairways and greens. The applicant should be required to formulate a pesticide and fertilizer management plan for the golf course that reduces the chance for adverse impacts to ground or surface water quality on and off-site. In this regard, every effort should be made to limit the amount of development that takes place on the site which drains directly to Lake Konomoc Reservoir.

Also, according to the Department of Environmental Protection's Community Water Systems in Connecticut by H. Sternberg, 1986, a community water supply well (City of New London) is located on the east side of Lake Pond Brook southeast of the site. Since 85% of the site ultimately drains to Lake Pond Brook valley via Polly Brook, this underscores the need for a conscientious fertilizer/pesticide management plan and implementation of a surface and ground water monitoring plan.

The Department of Environmental Protection Pesticide Unit should be contacted regarding good management practices for golf course maintenance and operation to protect water supply wells on and off the site and the site's class A water resources.

The following comments should be considered for the fertilizer/pesticide plan:

1) the types of pesticides/fertilizers to be used at the proposed golf course (some may not be permitted because they pose too great a risk to surface, ground water or wildlife or may require licensing by the the Department of Environmental Protection). All materials should be applied by a State of Connecticut licensed applicator;

2) the location and construction of pesticide and fertilizer storage facilities. Storage areas for pesticides/fertilizers should be constructed on a cement slab protected from precipitation and surface runoff and properly secured;

3) the period of operation and application rates of pesticides and fertilizers. Pesticides/fertilizers should not be applied during or prior to heavy periods of precipitation, when runoff is high;

4) a ground and surface water impact assessment based on hydrogeologic analysis and a detailed monitoring program;

5) monitoring the water below the root zone under a green to measure the potential for leaching of pesticides and fertilizers to groundwater;

6) the action to be taken if pesticide or nitrate levels increase or exceed hazardous levels; and

7) utilization of grasses and plants that have low nitrogen requirements and the use of slow release fertilizers.

Two irrigation ponds are proposed for the golf course. As mentioned earlier, there is concern, due to the potential of fluctuating water table in the area of the ponds, that the area to be irrigated by the ponds is limited by the amount of water available throughout golf playing season. Water levels in the pond would be expected to be lowest in the summer time when irrigation water for greens, tees and fairways will be in greatest demand. As such, additional irrigation ponds or irrigation wells may be needed. Pond capacities must be adequate to meet golf course irrigation requirements and to overcome unavoidable water losses. For example, a .15-inch application of water on 40 acres (approximate area to be irrigated) requires 163,000 gallons of water per day. One then begins to realize the significant amounts of water needed for irrigation purposes for a 40 acre area and underscores the need to design a water budget that includes proposed irrigation rates and surface and ground water contributions available on the site.

Storm drainage and golf course runoff should be directed to the pond(s). Ideally, the water collected in the pond(s) could be recycled for irrigation purposes. A drainage/irrigation system, which recycles the water should be considered to reduce the potential for surface and ground water contamination on and off the site.

