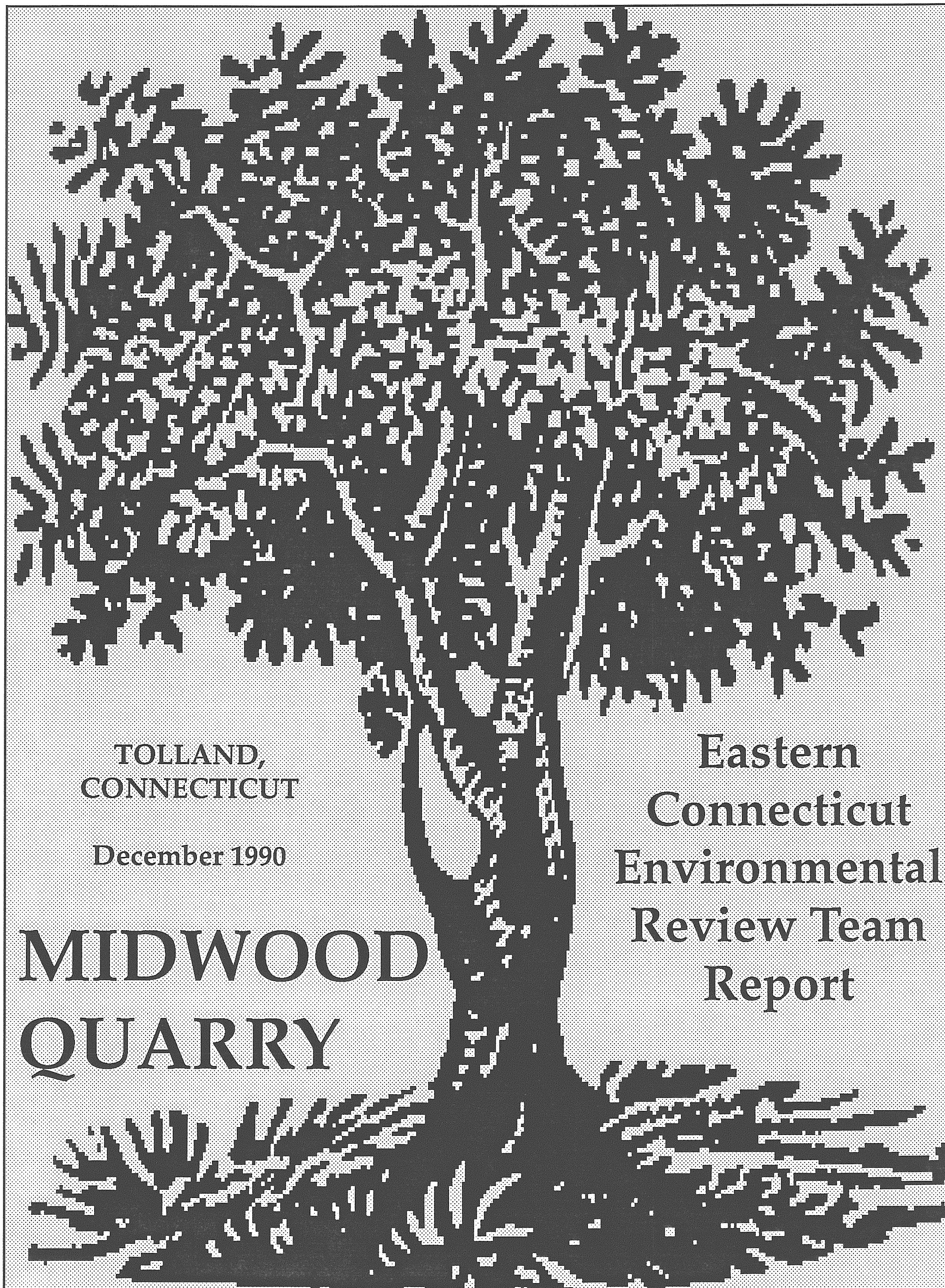

TOLLAND, CONNECTICUT

December 1990

MIDWOOD QUARRY

Eastern Connecticut Environmental Review Team Report

Eastern Connecticut
Resource Conservation and Development Area, Inc.

MIDWOOD QUARRY

TOLLAND, CONNECTICUT

Review Date: October 25, 1990

Report Date: December 1990

The Eastern Connecticut Environmental Review Team

The Eastern Connecticut
Resource Conservation and Development Area, Inc.

P.O. Box 70, 1066 Saybrook Road
Haddam, Connecticut 06438
(203) 345-3977

ENVIRONMENTAL REVIEW TEAM REPORT
ON

MIDWOOD QUARRY

TOLLAND, CONNECTICUT

This report is an outgrowth of a request from the Tolland Wetland Agent for the Inland Wetlands Commission to the Tolland 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, October 25, 1990. Team members participating on this review included:

Pete Aarrestad	**Fisheries Biologist** **DEP - Eastern District Headquarters**
Nick Bellantoni	**State Archaeologist** **Office of State Archaeology**
Steve Hill	**Wildlife Biologist** **DEP - Eastern District Headquarters**
Jim Parda	**Forester** **DEP - Eastern District Headquarters**
Joyce Purcell	**District Conservationist** **USDA - Soil Conservation Service**
Barbara McFarland	**Community Development Planner** **Capitol Region Council of Governments**
Nancy Murray	**Sr. Environmental Analyst** **DEP - NRC - Natural Diversity Data Base**
Elaine Sych	**ERT Coordinator** **Eastern CT RC&D Area, Inc.**
Carol Szymanski	**Community Development Planner** **Capitol Regional Council of Governments**
Bill Warzecha	**Geologist/Hydrologist** **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 plans and told that additional information (new plans and hydrological information) would be available in several weeks. The Team met with, and were accompanied by two environmental analysts from the CT Water Company, the Wetlands Agent, the Principal Sanitarian for the Town, the landowners/developers and his consultant. Following the review, reports from each Team member were submitted to the ERT Coordinator for compilation and editing into this final report.

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

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

If you require additional information, please contact:

Elaine A. Sych
ERT Coordinator
Eastern Connecticut RC&D Area
P.O. Box 70
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(203)345-3977

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1. LOCATION, LAND-USE AND ZONING

The site of the proposed quarry expansion consists of about 122 acres in west central Tolland. It is bounded by wooded land on the east, residential properties and wooded land on the west, Old Stage Road and residential properties on the south, and residential properties on the north. Alden Circle, Pilgrim Drive and Crestwood Road are in proximity to the northern property line. The site is accessed via a gravel-based road that is located off of Mountain Spring Road.

Except for a ±13 acre area of existing active rock and soil excavation operated by Burgundy Hills Associates, the site is comprised of wooded land. Surrounding land uses consist mainly of residential properties. The greatest concentration of homes occur to the north and southwest, but the closest residential properties occur to the south. An abandoned mine known as Burgundy Hill Garnet Mine occurs in the central part of the site. The mine which produced garnets for abrasives and building stone is believed to have been active in the 1930's. Two adits (mine shafts) occur on the site. Preservation of the adits, which represent part of the Town's industrial past, should be a consideration so that they are not destroyed. (Please see **ARCHAEOLOGICAL REVIEW** section)

According to Town officials the property is zoned for residential purposes. As such, the proposed rock quarry expansion does not appear to be compatible with the residential zone regulations and, therefore the applicant will need to secure a special permit in order to expand beyond the existing quarry. It is understood that a ±5 acre non-conforming area that includes part of the existing operation occurs in the central parts.

