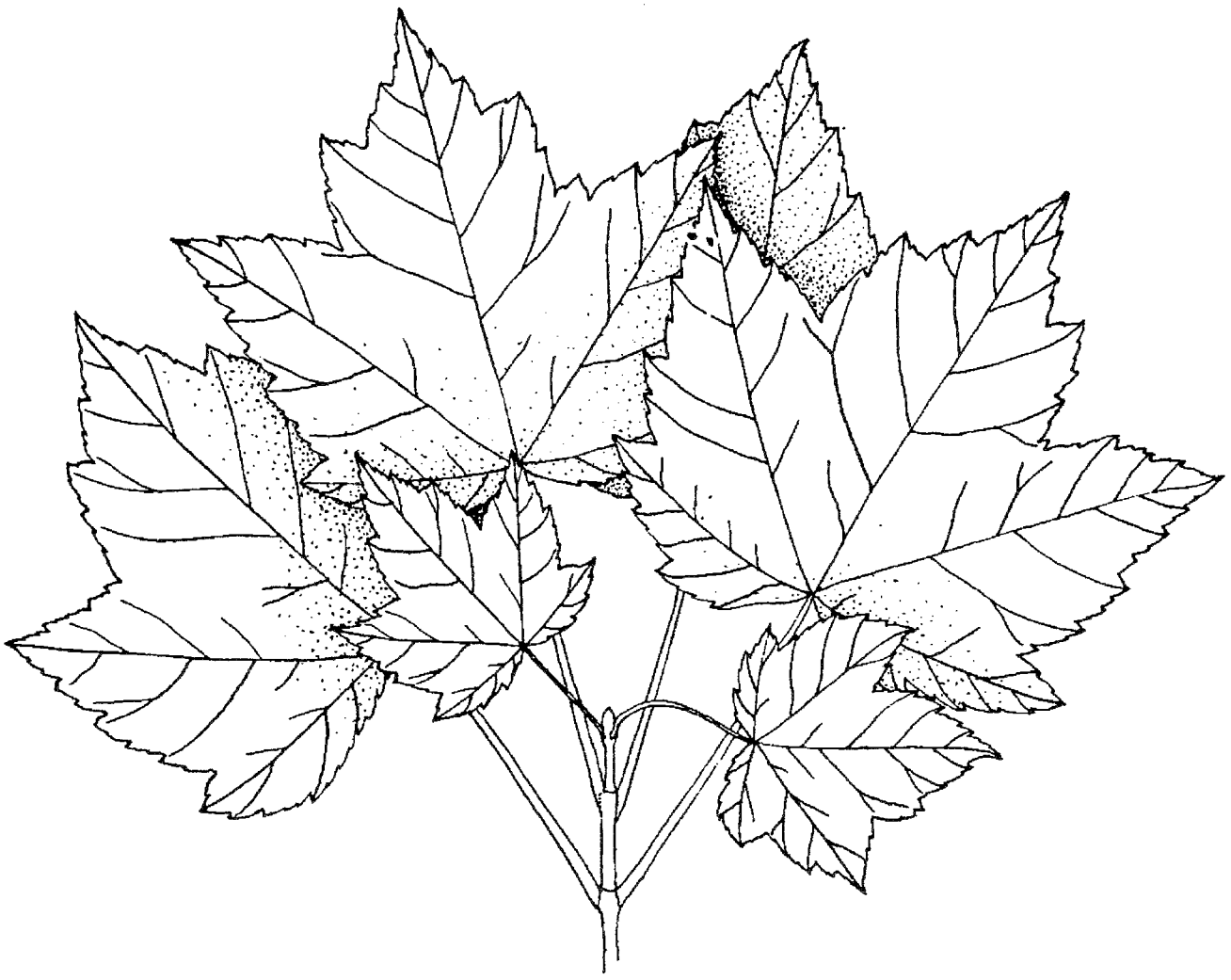
KUS EXCAVATION

OLD LYME, CONNECTICUT

SEPTEMBER 1989

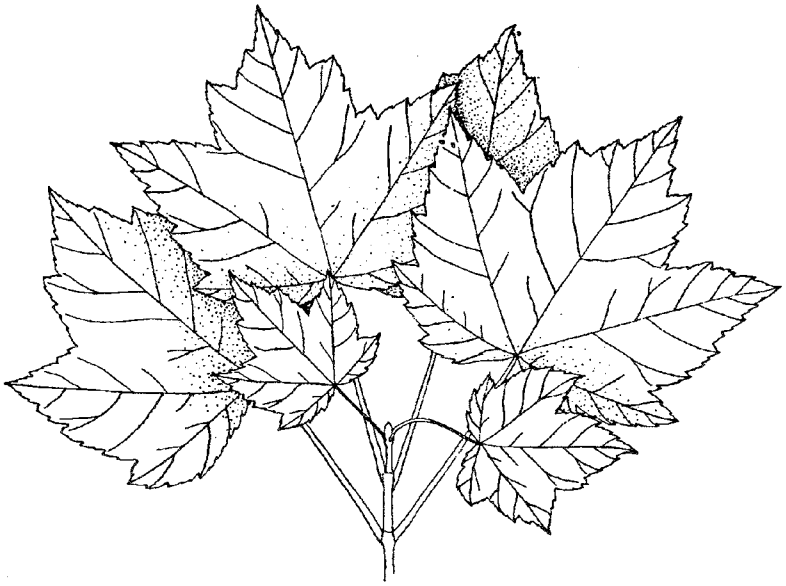


EASTERN CONNECTICUT
ENVIRONMENTAL REVIEW TEAM REPORT

Eastern Connecticut Resource Conservation and Development Area, Inc.

KUS
EXCAVATION
OLD LYME, CONNECTICUT

Review Date: August 3, 1989
Report Date: September 1989



EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.
P.O. Box 70, Route 154
Haddam, Connecticut 06438
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ENVIRONMENTAL REVIEW TEAM REPORT
ON

KUS EXCAVATION

OLD LYME, CONNECTICUT

This report is an outgrowth of a request from the Old Lyme 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, August 3, 1989. Team members participating on this review included:

Nick Bellantoni	**State Archaeologist**	**CT Museum of Natural History**
Frank Buck	**Environmental Analyst**	**DEP-Water Reosurces Unit**
Patrice D'Ovidio	**Soil Conservationist**	**USDA-Soil Conservation Service**
Steve Hill	**Wildlife Biologist**	**DEP-Eastern Disrict Headquarters**
Brian Murphy	**Fisheries Biologist**	**DEP-Eastern District Headquarters**
Richard Stoecker	**Regional Planner**	**CT River Estuary Regional Planning Agency**
Elaine Sych	**ERT Coordinator**	**Eastern CT RC&D Area, Inc.**
Bill Warzecha	**Geologist**	**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 a copy of the applicant's plan. The Team met with, and were accompanied by members of the Old Lyme Conservation Commission and the applicant. 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 excavation project.

If you require additional information, please contact:

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

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1. SETTING, LAND USE AND TOPOGRAPHY

The Kus property, about 140 acres in size, is located south of Boston Post Road (Route 51) in northeastern Old Lyme. It is bounded on the north by Route 51, on the east and south by private, undeveloped land and on the west by single family residential properties that include elderly town housing. The site vicinity consists mainly of low density residential. Higher residential densities as well as commercial land-uses characterize the frontage areas along the Boston Post Road to the west. Additionally, the town stump dump is located in the eastern half of the site. The remainder of the land is wooded.

