Montville, Connecticut

December1990

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Soneco Services
Rock Quarry

Montville, Connecticut

Review Date: September 27, 1990

Report Date: December 1990

EASTERN CONNECTICUT
ENVIRONMENTAL REVIEW TEAM

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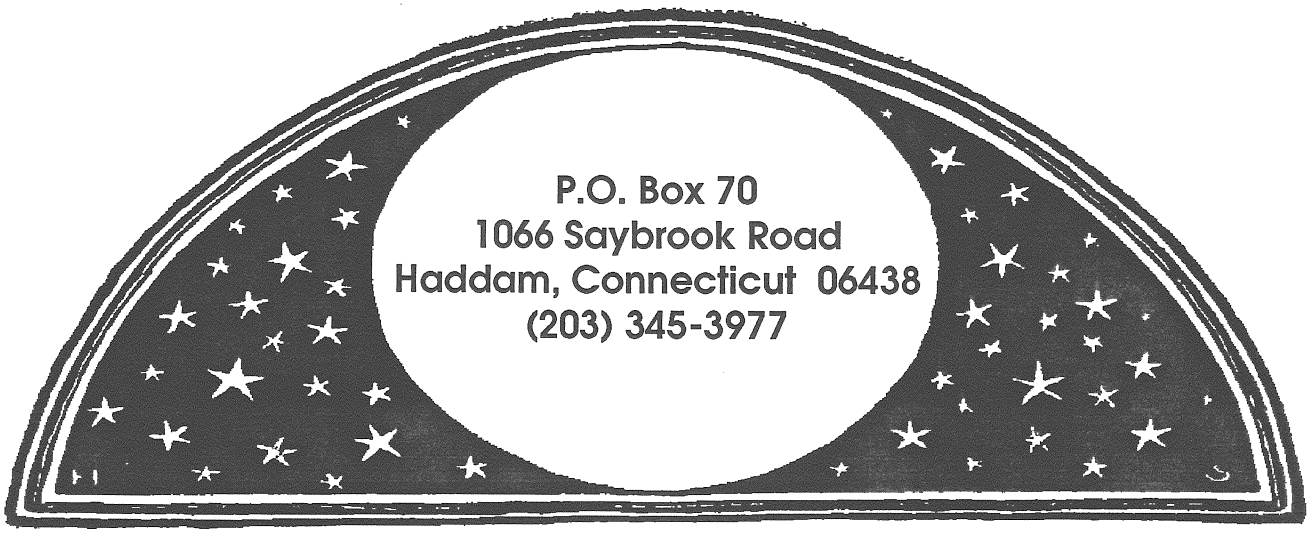

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ENVIRONMENTAL REVIEW TEAM REPORT
ON

Soneco Services Rock Quarry
Montville, Connecticut

This report is an outgrowth of a request from the Montville Inland Wetlands 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 27, 1990. Team members participating on this review included:

Patrice Beckwith	*Soil Conservationist* *USDA - Soil Conservation Service*
Nick Bellantoni	*State Archaeologist* *The Office of State Archaeology*
Dan Mayer	*Environmental Analyst* *DEP - Inland Water Resources Management*
Brian Murphy	*Fisheries Biologist* *DEP - Eastern District*
Nancy Murray	*Sr. Environmental Analyst* *DEP - NRC, Natural Diversity Data Base*
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 preliminary plans and a wetland assessment report. The Team met with, and were accompanied by the Montville Wetlands Officer, the Town Planner, the applicant and his engineer. 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 rock quarry.

If you require additional information, please contact:

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1. Location, Land Use and Zoning

The site of the proposed quarry operation which is located in northern Montville was planimetered to be about 150 acres in size (Soneco Services, Inc. and Terra Firma Properties). It is bordered by Trading Cove Brook and the Bozrah town line on the north, a Connecticut Light and Power high tension wire right-of-way on the west, wooded land, which includes the former Barret rock quarry operation site on the south, and wooded land on the east. Additionally, to the west, the land comprises a Natural Area Inventory Site and Nature Conservancy Preserve. Access to the site, which includes an active asphalt processing plant operated by Soneco Services Company, Inc., is provided by Caroline Drive, an 1,800 foot long cul-de-sac.

Except for ±12 acres that includes the Soneco Service, Inc. asphalt plant operation area, the site consists of mostly wooded land that is unused. An open field under an acre in size occurs in the northwest corner. Two man-made ponds, which would be eliminated by the proposed quarry operation occur in the southcentral parts. As mentioned in the preceding paragraph, a former rock quarry known as the Barret Quarry, which was operated in the 1960's, is located south of the site. Remnants of this activity such as an open quarry pit, rusty machinery and buildings are visible on and near the site. Originally the rock in the Barret quarry was used for building stone and subsequent to that for sized aggregate that was used primarily for road construction.

Other surrounding land uses include residential properties. The greatest concentration of homes occur on the east side of Route 82, about l,BOO feet from the proposed rock quarry operation. The closest residence, about 400 feet occurs east of the site and is also accessed by Caroline Road.

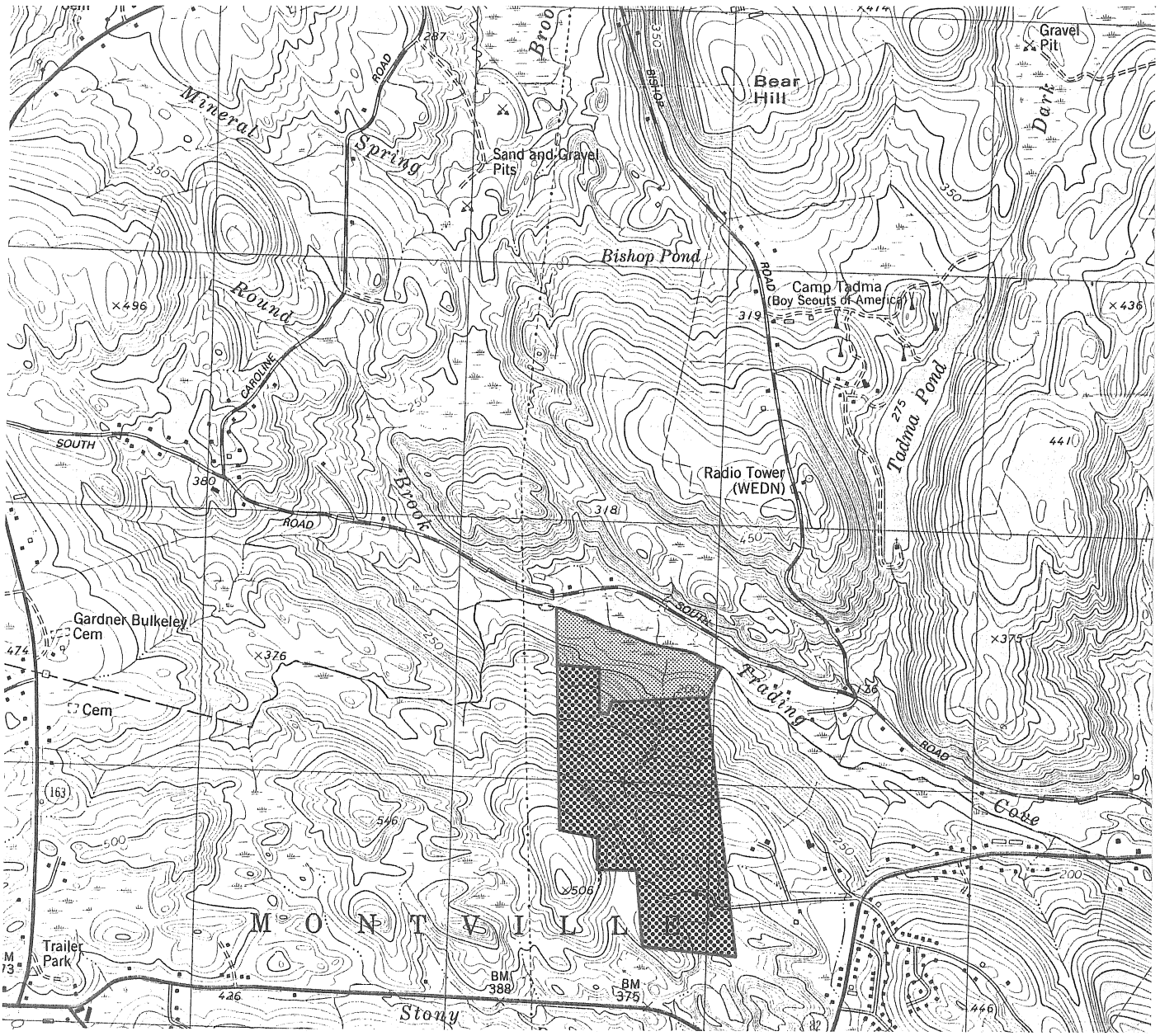
According to Town officials the property is located in a Manufacturing District. It is not known if the proposed rock quarry operation would be compatible with this zone. A determination will need to be made regarding this matter.