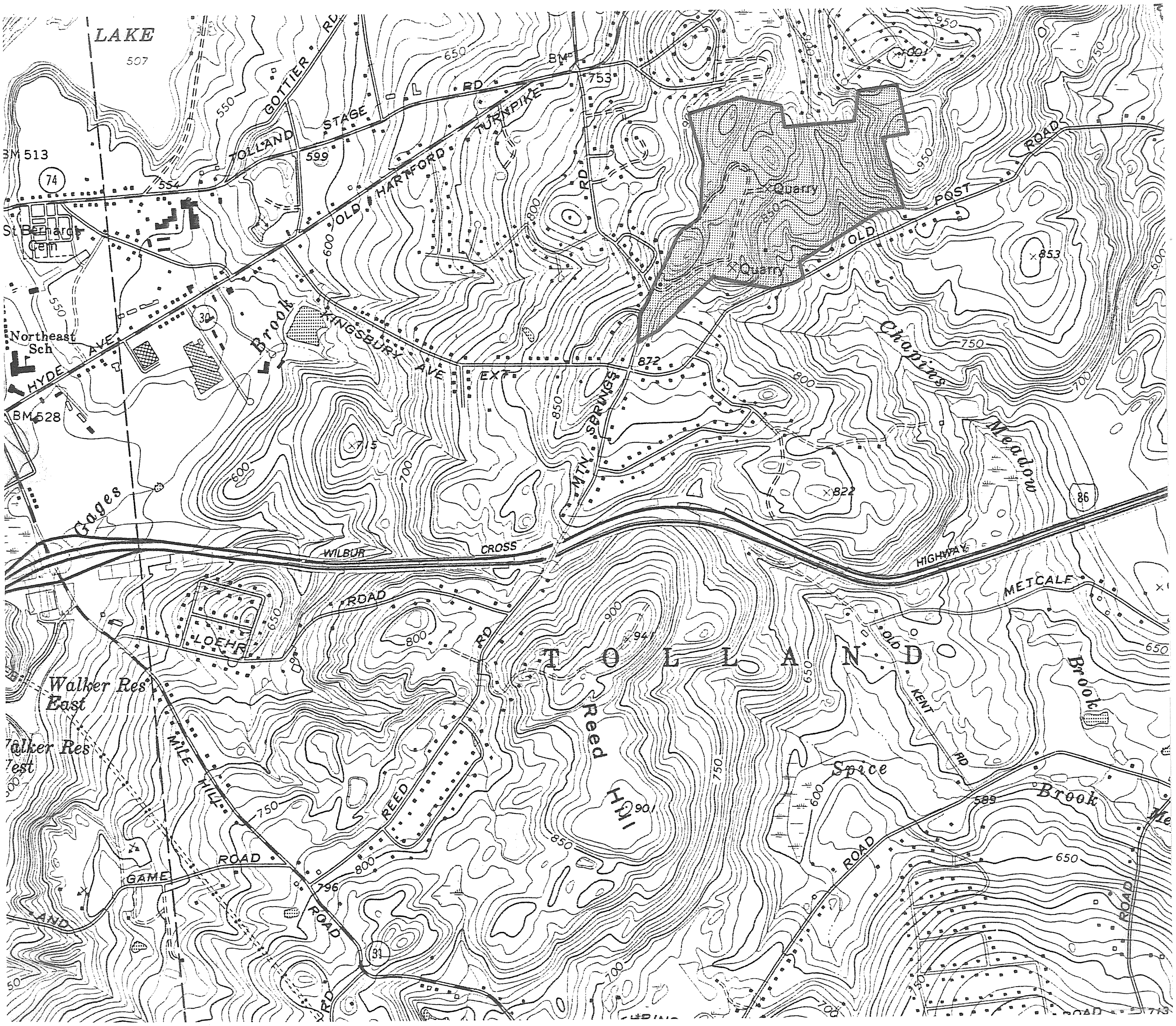
2. PROJECT DESCRIPTION

The proposed quarry expansion would be an extension of the existing Midwood Quarry. The proposed rock removal operation, which according to the applicant requires blasting 4 to 5 times per year, would encompass 25 acres. In their latest report (received week of 11/26/90), the applicant's geotechnical consultant (Ground Water, Inc.) indicates that more than 1 million cubic yards of rock (quartzite, gneiss, schist and amphibolite) would be removed from the site by the proposed quarry operation. The excavation would extend from ground surface to 10 feet below the water table across the 25 acres. It is understood that the Midwood Quarry operation has existed on the site for about 8 years. In the end, the quarry operation would result in an irregularly shaped rock basin east of the pond (Wetland #1, see Ground Water Inc., Location of Geologic Units and Wetlands, Plate 4) on the site. The final quarry floor, which will have a north/south trending bench in the west-central parts of the excavation, will slope easterly to Wetlands #3 and #4 (refer to plan). A ±1 acre land area in the northern parts which now drains to Shenipsit Reservoir will be re-directed to the Chapins Meadow Brook drainage area due to proposed quarrying and grading activity at the site.

LOCATION MAP

Scale 1" = 2000'

Approximate Site



3. TOPOGRAPHY

Due to the existing rock quarry operation, the site's topography has been greatly modified in the central parts. The remainder of the site is characterized by irregular and hummocky terrain that is controlled by the underlying bedrock. Bedrock occurs at or near the ground surface throughout the site. It has been exposed naturally by erosion and past glacial activity in several areas of the site. The existing quarry operation has further exposed it in the central parts.

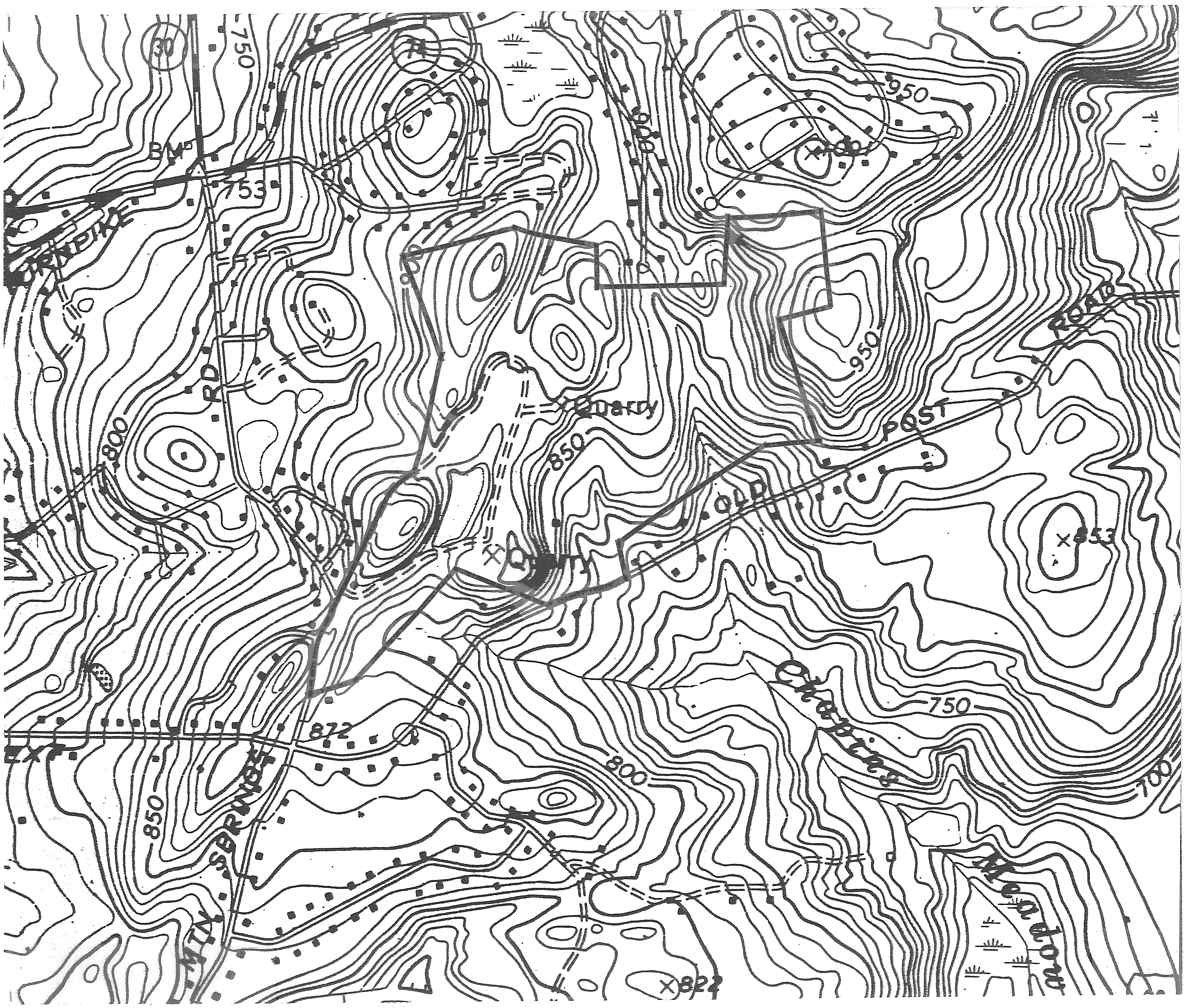
Slopes on the site range from gentle to very steep. Steepest slopes generally flank the rock cored hills in the eastern, western and central parts of the site. Gentle and moderate slopes characterize the remainder of the site. Site elevations range from about elevation 970 on the top of the rock cored hill in the northeast corner to elevation 770 at the intersection of the southern property line and the unnamed Chapins Meadow Brook tributary (east-central parts).

According to the geotechnical report prepared for the applicant, the final quarry floor will extend to 10 feet below the estimated static water table. There is concern that removal of the rock below the water table may alter local groundwater flows which, in turn may adversely impact local water resources such as wetlands, surface water bodies and streamcourses. The pond and Wetland #1 on the site may be a recharge basin for residential bedrock wells to the west and southwest. There is concern that an excavation deeper than the surface elevation of the wetlands/surface waterbody could conceivably draw water out of the immediate area. As such, groundwater flow in fractured bedrock, which appears to be the source of domestic water to many homes in proximity to the quarry site, may be adversely impacted by this activity. If local bedrock wells are affected by this type of work, for example diminished well yields, consideration should be given in advance to require that the applicant set up an escrow account or post a bond which would cover the cost of drilling a new well, deepening an existing well or extending a public water supply main (Connecticut Water Company) to potentially affected residences.

TOPOGRAPHIC MAP

Scale 1" = 1000'

Approximate Site Boundary



4. BEDROCK GEOLOGY

The bedrock geology for the quarry expansion area is well described by Janet M. Aikens, 1953, in the Bedrock Geologic Map of the Rockville Quadrangle (QR-6). Also, for the bedrock geology section of this report the Team's geologist reviewed the Bedrock Geological Map of Connecticut, John Rodgers, 1985 and bedrock geologic information supplied by the applicant's geotechnical consultant. The latter information includes bedrock geologic mapping data produced by a professor and his students from the University of Connecticut's Geology and Geophysics Department.

Soils information indicates that bedrock is at or near ground surface (<20 inches) throughout the majority of the site.

Three major formations, the Littleton Formation, Clough Quartzite, and the Middletown Formation comprise the bedrock beneath the site. Because of the level of detail of the bedrock mapping data prepared by the applicant's geotechnical consultant, 5 rather than 3 bedrock units were identified beneath the site. The reason for the difference is that the applicant further divided the formations into subunits based on textural and mineralogical changes observed in the rocks. As such, the contact or boundaries between the various rock formations shown on the accompanying map may differ slightly from the detailed bedrock geologic map produced by the applicant's geotechnical consultant.

The western parts of the site are underlain by the Littletown Formation and consist of a gray to silvery, medium-grained schist and micaceous (mica rich) quartzite. In the eastern parts, the bedrock is comprised of the Middletown Formation. In general, it is described as dark to light gray gneiss and granofels; hornblende gneiss and amphibolite. Finally, in the central parts, the Clough Quartzite is fingered between the Littleton Formation and Middletown Formation. It is described as a white, medium-grained, well-layered quartzite.