Town officials noted on the review day that the site is located in an RU-80 zone. Permitted uses of the land include residential development on lots that are a minimum of 80,000 square feet or about 2 acres in size. The proposal to remove earth materials in the central parts of site does not appear to be compatible with the RU-80 zone, and will therefore require a special permit.

The site can be divided roughly in half by topography. An unnamed streamcourse and its accompanying wetlands/floodplain bisects the site. The streamcourse flows into a surface water body to the north known locally as Davis Pond. The outlet stream for the pond flows westward into Rogers Lake. The proposed excavation will take place on the east side of the streamcourse in the central parts and will ultimately impact an 11.45 acre area, most of which comprises regulated soils (wetland/floodplain). To the east and west, the land rises to bedrock cored hills that are covered by a thin blanket of glacial till (see **GEOLOGY** Section).

Slopes are steepest in the east central parts of the site and range between 8-15%. Gentler slopes occur in the western half of the site and at the eastern limits. Unconsolidated materials have been recently mined on the steep slopes and wetlands in the eastcentral parts.

LOCATION MAP

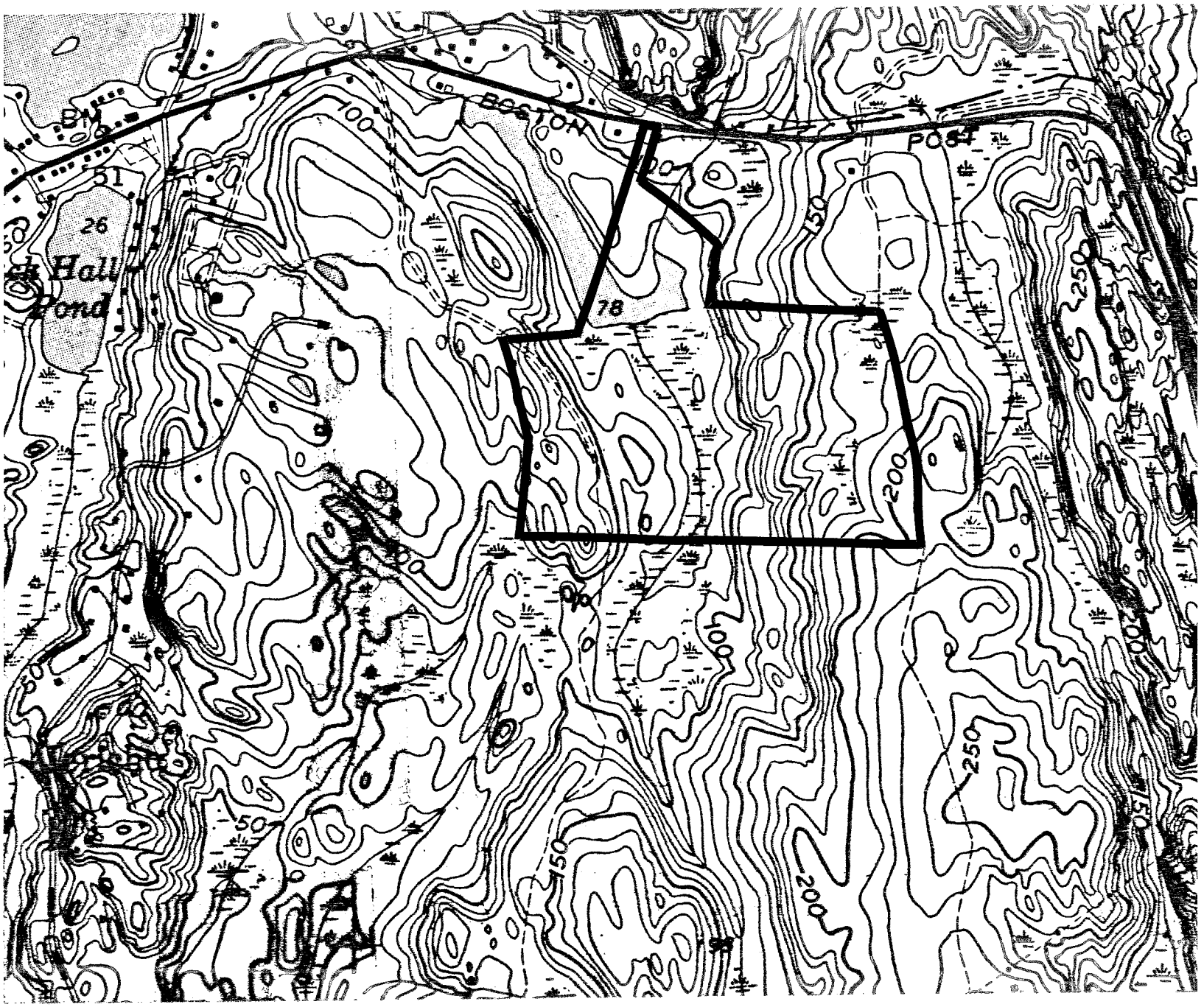
SCALE 1" = 2000'

—— Approximate Site Boundary

TOPOGRAPHIC MAP

SCALE 1" = 1000'

Approximate Site Boundary



2. GEOLOGY

Bedrock ledges are exposed in the eastern and western limits of the site. Depth to the bedrock surface is variable throughout the site, but is probably within 10 feet of the ground surface in most places on the site. Greatest depth probably occurs in the streamcourse valley in the central parts where the mining activity will take place. Bedrock underlying the site consists of crystalline Plainfield Formation and is described as a gray biotitic quartz feldspar gneiss that contains numerous layers of schist and amphibolite. (Geologic Map of the Old Lyme Quadrangle, CT. Map QR-21, by L.L. Lundgren,1965.)

Overlying bedrock across most of the site is a glacial sediment called till. In general, the till which was deposited directly by the glacier consists of an unsorted mixture of sand, silt, clay, with gravel, cobble and boulders. The texture of the till may range from sandy, stony and loose to silty and compact.

Another glacially deposited material known as ice-contact stratified drift probably occurs in the area proposed for mining and pond creation. The exact thicknesses of these deposits are unknown but they are probably less than 10 feet in most places and do not cover too great an areal extent. Soil borings would be needed to determine the exact thicknesses.

Sand and gravel are the major components of stratified drift. They were deposited by glacial meltwater mainly in streamcourse valleys. Depending upon the texture of the sand and gravel, it can be excellent fill material.

Post-glacial deposits known as swamp sediments overlie stratified drift and till in the valley that bisects the site. These deposits consist of silt, sand, and clay mixed with organic material in poorly drained areas. The wetland soils on the site are described as Ce (Carlisle muck) on the accompanying soils map. The Carlisle mucks are very poorly drained soils that occur in pockets and depressions of flood plains, stream terraces, outwash plains, and glacial till plains. It is characterized by black and dark reddish brown, muck organic deposits to a depth of 60 inches or more and has a high water table near or above the surface most of the year. In some cases, the organic material (muck) can be mixed with topsoil and used for landscaping purposes.