WATERSHED BOUNDARY MAP

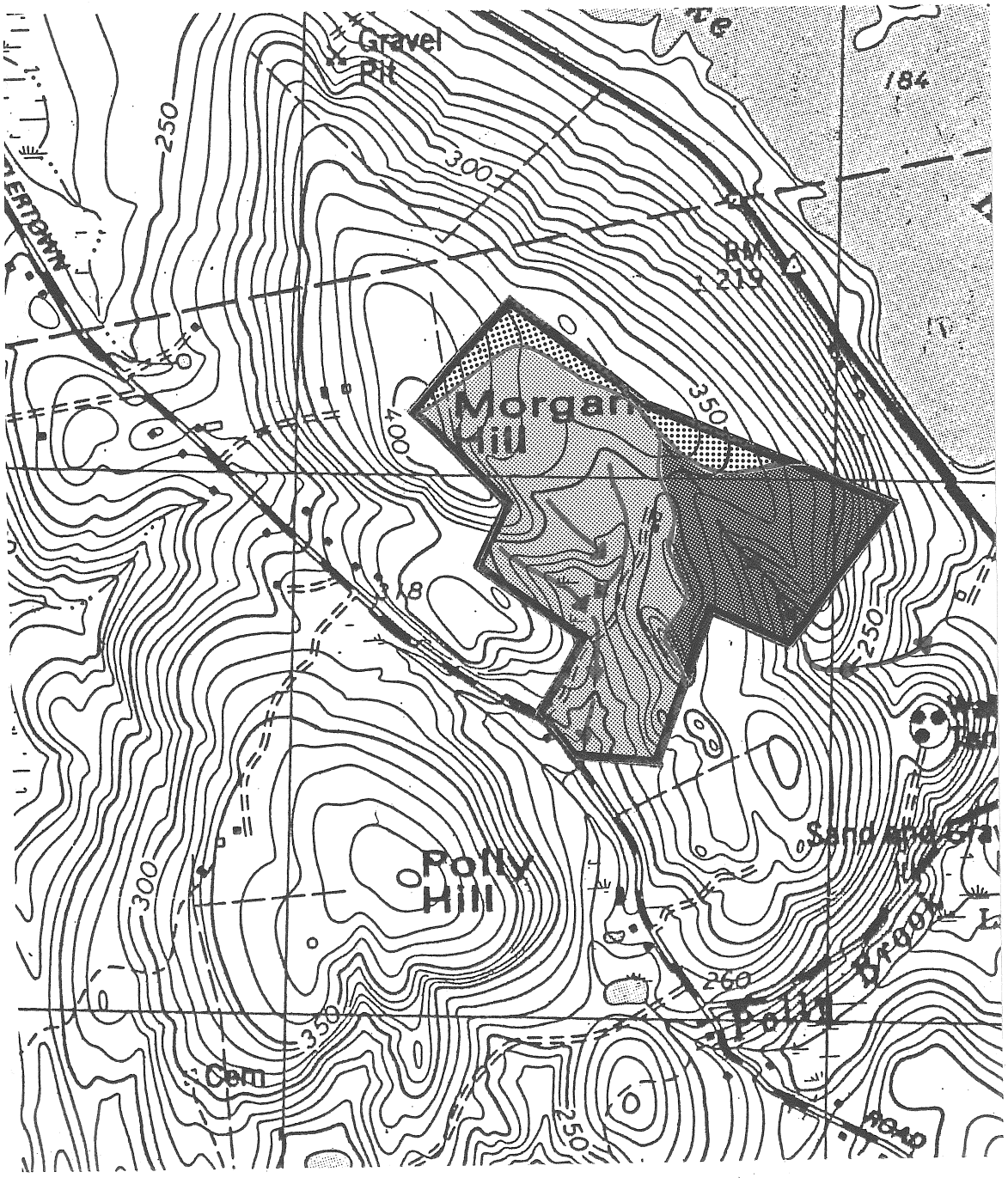
Scale 1" = 1000'

Approximately 51 acres of the site that drains to an unnamed Polly Brook tributary.

Approximately 6 acres of the site that drain directly to Lake Konomoc.

Approximately 26 acres of the site that drain to an unnamed Polly Brook tributary.

Watercourses showing direction of flow.



7. WETLAND REVIEW

General Site Conditions

This proposal involves the construction of a 9-hole public golf course with associated parking and a "sandwich shop" restaurant. No locker room facilities are proposed. The project site is located on the east side of Butlertown Road, approximately 2500 feet north of Pump Lake Road. The topography on the property ranges from gently sloping to steep slopes located on the eastern side of the site. The study area is generally forested with areas of mowed open fields interspersed.

Project Impacts to Regulated Areas

The project site is approximately ±93 acres in size and includes 9.3 acres of regulated wetlands and associated small streams. The direct impacts to wetlands and watercourses include: **1)** the excavation of two ponds within wetland boundaries, **2)** filling for pond bank stabilization, **3)** bridge placement over a stream in a wetland corridor and **4)** line-of-site vegetation clearing.

The first pond is located in wetlands on the west side of the site. The wetlands at this location have been previously disturbed by agricultural activities. A smaller pond already exists and the wetlands are basically a depression in a mowed field. The wetlands primarily serve to detain water prior to entering a stream which leaves the property at the southwest corner. In the past, they may have served to filter agricultural runoff from adjacent fields. The wetlands in this have limited habitat value since there is virtually no cover and they are within close proximity to the existing house. The existing pond may serve amphibians and local bird populations to some degree. Given the altered condition of the wetlands and their limited functional value, a pond in this location appears to be acceptable.