All of the rocks (gneisses, schists, amphibolites, granofels, and quartzites) underlying the site are metamorphic rocks; rocks which have undergone changes as a result of very high pressures and/or temperatures. These changes generally include recrystallization, altered mineral composition, and alignment of elongate minerals. Each rock type will be described briefly below. In "gneisses", thin layers of elongate minerals alternate with layers of more rounded minerals, giving the rocks a streaky or banded appearance. "Schists" are characterized by platy, flaky or elongate minerals (usually mica) that have become aligned to form surfaces of relatively easy parting. Because of their texture, mineralogy and susceptibility to weathering, schists have limited value for dimension (building) stone and construction aggregate. "Amphibolites" are rocks rich in amphiboles, a certain mineral group. They are generally dark colored and contain the amphibole minerals hornblende and plagioclase feldspars as well as micas. "Quartzites" are metamorphosed sandstones that are composed primarily of quartz. They are light colored rocks that are very hard and resistant to erosional processes. The structure of the quartzite beneath the site ranges from thinly bedded to massive. Thick-bedded or massive structure permits quarrying of uniform, large-size blocks suitable for building veneer. Thin-bedded quartzite permits the rock to be split into layers suitable for landscaping i.e., patios, walls, etc. This is largely due to the presence of garnet and mica layers, which are concentrated in layers 1-6 inches apart in the rock. The garnet/mica zones allow the rock to be split into thin layers which have certain attributes for decorative stone uses. As such, the quartzite beneath the site has commercial value for dimension (building) stone and from a quarrying standpoint has the most practical commercial significance of the rock formations beneath the site. The final rock type found on the site are granofels. "Granofels" are similar to the gneisses described earlier except they lack the compositional banding of a gneiss. Gneisses, schists, amphibolites, quartzites and granofels may be interlayered in the rock formations beneath the site. The gneisses, amphibolites and granofels may have some value for construction aggregate but as schistosity (mica minerals) increases in the rock its value will likely decrease. The differences in bedrock types were described mainly for thoroughness of the report but also to show that they differ in commercial value. In this regard, it should also be pointed out that the bedrock (schist, amphibolite, and gneiss) in the eastern parts (east of the unconformity line) may contain sulphur rich minerals. The presence of the sulphur rich minerals such as pyrite and pyrrhotite in the rock may change the physical and chemical quality of water when it comes in contact with freshly exposed quarry rock. Depending upon the amount of sulphur rich minerals in the rock, the potential exists for acid mine drainage problems to affect the aquatic environments of surface water quality on or off-site. It may affect groundwater quality too. If the rock is found to have acid production potential, it should not be deposited or stockpiled near surface water bodies or close to the groundwater table, unless mitigative measures are taken to buffer potentially acid laden water. This will hopefully minimize the chance for adverse water quality changes particularly since the quarry operation is proposed to extend 10 feet below the water table across the 25 acres.

Because of the acid-forming potential of the bedrock in the eastern parts and because present plans indicate that the rock in this area will be quarried, it is suggested that the rock first be evaluated 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. Due to its mineralogy (acid-forming potential) and layers that contain a weathered garnet schist, the bedrock in the eastern parts may pose an environmental risk to local water resources as well as poor construction aggregate. Therefore, its commercial value may be limited.

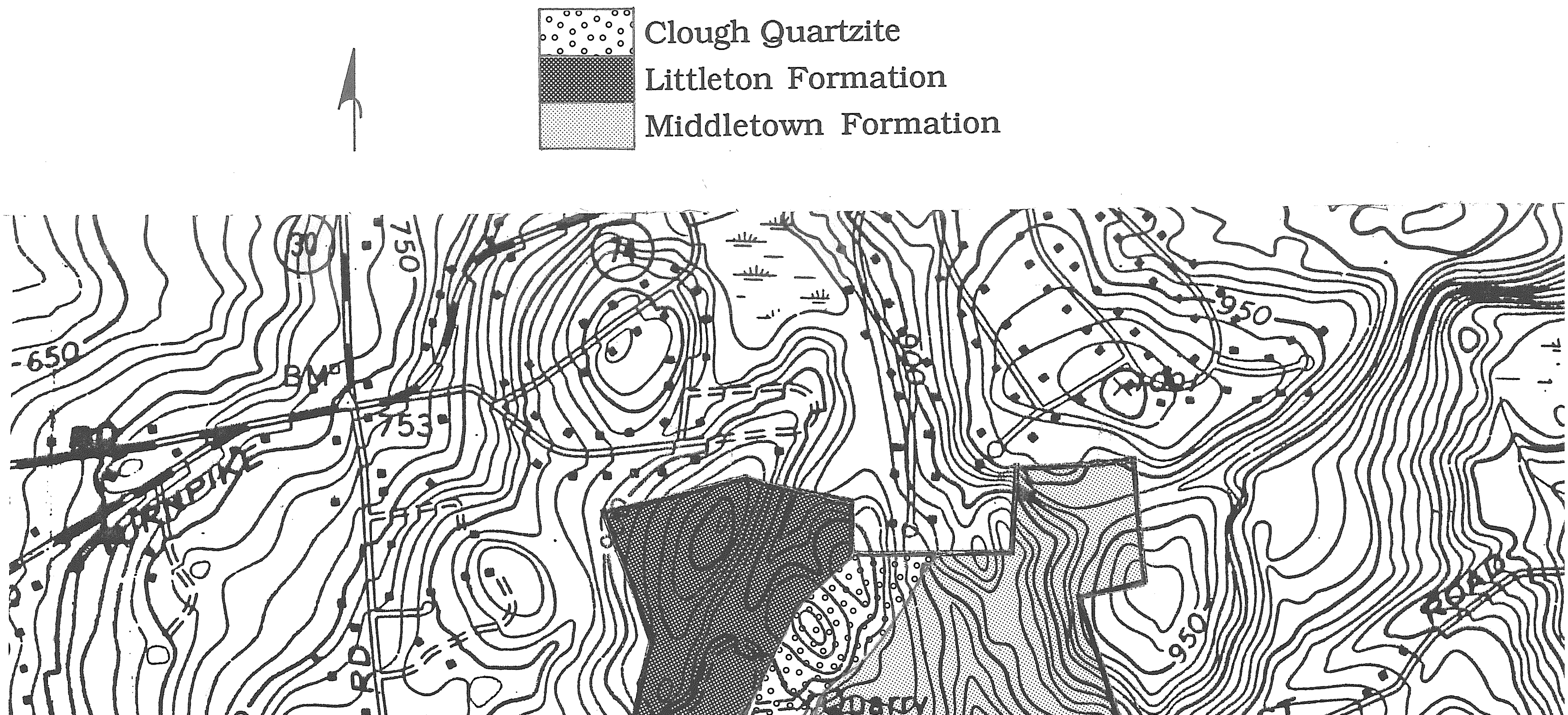
It should also be noted that the mineral, arsenopyrite (FeAsS), is known to occur in the Clough Quartzite in the town of East Hampton, which is southwest of Tolland. Consequently, it may be present in the Clough Quartzite beneath the site. While there is no information to suggest that the presence of arsenopyrite in the rock formation presents an environmental/environmental health concern relative to the quarrying operation, it is suggested that the applicant's geotechnical consultant investigate the occurrence of arsenopyrite in the Clough Quartzite on the site and the conditions under which the arsenic could become mobile in ground or surface water at the site or at locations where the rock material is used.

Town officials asked the Team's geologist whether or not there is a potential radon danger to the site and vicinity due to the quarry operation. It appears that the Midwood Quarry presents no known radon danger. As indicated by the applicant's geotechnical consultant, radon is a natural product of radioactive decay and is continuously being produced. Blasting activities at the quarry may cause some local modifications of rock fracture patterns. It is unknown if these modifications cause significant changes in radon emanation rates within the quarry or radon concentrations in local wells.

Radon that escapes from a quarry or ground surface is dispersed into the air with little health risk unless the radon levels are above the U.S. Environmental Protection Agency action guideline of 4 picocuries/liter.

BEDROCK GEOLOGIC MAP

Scale 1" = 1000'



5. SURFICIAL GEOLOGY

Since no surficial geologic map has been produced to date for the Rockville Quadrangle, the Team's geologist referenced, the Soils Survey - Tolland Connecticut for most of this section of the report. The unconsolidated materials overlying the metamorphic rocks on the quarry expansion site consist mainly of a thin blanket of till, a glacial deposit. It 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 site is sandy, stony and loose. In the quarry expansion area, it is expected that the unconsolidated materials would be mined and used for construction fill material.

According to the site plans, the applicant's soil scientist flagged the wetland soils on the site. Their boundaries were subsequently superimposed onto the site plans. The principal wetland soils on the site parallel the intermittent streamcourses in the northern corner, and in the central and western parts. A ±2.6 acre area of peat and muck occurs north of the pond on the site. The area of wetlands that would be permanently eliminated by the quarry operation was planimetered to be about .05 acres or 2,178 square feet.

Removal of the unconsolidated materials above bedrock prior to rock excavation in the quarry expansion area, will inevitably disturb and mobilize the finer soil particles in the till particularly when the water table is encountered or during periods of precipitation. This activity poses a potential threat of water quality problems to on- and off-site streams. Based on visual observations made during the field walk, it appears that the existing quarry operation presently poses a threat to local surface water resources mainly due to the inadequacy of erosion and sediment control measures but also due to overall poor housekeeping on the part of the quarry operator. If the proposed quarry expansion 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, should provide protection of local surface water resources during clear cutting, removal of unconsolidated materials and active quarrying periods. The installation of silt fences, hay bales, anti-