The area encompassed by the Carlisle muck has a very high value because of its excellent wetland wildlife, water renovation and floodwater storage capabilities. It should be noted that the Flood Insurance Rate Maps for Old Lyme identifies the area to be mined to lie within a Zone B. This

zone includes areas between the limits of the 100-year flood and 500-year flood. As such, it has some natural capabilities for detaining flood waters.

The mining of material in a ±3 acre area in the central parts (on the east side of the wetland) of the site commenced post 1980. This activity which is on-going included the excavation of organic materials (Carlisle mucks) and the glacial sediments (till and/or stratified drift) that lie beneath or adjacent to it. The water table was intercepted in these excavations mainly in wetland areas creating the resultant ponds. The mining activity has also expanded eastward into the upland areas of the site.

GEOLOGIC MAP

SCALE 1" = 1000'

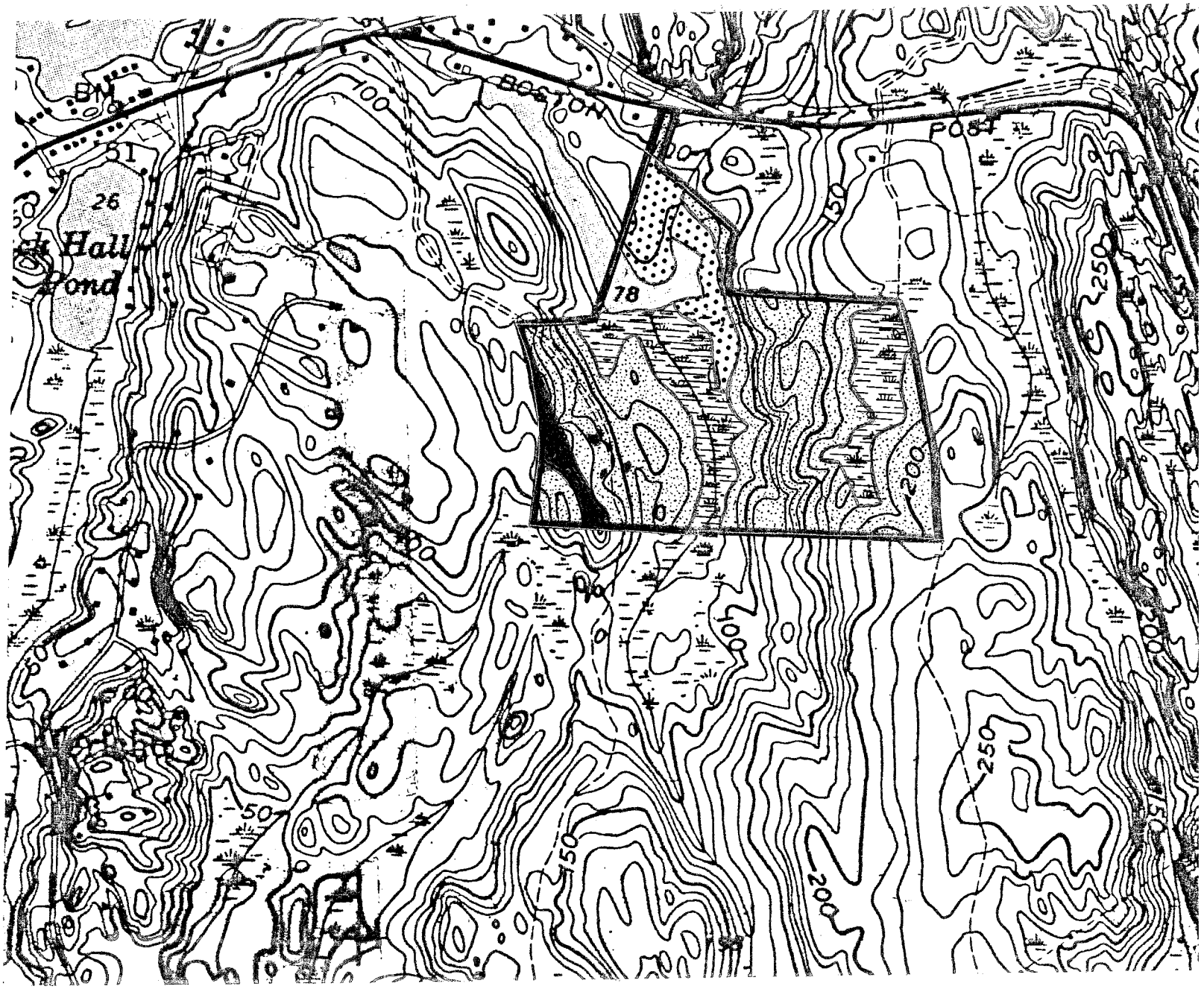
Stratified Drift

Swamp Sediments

Till

Areas of Shallow Bedrock

*Entire site underlain by Plainfield Formation



3. HYDROLOGY

The area of proposed excavation and subsequent pond creation is located in the central parts of the site, about 50 feet east of the unnamed streamcourse that bisects the property. The streamcourse flows in a northerly direction into Davis Pond, a man-made surface water body north of the study area. From its intersection with the spillway on Davis Pond, the streamcourse drains an area of about 1026 acres or 1.6 square miles.

The surface water and groundwater within the site and in the vicinity is classified as A and GA, respectively. A "GA" classification means that the groundwater is presumed suitable for direct human consumption. A class "A" surface waterbody means that its designated uses include fish and wildlife habitat and recreational.

Based on the site plan submitted to Team members on the review day, approximately 3 acres of ponds (including the silt pond) have been created to date by the excavation activity. The land surface throughout the 3 acre area has been extensively disturbed and retains features resulting from excavation. These include the ponds, stock piled soils and boulders, poorly drained depressions, and bare (unprotected) soils. All of this activity has disrupted the natural drainage in the area. In places, the excavation has encroached within the town's 50 foot buffer strip or setback required between any excavated area and any natural stream or surface waterbody.

The mining and dredging of unconsolidated material will inevitably disturb and mobilize the finer soil particles. As a result, one can see the potential threat of water quality problems to the stream, if the mining activity infringes too closely to it.

The surface waterbodies visible during the field review were created by the excavation of unconsolidated materials below the water table, which has occurred mostly in wetland areas. In places, the side slopes of the ponds are vertical or very steep, which increases the chance for sloughing of the unconsolidated materials. The silt pond was created to contain and filter disturbed water and prevent environmental damage to surface waters on and off the site. It is understood that the applicant ultimately wishes to excavate an additional 8 acres most of which would take place on regulated wetland soils. The result would be a +11 acre surface waterbody that would be hydraulically connected to Davis Pond.