LOCATION MAP

Scale 1" = 2000'

Terra Firma Property

Soneco Services Inc. Property



2. Project Description

Team members were informed on the review day that over a 20 - 30 year time period, approximately 14,000,000 cubic yards of rock material would be removed by the proposed quarry operation. This work would be conducted by Soneco Services, Inc. Preliminary plans distributed to Team members indicated that the final quarry site would consist of a gently sloping (5%) bedrock floor which is bounded by very steep rock walls on the west, south and east. At the end of the quarry operation, it would be 'U' shaped. The rock wall, which in places may be over 250 feet high, would be constructed with 5 - 10 foot benches. On the north, the quarry floor would grade to Trading Cove Brook Valley. Runoff/sediment control basins for the quarry operation are proposed at the northern limits near the Trading Cove Brook floodplain. As planimetered using the plan distributed to Team members, it was computed that 38 acres or 25% of the total site comprises regulated wetlands. In general, the wetlands parallel several north flowing streamcourses on the Soneco Service, Inc. property that convey water to Trading Cove Brook. Also, nearly 60% of the Terra Firma Property comprises regulated wetlands that are mainly associated with Trading Cove Brook floodplain. Team members were informed that the rock material that is excavated would be used for construction aggregate and used in the asphalt processing plant.

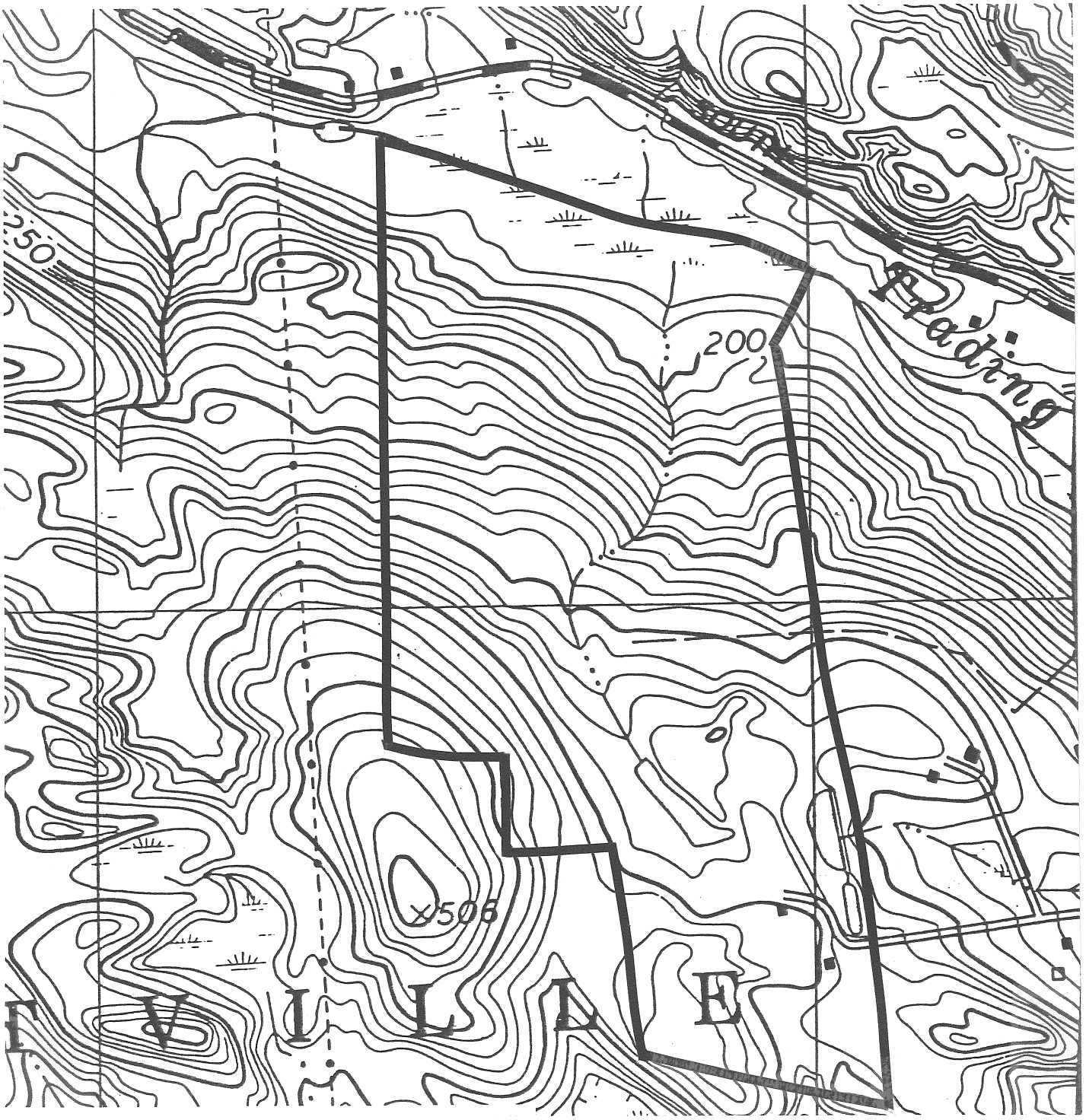
3. Topography

The proposed quarry site encompasses the north end and east flank of a rock cored hill whose peak occurs southwest of the site. The land surface slopes moderately northward to the Trading Cove Brook floodplain. Flat conditions occur throughout the Trading Cove Brook floodplain and in the area of Soneco Service, Inc. asphalt plant operation. Site elevations range from about elevation 470 at the southwest corner to elevation 180 in the Trading Cove Brook floodplain.