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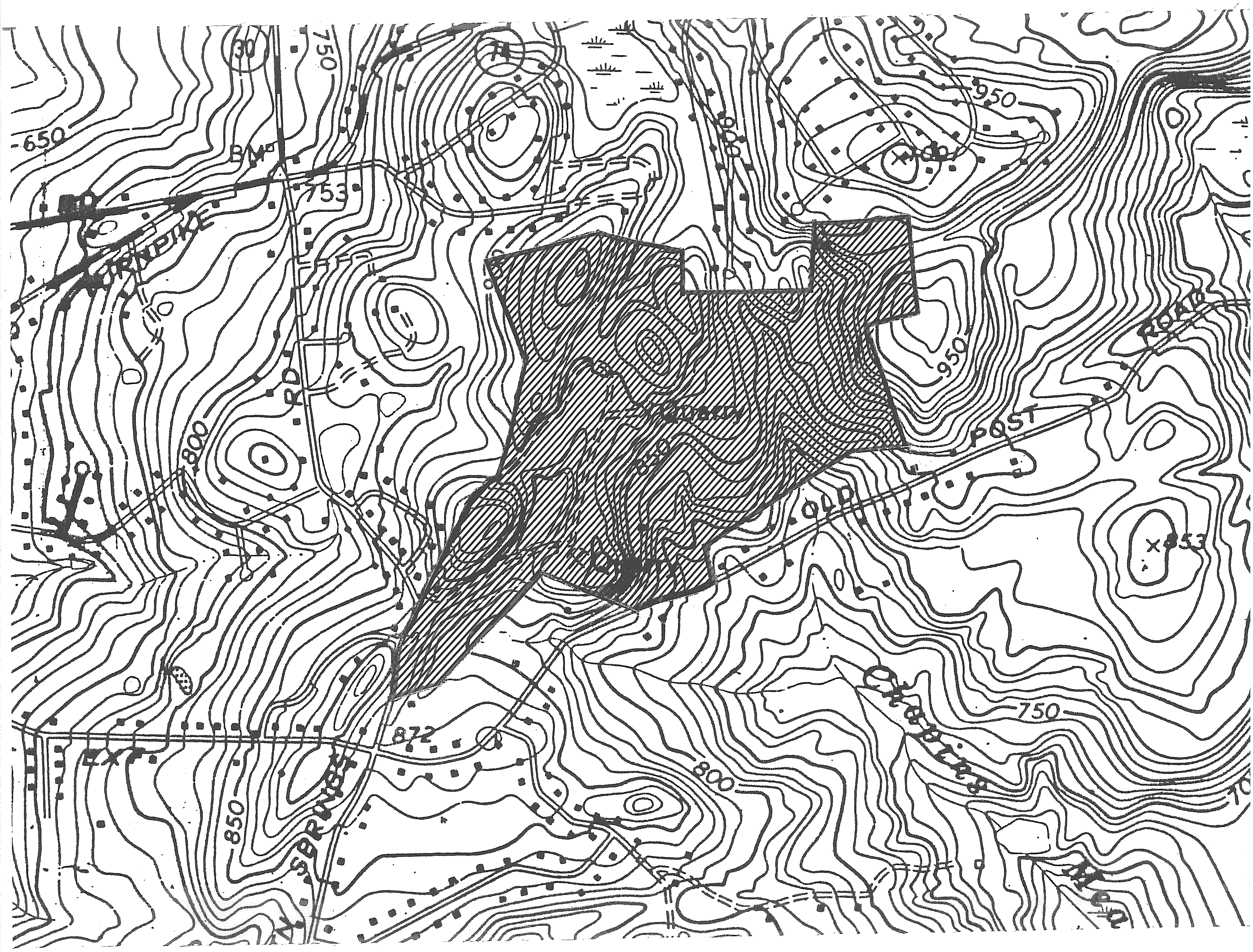
SURFICIAL GEOLOGIC MAP

Scale 1" = 1000'

Till (Generally 10' or less)



6. SOIL RESOURCES

GENERAL SOILS INFORMATION

The information contained in the Soil Survey of Tolland County, CT appears to be adequate for planning purposes. Basic interpretive information for the following map units are attached for inclusion into the report. If the commission requires additional information it is suggested that the applicant retain the services of a qualified private soil scientist to review the information contained in the Soil Survey of Tolland County, CT, examine conditions in the field and provide the commission with a verified map and more detailed interpretive information for the site. Map units within the site boundaries are: CaB, CaC, CrD, HrC, HrE, Lg, Pk, SxB, and SvB.

SOIL DESCRIPTIONS

CaB - Canton and Charlton soils, 3 to 8 percent slopes

This unit consists of gently sloping, deep well drained soils on ridges, hills, and side slopes of glacial till uplands. The areas are mostly rectangular or irregular in shape. Slopes are generally smooth and convex and 200 to 400 feet long. About 45 percent of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. Some areas of this unit consist almost entirely of Canton soils, some almost entirely of Charlton soils, and some of both. The soils were mapped together because they have no significant differences in use and management.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly loamy sand to a depth of 60 inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils, well drained Paxton soils, and moderately well drained Sutton soils. Also included are a few large, nearly level areas and a few areas that have a compact substratum at a depth of 40 to 50 inches.

The water table in these Canton and Charlton soils is commonly at a depth of more than 6 feet. The permeability of the Canton soils is moderately rapid in the surface layer and subsoil and rapid in the substratum. The permeability of the Charlton soils is moderately rapid. Both soils have medium to rapid runoff, have moderate available water capacity.

Instability of some excavations in the Canton soils is the main limitation of these soils for community development.

<u>CaC - Canton and Charlton soils, 8 to 15 percent slopes</u>

This mapping unit consists of sloping, deep well drained soils on ridges, hills, and side slopes of glacial till uplands. Slopes are mainly smooth and convex and less than 200 feet long. The soils of this unit are the same as those described for the Canton and Charlton soils, 3 to 8 percent slopes except for slope gradient. Included with these soils in mapping are a few areas with slopes greater than 15 percent.

Slope is the main limitation of these soils for community development, especially for onsite septic systems. Excavations in these soils are unstable.

<u>CrD - Canton and Charlton soils, 15 to 35 percent slopes, extremely stony</u>

This mapping unit consists of moderately steep to steep, well drained soils on ridges, hills, and side slopes of glacial till uplands. The areas are mostly long and narrow. Slopes are smooth and convex and are mainly less than 200 feet long. Stones cover 8 to 25 percent of the surface. About 45 percent of this unit is Canton soils, 40 percent is Charlton soils, and 15 percent is other soils. Some areas consist almost entirely of Canton soils, some almost entirely of Charlton soils, and some of both. The soils were mapped together because they have no significant differences in use and management.

Typically, the Canton soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown fine sandy loam, gravelly fine sandy loam, and gravelly sandy loam 21 inches thick. The substratum is pale brown gravelly loamy sand to a depth of 60 inches or more.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches.

Included with these soils in mapping are small areas of somewhat excessively drained Gloucester and Hollis soils and well drained Paxton soils. Also included are a few large areas where stones cover less than 8 percent of the surface and areas with a compact substratum at a depth of 40 to 50 inches.

The water table in these Canton and Charlton soils is commonly at a depth of more than 6 feet. The permeability of the Canton soils is moderately rapid in the surface layer and subsoil and rapid in the substratum. The permeability of the Charlton soils is moderate or moderately rapid. Both soils have moderate available water capacity and rapid runoff.

Slope limits the soils of this unit for community development, especially for onsite septic systems. Slopes of excavations in the soils are unstable and the stones on the surface hinder landscaping.

HrC - Charlton-Hollis complex, 3 to 15 percent slopes, very rocky

This complex consists of gently sloping to sloping, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. The areas of this unit are mostly irregular in shape. Slopes are mostly complex and are 100 to 200 feet long. Stones cover 1 to 8 percent of the surface.

This unit is about 55 percent Charlton soils, 20 percent Hollis soils, 15 percent other soils, and 10 percent exposed bedrock. The Charlton and Hollis soils are in such a complex pattern that it was not practical to map them separately.

Typically, the Charlton soils have a thick, fine sandy loam topsoil and subsoil over a sandy loam substratum. The soils are commonly deeper than 60 inches.

The Hollis soils have fine sandy loam topsoil and subsoil from 10 to 20 inches thick over hard, unweathered schist bedrock.

Included with these soils in mapping are small areas of well drained Canton and Paxton soils; moderately well drained Sutton and Woodbridge soils; and poorly drained Leicester soils. Also included are small areas with bedrock at a depth of 20 to 40 inches.

The water table of these soils is commonly at a depth of more than 6 feet. The available water capacity is moderate in the Charlton soils and very low or low in the Hollis soils. Both soils have moderate or moderately rapid permeability and medium to rapid runoff.

The areas of exposed rock and the depth to bedrock in the Hollis soils limit the use of these areas for community development, especially as a building site or as a site for onsite septic systems. The stones on the surface restrict landscaping.

HrE - Charlton-Hollis complex, 15 to 45 percent slopes, very rocky

This complex consists of moderately steep to steep, somewhat excessively drained and well drained soils on hills and ridges of glacial till uplands. Areas of this unit are mostly long and narrow or oval in shape. Slopes are mainly convex and are 100 to 500 feet long. Stones and boulders cover 1 to 8 percent of the surface. This unit is about 55 percent Charlton soils, 20 percent Hollis soils, 15 percent other soils, and 10 percent exposed bedrock. The Charlton and Hollis soils are in such a complex pattern that it was not practical to map them separately.

Typically, the Charlton soils have a surface layer of dark yellowish brown fine sandy loam 5 inches thick. The subsoil is yellowish brown fine sandy loam and sandy loam 20 inches thick. The substratum is light yellowish brown and light brownish gray sandy loam to a depth of 60 inches or more.

Typically, the Hollis soils have a surface layer of dark grayish brown fine sandy loam 2 inches thick. The subsoil is yellowish brown gravelly fine sandy loam 12 inches thick. Hard, unweathered schist bedrock is at a depth of 14 inches.

Included with these soils in mapping are small areas of well drained Canton and Paxton soils; and moderately well drained Sutton and Woodbridge soils. Also included are areas with bedrock at a depth of 20 to 40 inches and a few small areas with slopes of more than 35 percent.

The water table of these soils is commonly at a depth of more than 6 feet. The available water capacity is moderate in the Charlton soils and very low or low in the Hollis soils. Both soils have moderate to moderately rapid permeability and rapid runoff.

The slope, exposed rock, and the depth to bedrock in the Hollis soils limit these areas for community development, especially as a site for onsite septic systems and buildings.

Lg - Ridgebury, Leicester and Whitman soils, extremely stony

This mapping unit consists of nearly level, poorly drained and very poorly drained soils in depressions and drainageways of glacial till uplands. The areas are mostly long and narrow or irregular in shape. Slopes range from 0 to 3 percent and are mainly 100 to 300 feet long. Stones cover 8 to 25 percent of the surface. About 40 percent of this unit are Ridgebury soils, 25 percent are Leicester soils, 15 percent are Whitman soils and 10 percent are other soils. Some areas of this unit will consist of one these soils and other areas will consist of two or three. The soils of this unit were mapped together because they have no significant differences in use or management.