The second pond is located in a forested system that provides a much higher quality habitat. Forested wetlands are important to wildlife in the areas surrounding them because they offer a stable habitat. In times of drought, surface water may generally be obtained by animals in wetlands. In times of windy, winter cold, wetlands provide windless refuges, producing seeds and fruits that may be consumed as food. Additionally, forested wetlands are often warmer than more open areas because of the

close proximity of unfrozen and often flowing surface water and springs, combined with the windbreaking ability of the trees. Thus wetlands offer insurance for survival to animals in times of climatic extremes. This wetland is connected to other off-site wetlands by a stream and thus provides a safe, forested travel lane for wildlife.

The wetlands, by the nature of the soils and vegetation contained therein, also provide pollution abatement functions. Sediments and other pollutants entering the wetlands through runoff are filtered by the vegetation and allowed to settle out prior to entrance into the stream. With the addition of chemical fertilizers, pesticides, herbicides and fungicides for the maintenance of manicured greens and fairways, this pollution attenuation function becomes very important. Although the stream in question does not feed Lake Konomoc, a public water supply reservoir, it is still important to maintain the water quality in this stream.

While positioning a pond in this location may be convenient for water supply purposes, it is suggested that an alternate location or well installation for irrigation purposes be evaluated. Reduction in natural forested wetland in this area would reduce the pollution attenuation function that this wetland serves to protect the water quality of the stream.

North of the property boundary, in this same system, the applicant proposes to bridge the stream for cart crossing. This seems to be the most prudent alternative since the natural stream bed would remain intact.

The wetlands on this site also function to collect and detain overland runoff prior to the water's entrance into the streams. This storage function becomes increasingly important upon the removal of vegetation and construction of impervious and grassed surfaces which will increase the rate of stormwater runoff.

A third pond is shown on the site plan at the northwest corner of the site adjacent to a small pocket of wetlands. However, Mr. Lefebvre indicated during the site walk that this pond would be eliminated because of a lack of groundwater support.

General Comments and Recommendations

It appears that the applicant has made an effort to avoid direct impacts to the forested wetland systems on his property. As noted above, the larger pond has been proposed

in an area that has been previously disturbed and may be enhanced by introducing an open water body. To enhance the pond's attractiveness to wildlife and to provide sediment and pollution filtration functions, emergent vegetation can be introduced. Preferred species include cattails, bur-reed and any seed-producing rushes and sedges. To provide a visual screen or buffer around the wetlands, species such as Northern White Cedar or Carolina Poplar are trees which tolerate poorly drained soils. Shrub species could also be introduced that attract wildlife including Viburnum, Elderberry, Winterberry and Silky Dogwood.

The applicant should evaluate the alternatives to constructing the second pond within the forested wetland system. Section 22a-41(b) of the Connecticut General Statutes mandates that a permit shall not be issued unless there is a finding that a feasible and prudent alternative does not exist. The applicant is responsible for providing the commission with alternatives that would accomplish the goals of the original proposal. If the goal is to irrigate the golf course, then the alternative of installing a well should be evaluated.

The applicant has proposed line-of-sight clearing in a wetland area. The specifics of line-of-sight clearing should be outlined, indicating the actual diameter at breast height of trees to be removed. Removal of large trees should not have a serious negative impact upon the wetlands. Wetland understory and shrub vegetation should continue to inhabit the area providing the hydrology is not altered.

The DEP's Pesticides Management Section has lists of restricted use pesticides, residual pesticides, and non-contaminating pesticides. Depending on the specific problems encountered by the greenskeeper, their choice of products should be compared with these rosters. Again, any pesticide applied to water requires licensing by the DEP Pesticides Management Section. Chemicals should only be applied to the greens and tees, allowing the rough to be maintained through cutting alone. Further information on this can be obtained from the DEP Pesticides Management Section at 566-5148.

It is recommended that all sediment and erosion controls be installed prior to any construction activity and that they be properly maintained throughout the course of construction activity.

8. SEWAGE DISPOSAL

Since public sewers are not available to the site, the construction of an on-site sewage disposal system(s) or expansion of the existing residential sewage disposal system will likely be required to serve the proposed restaurant and clubhouse (showers and sanitary facilities). The area in the vicinity of the existing house (east and south) is somewhat limited for septic system installation mainly due to a relatively shallow permeable soil layer found above a compact glacial till commonly called till.

