# SAMUEL HILL SUBDIVISION

## COLUMBIA, CONNECTICUT

### FEBRUARY 1989

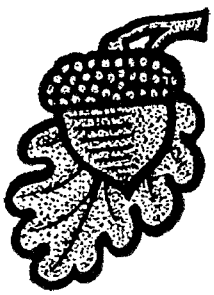
## EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM REPORT

EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

# SAMUEL HILL SUBDIVISION

## REVIEW DATE: JANUARY 5, 1989

## REPORT DATE: FEBRUARY 1989




EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

EASTERN CONNECTICUT ENVIRONMENTAL REVIEW TEAM
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# ENVIRONMENTAL REVIEW TEAM REPORT
# ON

# SAMUEL HILL SUBDIVISION
# COLUMBIA CONNECTICUT

This report is an outgrowth of a request from the Columbia 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, January 5, 1989. Team members participating on this review included:

| | | |
|---|---|---|
| *Nick Bellantoni* | *State Archaeologist* | *CT Museum of Natural History* |
| *Barbara Buddington* | *Senior Planner* | *Windham Regional Planning Agency* |
| *Kevin DesRoberts* | *Wildlife Assistant* | *DEP-Eastern District* |
| *Steve Hill* | *Wildlife Biologist* | *DEP-Eastern District* |
| *Gerald Lang* | *Hydraulic Engineer* | *USDA-Soil Conservation Service* |
| *Brian Murphy* | *Fisheries Biologist* | *DEP-Eastern District* |
| *Joe Neafsey* | *District Conservationist* | *USDA-Soil Conservation Service* |
| *James Parda* | *Forester* | *DEP-Eastern District* |
| *Elaine Sych* | *ERT Coordinator* | *Eastern Connecticut RC&D Area* |
| *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 subdivision plans and drainage calculations. The Team met with, and were accompanied by the Town Planner, members of the Inland Wetlands Commission, the Inland Wetlands Agent, the developer and his engineers. 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 subdivision.

If you require additional information, please contact:

Elaine A. Sych
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# 1. SETTING AND LAND-USE

The proposed subdivision site, about 70 acres in size, flanks the northeast side of Chestnut Hill in eastern Columbia. The site is located on the east side of Route 87 just over two (2) miles south of Columbia Center. The Ten Mile River forms the eastern boundary of the site.

The irregular shaped parcel of land is located in a RA-2 zone, which permits single family housing at a minimum lot size of 50,000 square feet for front lots. Rear lots require 100,000 square feet. Two hundred feet of frontage is required for the 50,000 square foot lots, while 20 feet of frontage is required for the rear lots. The Town requires a 75 foot setback (buffer zone) between septic systems, buildings, etc., and regulated wetland areas.