The Ridgebury soils have a seasonal high water table at a depth of about 10 inches from fall through spring. The permeability of the soils is moderate to moderately rapid in the surface layer and the subsoil and slow to very slow in the substratum. Runoff is slow The Ridgebury soils have a moderate available water capacity.

The Leicester soils have a seasonal high water table at a depth of about 10 inches from fall through spring. The permeability of the soils is moderate or moderately rapid throughout. Runoff is slow. The Leicester soils have a moderate available water capacity.

The Whitman soils have a seasonal high water table at or near the surface from fall through spring. The permeability of the soils is moderate or moderately rapid in the surface layer and subsoil and very slow in the substratum. Runoff is slow. The Whitman soils have a moderate available water capacity.

The high water table and slow to very slow permeability are major limitations of the soils of these areas for community development. Steep slopes of excavations in these soils slump when saturated. The stones on the surface restrict landscaping and lawn areas are soggy most of the year.

Pk - Carlisle muck

This soil is nearly level to level and very poorly drained. It is in low depressions on outwash terraces and glacial till plains. Areas of this soil are mostly oval in shape. Slopes range from 0 to 2 percent but are mostly less than 1 percent.

Typically, this soil is black, very dark brown, and dark reddish brown muck to a depth of 60 inches or more.

Included with this soil in mapping are small areas of very poorly drained Adrian, Palms, Saco, Scarboro, and Whitman soils. A few small areas have a thin mineral layer on the surface. Included areas make up about 25 percent of the unit.

The water table of this Carlisle soil is at or near the surface during most of the year. The available water capacity is high. Permeability is moderately rapid. Runoff is very slow, and water is on the surface of some areas from autumn to spring and after heavy rains.

Most areas of this soil are wooded or are covered by marshgrasses and sedges. Most areas do not have adequate drainage outlets. Although this soil supports red maple, ash, and alder, it is poorly suited to woodland production. The organic material will not support heavy equipment, and uprooting is common during windy periods.

The high water table and the low strength of the organic material make this soil generally unsuitable for community development.

<u>SxB - Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony</u>

This nearly level to gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Stones and boulders cover 8 to 25 percent of the surface. Areas are dominantly irregular in shape.

Typically, this Sutton soil has a very dark grayish brown, fine sandy loam surface layer 4 inches thick. The subsoil is yellowish brown, dark yellowish brown, and dark brown, mottled fine sandy loam and sandy loam 29 inches thick. The substratum is olive brown, mottled sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of well drained Canton and Charlton soils; moderately well drained Woodbridge soils; and poorly drained Leicester soils. Included areas make up about 10 percent of this map unit.

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.

The major limiting factor for community development is the seasonal high water table. Onsite septic systems need special design and installation to prevent effluent from seeping to the surface. Foundation drains help to prevent wet basements. Stones and boulders need to be removed for landscaping. Quickly establishing a plant cover and using mulch, temporary diversions, and sediment basins help to control erosion during construction.

<u>SvB - Sutton fine sandy loam, 3 to 8 percent slopes</u>

This gently sloping, moderately well drained soil is on upland glacial till plains, hills, and ridges. Areas are dominantly irregular in shape.

Typically, this Sutton soil has a very dark grayish brown, fine sandy loam surface layer 9 inches thick. The subsoil is yellowish brown, dark yellowish brown, and dark brown, mottled fine sandy loam and sandy loam 24 inches thick. The substratum is olive brown, mottled sandy loam to a depth of 60 inches or more.

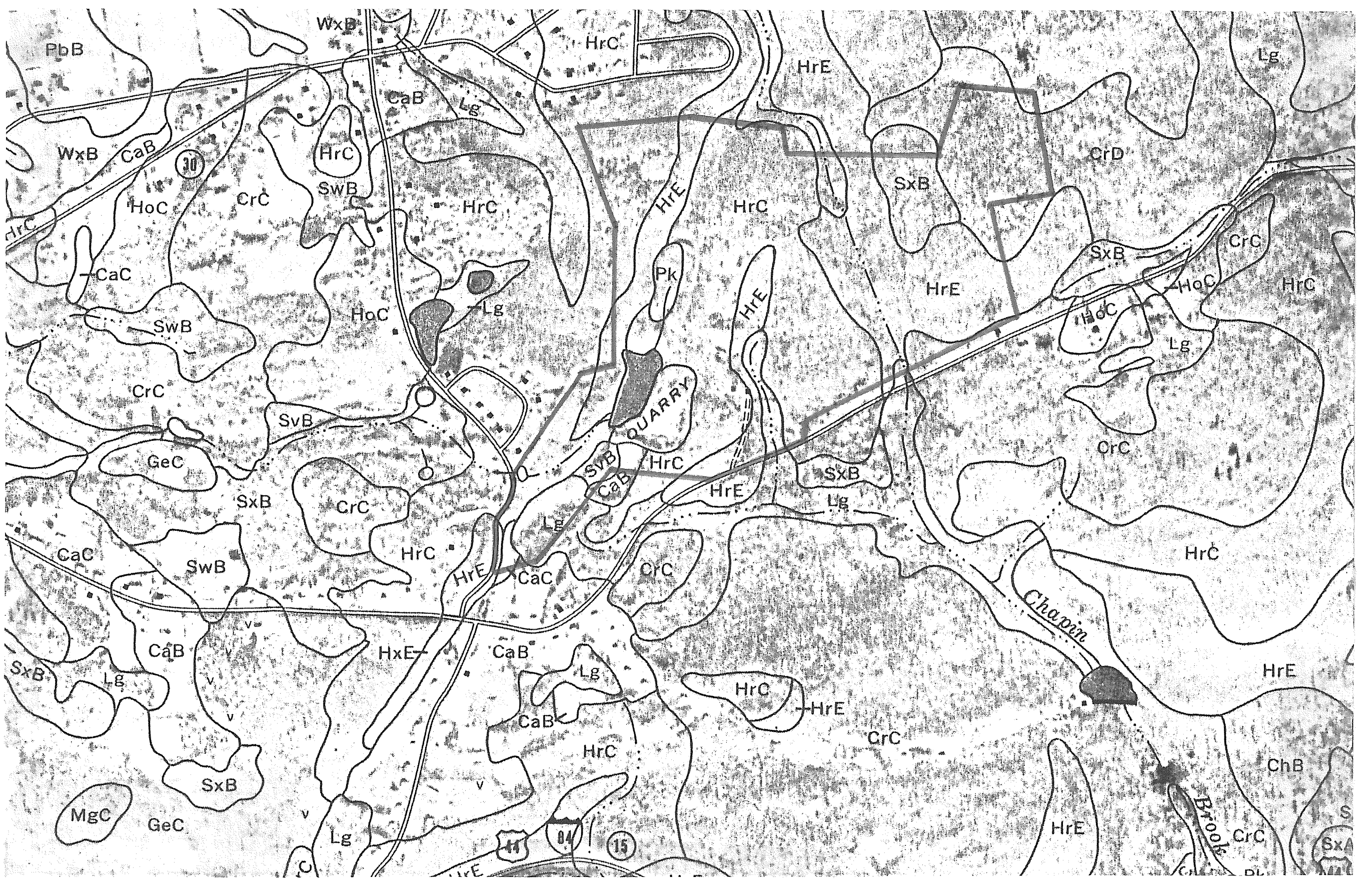
Included with this soil in mapping are small areas of well drained Canton and Charlton soils; moderately well drained Woodbridge soils; and poorly drained Leicester soils. Included areas make up about 10 percent of this map unit.

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 medium. Sutton soil warms up and dries out slowly in the spring.

The major limiting factor for community development is the seasonal high water table. Onsite septic systems need special design and installation to prevent effluent from seeping to the surface. Foundation drains help to prevent wet basements. Lawns are wet and soggy in the fall and spring. Quickly establishing a plant cover and using mulch, temporary diversions and sediment basins help to control erosion during construction.

SOILS MAP

Scale 1" = 1320'



WETLAND BOUNDARY INFORMATION

Wetlands on this site were identified in the field by a soil scientist and located on the plot plan. The soil scientist should review the plans and sign a statement on the map(s) certifying that the information is substantially correct. The certification statement should be similar to the following: "The wetland soils on this site were identified in the field using the criteria required by Connecticut P.A. 72-155 as amended by Conn. P.A. 73-571, Conn. P.A. 87-338 and P.A. 87-533. The boundaries of these soils and of identified watercourses are accurately represented on the plot plan." This statement should be signed by the soil scientist who performed the field work.

If this procedure is followed and discrepancies are found, the Tolland County Soil and Water Conservation District can on request review submitted information for adequacy.

SOIL EROSION AND SEDIMENT CONTROL PLAN

A detailed soil erosion and sediment control plan should be developed and implemented for this site. The plan should be developed using the criteria contained in the Connecticut Guidelines for Soil Erosion and Sediment Control (1985). The Tolland County Soil and Water Conservation District would appreciate the opportunity to review this plan prior to final approval. Due to the magnitude of the project a phasing plan should be developed showing the limit of disturbance during each phase and appropriate measures planned to control erosion and stabilization/vegetation of the site. A checklist should also be developed for the site based on the detailed narrative. The Commission may also want to require the following (or similar) statements on the plan which relate to implementation and inspection of the soil erosion and sediment control plan:

> **1.** The contractor shall secure the services of a certified professional soil erosion and sediment control specialist or professional engineer who shall verify in the field that the controls required by this

plan are properly installed, shall make inspection of such facilities not less frequently than weekly and within forty-eight (48) hours of any significant rainfall, and shall by written report, inform the owner or his agent not less frequently than weekly and the Town Planning and Zoning Commission not less frequently than monthly of observations, maintenance, and corrective activities undertaken. An approved checklist may be used to document the inspection findings.

2. There shall be a pre-construction meeting with the Town soil erosion and sediment control agent, the Town wetlands agent, the contractor and the contractor's professional soil erosion and sediment control specialist to discuss the plan and inspection and report requirements.