Sewage disposal systems typically constructed in soils found in proximity to the house require installation of ground water control drains and placement of sandy fill material to elevate leaching systems above seasonally high ground water tables. Detailed soil testing which has not been conducted to date will be required for the septic system area in order to determine subsurface conditions. This work which includes septic system design should be done under the supervision of a professional engineer familiar with sanitary disposal design. Soil testing should also be witnessed by the Town Sanitarian. Careful design and installation of the sewage disposal system for golf course facilities will be necessary in order to prevent future sanitary problems due to system malfunction that could adversely impact local water resources.

9. WATER SUPPLY

Because there are no public water supply lines accessible to the site, the proposed golf course development will rely on water supplied by individual on-site wells. Additionally, an irrigation well or wells may be needed to supplement water drawn from the two ponds proposed for the golf course. Since the well or wells serving the clubhouse and restaurant is likely to serve more than 25 persons, the applicant may need approval from the Department of Health Services (DOHS) for the construction of a community water supply. This procedure would be done in conjunction with the local health department. Water quality, yields and plans for pumpage, storage and distribution must be reviewed and approved by the DOHS and local health department. Additionally, the location of well or wells will require approval by both departments.

The bedrock appears to be the only suitable aquifer on the site. An aquifer is a

geologic formation that is capable of yielding a usable amount of water to a well. Because the hydraulic conductivity of till is typically low, it has low potential for groundwater development. Additionally, the water table in the till tends to fluctuate, making it unreliable as a water supply source, particularly for shallow dug wells during the summer and fall months. During this period or during droughty periods the water table may recede below the bottom of the well. In terms of irrigation for the golf course, fluctuating groundwater levels may also adversely impact the storage capacity of the proposed two ponds especially during the summer months when groundwater levels are typically low and when irrigation for the golf course is needed the most. This potential concern will be discussed in more detail in the HYDROLOGY section.

Yields from bedrock wells depend upon the number and size of water-bearing fractures that are intersected by the wells. Density and size of fractures in different bedrock zones vary widely, but they generally occur within the first few hundred feet of the surface. Because the distribution of fractures in bedrock is irregular, there is no practical way outside of drilling the well first, to predict the yield of a well drilled in a specific location.

As noted earlier, the bedrock underlying the site consists of gneisses and quartzites. Although the composition and texture of the bedrock varies considerably across the site and with depth, both responded similarly to movements and deformation stresses within the earth's crust by fracturing and forming distinct open joints and fractures. These openings serve as conduits for groundwater movement. As such, it does not seem likely that one rock unit will be more productive than the other.

A survey of 2,000 domestic wells in the Lower Thames and Southeastern Coastal River Basins, in which the site is located, found that approximately 90% of bedrock-based wells tapping a rock similar to that underlying the site provided at least 3 gallons per minute 90% of the time. A yield of 3-gallons per minute is equivalent to 3,240 gallons of water/day (18-hour pumping period).

More locally, the Team's geologist reviewed well completion reports for 15 residences located on Butlertown Road that were drilled from 1970 and to the present. The yields of the wells ranged between a 1/2 gallon per minute to 100 gallons per minute. The depths of the wells range between 125 and 525 below the ground surface. All of the wells reportedly tapped a granitic rock that is gray color and that appears to be representative of the Potter Hill Granitic Gneiss. Several of the wells reported yields of

only 1/2 gallon per minute. However, 3 wells drilled on properties abutting the site to the southwest reported yields of 75 gallons per minute (Karasewicz), 10 gallons per minute (DiPollina) and 5 gallons per minute (DeWulf). A typical yield for bedrock well is 3-5 gallons per minute. The highest yielding well surveyed was reported at 100 gallons per minute. No well completion information was found for the well serving the site (Lefebvre).

Water consumption data for the proposed golf course which includes a small restaurant and clubhouse was not available at the field review. The applicant should ascertain water usage figures for peak periods to determine whether or not the underlying bedrock can satisfy the demands of the proposed country club building and restaurant. If possible, flow figures from a similar-sized facility should be obtained or metered and used as a guideline. Some adjustments to flow figures may be required, depending on the final design. A breakdown of flow rates for all proposed facilities using water should be calculated. Once the water budget for the golf course facilities is defined, the applicant can determine whether or not existing residential well is capable of providing a reliable amount of water to the facility. Providing the restaurant is kept small and clubhouse water usage kept low it seems likely that a well yielding between 3-5 gallons of water/day could adequately serve these facilities. Short-term daily needs for high flow rates might be met by a low yielding well in conjunction with a water storage tank.