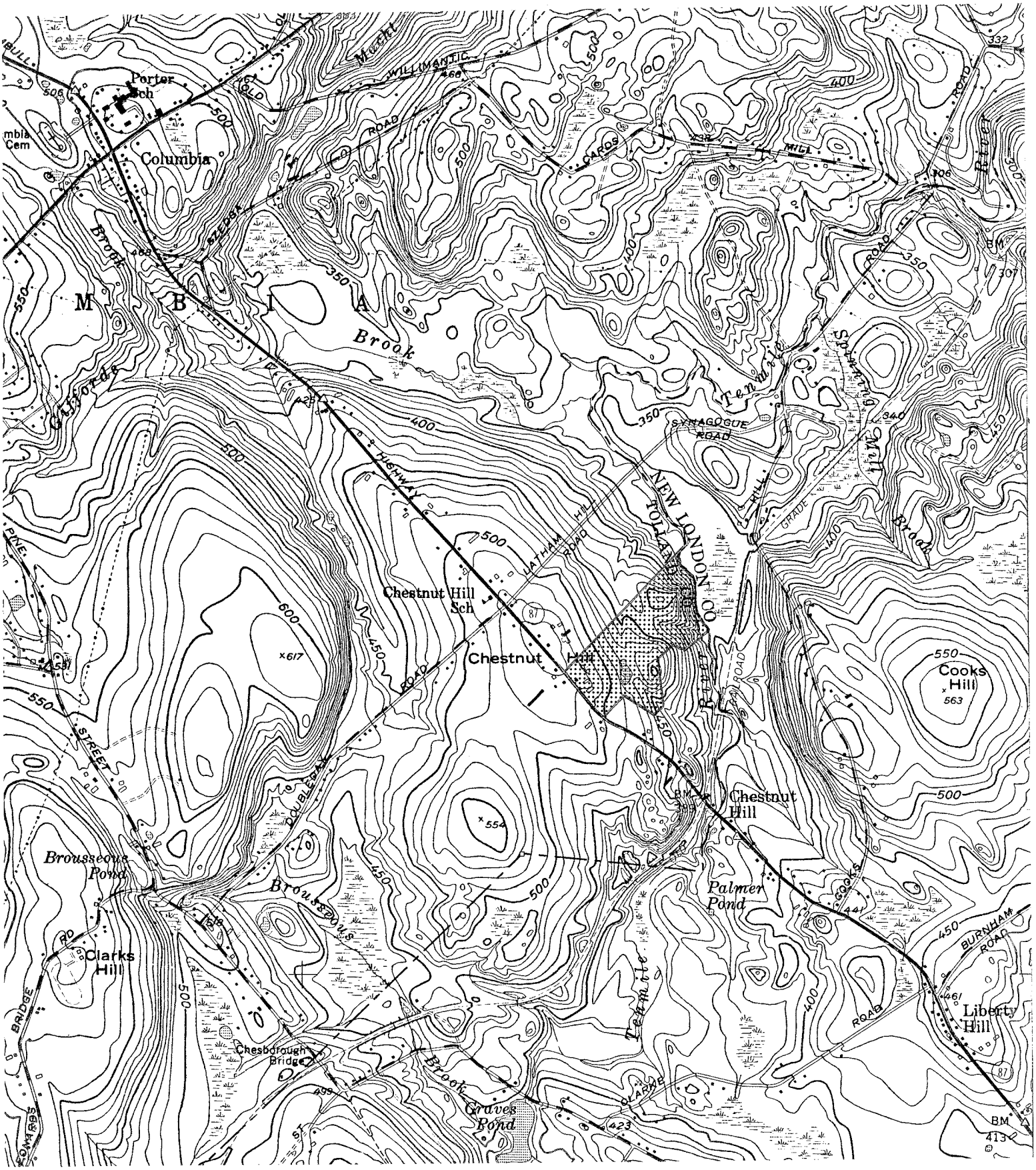
The site and area have historically been used for agricultural and residential purposes. A review of air photos of the area dating back about 50 years indicates that there has been a decrease in actively farmed land, an increase in forested land and an increase in residential density. It should be noted that the configuration of the farm fields on the site (western section) have not changed very much in the past 50 years. The eastern half of the site is covered by a second growth, hardwood forest.

The site is characterized by terrain which slopes gently to steeply to the Ten Mile River. The steepest slopes occur at the eastern limits. Site elevations range from about 530 above mean sea level on Lot #1 to about 350 feet above mean sea level at the Ten Mile River. This represents a difference of approximately 180 feet.

## LOCATION MAP

SCALE 1" = 2000'