TOPOGRAPHIC MAP

Scale 1" = 1000'

Entire project site boundary



4. Bedrock Geology

The bedrock geology for the proposed quarry site is well described by George L. Snyder, 1964, in the Petrochemistry and Bedrock Geology of the Fitchville Quadrangle, Connecticut. (Geological Survey Bulletin 1161-I). Also, for the bedrock geology section of this report the Team's geologist reviewed the Bedrock Geological Map of Connecticut. John Rodgers, 1985. No on-site testing or mapping which would be more detailed than the publications noted above have been compiled by the applicant to date.

Soils information suggests that bedrock across the site has been covered by a relatively thin blanket (10 feet or less) of glacial materials. A single bedrock exposure occurs in the north central parts of the site.

Two major rock types, a granitic gneiss and plagioclase gneiss occur in the area proposed for quarrying. The southern half of the site is underlain by a red weathering, medium-grained light-colored granitic gneiss composed of the minerals albite and quartz. Minor minerals in the rock include magnetite-ilmenite, biotite, blue-green hornblende, keilhauite and pyroxene. The northern portions of the quarry site are underlain by a medium grained layered gneiss composed of the minerals oligoclase, quartz, potassium feldspar and biotite. The granitic gneiss that occurs in the southern parts was mined in the Barret quarry south of the property. Bedrock underlying the Trading Cove Brook Valley, consists of a medium-grained biotite-muscovite schist. Due to its mineralogy and texture (schistosity). the latter rock unit probably has low desirability for construction aggregate. Also, mining in or near Trading Cove Brook is not recommended due to the potential for water quality impacts and change to stream hydrology.

The bedrock (granitic gneiss and biotite gneiss) that underlies the area of the proposed quarry has been used in the past either for building stone or as crushed aggregate. As such, it has at least some commercial value. The applicant proposes to crush the rock material for various construction uses and for mixture with asphalt. It is not known if the applicant has tested the rock planned for quarrying to determine whether or not it will be suitable for its intended uses.

At the site's northern boundary Snyder has identified a northwest/southeast trending fault, that is aligned with Trading Cove Brook. It is a major structural feature in southeastern Connecticut and is known as Honey Hill Fault. The position of the Brook relates to structural and differential erosion impacts that the fault had on the underlying rock units. In the fault zone, which may be ±.5 mile wide in the area, it is reasonable to expect that the upper few hundred feet of bedrock is fractured and weathered. "Gneisses" and "schists" are metamorphic rocks; that is, rocks which have undergone changes due to high pressures and temperatures in the earth's crust. These changes generally include recrystalization, altered mineral composition, and alignment of elongate minerals. In "gneisses", thin layers of elongate minerals alternate with layers of more rounded minerals, giving the rocks a streaked or banded appearance. "Schists" are characterized by platy, flaky or elongate minerals (usually micas) that have become aligned to form surfaces of relatively easy parting. The layering of elongate or platy minerals in the rock, known as foliation planes, dip moderately to the north.

According to a petrographic summary of rocks of the Fitchville quadrangle, Connecticut, in Geological Survey Bulletin 1161-I, the mineral pyrite may be present in small amounts in the two rock units that underlie the proposed quarry site. The concern here is that the presence of sulphur rich minerals such as pyrite, even in small amounts, may change the physical and chemical quality of water when it comes in contact with freshly exposed quarry rock or stockpiles of crushed rock. Depending upon the amount of pyrite or other sulphur rich minerals in the rock, the potential exists for acid mine drainage problems to affect the aquatic environments of surface water quality on site or to Trading Cove Brook. The latter is stocked with brook trout by the Connecticut Department of Environmental Protection. Acid mine drainage may also affect groundwater quality. If the rock is analyzed and found to have acid production potential, the usefulness of the rock for construction purposes may be severely limited for construction aggregate since it may adversely affect the environmental health of surface water resources and/or degrade well water quality due to acid mine drainage emanating from stockpile or fill areas. Mitigation measures may be needed to buffer potentially acid laden water.

Because of the acid-forming potential of the bedrock beneath the proposed quarry site, it is suggested that the rock first be analyzed for its acid generating potential, i.e., total sulphur content. A testing method known as Acid Base Analysis is used to predict the field occurrences of acidic drainage in rock formations. It is suggested that the applicant acquire the services of a geotechnical consultant to investigate the acid mine drainage potential of the rock units to be quarried on the site. The geotechnical consultant should be familiar with this type of problem. A plan that describes the sampling strategy should be devised for the proposed quarry operation so that the body of material to be mined is adequately characterized. Information about the sampling and testing which includes sampling method, location, date, method of preparation, testing and results should be included in the plan. Finally, the consultant should interpret the testing results with respect to its potential impact on surface and ground water quality.

BEDROCK GEOLOGIC MAP

Scale 1" = 1000'

5. Surficial Geology

A surficial geologic map (GQ-485) for the Fitchville quadrangle has been prepared by Fred Pessl, Jr. for the U.S. Geological Survey. Except for some minor sand and gravel deposits along Trading Cove Brook, the site is covered by a relatively thin layer of glacial sediments called till. Till consists of an unsorted mixture of sand, silt and clay with variable amounts of gravel, cobbles and boulders which were deposited directly by glacial ice. The texture of the till covering the proposed quarry site varies from sandy, stony and loose in the western half of the site to a siltier, more compact variety in the eastern parts. The latter variety of till commonly contains a high percentage of fine-grained materials (fine sand and silt) and is characterized by a seasonally high water table condition. In the proposed quarry area, it is expected that the unconsolidated materials would be mined and used for construction fill material.

The sand and gravel deposits at the northern limits were deposited by glacial streams confined in the Trading Cove Brook Valley. There is probably too little stratified drift on the site to have any real commercial value, although local mining for fill appears to have occurred in the area.

Removal of the unconsolidated materials above bedrock prior to rock excavation in the proposed quarry area will inevitably disturb and mobilize the finer soil particles in the till particularly where the watertable is encountered or during periods of precipitation. This activity poses a potential threat of water quality problems to on- and off-site streams. If the proposed quarry is approved, proper sedimentation and erosion control (E&S) measures that include a quarry sequencing/phasing plan will help to reduce potential adverse impacts to local water resources. The E&S plan, which should be policed on a regular basis by Town officials when it is in place, should provide protection of local surface water resources during clearcutting, removal of unconsolidated materials and active quarrying periods. The installation of silt fences, hay bales, anti-tracking devices, sedimentation ponds and limiting disturbed areas to small acreages will help reduce the chance for siltation problems and turbid water. Consideration should be given to a

phasing/scheduling plan that limits clearing, soil removal, and quarrying to 2 or 3 acres at a time. Before moving on to subsequent phases, a reclamation plan that includes slope stabilization, re-seeding and mulching should be implemented. Also, in order to protect the environmental health of Trading Cove Brook and its accompanying floodplain the proposed quarry site should be scaled back to a point at a minimum south of the Terra Firma property.

Overlying sand and gravel and till in the Trading Cove Brook Valley are post-glacial sediments called swamp deposits. These sediments consist of sand, silt and clay that is mixed with organic matter in poorly drained areas. Additionally, site plans indicate that about ±38 acres of regulated wetland soils were identified in the proposed quarry site. The major wetland area on the Soneco Services, Inc. property, bisects the central parts in a north/south direction. Other wetland areas occur in the northwest and northeast corners of the Soneco Services, Inc. site. A high percentage of the Terra Firma property comprises wetlands/floodplains that are associated with Trading Cove Brook. Regulated wetland soils on both sites consist either of poorly drained, very poorly drained or alluvial soils. Regulated areas also include the two man-made ponds and streamcourses.