OTHER

Wetland areas and watercourse need to be protected from sediment damage. A sediment basin has been proposed to collect sediment and sediment laden stormwater generated during the mining process.

The sedimentation Basin Design Report prepared by Megson and Heagle (10-29-90) was reviewed for adequacy. The following are comments concerning the report:

It appears that the drainage area should be larger than the one outlined on the plan map. The drainage area should include the proposed area of excavation too.

Show the hydrology calculations for the 18" outlet pipe proposed, and the emergency spillway.

Show that the type of protection proposed below the outlets are safe and stable. Use the outlet protection standard in the Guidelines for Soil Erosion and Sediment Control - CT 1985 and size the outlet protection areas accordingly.

A detailed operation and maintenance plan needs to be developed for the basin, stating that sediment will be removed from the basin yearly and disposed of in an appropriate manner.

Operations need to be conducted so that all runoff drains, or is directed toward the basin.

A phasing plan for the total operation should be developed prior to construction of the basin to insure that all sediment laden runoff will enter the proposed basin.

Notes and earth standards need to be submitted as part of the basin design. Stripping the site, constructing a core trench, backfilling and other specifications need to be supplied to insure that the basin is constructed adequately.

VEGETATION ESTABLISHMENT

The terracing details show that rock cuts will be at 1:12 which is a steep rock face. The site will need to be fenced for safety or an alternative slope to the face considered. The earth cuts are proposed to be 3:1 which can be stabilized according to a detailed vegetative plan.

In reclaiming mined lands site-specific planning is needed for the kind of plant materials, soil amendments, mulching, planting and other techniques. Subsoiling, ripping, or other tillage practices improve micro-relief and result in keeping more rainfall on the mined area. The roughened surface also helps in holding seed and seedlings in place until plants are established. Perennials that grow vigorously when young perform particularly well on mine spoil. Rapid growth the first few years is essential in developing a good root system and the ability to withstand spoil instability. These perennials are nitrogen-fixing species adapted to sites low in fertility and organic matter. Most important is their ability to reproduce vegetatively. Either by rhizomes, root stocks, or root suckers they can spread underground and produce new plants throughout the growing season. This underground growth characteristic combined with plant vigor ensures good stand density. As site stability is maintained, surface litter develops rapidly, and with nitrogen added to the spoil a progressive plant community is initiated.

The following species are suitable for vegetative reclamation:

Crownvetch, where adapted, is the best legume for providing early continuous cover at a minimum cost is establishment and maintenance. It requires a pH of 5.5 or more for establishment by seeding.

"Lathco" flatpea (Lathyrus sylvestris) is more acid tolerant than crownvetch, and maintains a pure stand better than most legumes.

Black locust (Robinia pseudoacacia) is the best tree species for providing quick cover and stabilizing a wide variety of sites pH 4.5 or higher.

"Arnot" bristly locust (Robina fertilis) is a thicket-forming shrub that is very acid tolerant.

Vegetated areas need to be maintained. Bare spots must be treated as necessary and reseeded promptly. Weeds, foot and vehicular traffic must be controlled to maintain an adequate plant cover. Many reclaimed areas will require use of lime and fertilizer in substantial amounts, especially during the first few years after reclamation. A detailed written plan of maintenance should be part of the vegetative plan. (Also refer to section 9, **WATER RUNOFF AND REVEGETATION**)

7. HYDROLOGY

The ±122 acre site can be divided roughly into 3 subwatershed areas. The largest of these, about 100 acres, which includes most of the proposed quarry expansion area drains either directly to Chapins Meadow Brook or a nearby tributary. The latter occurs in the east-central parts and is one of the principal streamcourses on the site. Chapin Meadows Brook which has a drainage area of about 1.16 square miles or 742 acres ultimately drains to the Skungamaug River. Wetland area #1 which includes the pond on the site drains to Chapin Meadows Brook. Approximately 14 acres in the northwest corner of the site drains via drainageways to a wetland area north of the site. The outlet for the wetlands, Sucker Brook, routes the water to Shenipsit Lake, a Connecticut Water Company public water supply reservoir. It is estimated that the water supply reservoir services approximately 10,639 customers in Ellington, Tolland, South Windsor and Vernon. Any disturbance of the land in this area due to rock and soil removal activity may cause degradation of surface water quality that may adversely impact water quality in the reservoir. For these reasons, as well as others, consideration should be given not to allow quarrying activity within the area that drains to Shenipsit Reservoir. Finally, at the western limits, approximately 8 acres drains to an intermittent streamcourse that is tributary to Gages Brook.

Except for the portion of the site that drains to Shenipsit Reservoir, the watercourses which occur on the site have not been classified by the Connecticut Department of Environmental Protection (DEP) and, as such, are considered as Class "A" water resources by default. A Class "A" water resource may be suitable for drinking, recreational, or other uses and may be subject to absolute restrictions on the discharge of pollutants, although certain discharges may be permitted. The ±14 acres in the northern parts that drain to Shenipsit Reservoir are designated as a "AA" water resource. This means the resource is an existing or proposed use as a public drinking water supply. It is regulated similarly to an "A" water resource.

Groundwater classification for the site coincides with the surface water classification described in the preceding paragraph. Except for the ±14 acre area that drains to Shenipsit Reservoir, groundwater beneath the site is classified as "GA". This means it is suitable for drinking water without treatment. Groundwater beneath the site that drains to Shenipsit Reservoir is classified as "GAA", which means it is within a public water supply watershed.

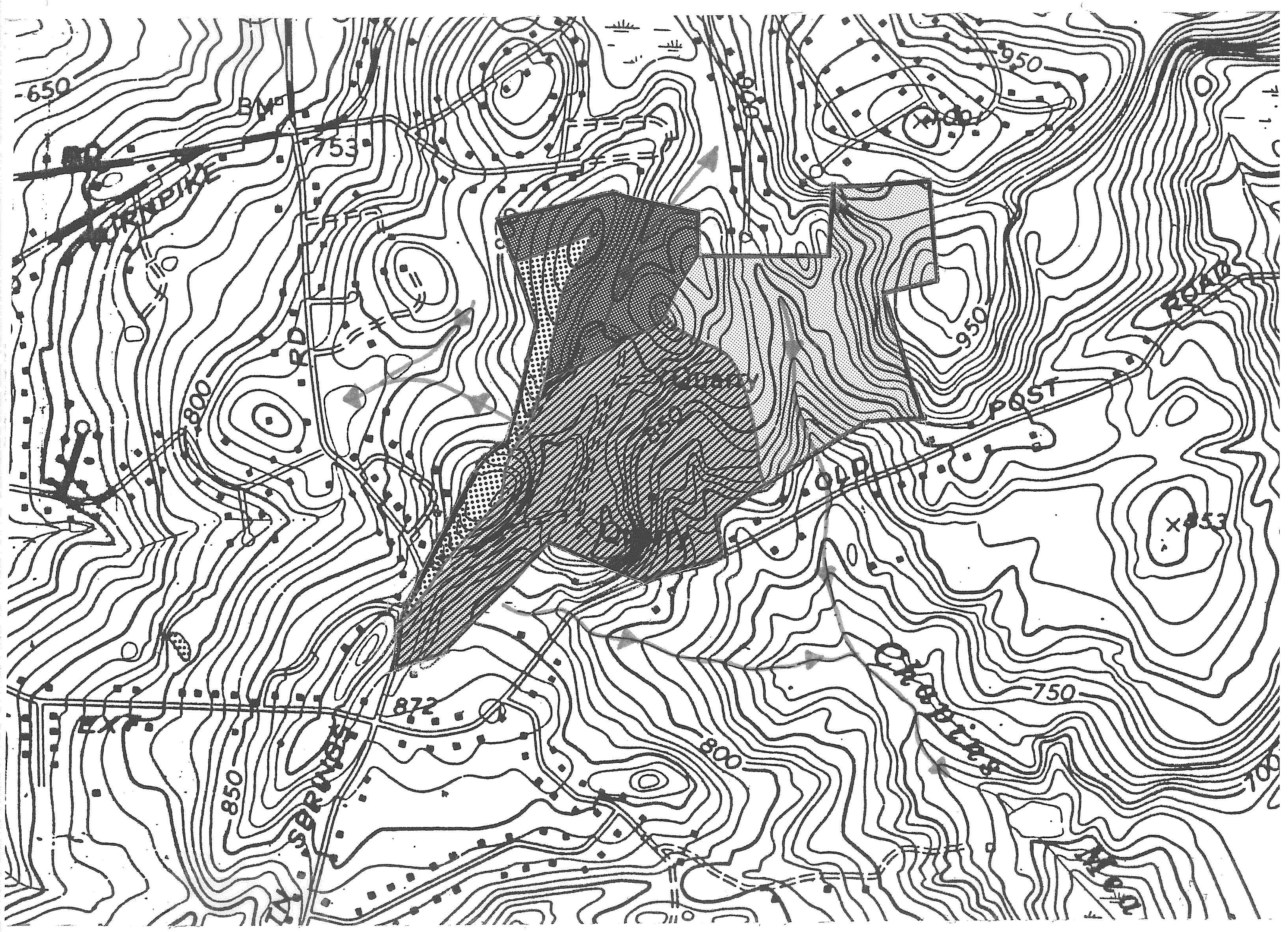
Because off the proposed quarrying operation which will require removal of the vegetative cover/earth materials and because of drainage directing measures likely to be taken, the character of the site and vicinity drainage will be altered markedly. As such, a water management plan should be developed which addresses potential impacts such as flooding and streambank erosion/surface water degradation to on and off-site water resources due to the proposed quarry operation. Unless the phasing plan includes placing unconsolidated soil materials over the final quarry floor, and re-seeding, it seems likely that post-development quarrying activity would result in increased runoff conditions due to the impervious bedrock floor over 25 acres. Provisions should be made to utilize control structures (detention basins) to avoid net increases in peak flows discharging from the site. Close examination of the culvert passing under Old Stage Road is warranted. The water quality of runoff from the site will also need to be maintained during the quarrying activity by proper use of sedimentation and erosion control measures.