During summer months or droughty periods it may be necessary to augment irrigation water from the two proposed ponds by water withdrawn from a deep bedrock well or wells. Because of their depth, such wells may not be as affected by a seasonally fluctuating water table. The applicant should determine the irrigation needs for a 9-hole golf course by computing the area of greens, tees and fairways that will be irrigated and an application rate (probably about 1 inch/week). Irrigation needs will likely be necessary during the growing season (late March to early October). The irrigation rates for other local 9-hole courses should also be checked for comparison purposes. Once this information is compiled, the applicant will be able to better understand whether or not the bedrock aquifer can supplement water flows sufficient for irrigation purposes if water withdrawals from the proposed artificial ponds are diminished or reduced during summer months. During droughty periods, it may be necessary to restrict irrigation to only tees and greens and not fairways which would help conserve water. Also, water could be applied during the late afternoon and evening, in order to reduce evaporation losses that would occur during the day time.

The quality of natural groundwater on the site should be good. Groundwater on most of the site is classified by the Department of Environmental Protection as GA, which means that it is suitable for private drinking water supplies without treatment. Since it drains to a public water supply reservoir, groundwater in the northern and eastern limits is classified as GAA.

Every effort should be made to locate water supply wells, on a relatively high portion of the lot, properly separated from the sewage disposal systems or any other potential pollutants (e.g., road drainage, curtain drain pipe, golf course drainage, etc.) and in a direction that is opposite the expected groundwater movement. All wells should be cased with steel pipe into the underlying bedrock and properly installed in accordance with all applicable State Public Health Code and Connecticut Well Drilling Board regulations to provide adequate protection of the quality of bedrock water. In addition, the Town sanitarian must inspect and approve all well locations. Where feasible irrigation wells should be located to intercept and recycle groundwater that may potentially be contaminated by fertilizer and pesticide applications.

Any well which withdraws 50,000 gallons of water per day or more is subject to a diversion permit per Sections 22-365 thru 378 of the Connecticut General Statutes. This also applies to water withdrawals from the two artificial ponds. Robert Gilmore of the Department of Environmental Protection Water Resources Unit should be contacted at 566-7220 regarding this matter.

10. VEGETATION

STAND #1 - Open fields and house lot.

STAND #2 - Old field type with an overstory of red cedar, flowering dogwood and black cherry. The understory is typically made up of various grasses, golden rod, viburnum and a few patches of bayberry. Most of this area is proposed to be cleared. Some of the small red cedars might be used for landscaping the fairways. The larger cedars could be salvaged for posts or poles.

STAND #3 - Mixed hardwoods, mostly pole-size. These are stands of young trees

with a considerable amount of the area classified as "wetlands". Red maple predominates, although oaks and hickory are common on the dryer portions. Sweet pepperbush and blueberry are common in the understory. The areas could be thinned to remove firewood, but since there are no plans to develop any of this area it is best to leave it alone for the present.

STAND #4 - This is a mixed hardwood stand that is typical of the oak-hickory type. The dominant species are black and scarlet oak, with white oak and pignut hickory also present. Black birch and red maple are common also, especially in the understory. There are even a few stems of shag bark hickory and in the area adjoining STAND #5 there are some tulip trees. Most of the area is heavily wooded containing both fuelwood and sawlogs that could be salvaged for the wood products markets.

STAND #5 - Mixed hardwoods made up of oaks, tulip,and birch. This is a small section of lowland hardwoods of higher quality hardwood. Red and black oaks are common, with high quality tulip popular. The black birch and red maple are generally somewhat suppressed and poorer quality. This is the one area where there is a substantial amount of Mountain Laurel in the understory. Some portion may have to be cleared, but in the uncut portion harvesting should be confined to only removing the small, poorly formed trees leaving the overstory and the Laurel intact, as much as is pratical. This will be a highly aesthetic area.

STAND #6 - Mixed hardwoods that are pole-size (6-10 inches). This is a mixture of oaks, hickory, maple (red and sugar) and birches (black and yellow). There are few large trees (12 inchesin diameter or more), but the trees that will have to be cleared would be quite suitable for fuelwood. On this site sugar maple is the preferred species to leave.