Except for the floodplain soils (Limerick Variant Silt Loam) that parallel Trading Cove Brook on the Terra Firma property, the wetland soils identified on the plan appear to consist of the Ridgebury, Leicester and Whitman extremely stoney fine sandy loams. This undifferentiated unit is comprised of very deep, loamy soils that formed in glacial till. The Ridgebury and Whitman soils develop in the compact glacial till while the Leicester soils develop in the 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 or gently sloping soils in drainageways and low lying positions of till covered uplands. The Whitman soils occur in nearly level to gently sloping depressions and drainageways on till covered uplands.

The major concern of these soils from an engineering standpoint focuses on a 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.

The Limerick Variant silt loam soils which are poorly drained occur on floodplains of major rivers and streams. Nearly level conditions exist in the areas that they cover. Typically, the Limerick Variant soil has a very dark brown, silt loam surface layer 8 inches thick. The subsoil is grayish brown, dark grayish brown, and dark gray. Mottled loamy fine sand and silt loam 28 inches thick. The substratum or parent material below the subsoil zone consists of grayish brown gravelly coarse sand to a depth of 60 inches or more. The water table is near the ground surface November through June. Also, during the period January to June, areas covered by Limerick Variant silt loam soils are subject to frequent flooding for brief periods of time. Due to flooding and wetness, the area covered by Limerick Variant silt loam are poorly suited for any type of development. Conversely, the areas comprised of these soils have high ecologic, hydrologic and biologic value worthy of preservation and, as such, should not be disturbed.

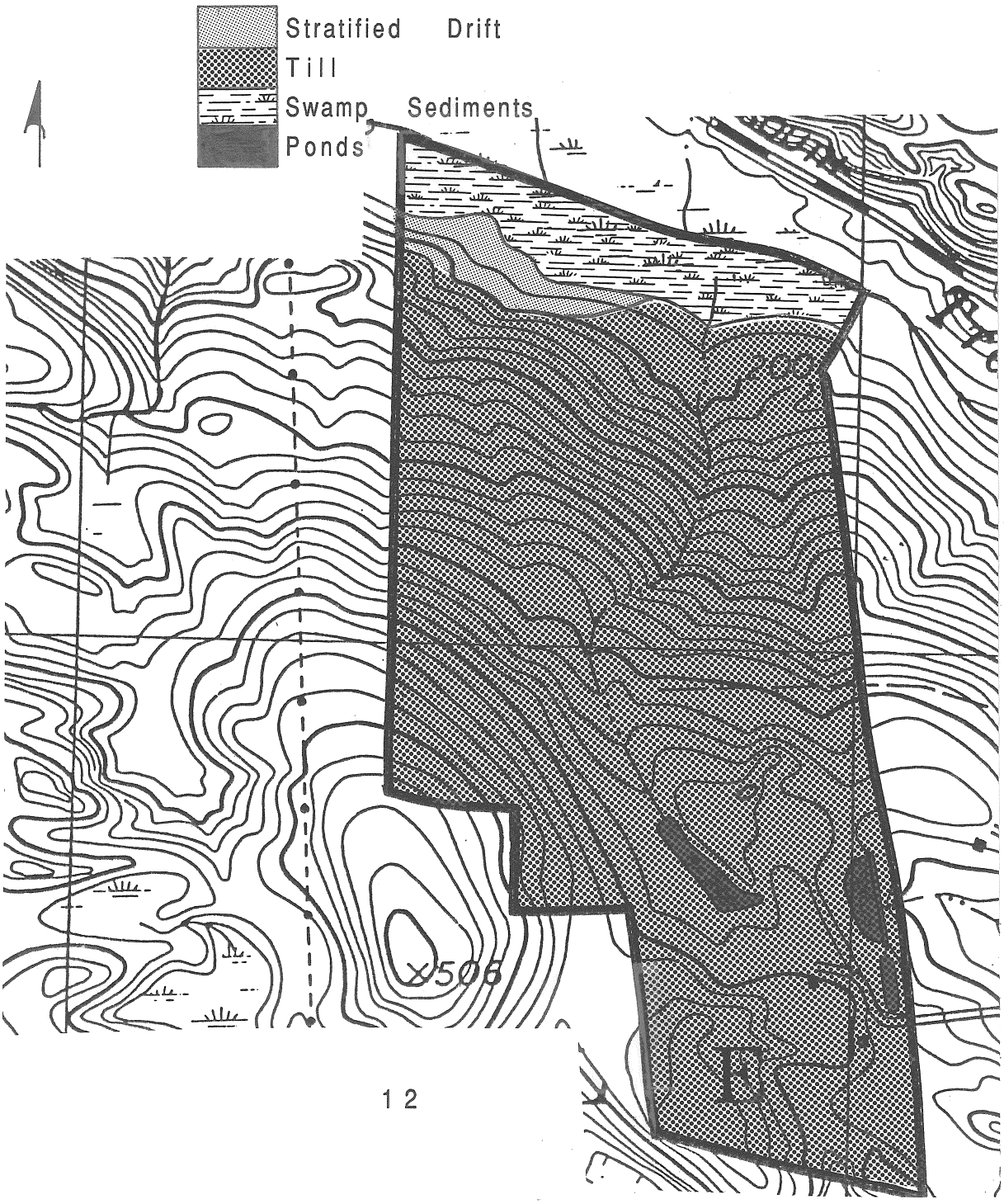
Based on present plans the proposed quarry operation would eliminate approximately 30 acres of wetlands. Due to the positioning of the wetlands on the site and size of the proposed quarry operation, it is virtually impossible not to impact site wetlands unless the operation was scaled back significantly and limited to non-wetland areas. Even if this was done the hydrology of the wetlands on and off-site would ultimately be impacted by grading and excavating. From a hydrologic standpoint, the wetlands on the site function as discharge zones where groundwater is directed toward the water table. The surface and ground water on the site flow generally downslope to these local discharge areas, which in turn route the water to Trading Cove Brook. These wetlands also serve certain ecological and biological functions. (See *Wetland Resource Review* section)

In reviewing the proposal, the Inland Wetland Commission needs to determine the impact of eliminating the ±30 acres of wetland due to the quarrying operation. If the Commission determines that the wetland/floodplain is serving an important hydrological, ecological and biologic 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. This may include reducing the size of the quarry operation so that less wetland areas are disturbed, recreation of the lost wetlands on another part of the site, off-site wetland mitigation and/or implementation of a detailed erosion and sediment control plan that may require pre-treatment of surface water before it enters Trading Cove Brook. (Also see *Hydrology* section and *Wetland Resource Review* section.)

SURFICIAL GEOLOGIC MAP

Scale 1" = 1000'



6. Soil Resources

A good portion of the site has been mapped as Canton-Charlton with other shallow to bedrock soils. These mapped soil units have major limiting factors for the excavating of roadfill, sand, gravel, or topsoil. Most of the area is bedrock dominated, hence the proposal for rock excavation.