WATERSHED BOUNDARY MAP

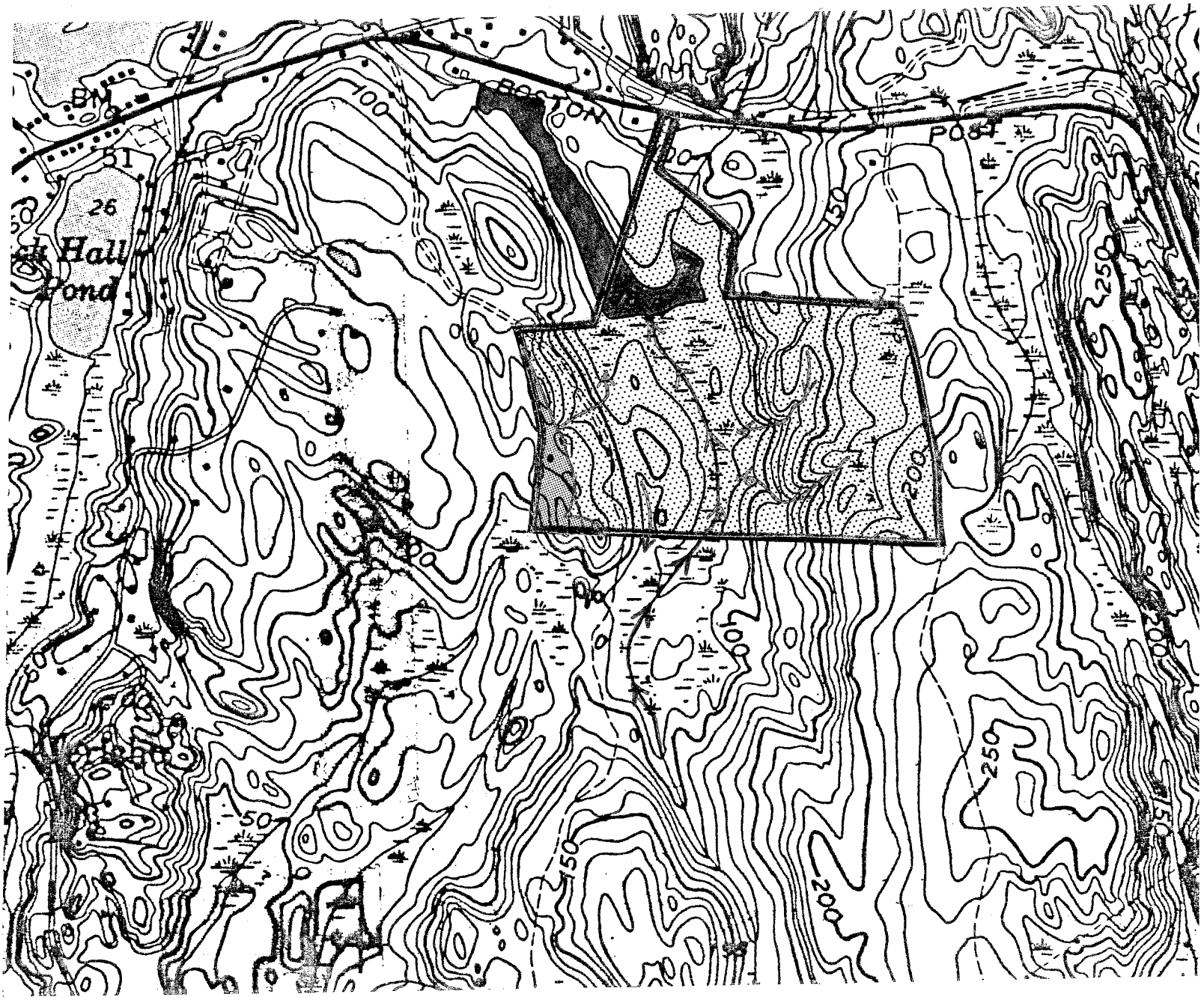
SCALE 1" = 1000'

Portion of site that flows to an unnamed tributary of Hall River.

Portion of the site that flows to the unnamed streamcourse that bisects the property and ultimately flows to Rogers Lake.

Watercourse showing direction of flow.

Davis Pond



4. SOILS REVIEW

As mapped in the soil survey, the majority of the soil mapping units on the east side of the property, where much of the gravel excavation is taking place, are Canton-Charleton and Woodbridge-Rainbow soils. Both are good to fair sources of material for roadfill/fill. At the site it was apparent that the material was present and in adequate quantities.

Much of the excavation and land disturbance activities were either directly related to or in close proximity to large water bodies and wetland areas. There were no sediment and erosion controls in place at the site.

This section of the report will attempt to provide detailed information to the landowner and governing bodies for developing a complete sediment and erosion control plan.

As of 1983, the State of Connecticut has enacted Public Act 83-388, "An act concerning Soil Erosion and Sediment Control". A summary of the act states that all municipalities must develop regulations that require sediment and erosion control plans for projects which disturb an area larger than 1/2 acre. A plan shall include at least:

A) A narrative describing all activities planned on the site, and methods of stabilization after construction;

B) A site plan map of sufficient scale showing present and proposed topography, structures, natural features, sediment and erosion control application and design criteria and the grading plan;

C) Any other information deemed necessary and appropriate by the Commission. A checklist for the items to be included on such a plan has been included. It is suggested that the landowner contact a consulting firm that is familiar with developing these plans and/or study the Connecticut Guidelines for Soil and Erosion and Sediment Control and its revisions (1986). Copies of this book can be obtained from CT DEP Publications,566-7719.

In brief, the following steps should be taken in preparation for developing a soil and erosion plan: A certified soil scientist must walk the site and soil sample to determine boundaries of inland wetlands soils. This boundary should be flagged, numbered, surveyed and overlaid on the site plan. A list of certified soil scientists can be obtained from the New London County Soil and Water Conservation District, 887-4163.

The area should be surveyed for property boundaries, present and proposed topography and locating project features. A narrative should then be developed describing the project from start to completion including dates, sequence of grading activities, installation of sediment and erosion control measures and methods for final stabilization of the area. Refer to the enclosed checklist for additional items to be included.

The New London County USDA-SCS and SWCD offices support a plan that would include phasing the project and complete area reclamation and stabilization before continuing to the next phase of the project.

All wetland areas and water bodies should be protected from disturbance and pollution. Sediment barriers, such as long-lived, U.V. protected silt fences, are recommended for areas disturbed for greater than 60 days. A maintenance plan for barriers would be particularly important in an area where such extensive earth moving activities are proposed. Refer to Chapter 7 of Connecticut Guidelines.

The existing and proposed drainage pattern on this site would be necessary to a complete plan. As with all projects, the town should employ the methods described in "Materials for Use in Improving Erosion and Sediment Control Plan Implementation", as prepared by the Connecticut Council on Soil and Water Conservation, October 1988. Copies have been provided to the Commissions by the New London County Soil and Water Conservation District.

When a plan has been developed, the New London County SWCD office will be available to review it at the town's request.

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: _____

_____

EROSION AND SEDIMENT CONTROL PLAN WORKSHEET

==========

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 drainageways 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 yr.) 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 @ 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

EROSION AND SEDIMENT CONTROL PLAN WORKSHEET

_____ Temporary erosion control in method for protection of disturbed areas when time of year or
_____ Weather prohibit establishment of permanent vegtative 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 stormwater management system
_____ Size and location of culverts and storm sewers
_____ Drainage calculations for review by town engineer
_____ Stormwater 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

SOILS MAP

Scale 1" = 1320

New London County USDA-SCS
562 New London Turnpike
Norwich, CT 06360
887-4163

SOILS DESCRIPTIONS

Aa - Adrian and Palms mucks

These nearly level, very poorly drained soils are in pockets and depressions of stream terraces, outwash plains, and glacial till uplands. Slopes range from 0 to 2 percent. Adrian soils have a high water table which is at or near the surface for most of the year. Permeability is moderately rapid in the organic layers and rapid in the substratum. Palms soils have a high water table which is at or near the surface for most of the year. Permeability is moderately rapid in the organic layers and moderately slow in the substratum. The available water capacity is high for these soils. Runoff is very slow or ponded. These soils are strongly acid through slightly acid. These soils are not suited to cultivate crops. These soils are suited to trees. Windthrow is common because of shallow rooting depth above the water table. These soils are poorly suited to community development.