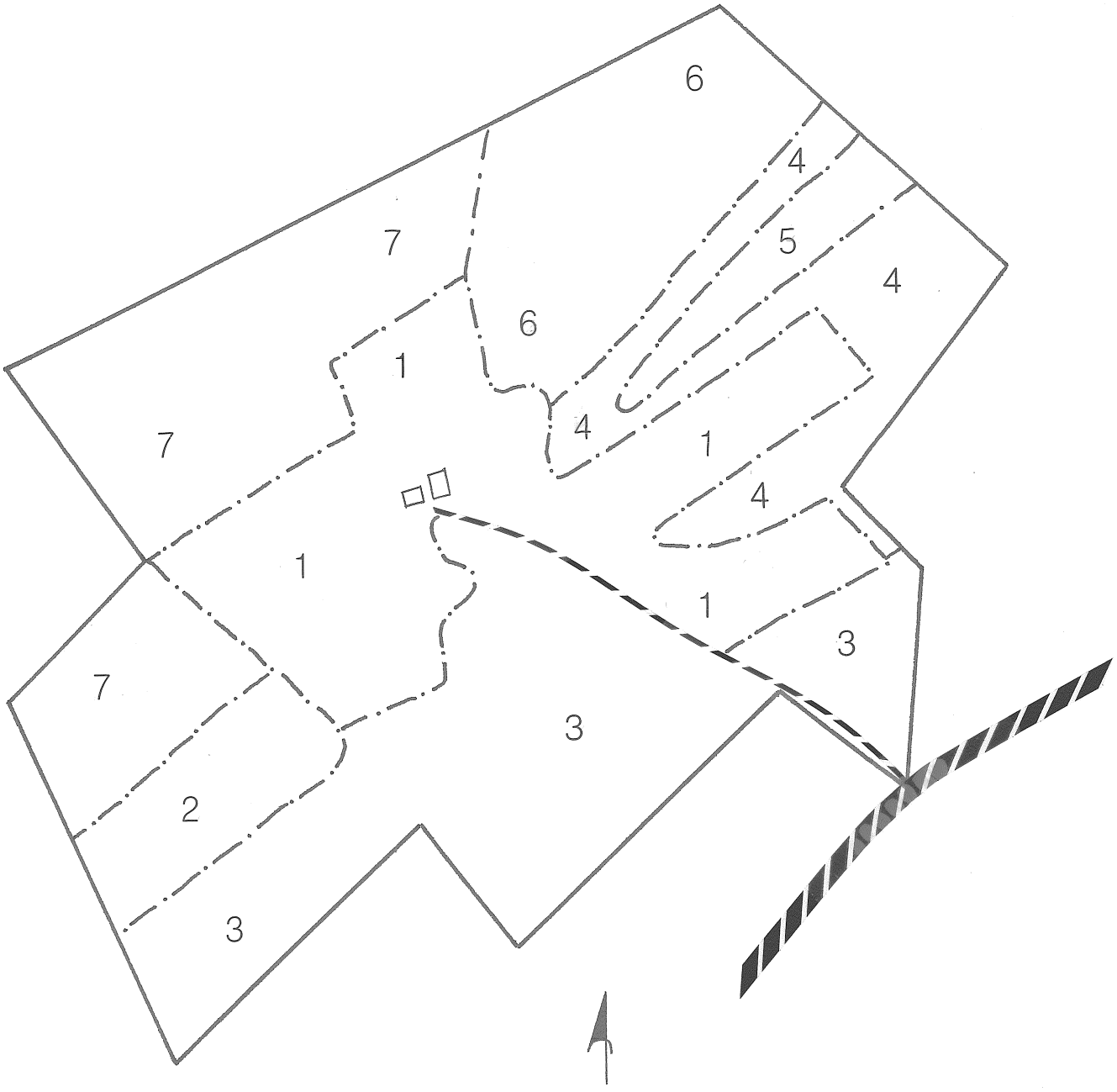
STAND #7 - Mixed hardwood. Not too different from STAND #6, although this stand is much more varied. The area was more recently pasture and as a result there are the larger old pasture trees and younger pole-size trees. There is more sugar maple in this stand which will make some nice trees along the fairway. There are some sawlogs within the cleared area, as well as firewood that could be utilized.