Present plans indicate that a ±1 acre area in the northern parts, which is encompassed by the drainage area to Shenipsit Reservoir will be quarried for thin-bedded quartzite. Following the removal of the rock the one acre area would be diverted to the Chapin Meadows Brook drainage area. There is a possibility that this activity may be subject to a diversion permit per Sections 22a-365-378 of the Connecticut General Statutes. Robert Gilmore of the Department of Environmental Protection Water Resources Unit should be contacted at 566-7220 to discuss this potential permit.

WATERSHED BOUNDARY MAP

Scale 1" = 1000'

- ±14 acres that drains to Shenipsit Reservoir
- Portion of site that drains to Gages Brook
- Portion of site that drains to Chapins Meadow Brook tributary
- Portion of site that drains directly to Chapins Meadow Brook
- Streamcourses showing direction of flow



8. BLASTING CONCERNS

According to the applicant, the quarrying methods to be used at the Midwood Quarry includes blasting 4 to 5 times per year.

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 be considered due to the site's proximity to residential properties.

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 groundwater 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.

All blasting 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-blasting 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-blasting survey radius) should be strongly considered. As noted earlier, 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. Although the applicant's geotechnical consultant indicates that little or no changes to the local water table will occur as a result of the proposed quarry operation, monitoring of the water table during active quarrying is warranted. 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. 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 responses 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. 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 expansion area. This might be accomplished by including a statement on the site plan.

In the vicinity of the site, pre-quarry expansion 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. WATER RUNOFF AND REVEGETATION

The techniques and recommendations of this review will minimize erosion and sedimentation potential by retaining some vegetation, replacing lost vegetation and controlling storm runoff with good engineering practices. Trees, individually and as forests, provide a positive influence on air quality as they convert carbon dioxide to oxygen, collect airborne particulate pollutants and can act as a visual screen. Tree roots also hold forest soils in place as forests contribute little to stream sedimentation.

When highly absorptive forest soils are disturbed, overland flow of water can increase because the sponge-like effect of the litter and humus layer is lost. However, additional systematic clearing for quarry operations will not dramatically increase run off over what it is now given that proper engineering techniques are utilized to accommodate the 25 year storm. Temporary soil stabilization methods using grass and hay mulch immediately after forest clearing will minimize erosion and sedimentation potential. Proper erosion and sedimentation control procedures should include the correct installation of hay bales and silt screens in advance of a substantial rain event. Also, forested buffers should be 50-100 feet wide along streams and wetlands. The steeper the slope adjacent to the wetland the wider the buffer should be to absorb any overland waterflow.

Trees also help to reduce air and noise pollution. Leaves and branches move to deaden and mask sound. Pubescence on leaves trap and hold dust particles. A 300 - 500 foot wide buffer of trees around the outer quarry perimeter will act as a noise screen. Conifers planted on the perimeter (white pine and/or hemlock) will grow up over the years to block sight lines. Islands of planted conifers will add to the aesthetics of the forest and provide wildlife cover. An occasional thinning of poor quality trees for fuelwood or logs will increase sunlight to planted conifers and result in faster growth. It is also important to have good understory growth to create two layers of vegetation, one 80 feet tall of larger diameter trees, and one 20-40 feet tall, with several hundred stems per acre, to maximize the effects of a visual/sound barrier.

As areas of the quarry are completed and graded for reestablishing vegetation, grass and hay mulch should be applied as soon as possible. Grass germinates best prior to May 15 and after August. Mulch will hold soil prior to seed germination.

It is possible to plant white pine at 8' by 8' spacing in as little as 6 inches of low fertility soil. However, in this area natural grass seeding will occur to help restoration. Gray birch and aspen are also present on site and will occupy exposed soils within one growing season with several thousand stems per acre. They will actually serve to stabilize soils better than planted pine. The birch will seed in fast with more trees per acre and crows out the pine in 5 - 10 years.

Individual trees may be planted to grow as shade trees. Both conifers and deciduous can be planted as long as the site is suited to the individual tree. Flowering trees are also a possibility around the pond. If settling basins are installed wildlife fruiting shrubs may be planted to increase wildlife habitat.

Trees have value in reducing noise and air pollution and controlling runoff. They also provide wildlife habitat, aesthetic enjoyment and wood products. The forest in this area can fulfill these amenities. There is sufficient vegetation to protect against runoff and reduce noise and air pollution for up to a 50 acre quarry.

10. WILDLIFE RESOURCES

HABITAT DESCRIPTION

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 witchhazel, elderberry, grape, blackberry and hardwood regeneration. Very few mast producing trees are present on the site. The area appears to have been logged in the last five years.

Wildlife frequenting such habitat types include deer, fox, raccoon, gray squirrel, woodpeckers (pileated, hairy and downy), ovenbirds, scarlet tanagers, black-throated blue and green warblers, barred owls, broad-winged hawks and various non-game species such as porcupines, shrews, voles and snakes.

IMPACTS OF DEVELOPMENT

The site appears limited for use by turkeys now and in the past due to land fragmentation in the area. White-tailed deer will continue to inhabit the area. The quarry development may temporarily displace and disrupt some wildlife species.

11. FISH RESOURCES

Site Description

Midwood Quarry is located on a 122 acre site in the west central region of Tolland, Connecticut. Most of the parcel drains to the south into Chapins Meadow Brook which later forms Metcalf Brook, a tributary of the Skungamaug River in the Thames River drainage Basin. A smaller area in the north western portion of the parcel drains into Gages Brook, a tributary of Tankerhoosen River in the Connecticut River Drainage Basin.

Preliminary site plans entitled "Excavation Plan Prepared For Burgundy Hill Associates Tolland Connecticut" (dated 8-1-90) were reviewed. It was later reported to the Team fisheries biologist that contrary to the site plan, the area of the proposed excavation is to be reduced from 42 to 25 acres and the amount of material from 2,575,000 cubic yards to approximately 1,250,000 cubic yards. Since one area that was previously slated for mining but later withdrawn is that portion that drains into the Connecticut Basin, no further discussion of Gages Brook or its watershed will take place and no discussion of Sucker Brook and it's watershed, which will be affected by the ±1 acre land area that is proposed to be quarried and graded, will take place since the Team fisheries biologist was not made aware of this change in the plans.

Aquatic Resources

Chapins Meadow Brook originates within the project parcel as do its two headwater tributaries.

The westernmost stream begins at the quarry access road at the outlet of the quarry pond. The quarry pond was constructed around 1940, has a surface area of approximately 1.5 acres and is presumed to be host to warmwater fish species such as largemouth bass, various sunfish species such as bluegill and pumpkinseed, golden shiner and brown bullhead. The mining operation currently has only a minimal impact on this stream and pond due to the close proximity of the access road and associated windblown dust. This small stream will probably not support a significant fish population year round.

The central stream (hereafter known as the second stream) is the smallest of the three and it is currently sustaining major degradation due to the existing quarrying operation. This stream appears to be intermittent and is not expected to support fishes on a year round basis. The lower reaches of this stream are probably colonized seasonally by fishes from Chapins Meadow Brook.

The easternmost and largest stream is Chapins Meadow Brook. Chapins Meadow Brook is a high quality coldwater stream that appears to support a diversity of stream fishes. The stream was observed near Old Post Road as was a 500 foot segment just upstream of Chapins Pond, a two acre flow-through pond approximately 0.5 miles downstream of Old post road. Both of the two tributary streams enter Chapins Meadow Brook upstream of Chapins Pond. Chapins Meadow Brook contains a mixed substrate and has a good pool to riffle ratio. The stream also enjoys a high degree of shading since most of it courses through undeveloped woodland.

Species expected to inhabit this stream include tessellated darter, native (wild) brook trout, longnose dace, blacknose dace, American eel, fallfish, common shiner and white sucker. Downstream areas impounded by beavers or man would be expected to contain species more typical of slow moving streams or warmwater ponds such as brown bullhead, golden shiner, chain and or grass pickerel, and various species of sunfish and largemouth bass. The Skungamaug River into which Chapins Meadow Brook ultimately flows is an important trout stream which is annually stocked by the Department of Environmental Protection Inland Fisheries Division with nearly 5,000 adult size (9-12") brook, brown, and rainbow trout.

The portion of Chapins Meadow Brook within the project site is currently unaffected by the mining operation. Areas of Chapins Meadow Brook downstream of its confluence with Second Stream may potentially be degraded by sediment from the project site.

Project Impacts

Soil erosion and sedimentation of watercourses can be a major source of stream degradation. The second stream is currently experiencing degradation from siltation that is direct result of the quarrying operation. Some unusual erosion and sedimentation control devices have been employed at this site but they appear to be inadequate as witnessed during the site inspection. A serious deposition of fines is currently contained within the riparian wetland area and stream channel immediately downslope of the quarrying operation. Sediment from this project was also evident within the stream channel at Old Post Road. Although small amounts of fine sands were observed within Chapins Meadow Brook near Chapins Pond, it is not believed that the silt load within the second stream has been transported that far yet. It is expected that over time, much of the sediment within the second stream will be transported to and ultimately degrade Chapins Meadow Brook.

Excessive sediment deposition can damage aquatic ecosystems in the following ways:

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

(B) Sediment reduces the amount of usable habitat required for spawning purposes. Excessive fines can clog spawning gravels causing fish to disperse to other areas.

(C) Sediment reduces the abundance of aquatic insects. Since aquatic insects are important food items in fish diets, reduced insect populations levels will adversely affect fish growth and survival as fish expend excess energy locating prey.

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

(E) Turbid waters impair normal gill function and feeding activities of fish. High concentrations of sediment can cause mortality by clogging gills.

(F) Sediment encourages the growth of filamentous algae and nuisance proportions of aquatic weeds (CT DEP 1989). Eroded soils contain plant nutrients such as phosphates and nitrates. Once introduced into aquatic habitats, these nutrients function as fertilizers resulting in accelerated plant growth.

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

Wetlands may become degraded due to quarry runoff. These wetlands serve to protect stream water quality by: **(1)** controlling flood waters by acting as a water storage basin, **(2)** trapping sediments from natural and man-made sources of erosion, and **(3)** filtering out pollutants from runoff before they enter watercourses. The riparian wetland area downslope of the quarrying operation is currently being degraded to the point that the wetlands may soon lose the ability to carry out these functions.