These soils are in capability subclass VIw.

CdC - Canton and Charlton extremely stony fine sandy loams, 3 - 15 percent slopes

These gently sloping and sloping, well drained soils are on glacial till upland hills, plains, and ridges. Stones and boulders cover 8 - 25 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 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 or severe. These soils are suited to trees.

These soils are in capability subclass VIIs.

Ce - Carlisle muck

This nearly level, very poorly drained soil is in pockets and depressions of flood plains, stream terraces, outwash plains, and glacial till uplands. The Carlisle soil has a high water table near or above the surface for most of the year. Permeability is moderately rapid. The available water capacity is high. Runoff is slow. The soil is strongly acid through slightly acid. This soil is not suited to cultivated crops. This soil is poorly suited to trees. Windthrow is common because of the shallow rooting depth above the high water table. This soil is generally not suited to community development.

This soil is in capability subclass VIw.

SOILS DESCRIPTIONS

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.

HkC - Hinckley gravelly sandy loam, 3 - 15 percent slopes

This gently sloping and sloping, excessively drained soil is on stream terraces, outwash plains, kames, and eskers. Permeability of the Hinckley soil is rapid in the surface layer and subsoil and very rapid in the substratum. The available water capacity is low. Runoff is medium or rapid. Hinckley soil warms up and dries out rapidly in the spring. Unless limed, it is strongly acid or medium acid. This soil is suited to cultivated crops. Hinckley soil is droughty, and irrigation is needed. The hazard of erosion is moderate or severe. This soil is suited to trees.

This soil is in capability subclass IVs.

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.

SOILS DESCRIPTIONS

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.

PdC - Paxton and Montauk very stony fine sandy loams, 8 - 15 percent slopes

These 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 rapid. 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 severe. These soils are suited to trees. The major limiting factors for community development are 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.

SOILS DESCRIPTIONS

WzC - Woodbridge and Rainbow extremely stony soils, 3 - 15 percent slope

These gently sloping and sloping, moderately well drained soils are on drumloidal, glacial till, upland landforms. Stones and boulders cover 8 - 25 percent of the surface. The Woodbridge and Rainbow soils have a seasonal high water table at a depth of about 18 inches. Permeability of these soils is moderate in the surface layer and subsoil and slow or very slow in the substratum. Runoff of these soils is medium or rapid. These soils warm up and dry out slowly in the spring. The available water capacity of Woodbridge soils is moderate. The Woodbridge soils are strongly acid or medium acid in the surface layer and subsoil and strongly acid through slightly acid in the substratum. The Rainbow soils are strongly acid or medium acid. The available water capacity is high in Rainbow soils. These soils are not suited to cultivated crops. The hazard of erosion is moderate. These soils are suited to trees. The major limiting factors for community development are the seasonal high

5. WETLAND REVIEW

The property owner Alvin Kus, proposes to excavate an undetermined amount of sand and gravel from the central lowland areas on the approximately 140 acre property. An estimated 20 acres of this property consists of inland wetlands. These wetland systems approximately bisect the Kus Property in a north/south orientation within the central low valley and are bordered along the west by a perennial stream flowing north to Davis Pond. Additionally, there is an area of approximately 3 acres of open water created by past excavation of sand and gravel, as shown on plans entitled "Plan of Land of Alvin & Margaret C. Kus, Scale 1"=80', dated February 1989". As currently proposed. approximately 10 - 11 acres of these wetlands would be excavated for sand and gravel.

The U.S. Fish and Wildlife Service's National Wetland Inventory identifies three wetland types within the study area. This classification is based on the wetlands' hydrologic location, vegetative cover, water regime, and site specific modifiers. The wetlands under review are outlined below:

1. **PFOIE Palustrine, forested, broad leaved deciduous, seasonally saturated.**
   Wetlands classified as PFOlE are characteristically vegetated by a hardwood forest canopy usually dominated by Red Maple (Acer rubrum) with saturated soil or standing water during most of the growing season. This is the dominant wetland type on the site.

2. **P(FO/SS)lE - palustrine,(Forested / scrub/shrub), broad leaved deciduous, seasonally saturated.**
   This type of wetland is similar to the above with a greater abundance of deciduous shrubs such as Highbush Blueberry and Speckled Alder.

3. **P(SSl/EM)lE - palustrine, (Scrub/shrub - Broad leaved deciduous / Emergent Semipermanent.**
   This wetland type is characterized by a well developed layer of open shrub cover with a well developed herbaceous layer of sedges and hydrophytic grasses interspersed with scattered trees .

Wetland types #2 & #3 above are prevalent only in the area surrounding the southern fringes of Davis Pond.

Due to the size of the remaining undisturbed wetlands in relation to the relatively undeveloped uplands surrounding the site, these wetlands provide substantial feeding and breeding habitat for a variety of fish, amphibians, reptiles, birds and small mammals. Conversion of a complex wetland system composed of several wetland types, each of significant size, to a simple open water system would result in the substantial degradation of the ecological value of the wetland area. Project modification to reduce habitat destruction is recommended.

These wetlands are hydrologically connected to Davis Pond, which ultimately connects to Rogers Lake. Proposed wetland excavation could have substantial adverse impacts upon the water quality of Davis pond and Rogers Lake through the mobilization of fine organic materials, silts and sands. If active excavation areas are not isolated from other waters and adequate siltation controls are not employed, migration of silts and excess nutrient loading to downstream areas may result. Such siltation would have severe impact upon fish and wildlife functions of the wetlands located at the southern portions of Davis Pond. As Davis Pond and Rogers Lake are waters of biological and recreational significance, protection of the water quality of these water bodies should be a critical aspect to any final project design.

In order to provide bank stability and erosion protection during storm events a minimum 50 to 70 foot buffer between the proposed pond and the existing stream should be maintained. In several areas the excavation has already encroached upon this buffer area and no further encroachment is recommended. In order to maintain adequate isolation from other waters the two channels extending westward from the ponds toward the existing stream should be filled in to provide the minimum distance from the stream prior to the excavation.

As currently proposed, the excavation of 11 acres of wetlands would result in the hydrological connection of the gravel excavation to Davis pond. Any direct hydrological connection to Davis pond or the tributary stream along the western border would require a Water Diversion permit from the DEP Water Resources Unit. As Previously discussed on-site between WRU staff and Mr. Kus on May 15, 1989 it is highly unlikely that WRU staff would recommend permit issuance for such an activity.

As discussed with the applicant and commission members during the August 3 ERT field meeting, more detailed plans are required to allow the local commission to make an informed decision. Plans submitted for any final proposal should include, but not be limited to the following;

1. Plan and cross section drawings clearly illustrating existing versus proposed conditions including;

- wetland boundaries, water courses and areas of open water delineated by a certified soils scientist,
- water surface elevation,
- areas to be excavated,
- required set back or buffer areas.
- topographic contours at 2 foot intervals, - tree lines, disturbed areas,
- vehicular access,
- stockpile areas,
- pond depths at various intervals.
- proposed side slopes,
- placement of fish habitat enhancements.