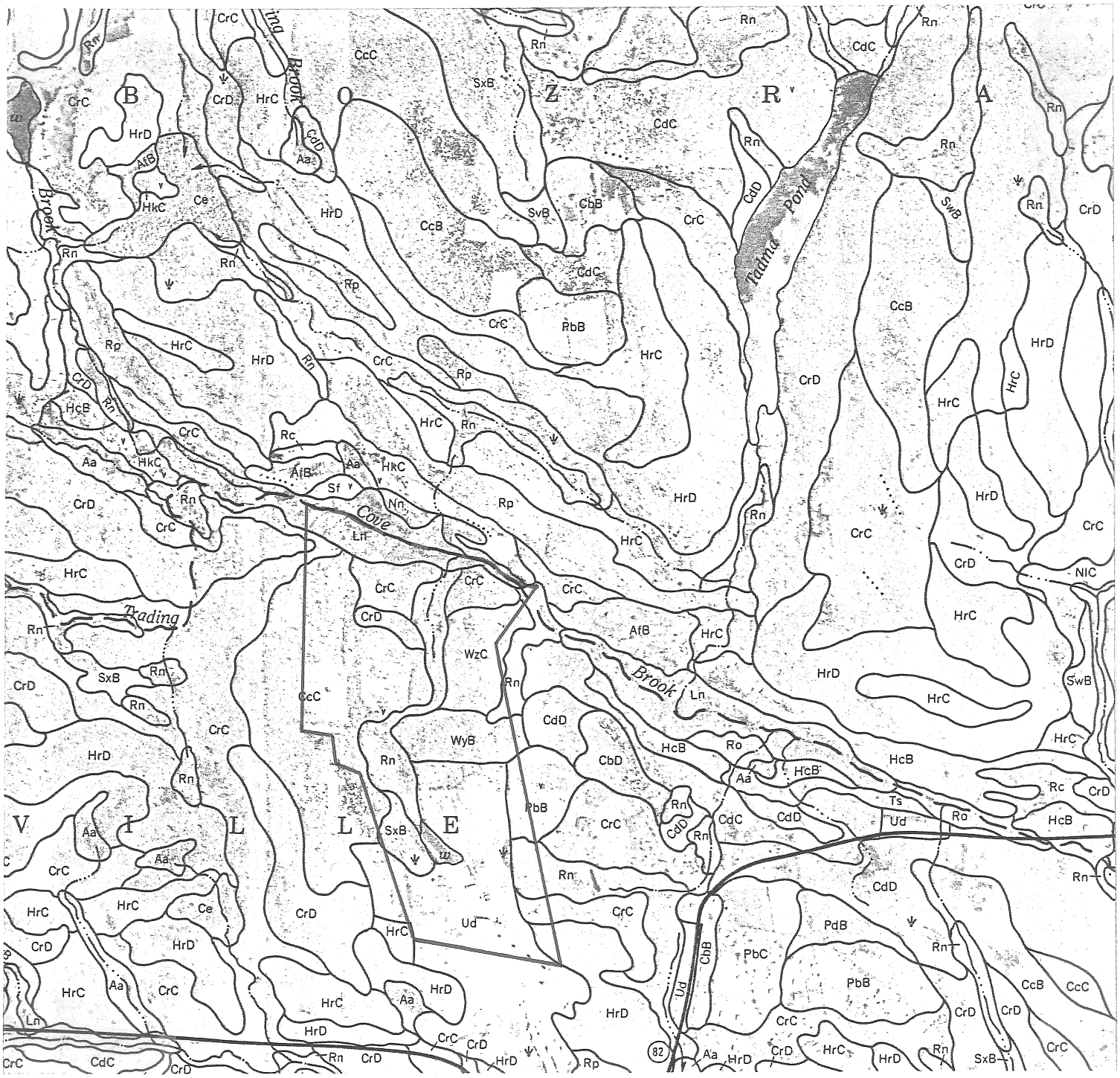
According to the proposed excavation, Soneco will attempt to control erosion by terracing the slopes surrounding the quarry. It seems, however, that the soils occupying the areas to be terraced are not conducive to such treatment. The western edge of the proposed excavation consists of Canton and Charlton very stony fine sandy loams, a soil type that is considered too sandy for terraces and diversions. Also, slopes of excavated areas of the soils on the eastern edge of the excavation (Woodbridge very stony fine sandy loam and Woodbridge and Rainbow extremely stony soils) have been determined to slump when wet. This could lead to much slumping, considering the proposed duration of the project. A third problem, it seems, would be created by the small stream running directly down the middle to the excavation. When the slope increases from the cuts of the excavation, northward run-off might be hard to control even with the aid of terracing, benches, or diversions.

Approximately 30 acres has been mapped as wetland soils, primarily Ridgebury, Leicester, and Whitman runs through the center of the property and Limerick Variant soils are on the northern edge of the property. It will be nearly impossible to avoid the central corridor of wetlands. The town must decide if the value of the project outweighs the value of the wetlands. It is usually very difficult to replace or recreate wetlands because of the soil morphology. This may not be a practical solution to the destruction of wetlands. The wetlands to the north of the property are part of an extensive wetland system of Round Brook, Trading Cove Brook and the Stoney Brook Reservoir. No activity is proposed in this area however, precautions should be taken to protect this system from negative impact. It is recommended that a buffer zone be maintained and revegetation of as much of the disturbed area as possible to protect against sedimentation.

If excavation takes place close to the river, some problems with flooding could result. Flooding is a characteristic of the Limerick Variant silt loam that borders the site and this zone should be carefully monitored to exclude excessive activity.

SOILS MAP

Scale 1" = 1320'



Soil Types

CcC - Canton and Charlton very stony fine sandy loams, 8 - 15 percent slopes

These 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 rapid. These soils warm up and dry out rapidly in the spring. It is strongly acid or medium acid. These soils are not suited to cultivated crops. These soils are suited to trees. Steepness of slope is a major limiting factor for community development.

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.

/* Ln - Limerick Variant silt loam

This nearly level, poorly drained soil is on flood plains along major rivers and streams. The Limerick Variant soil has a seasonal high water table at a depth of about 6 inches. It is subject to frequent flooding. Permeability is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. The available water capacity is high. It warms up and dries out slowly in the spring. It is strongly acid in the upper part of the soil and strongly acid through slightly acid in the lower part; it is medium acid or slightly acid within a depth of 40 inches. This soil is suited to cultivated crops. Wetness and flooding are the major limitations, but this soil is seldom flooded during the growing season. The hazard of erosion is slight. This

soil is suited to trees. Windthrow is common because of the shallow rooting depth above the high water table. This soil is poorly suited to community development.
This soil is in capability subclass IIIw.

*** 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.

SxB - Sutton extremely stony fine sandy loam, 0 - 8 percent slopes

This nearly level to gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Stones and boulders cover 8 - 25 percent of the surface. The Sutton soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate or moderately rapid. The available water capacity is moderate. Runoff is slow or medium. Sutton soil warms up and dries out slowly in the spring. It is strongly acid or medium acid in the surface layer and subsoil and strongly acid through slightly acid in the substratum. This soil is not suited to cultivated crops. The hazard of erosion is slight or moderate. This soil is suited to trees. The major limiting factor for community development is the seasonal high water table.
This soil is in capability subclass VIIs.

Ud - Udorthents-Urban land complex

This complex consists of excessively drained to moderately well drained soils that have been disturbed by cutting or filling, and areas that are covered by buildings or pavement. Urban land consists mainly of areas of houses, small commercial buildings, schools, streets, parking lots, roads, and highways. Permeability of the Udorthents is slow to very rapid. The available water capacity and runoff are variable.
This complex is not assigned to a capability subclass.