Recommendations

Effective erosion and sedimentation controls must be properly installed and maintained at this site to prevent further degradation to the aquatic resources within the Chapins Brook Watershed. It is inexcusable that the erosion and sedimentation that has already damaged the second stream has occurred when there exists on site a supply of materials that can be used in erosion control. One half inch to three quarter inch stone and smaller materials such as pea stones can be used to make temporary berms to trap sediments from overland flow. These materials are available on site as a result of periodic rock crushing activities. A stock pile of material should remain on site to be used as a backup if the primary erosion and sedimentation devices fail.

The site plan for this operation should not be approved until a certified erosion and sedimentation control plan has been accepted by the Town. Such a plan must contain provisions for bonding or other such mechanisms that can be employed to ensure proper installation, maintenance, and inspection of these devices.

Further expansion at the quarry site should initially commence in a northerly direction. In addition, rock crushing and other intensive operations should occur further away from the wetland area than is currently taking place. It is recommended that at the minimum, a 100 foot vegetated buffer zone be maintained along the wetland boundary of all streams and riparian wetlands. Vegetated buffers help prevent damage to wetlands and stream ecosystems that support diverse fish and aquatic insect life . These buffers will retain silt from surface runoff and assimilate pollutants before they can enter and damage wetlands and streams. By relocating access roads and bases of operation at this site, it should be relatively easy to effect an appropriate buffer at this site. This buffer, complete with appropriate grades (as low as is possible) and plantings should also be shown on the site plan. This will minimize future degradation to the aquatic resources of the second stream and the entire Chapins Meadow Brook Watershed.

Bibliography

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

12. PLANNING CONCERNS

EXISTING CONDITIONS

The site is currently being utilized as a rock and gravel operation with an on-site processing facility. It is zoned residential and the land uses surrounding the site are primarily residential single family homes.

The Tolland zoning regulations do not permit processing operations except as existing non-conforming uses. If noise is a problem on the site, the DEP has a Noise Control Unit (566 -7494) and Noise Control regulations exist. Sand and gravel processing operations are covered under these regulations.

RELATIONSHIP TO REGIONAL PLAN OF DEVELOPMENT

The Regional Plan Policy statements under Land Use promote the protection of aquifer and water supply watershed areas in order to provide for the long-term supply needs of the region. The Plan would not support any operation which would adversely affect any water supply source. Adequate buffer areas should be established and enforced to prevent contamination of stormwater runoff in the watershed.

Also, under Land Use, the Plan promotes the preservation of unique man-made features of historic, cultural or educational significance. The preservation of the garnet mine as well as public sharing of historical data regarding the mine is encouraged.

RECOMMENDATIONS

A "phasing plan" complete with limits of disturbance should be devised by the developer to minimize disturbed areas and to steadily reclaim areas as mining operations are completed. The developer should also generate a master planting plan for the site as a whole; native plantings should replace those removed;

How will the site be utilized after the mining operation is completed? Answering this question in some fashion will assist the Commission in evaluating how the site should be restored, what slopes are acceptable and how much planting is needed;

Topsoil should not be removed from the site. It should be stored on-site to be used in the reclamation;

Ideally, blasting should be done while children are in school to minimize the danger of this activity;

If mud tracking onto the public road becomes a nuisance, require that a "construction pad entrance" of crushed stone be created and maintained at the point where the private road meets the public street or require that a tire washing area be installed;

A gate or other suitable barrier should be installed at the entrance of the site to prevent uncontrolled public access;

Adequate buffer areas should be established and enforced to prevent contamination of storm water runoff in the watershed.

The preservation of the garnet mine as well as public sharing of historical data regarding the mine is encouraged.

The developer should submit erosion and sedimentation control plans and submit progress reports on their maintenance to town officials. In this way, the best use of staff time will be for "spot checks" to determine compliance.

Zoning regulations regarding excavation operations from other Capitol Region towns have been included in the **APPENDIX** and it is hoped that these may be helpful to the Town of Tolland.

13. ARCHAEOLOGICAL REVIEW

A review of state maps and files indicates no prehistoric sites in the proposed project area. However, this area may prove favorable for undiscovered rockshelter occupations. Outcroppings of bedrock providing a natural ledge or wall to camp against were often used by Indians and colonialists as a means of shelter during hunting, fishing and gathering trips. While most of the natural topography has been altered by previous mining operations, there are undisturbed areas that should be explored by an archaeologist prior to any blasting.

The quarry, which has been in operation since the 1930's, has an interesting history. Most notably, the mine provided stone material for the construction of the fireplace in President Eisenhower's home at Gettysburg, Pennsylvania. The Eisenhower home is on the National Register of Historic Places and is visited by thousands of tourists every year. Locally, the tower which stands in the center of the town of Rockville was carved out of stone from the Midwood Quarry.

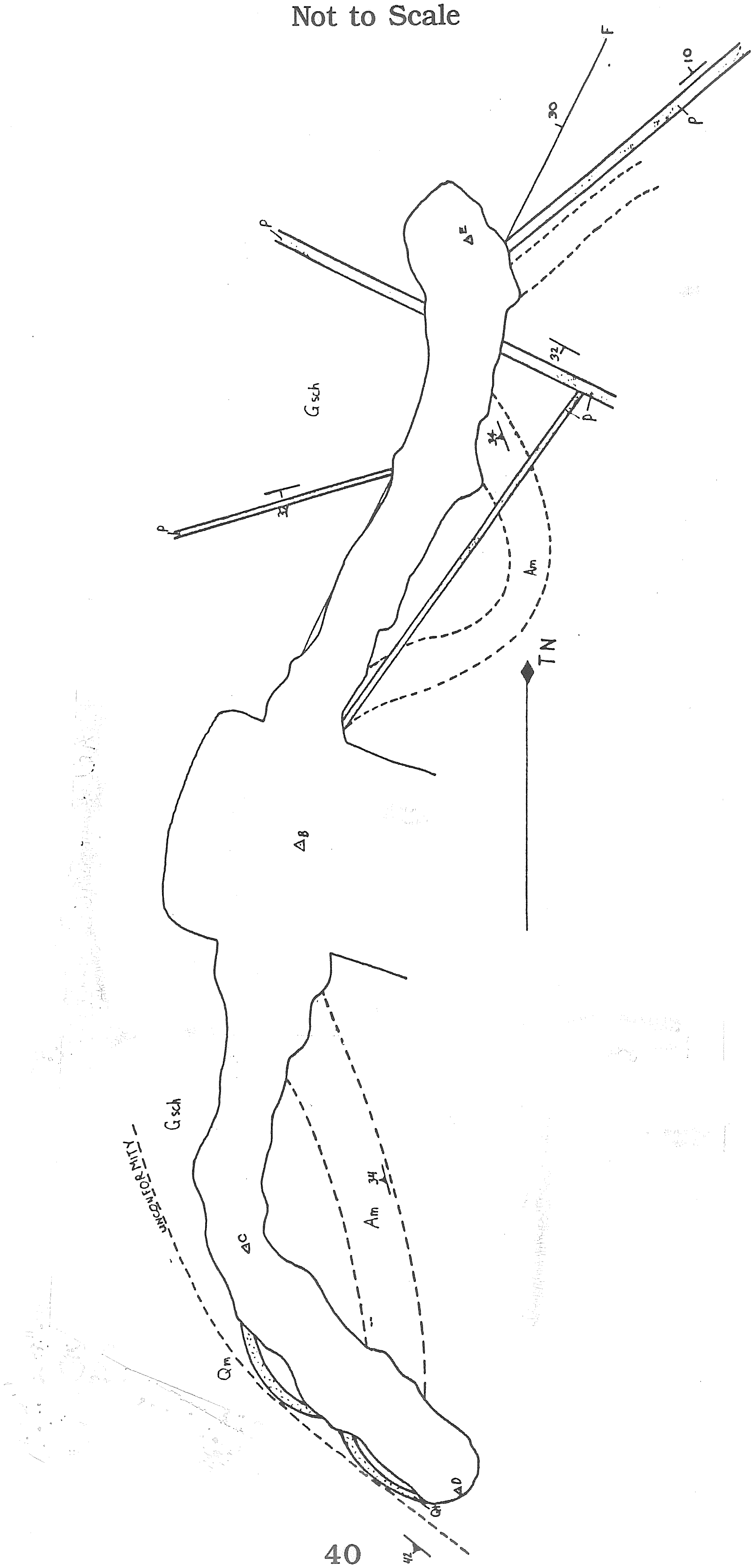
The two original shafts of the garnet mine are still preserved (See map). These shafts extend for over sixty and fifty feet respectively and are a fine example of early mining technology. They offer the industrial historian and archaeologist an opportunity to explore the development of the mining process in our state. Connecticut is currently listed as one of the seven leading mining states in the nation. Few of our residents are aware of the rich mining history in Connecticut, and the Midwood quarry could serve an important educational function because of the preservation of the garnet shafts. The University of Connecticut Summer Geological Field School has utilized the quarry area for the past several years as an outdoor laboratory to train future generations of geologists. The Town of Tolland's educational system might also take advantage of this resource in teaching the early industrial history of the community.

Based on the above information, the Office of State Archaeology recommends the creation of a buffer zone around the area of the quarry itself in order to preserve its integrity and availability as a historical and educational resource. They are aware that safety precautions must be considered in maintaining the open garnet mine shafts. It is suggested that fencing be put around the area to restrict access during operations.

In summary, the project area contains undisturbed ledge outcroppings that may have been used as rockshelter camp sites by migrating groups of prehistoric Native Americans. These areas should be tested prior to any blasting activities. In addition, the preservation of the old garnet mine shafts and the history of the quarry are cultural resources the Town of Tolland could use for educational purposes. It is recommended that the historic remnants of the quarry be maintained and a preservation buffer be established to ensure its continued integrity.

GEOLOGIC SURVEY OF GARNET MINE

Not to Scale



Appendix

For Appendix Information please contact
the ERT Office at 860-345-3977

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.