This plan should be signed and sealed by a registered land surveyor and certified Professional Engineer registered in the State of Connecticut.

2. Narrative Providing;

- Proposed water handling during excavation,
- method of excavation,
- how the excavation area will be isolated from the existing stream,
- how excavated materials will be dewatered,
- how disturbed areas will be stabilized,
- how erosion and sedimentation will be controlled,
- estimated cubic yards of material to be removed,
- a construction sequence and schedule of excavation,
- site reclamation and slope stabilization,

3. The agency may consider requiring the posting of a performance bond or letter of credit, assigned to the town, to assure satisfactory compliance with all permit conditions, especially final site closure and restoration.

At the time of inspection the applicant had not provided any documentation that substantial deposits of commercially valuable sand and gravel resources exist beneath the wetlands at this site. Examination of the Surficial Geology maps reveal deposits of glacial till materials on surrounding uplands similar to those which exist beneath the wetlands. Indeed, at the time of inspection several upland areas east of the existing ponds had been mined. Excavation of sand and gravel from uplands would result in avoidance of wetland impacts.

Additionally, it appears that modifications to the current plan which would greatly reduce wetland disturbance also exist. As noted above, approximately 3 acres of wetlands have been previously excavated, resulting in an irregularly shaped pond. Continued excavation of sand and gravels from this disturbed area into a more uniformly shaped pond would meet the projects basic objectives, while greatly reducing the irretrievable commitment of undisturbed wetland resources. Further, provided a well designed pond restoration plan was implemented, an increase in the habitat diversity and ecological value of the area may be realized.

Evaluating the current Proposal in light of the factors for consideration enumerated in section 22a-36 through 22a-45 of the Connecticut General statutes, it appears that feasible and prudent alternatives to the irretrievable loss of inland wetlands associated with this proposal exist. Therefore as currently proposed, this activity is not in conformance with the States goals for wetland protection, and modification is recommended.

6. POND CONSTRUCTION/MINING ACTIVITY FROM A GEOLOGIC VIEWPOINT

The excavation and dredging of ponds will disturb and mobilize fine grained particles. In order to avoid environmental damage on and off site, it will be important to contain and filter disturbed water. As such, a thorough erosion and sediment control plan will be required and should be strictly enforced by the town. Connecticut Guidelines for Soil Erosion and Sediment Control (1988) should be referenced during the preparation of the plan. Every effort should be made to protect the streamcourses from unwanted silt on and off the site and Davis Pond.

At least initially, it seems likely that there would be a minor drain on the sand and gravel aquifer system in the immediate area to fill the ponds. As each dragline bucket is removed, water will fill the void draining the local water from around it. This effect would be gradual, a one time event and would stabilize once the excavation was completed.

It is expected that there would be some readjustment in the balance of evapotranspiration from wetland soils and evaporation from surface water bodies but this change would probably be too small to quantify.

The remaining 8 acres to be excavated comprise regulated wetland soils (Carlisle mucks). These wetlands serve many valuable hydrological and ecological functions. They act as natural runoff retention basins, reducing downstream flood flows during storms. They trap sediments from upstream areas. They change water quality through biochemical processes, often resulting in cleaner water. They also serve as habitat for many species of animals and plants. For these reasons and others, the proposed ±8 acre excavation needs to be studied very carefully from a hydrologic, ecologic and biologic standpoint. In its present form, the plan distributed to Team members is insufficient and does not appear to meet all the town requirements of Article III Section F - Excavation, Removal on Deposits F.l-F.18 nor is there a comprehensive erosion sediment control plan. All of the pertinent information should be compiled by the applicant's technical staff and presented to the Town for their review.

In reviewing the proposal, the Inland Wetland Commission needs to determine the impact of destroying the wetland and creating an open waterbody. If the Commission determines the wetland is serving an important hydrological or ecological function and that the impact of the activity will be significant they may deny the activity altogether or, at least, require measures that would minimize the impact.

Before the town gives the applicant permission to excavate any more material and expand the present pond system, it is suggested that the applicant be required to submit a reclamation plan for the land area that has been disturbed. The plan, which should meet all the requirements of Article III, Section F Excavation Removal or Deposit F.1-F.18 should include the following type of information; (1) existing wetland boundaries as delineated by a certified soil scientist, (2) erosion sediment control measures, (3) existing and proposed grades, (4) amount of material to be excavated, (5) stockpile areas, (6) engineering data to support the pond construction and mining activity, (7) methods used to remove material, and (8) seeding and planting plan. Not until this type of information is collected and presented in a well thought-out plan, can town officials make an environmentally sound decision for the proposed activity.

7. WILDLIFE RESOURCES

HABITAT TYPE DESCRIPTIONS

The habitat types located on this property include mixed hardwood forest, shrub swamp, and disturbed excavation site. The variety of habitat types provides for a diversified wildlife population.

Mixed Hardwood Forest: This habitat consists of a variety of hardwood species including red maple, beech, red oak, elm, hickory, white oak and scattered white pine and cedar. Understory vegetation includes witch hazel, elderberry, multiflora rose, grape, blackberry and hardwood regeneration.

Wildlife frequenting such habitat types (dependent upon age mix of stand) include deer, fox, raccoon, gray squirrel, woodpeckers (pileated, hairy and downy), ovenbirds, scarlet tanangers, blackthroated blue and green warblers, barred owls, broad-winged hawks and various non-game species such as shrews, voles and snakes.

Wetland/Riparian Zone: This habitat type consists of various combinations of streams/brooks, open ponds, swamps and small marshy areas. Associated vegetation includes red maple, speckled alder, dogwood, jewel-weed, spicebush, sweet pepper bush, high bush blueberry, sensitive fern, and various grasses and sedges.

Wildlife using such sites include deer, fox, raccoon, skunk, muskrat, mink, swallows, red-winged blackbirds, grackles, kingbirds, cedar waxwings, hooded and wilson's warblers, titmice, woodpeckers, wood ducks (forested wetland) and numerous amphibians and reptiles including water and garter snakes, salamanders, newts and spotted and painted turtles.

Excavated Area: This area consists of several sedimentation ponds of varying depths. The site is non-vegetated except along the eastern margins. Vegetation consists of speckled alder, highbush blueberry, red maple, jewel weed, and sweet pepper bush.

EFFECT OF PROPOSED DEVELOPMENT ON WILDLIFE

In a small, but heavily developed and highly populated state like Connecticut, available habitat continues to decline on a daily basis. It is critical to maintain and enhance existing wildlife habitat. As the demand for land increases and land is developed, there will be an immediate and lasting negative impact on wildlife.

The primary impact is the direct loss of wetland habitat due to the proposed excavation of gravel from the wetland site.

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

Not only are wetlands important to wildlife, they are also important to humans. Various functions of wetlands include flood control, ecological integrity, fish and wildlife habitat, nutrient and sedimentation trappings, educational potential, visual/esthetic quality, recreation, groundwater use potential and botanical sites. There are usually inherent limitations in developing wetlands due to poorly drained and unstable soil types.