WyB - Woodbridge very stony fine sandy loam, 0 - 8 percent slopes

This nearly level to gently sloping, moderately well drained soil is on drumloidal, glacial till, upland landforms. Stones and boulders cover 1 - 8 percent of the surface. The Woodbridge soil has a seasonal high water table at a depth of about 18 inches. Permeability is moderate in the surface layer and subsoil and slow or very slow in the substratum. The available water capacity is moderate. Runoff is medium. This Woodbridge soil warms up and dries out slowly in the spring. It is strongly acid or medium acid in the surface layer and subsoil and strongly acid through slightly acid in the substratum. This soil is not suited to cultivated crops. The hazard of erosion is moderate. This soil is suited to trees. The major limiting factors for community development are the seasonal high water table and the slow or very slow permeability in the

substratum.

This soil is in capability subclass VIs.

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 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

7. Hydrology

The area encompassed by the proposed quarry operation, which comprises about 125 acres, drains entirely to Trading Cove Brook. Trading Cove Brook, at its point of outflow to Thames River represents 13.4 square miles or 8,576 acres. As such, the proposed quarry operation area represents about 1.5 percent of the total Trading Cove Brook drainage area.

Within the proposed quarry site area, there are several intermittent streamcourses. These streamcourses, which are mostly north flowing function as discharge zones where groundwater is directed toward the water table. Also, numerous seeps were observed on the sloping hillside just above the Trading Cove Brook floodplain.

Except for Trading Cove Brook, none of the streamcourses on the site have been classified by the Department of Environmental Protection. As such, they are presumed to be Class "A" water resources by default. Class "A" water resources may be suitable for drinking, recreational or other uses and may be subject to restrictions on the discharge of wastes, although certain discharges may be permitted. All of the above streamcourses drain to Trading Cove Brook, which is classified as "B/A". A Class "B/A" water resource indicates that currently the water is known or inferred to be degraded due to landfill leakage. "B/A" water resources are generally suitable for recreational, agricultural or certain industrial uses such as process or cooling water. It is the State's goal to improve, through management, the water quality to that of an "A" resource (see above).

According to the Flood Insurance Rate Map for Montville, Connecticut the low lying parts of the Terra Firma Property to the north are located within areas of the 100-year flood. Although it appears that little or no activity is proposed in this area, it would be useful if the boundary of the 100-year flood was superimposed onto the plan. The remainder of the site lies within an area of minimal flooding.

The operation of a rock quarry will change site's hydrology due to

loss of evapotranspiration and increased surface runoff for a ±125 acre area. In the end, impervious conditions will exist on the quarry floor compared to existing conditions which include overburden and vegetation. As mentioned earlier in the report, there is also concern that the quality of water flowing over the quarry floor may change but this will depend upon the mineralogy of the rock that is quarried. Depending on the change in runoff conditions, it seems likely that a properly designed storm water retention facility would be required in order to control post-quarrying runoff increases. This retention basin may also be able to serve a sediment retention function during the quarrying operation. During land clearing phases and quarrying, the appropriate installation, monitoring and maintenance of erosion and sediment control measures will help protect adjacent streamcourses and wetlands. Due to high water table conditions and seeps in the northern and eastern parts and till soils that contain fine sand and silt and moderately steep slopes, erosion control devices should be inspected after installation and policed by town officials on a regular basis especially prior to and after major storm events.

Because of the site's proximity to a high quality stream corridor and because the supply and demand for construction aggregate materials may fluctuate, it is suggested that applicant provide the town with a phasing plan which includes information such as clearing and grubbing periods, removal or stockpiling of overburden materials, quarrying and final reclamation. Warning signs and fencing should probably be considered along the top of the quarry cut for public safety purposes.

The town should require the applicant to seek the services a of a geotechnical consultant that has considerable knowledge of potential environmental concerns which would be related to a quarry operation. The geotechnical consultant should evaluate potential adverse impacts on wetlands and watercourses and to nearby residential buildings due to blasting and quarrying. They should recommend measures to reduce or mitigate any adverse impacts which may occur to local water resources and nearby dwellings as a result of the proposed quarry operation.

8. Blasting

Removal of the rock material on the quarry site will undoubtedly require the use of explosives. Due to its preliminary stages, no information regarding blasting requirements or techniques for the proposed quarry operation were available on the review day.

All blasting requires care and strict supervision by persons experienced with modern blasting techniques. A geotechnical person who has considerable knowledge and experience with blasting should monitor, evaluate and oversee all blasting on the site. Seismographic testing for measuring and analyzing ground vibrations should probably be considered for the perimeter of the quarry operation. This will help to minimize potential damage to nearby homes.

Major blasting concerns for the area include seismic shock and airblast. These concerns are especially significant due to the proximity of residential homes. Flyrock is another potential problem, but it should be satisfactorily contained within the site. Increases in ground water turbidity in the vicinity of the blasting may result as well as an increase in fracture porosity of the rock, possibly creating enhanced hydraulic conductivity and water storage capacity. As such, nearby bedrock wells may be affected by the blasting.

The site is relatively remote. A few residential properties are within 1,000 feet of the proposed quarry operation. The greatest density of homes occur about 1,800 feet east of the site (east side of Route 82).

Any blasting conducted on the site should be accompanied by a pre-blasting survey. The applicant's geotechnical/blasting consultant should determine a safe pre-blasting survey radius. This depends upon the blasting requirements of the quarry operation. The pre-blast survey should include collecting background water quality data for nearby domestic wells and surface water. Yield tests for potentially affected wells (those within the pre-blast survey radius) should be strongly considered. Removal of rock material in the proposed quarry area may result in the lowering of the water table in the vicinity of the site to the

extent that water is no longer available or severely diminished in a given well. Of special concern would be the residential wells east of the site and the Soneco Services, Inc. well. The applicant should be required to acquire the services of a competent hydrogeologist that can evaluate potential changes in groundwater quality and quantity due to the proposed quarry operation. Also, monitoring of ground and surface is warranted during the active quarrying operation to ensure that water quality and quantity problems do not occur to on- and off-site water resources. If groundwater contamination occurs or if well yields are diminished, provisions should be made by the applicant to extend the municipal water main, drill new wells, or deepen existing wells to potentially affected residences.

Specific blasting techniques may minimize the potential environmental impacts of blasting, depending upon the blasting requirements of the site. Controlled blasting methods such as blasting to the open face, multiple small charge blasting, use of decked charges and/or use of millisecond delays between detonation can be employed to reduce blasting shock and seismic air blast. Every effort should be made to employ techniques that reduce the environmental effects of blasting.

In order to minimize adverse response by people occupying homes in proximity to the quarry, especially since explosives are likely to be involved, consideration should be given to educating local residents on blasting techniques to be employed at the quarry site once the blasting requirements are known. This may help to reduce public reaction and fears.

Future developments that are considered for abutting properties should be made aware of the potential blasting impacts of the proposed quarry area. This might be accomplished by including a statement on future site plans for abutting properties that are residentially developed.

In the vicinity of the site, pre-quarry surface water quality samples should be collected in order to determine background water quality conditions. The applicant should fully understand his/her responsibility for appropriate storage, handling, and disposal of quarry materials, fuels and maintenance liquids.