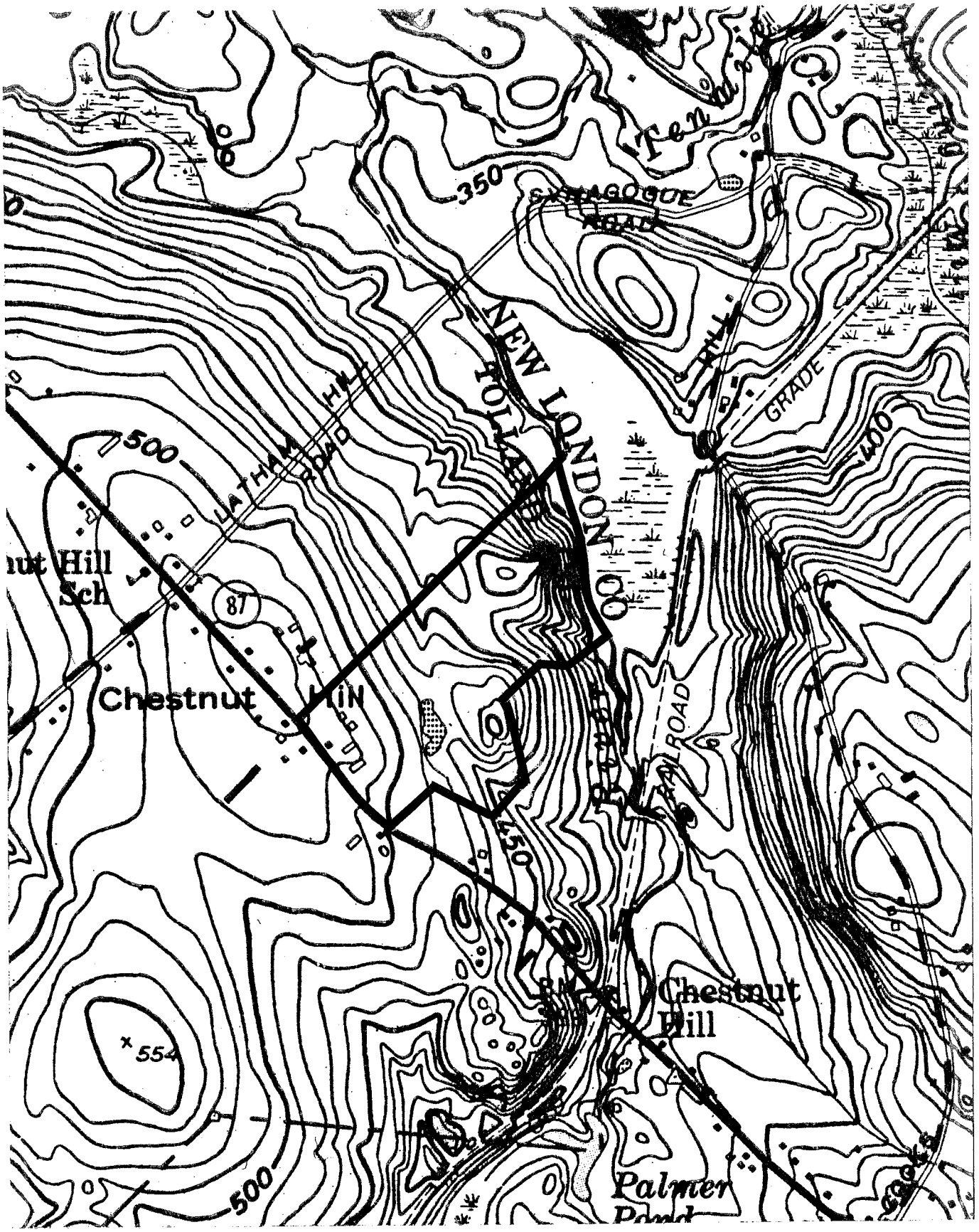
APPROXIMATE SITE LOCATION



## TOPOGRAPHY

SCALE 1" = 1000'

APPROXIMATE SITE BOUNDARY



# 2. BEDROCK AND SURFICIAL GEOLOGY

According to the bedrock geologic map for the Columbia quadrangle (GQ-592, by G. Snyder), bedrock underlying the entire site is comprised of the lower member of the Tatnic Hill Formation. The rocks are described as a medium to coarse grained, gray-brown schist composed of the minerals biotite, garnet, sillimanite and kyanite. The rocks outcrop as continuous ledges throughout the eastern portions of the site. It should be noted that other subunits of Tatnic Hill Formation may be interbedded in the rock unit described above.

The bedrock beneath the site has been subjected to folding and doming (uplifted). As a result of this activity, it is likely that upper parts (100-300 feet) of the bedrock surface are fractured and weathered. According to deep test hole information for subsurface sewage exploration shown on the subdivision plan, decomposed ledge rock was encountered in several deep test holes, which verifies that the upper parts of the bedrock surface are weathered. No major faults have been identified in the vicinity of the site.