Vegetation removal in wetlands may have severe impacts on wildlife, especially reptiles and amphibians. One or several of the cover, food, breeding habitat, and hibernation areas may be altered. Species dependent on specialized habitat are eliminated and more adaptable species are reduced in numbers (Campbell 1973). Barriers, such as roads, impact seasonal movement and population dispersal, creating serious threats (Campbell 1973). To minimize impact maintain a 100 foot wide buffer zone of vegetation around wetland/riparian areas. This buffer zone will help filter and trap silt and sediments, provide excellent wildlife cover and be an aesthetic and educational asset to the community.

The diversified habitats at this site provide for the needs of a wide variety of wildlife species that inhabit the general area. Gravel excavation in this wetland site will result in fragmentation and elimination of habitat which will in turn reduce species diversity and richness.

MITIGATION OF DISTURBANCES

There are several management guidelines which should be considered during the planning process in order to minimize adverse impacts on wildlife:

1. It is recommended that no gravel excavation be allowed in the undisturbed wetland areas. Excavation should be limited to the disturbed sites only.

2. Maintain at least a 75 ft. and if possible a 100 ft. buffer of undisturbed vegetation along the eastern margin of the existing ponds.

3. No connection between the ponds and the existing brook is recommended.

4. Revegetation of the disturbed sites should be undertaken in a timely manner to limit sedimentation. Native vegetation should be used whenever possible. Selection of vegetation types should control erosion and provide food and cover for wildlife.

5. The ponds created should be excavated to a depth that provides continuous aquatic habitat (at least 3 meters) but shallow enough in some areas to support emergent and submergent aquatic plants.

6. The creation of undulating or irregular shorelines and islands are desirable to create land-water edge and a variety of habitat conditions.

7. A detailed plan for the proposed pond construction and revegetation efforts should be completed before any work is permitted at this site. The habitat characteristics incorporated into this site depend largely on the animal species that the site is to attract and support. A site designed primarily to provide foraging habitat for waterfowl is different from one designed solely to support a warmwater fishery. Habitat for a broad array of species, however, could be incorporated into this site with careful planning.

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8. FISH RESOURCES

SITE DESCRIPTION

An existing sand and gravel operation has requested extension of excavation operations into adjacent lands that contain wetlands. Plans call for excavating a new pond in wetlands approximately 11.45 acres in size. Currently, sand and gravel operations have been limited to three ponds located on the property. This report will address impacts to local aquatic resources and delineate appropriate measures to mitigate impacts.

A small unnamed perennial watercourse abuts the property flowing northerly into Rogers Lake, a waterbody of significant recreational value. Waters are slow moving in this low gradient section. Predominant fish habitat is in the form of shallow "pools". The stream averages less than 10 feet in width with streambed substrate consisting of fine silts. Excessive nutrient loading in the stream has resulted in abundant growth of aquatic plants such as pickerel weed, waterlily and burrweed.

FISH POPULATION

Species composition in the unnamed brook is unknown at this time. The brook does contain habitat suitable for a warmwater fish complex. Fish expected to inhabit the brook are: redfin pickerel, largemouth bass, common shiner, and bluegill sunfish.

Surface waters of the unnamed brook are classified by the Department of Environmental Protection (DEP) as "Class A". Designated uses for this classification are: potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, and other legitimate uses.

IMPACTS

1. Site soil erosion and sedimentation of the brook through increased runoff from gravel mining areas : Erosion and sedimentation can result in stream degradation. Low gradient streams such as this are particularly prone to sedimentation. Excessive sediment deposition could damage the aquatic ecosystem in the following ways:

(1) Sediment reduces the survival of resident fish eggs, aquatic insects, and the amount of usable habitat required for spawning purposes.

(2) Sediment contributes to the depletion of dissolved oxygen (CTDEP 1989). Organic matter associated with soil particles is readily decomposed by microorganisms thereby effectively reducing oxygen levels.

2. Loss and degradation of wetland habitat : Proposed pond creation for mining operations will result in the permanent loss of wetlands. Wetlands are beneficial in several ways. They serve to: (1) control flood waters by acting as a water storage basin, (2) trap sediment from natural and man-made sources of erosion, and (3) help filter-out pollutants from runoff before they enter watercourses. Loss of local wetlands can degrade water quality of the brook.

3. Impact to downstream environments : Water quality and habitat degradation in the adjacent brook or disturbed wetlands may eventually be observed in downstream areas. Since this watercourse outlets into Rogers Lake, the water quality of Rogers Lake may be adversely impacted. Rogers Lake is actively managed by the DEP Bureau of Fisheries for "holdover" brown trout populations. Fine sediments transported by the stream will collect at its mouth creating suitable conditions for nuisance aquatic weed growth in Rogers Lake. Heavy stream siltation events due to gravel mining operations have been documented at other locations in eastern Connecticut. Consequently, it is critical that the town review this development not only as to potential impacts on a local site specific basis, but also on a "watershed-wide" basis. This approach will insure that vital aquatic resources and wetlands within the watershed are properly protected.

RECOMMENDATIONS

1. Excavation should not be allowed in undisturbed wetlands : If allowed to expand, the gravel operation would result in a permanent loss of valuable wetland habitat. This situation can be avoided by allowing mining to be expanded within existing disturbed areas only.

2. It is recommended that the existing buffer zone be maintained along the edge of the unnamed brook : the operation should not further encroach upon the stream's riparian zone; essentially the eastern edge of the existing ponds should not be extended in the direction of the stream. No connection should be allowed between the ponds and the unnamed stream. No alteration of existing habitat should be allowed in this zone. This buffer can be an effective mitigation measure. Research has shown that buffer zones help prevent damage to wetlands and stream ecosystems that support diverse fish and aquatic insect life (USFWS 1984;USFWS 1986;0DFW 1985).

3. Install and maintain a sediment fence along the perimeter of the buffer zone : this fence should be placed within excavated trenches to ensure that all runoff is properly contained. A town official should be responsible for inspecting this installation on a periodic basis to ensure that the operator has complied with all stipulated mitigation devices.

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9. PLANNING REVIEW

The site lies in a RU-80 zoning district of the Town of Old Lyme, with access onto the Boston Post Road. The CT River Estuary Regional Planning Agency (CRERPA) in the 1975 Regional Plan of Development depicts the area as a Natural Resource Area. These areas are characterized by ecologically sensitive areas (wetlands, steep slopes, marsh lands). The primary objective of this type of area is to preserve and protect the natural resource base of the region.

Presently, besides the dredging operation on the site, a permitted stump dump is located on the upland section of the property, which generates a modest amount of truck traffic. The sand and gravel operation would generate approximately 6 - 10 truck trips per day at full bore. The site is set back from residential neighbors and does not, nor should it be expected to, pose a hardship to the nearby neighbors in terms of truck traffic, noise and dust. There will not be any major stone crushing operations on the site nor will there be storage of any hazardous materials. The pumping operation and a few pieces of heavy equipment will consist of the majority of the overall proposed operation. The access road which serves the Kus property is projected to eventually provide through traffic from the Boston Post Road to Flat Rock Hill Road. This connection, if it can can eventually be negotiated and pushed through, would provide an important north/south connector for the town's road network. The sand and gravel operation on the Kus property however would not impede this extension in any way.