9. Wetland Resource Review

Site and Project Description

The site under review is a large acre hillside parcel of mixed hardwoods with numerous seep areas and perennial and intermittent watercourse corridors running south to north into Trading Cove Brook. The site is accessed off of Caroline Road through an existing asphalt operation. Most of this parcel has been previously cleared, within the past 50 years, with significant modifications to hydrology and vegetation occurring in the southern portion of the site above the existing 375 foot elevation contour. The northern portion of the site contains forested and emergent swamp systems of good to excellent quality. These northern areas provide a valuable buffer and transition from upland areas down into the Trading Cove Brook corridor, a Class "A" stream stocked by DEP, and represent the most valuable wetlands located on the site.

The proposed activity is to quarry approximately ±14,000,000 cubic yards of material over an approximate ±150 acre area. The quarried materials will be crushed and washed on site, and the activities are proposed to be phased over a 20 to 30 year period. Approximately ±30 acres of wetlands will be disturbed or completely destroyed as a result of the operation. Stormwater will be managed via a duel purpose detention and sedimentation basin to be constructed at the northern end of the site adjacent to Trading Cove Brook. The washing operation is proposed as a closed system with no discharge to Trading Cove Brook. As proposed the initial phase will include those areas closest to Trading Cove Brook for the establishment of the roadway, sedimentation and detention structures and crushing and washing operations.

Project Impacts and Recommendations

Due to the size and nature of the proposed activities this project will have significant impacts to the wetlands on the site and to the Trading Cove Brook corridor. In essence ±150 acres of habitat, including ±30 acres of wetlands will be destroyed over the 20 to 30 year duration of the project. The application makes reference to the creation and

replacement of wetlands at other locations to compensate for these losses. While the creation of wetlands may replace some of the wetland area and functions lost, significant portions of the existing functional capacities cannot be compensated for once they are removed.

Significant impacts will occur to several functional values of the site. First, a significant portion of wetland and wildlife habitat would be lost. Regardless of any wetland creation which might be done, the habitat along this portion of the Trading Cove Brook corridor will be permanently impacted. The water quality renovation capacities of this site will be reduced. Presently the long overland flow of stormwaters through vegetation and mixed soils provides for excellent renovation. Surface and subsurface hydrology on and adjacent to the site will be significantly modified. The amount of material being proposed for removal will increase runoff quantities over the area, redirect flow patterns of both surface and ground waters and could result in the lowering of water levels in wetlands adjacent to the site. Due to a lack of technical information, such as depth of soils and quantities of groundwater flow, the exact extent of such impacts cannot be determined. Once initiated, the project will present a permanent obstruction to wildlife migration along this portion of the Trade Cove Brook corridor. After the completion of the project the remaining excavated area will inhibit the passage of mammals due to its steep slopes and sparse vegetation. The activities present a very real potential for impacts to the water quality of Trade Cove Brook. Removal of surface materials and the ongoing washing of excavated and crushed materials on the site will create large quantities of silts and fine materials. The design and maintenance of the stormwater detention basin and the washing basin will be critical in mitigating water quality impacts. Lastly, if approved, the project will have an obvious impact to the aesthetic quality of the area. While this function is less tangible than others its value is of particular importance when dealing with a project of this size and nature. Due to the preliminary nature of the project certain information, such as soil borings and bedrock mapping, are not available. Information such as this will be useful not only for assessing impacts, but in anticipating potential erosion problems and establishing proper phasing procedures to reduce the potential for impacts.

In light of the above mentioned impacts the following

recommendations are offered in the evaluation of the proposed activities.

1) Due to the high quality of Trading Cove Brook and its value the proposed activities are viewed as being very significant. While the creation of wetlands could replace the acreage lost and some of the functional values if successful, the project will create a net loss of wetlands and functional capacities in the area. Therefore, it is recommended that alternatives to the proposal be investigated, including a reduction in the size and scope of the activities and other land uses. If the scope of activities were pulled back from the stream corridor to the existing 325 foot contour a considerable reduction in the amount of wetlands impacted could be achieved while increasing the buffer between the activities and the stream corridor. Additionally, downsizing the scope of project to this elevation would maintain a larger travel corridor for wildlife along Trading Cove Brook.

2) Particular attention should be paid to the design and implementation of all stormwater and sediment control measures. Stormwater management systems are often design for a ten-year frequency storm event, however, given the location of the ultimate discharge the commission may want to consider requiring a system capable of accommodating a 25-year or greater storm event. Insuring that a system can accommodate a larger storm event may provide an extra measure of protection from water quality impacts.

3) Careful sequencing of activities should be required to insure that as little of the site is left unstable as possible at any given time during the life of the project. Such sequencing might require approval or inspection of stabilization efforts prior to initiating the subsequent phase of the project. A maintenance schedule would also be prudent and should address such issues as the frequency of basin cleaning, method for cleaning of basins and sedimentation curtains, the location at which spoils will be deposited and/or stored and what measures will be used to stabilize spoils sites.

4) To off-set the visual and aesthetic impacts the commissions may want to consider establishing a replanting and/or landscape closure plan. Such a plan could include a landscaping design and listing of plantings, both upland and wetland, that could be planted within the excavated area after the completion of activities.

5) Federal wetland regulatory agencies use different criteria for establishing regulatory boundaries and should be notified by the applicant to determine the necessary application requirements. The

U.S. Army Corps of Engineers is located in Waltham, MA and can be reached at (617) 647-8673.

In conclusion, the scope and nature of the proposed excavation activities will result in significant irretrievable losses of wetland functions. Limiting the excavation to the a higher elevation would maintain the most valuable wetlands on the site, and increase the natural buffer between the activities and the Trade Cove Brook corridor, while still allowing for the the excavation of significant amounts of material. Careful planning of the timing of activities to be performed on the site in conjunction with stabilization requirements could greatly mitigate potential adverse impacts to water quality in the area. Lastly, due to the amount of regulated area which is proposed to be disturbed Federal wetland regulatory agencies should be asked to make a determination of permit need.

10. The Natural Diversity Data Base

The Natural Diversity Data Base maps and files regarding the project areal have been reviewed. According to our information, there are no known extant populations of Federally Endangered and Threatened species or Connecticut "Species of Special Concern" occuring at the site in question.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Natural Resources Center's Geological and Natural History Survey and cooperating units DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultation with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

11. Fish Resources

This report will address impacts to wetlands/local aquatic resources and delineate appropriate measures to mitigate impacts.

Fish Population

Trading Cove Brook, a tributary of the Thames River, borders the proposed quarry at its northern end. This watercourse is annually stocked by the DEP Inland Fisheries Division with more than 300 yearling brook trout in the towns of Montville, Bozrah, and Norwich. This stream also contains a native brook trout fishery. Other stream dwelling species that can be expected to inhabit this watercourse are: blacknose dace, longnose dace, tessellated darter, fallfish, common shiner, white sucker, and American eel.

Surface waters of Trading Cove Brook are classified as "Class B/A". Designated uses for this classification are: fish and wildlife habitat, recreational use, agricultural and industrial supply, and other legitimate uses.

Small intermittent feeder streams can be found on the property that do not contain any fisheries resources. One of the primary functions of these watercourses and associated wetlands is to provide clean and unpolluted waters to Trading Cove Brook.

Impacts

The following impacts can be expected if proper mitigation measures are not implemented:

1. Loss and degradation of wetland habitat. Proposed quarry mining operations will cause a *permanent loss* of 30 acres of invaluable wetland habitat. 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. The loss of these wetlands can degrade water quality of Trading Cove Brook or diminish the low flow regime. Maintenance of low flows is critical to the survival of

stream fishes.