Most homes in Columbia rely on drilled wells that tap the underlying bedrock aquifer. Present plans indicate that the homes in the proposed subdivision will be served by individual on-site wells that tap the underlying bedrock aquifer. Of course, this assumes that the bedrock beneath the site is fractured and capable of transmitting groundwater to a well.

Overlying bedrock across the site is a glacial sediment called till. Till is a non-sorted glacial deposit consisting of rock particles of widely varying sizes and shapes. The texture of the till on the site varies from sandy, stony and loose in the eastern half of site to silty non-stony and compact in the western parts. The latter variety of till is characterized by a relatively shallow "hardpan" layer that develops below the weathered or rooted surficial soil zone. Because the "hardpan" layer characterizing the soils in the western parts is quite compact, it has a low vertical permeability. During the wetter times of the year the more permeable soil zone above the "hardpan" layer often becomes saturated with groundwater, resulting in a seasonally high water table. The seasonally high

water table condition will be a hindrance in terms of constructing septic systems, house foundations and roads and will require careful planning and engineering. The till soils in the eastern parts are closer to the bedrock-surface (generally five feet or less) than in the western parts.

Overlying the till soils, mainly in the interior sections of the site and paralleling streamcourses in the area, are regulated inland-wetland soils. The wetlands were delineated by John Ianni, a certified soil scientist. According to the Soil Survey for Windham County, the area of regulated soils have been identified as Lg (Leicester, Ridgebury and Whitman very stony, fine sandy loams). The soils comprising this group would be expected to have seasonal high water tables, which are usually associated with watercourses. These areas are subject to frequent flooding particularly during the wet time of the year. These wet conditions make construction of most types difficult. It seems likely that these wooded, swampy areas would have good flood control and sediment retention attributes. The wetland pockets are drained by a narrow streamcourse that transports surface water to the Ten Mile River.

The project calls for three wetland road crossings of ±170 feet, ±30 feet and ± 120 feet and one driveway crossing of ± 25 feet. Additionally, a section of the proposed interior road will follow an existing farm road, which is located between the wetlands area in the interior sections and the man-made pond on the site.

Because this activity affects inland-wetland soils, it is regulated under Public Act 155. As a result, any activity which involves modification, filling, removal of soils, etc., will require a permit and ultimate approval by the Columbia Inland-Wetlands Commission. In reviewing a proposal, the Commission needs to determine the impact that the proposed activity will have on the wetlands. If the Commission determines that the wetland is serving an important hydrological or ecological function and that the impact of the proposed activity will be significant, they may deny the activity altogether or , at least, require measures that would minimize the impact. The applicant's engineer should include information on the site plan such as: (1) amount of fill to be placed on regulated soils; (2) the extent of fill lines; and (3) type of fill

material to be used. This information will greatly help Commission members in their decision making process.

Wetland road crossings are feasible, provided they are properly engineered. Provisions should be made for removing unstable material beneath the roadbed, backfilling with a permeable road base fill material, and installing culverts as necessary. When crossing any wetland, the roads should be at least 1.5 feet and preferably 2 feet above the surface elevation of wetlands. This will allow for better drainage of the roads. It will also decrease the frost heaving and should be done during the dry time of the year. Provisions should include an effective erosion and sediment control plan.

If permission is granted, every effort should be made to restrict the road crossing activity to the dry time of year, when water tables are low. This should help to minimize the chance for erosion and sedimentation problems.