In general, if possible, the trees that have to be removed should be cut and sold for forest products. It will not be a big income factor but it would be better environmentally

to utilize the product than to expend energy to turn them into chips.

Sugar maples, hickories and red cedar are the best trees to leave exposed along the fairways and other open areas. They are less susceptible to changes in their environment caused by the sudden release than oaks and they are stronger as single stems than the birches. Tulip popular is the fastest growing tree and where they are open grown and have developed a broad canopy, they hold up well also.

VEGETATION MAP



11. PLANNING COMMENTS

The proposed golf course is located in northwestern Waterford on the easterly side of Butlertown Road. The location is approximately two miles northwest of the intersection of Routes 85 and I-395 at exit 77. This is also the approximate distance from the proposed golf course northwest to the proposed intersection of Routes 11 and 161 in southwest Montville.

Surrounding land uses are low density residential and undeveloped forested areas. The City of New London Konomoc Reservoir and reservoir land holdings are located east of the site. The channel 26 television transmitter is located north of the site across the town line in Montville.

The area is recommended for low density uses in the Regional Development Plan with less than one dwelling unit per 1.5 acres, open space, recreation and water supply uses recommended. The area is zoned Rural Residential RU-120 which requires three acre lot sizes. This is Waterford's lowest density zone. This zoning designation provides for golf courses as a special permit. A small scale restaurant is intended to be an accessory use to the golf course. On a land use basis the golf course should be compatible with surrounding uses.

The Waterford zoning regulations require 100 parking spaces for a golf course. If one assumes that this represents an eighteen hole course, then a nine-hole course would require fifty spaces. Data from Trip Generation, 4th Edition, by the Institute of Transportation Engineers indicate that on a weekday each parking space for a golf course can be expected to generate 6.62 trips, on Saturday 5.899 trips, and on Sunday 6.001 trips. These generation rates result in 331 trips on a weekday, 295 on a Saturday and 300 on a Sunday for a nine-hole course. The peak hour 7-9 a.m. weekday generation is projected to be 14 trips and the 4-6 p.m. weekday peak generation, 17 trips. Saturday peak hour generation is expected to be 25 trips and Sunday 22 trips. No separate trip generations are presented here for the small restaurant because it is intended to serve patrons of the golf course. No existing traffic counts are available for Butlertown Road. The site line where the existing driveway enters Butlertown road will have to be improved by cutting ,clearing, grading and removing a stone fence. This driveway will become the access road for the golf course. It might also be advisable to eliminate the current bend in this driveway access

road where it enters Butlertown Road by extending the driveway-access road straight through to Butlertown Road. It does not appear feasible to have alternative direct access to the site from Route 85 because in addition to building an extensive new road which would drain towards the Konomoc Reservoir, the slope would be 15 percent or greater and numerous wetlands would have to be crossed both on and off the site. The current plan would only involve widening an existing wetlands crossing on the access road. No improvements are recommended in the Regional Transportation Plan for roads in this area of Waterford.

12. ARCHAEOLOGICAL REVIEW

A review of the State of Connecticut Archaeological Site Files and Maps show no prehistoric or historic resources in the project area. However, the Office of State Archaeology has listed for the Town of Waterford a series of Indian settlements associated with hills overlooking large wetland areas. Such an environmental situation presents itself with Morgan Hill adjacent to Lake Konomoc. While the creation of the lake is historic, the lowlands would have drained a series of brooks and swamps into its basin. The result would have been an area rich in natural resources that prehistoric hunters-gatherers would have found attractive. The flat terrain with a seasonal brook running through offers a high potential for archaeological resources.

The Office of State Archaeology recommends that if extensive landscaping is proposed for the area at the knoll of Morgan Hill and along the brook draining into the lake there should be an archaeological reconnaissance survey conducted. This survey can locate and delineate any cultural resources in the project area and can be limited to the area outlined in the accompanying map. We further recommend that all archaeological studies be conducted in accordance with the Connecticut Historical Commission's **Environmental Review Primer for Connecticut's Archaeological Resources.**