2. Site soil erosion and sedimentation of Trading Cove Brook from quarry mining areas. Without careful long-term planning, mining activities will suspend sediments within local waters creating extreme turbid conditions. If not properly contained, turbid waters will cause stream degradation in downstream areas. Excessive sediment deposition could damage the aquatic ecosystem in the following ways:

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

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

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

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

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

(6) Sediment encourages the growth of filamentous algae and nuisance proportions of aquatic macrophytes (CTDEP 1989). Eroded soils contain plant nutrients such as phosphorous and nitrogen. Once introduced into aquatic habitats, these nutrients function as fertilizers resulting in accelerated plant growth.

(7) 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.

3. Reduced streamflow in Trading Cove Brook. This may result from the removal of 30 acres of wetland that supply ground and surface waters to Trading Cove Brook. This situation would be most critical during normal summer low flow periods. Reduced stream flows would

impact local and downstream fisheries by increasing water temperatures, decreasing dissolved oxygen levels and reducing overall usable habitat for fishes and aquatic insects. Additionally, standing waters in the quarry will be exposed to heating from solar radiation. If these waters are allowed to drain into Trading Cove Brook, survival of coldwater stream fisheries will be threatened. The quarry operation may require a State of Connecticut Water Diversion Permit and as such, the applicant should contact the DEP Water Diversion Program Coordinator, Bob Gilmore, at 566-7160 for further details.

Recommendations

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

1. The extent of wetland disturbance should be minimized. Thirty acres of existing wetland habitat is too valuable to be destroyed for the purpose of quarry excavation. It is doubtful that a project which will result in such a large and irreplaceable loss of wetlands will receive approval from federal agencies that regulate inland wetlands. Recent policies of these agencies are geared towards "no-net" loss of wetlands. The applicant should determine if a smaller quarry operation which will disturb a significantly reduced acreage of wetlands will be economically feasible.

2. A detailed hydrologic analysis should be completed to investigate impacts to Trading Cove Brook. The Inland Fisheries Division will request detailed information regarding the extent to which existing stream flows will be diminished due to the loss of on-site wetlands. Information will also be requested regarding projected increases in stream water temperatures.

Bibliography

CTDEP (Connecticut Department of Environmental Protection) 1989. Non Point Source Pollution: An Assessment and Management Plan. CTDEP, Hartford.

12. Archaeological Review

A review of the State of Connecticut Archaeological Site Files and Maps shows no recorded sites for the proposed project area. However, the presence of a reliable water system, Trading Cove Brook, running through the length of the area presents an ideal location for prehistoric settlement, as numerous other known sites have demonstrated. The most sensitive area for the location of possible Indian sites is along the brook corridor (see map). Therefore, a reconnaissance survey of the area for archaeological resources is highly recommended.

On-site field inspection of the area revealed no remains of historical significance which would be affected by the proposed undertaking.

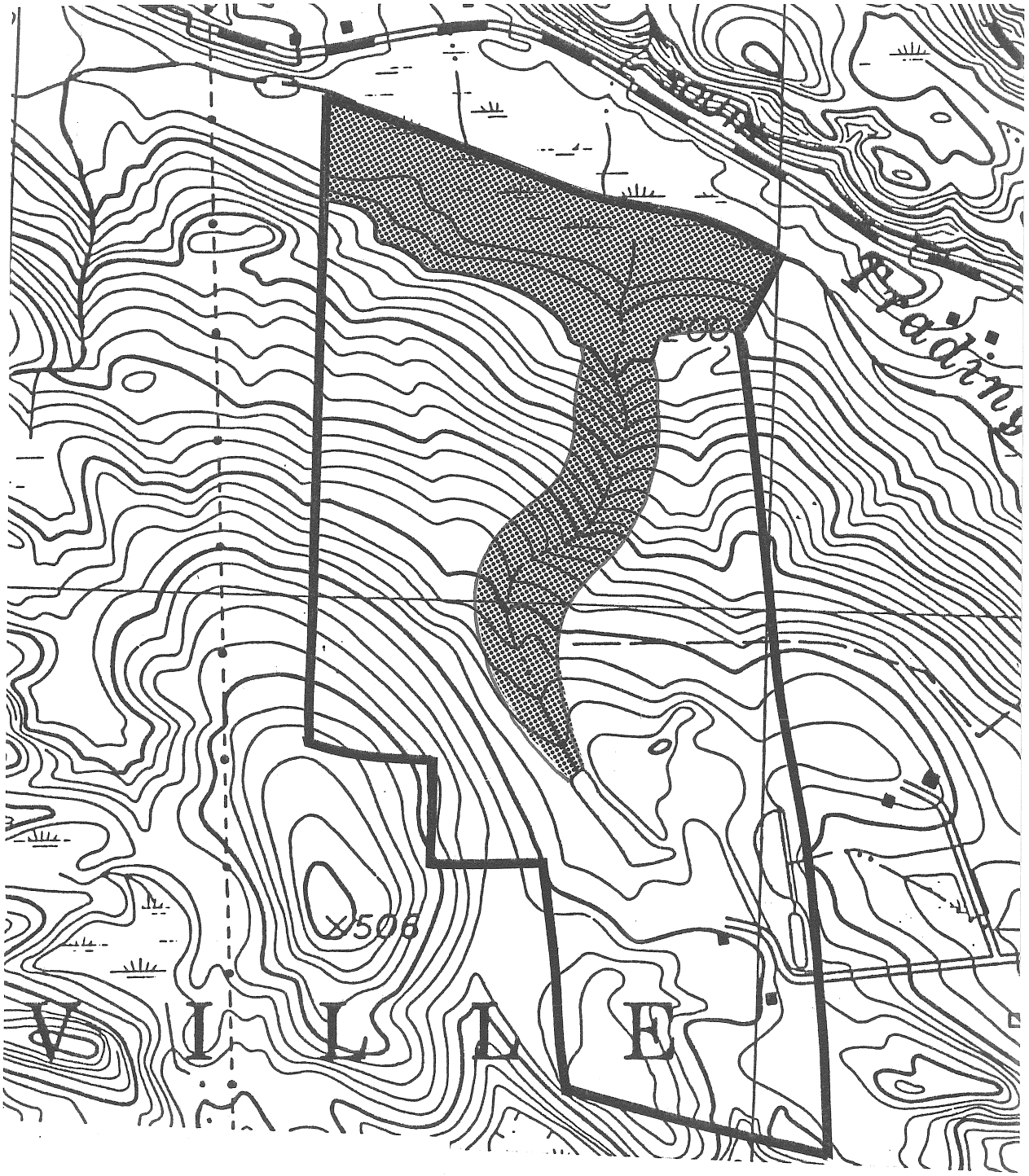
Although no sites of prehistoric or historic nature are on record for this area, the Office of State Archaeology suggests the high probability that prehistoric sites might in fact exist due to the advantageous aspects of the environment in regards to human occupation and subsistence. A complete survey of the areas adjacent to Trading Cove Brook would reveal any existing cultural resources. All archaeological studies should be conducted in accordance with the Connecticut Historical Commission's **Environmental Review Primer for Connecticut's Archaeological Resources.**

The Office of State Archaeology is prepared to offer the Town of Montville and the developer any technical assistance necessary in order to further the preservation of archaeological resources in your community.

ARCHAEOLOGICAL SENSITIVITY MAP

Scale 1" = 1000'

High Probability 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.