The proposed sand and gravel excavation is expected to dredge out 3 ponds, creating one lake roughly 15 acres. The site is planned for future residential use along with a Christmas tree operation on the stabilized slopes.

ZONING REGULATIONS

The Town of Old Lyme regulates the excavation of material under Article III, Section F of the Old Lyme Zoning Regulations.

F.2 General: Except as otherwise provided in this section, there shall be no excavation, removal or deposit of material from or on nay lot or parcel in any district in Town.

F.4 Special Exceptions:

F.5 Application: Application for a special exception to excavate, remove or deposit

material from any lot or parcel in any district of the Town shall be made to the Commission by the property owner or his authorized agent on forms provided by or acceptable to theCommission; shall be submitted to the Zoning Enforcement Officer (ZEO); and shall be accompanied by the following:

The applicant should follow the application requirements which are detailed in Sections F.5.1, F.5.2, F.5.3, F.5.4 and F.5.5 of the zoning regulations. Upon receipt of the application for a special exception the ZEO shall transmit the application and accompanying maps, plans and data to the Commission. The Zoning Commission shall hold a public hearing on the application and render a decision within the time required by law. The following Sections pertain to the operations of sand and gravel operations and should be reviewed by the applicant:

F.7 Conditions for approval
F.8 Alterations of Conditions
F.9 Additional Conditions
F.10 Bond
F.11 Periodic Reports
F.12 Duration of Special Exception
F.13 Expansion of Existing Operations
F.14 Termination of Existing Operations
F.15 Permits for Existing Operations
F.16 Extension of Permits Issued Before March 7, 1988
F.17 Special Types of Application Fees

10. ARCHAEOLOGICAL REVIEW

A review of the State of Connecticut Archaeological Site Files and Maps indicate no known archaeological sites on the Kus property. However, one prehistoric site is located immediately west of the project area. The site represents a seasonal camp occupied over two thousand years ago by hunters and gatherers of the lower Connecticut River Valley. A walk-over survey of the project area with the Environmental Review Team located in the western portion of the proposed development a small-stemmed quartz projectile point used at the end of a spear. It is possible that the two sites were contemporaneous.

Small-stemmed projectile point
Drawn to scale, manufactured from quartz

The project area has been mined for sand and gravel in the past and any evidence of human occupation in the area is gone. The proposed dredging and opening up of the pond areas covered with vegetation and earth fill will have no adverse effect on any cultural resources. However, the area outlined in the enclosed map has only been partially effected by previous work.

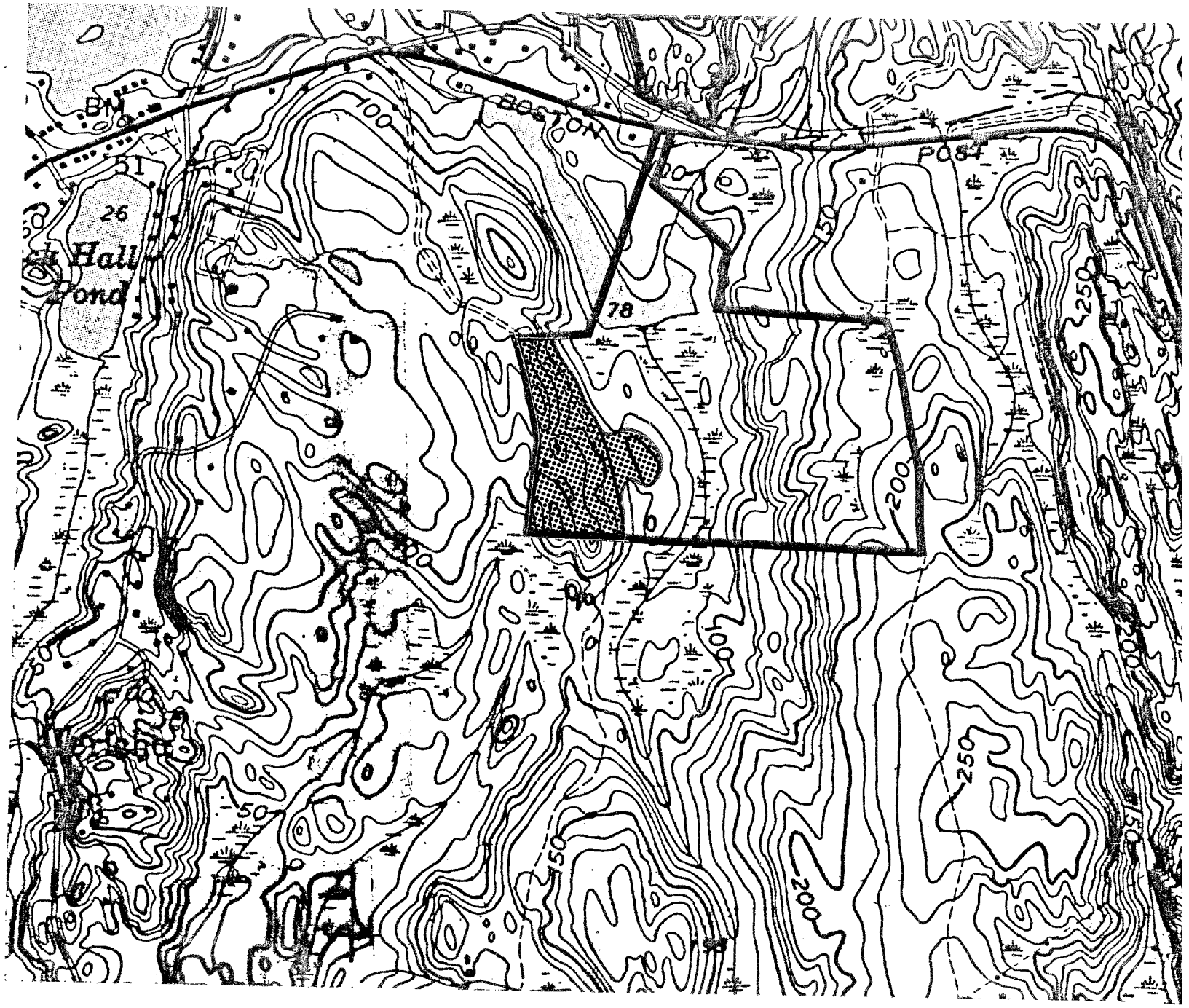
The Office of State Archaeology recommends that if the knolls along the western section of the project area are to be developed for sand and gravel or residential housing, an archaeological survey should be conducted to professionally excavate this prehistoric Indian campsite. All archaeological studies should be undertaken in accordance with the Connecticut Historical Commission's **Environmental Review Primer for Connecticut's Archaeological Resources.**

In summary, the walkover review of the project area recovered a small-stemmed quartz projectile point found along the knolls on the western bank of the brook. This prehistoric artifact is similar to those recovered at a site listed on State files immediately adjacent to the project area. These sites can provide significant information on settlement patterns in the lower valley and the use of interior resources by hunters and gatherers. It is recommended that an archaeological survey be conducted for this area. The remaining project area has already been mined and developed, the proposed excavations will have no adverse effect on the state's cultural resources.

AREAS OF SIGNIFICANCE MAP

Scale 1" = 1000'

Sensitive Area



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.