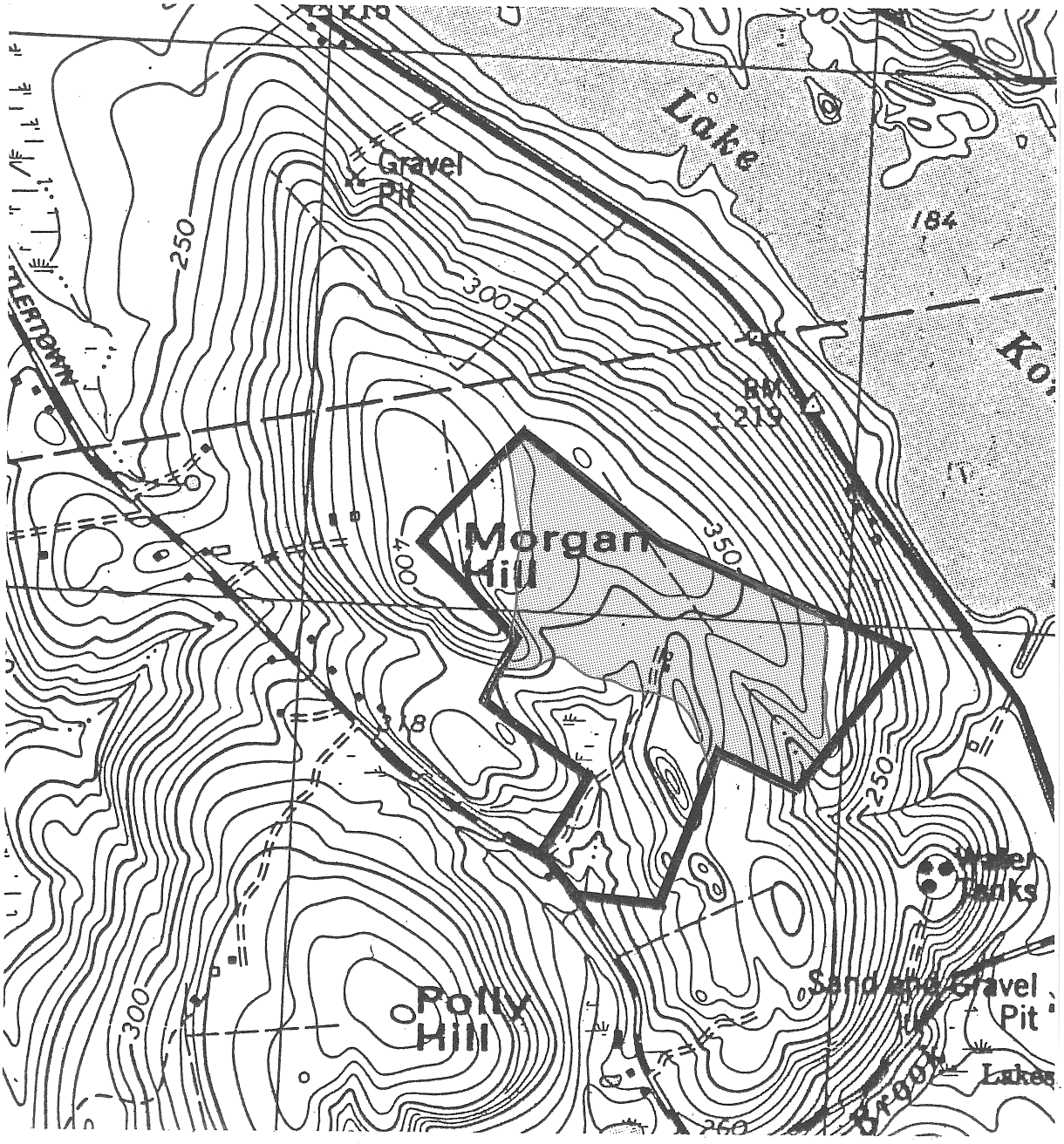
The Office of State Archaeology is prepared to offer the Town of Waterford and the landowner/developer technical assistance in undertaking the survey and reviewing the findings.

In summary, the project area is situation on a high, well-drained knoll overlooking a

large wetland. This type of natural setting has yielded many prehistoric Indian sites in southeastern Connecticut. It is recommended that an archaeological survey be conducted to locate and identify all cultural resources in an effort to ensure their preservation.

AREAS TO BE ARCHAEOLOGICALLY TESTED

Scale 1" = 1000'



ABOUT THE TEAM

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

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

PURPOSE OF THE TEAM

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

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

REQUESTING A REVIEW

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

For additional information and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 203-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438.