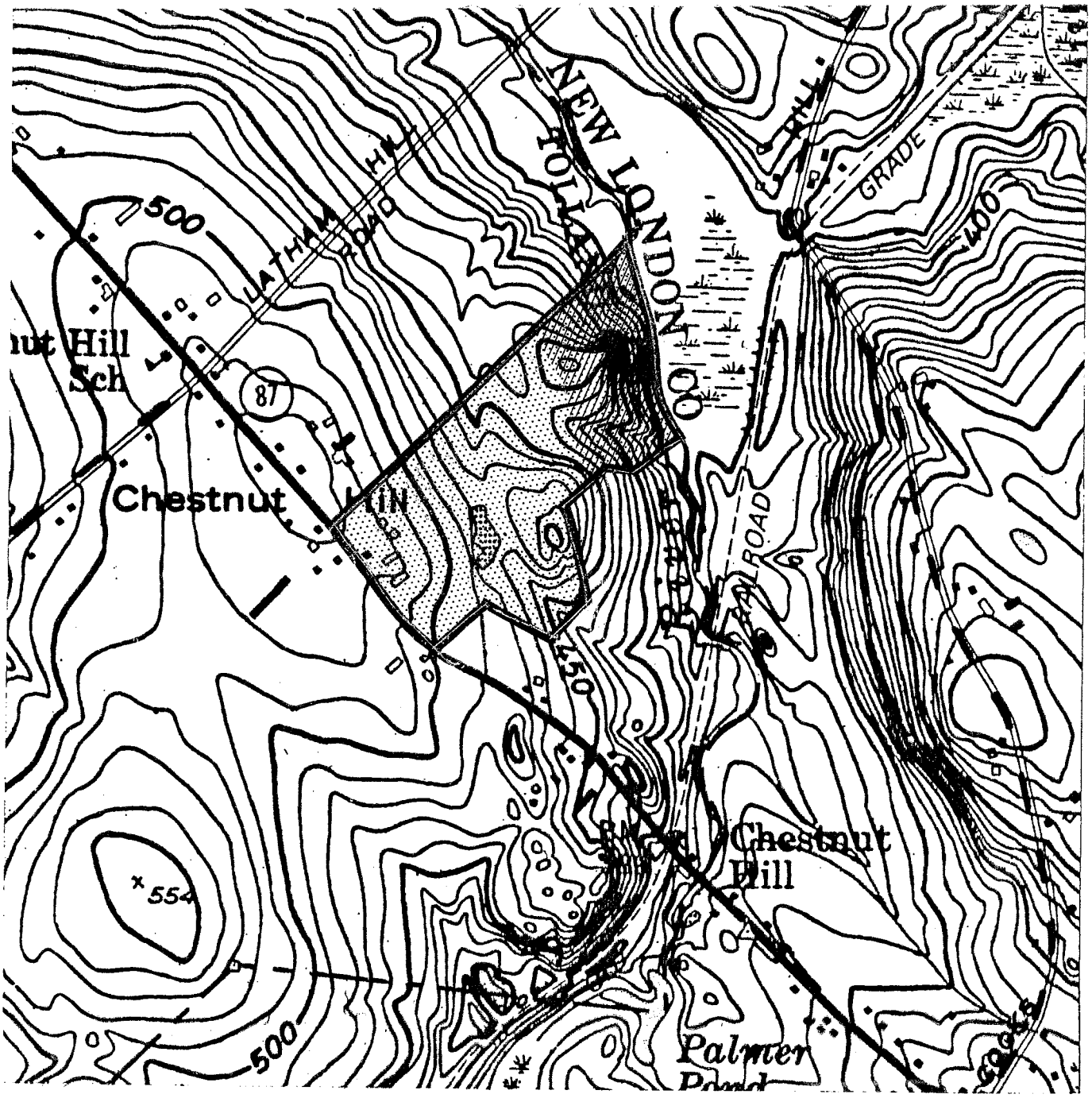
# GEOLOGY

TILL

SHALLOW TILL

*ENTIRE SITE IS UNDERLAIN BY LOWER MEMBER OF TATNIC HILL FORMATION

SCALE 1" = 1000'



# 3. SOIL RESOURCES

## GENERAL SOILS INFORMATION

The information contained in the Soil Survey of Tolland County, CT appears to be adequate for planning purposes. 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.

Note that the soil information that appears on plan maps was enlarged from the Soil Survey of Tolland County and then overlaid with the field delineated (and therefore more precise) wetland boundaries. Because of scale limitations (the original maps are at a scale of 1"=1320') and distortions in the original aerial photo base maps, the enlargement of the information to 1"=40' usually results in a grossly inaccurate as well as misleading map that is useless for any purpose. As an example, compare the wetland boundaries as delineated in the field by the soil scientist versus the soil survey boundaries as enlarged. Which set of information will the Commission use to determine the extent of regulated areas? The District suggests that either a private soil scientist verify the enlarged information or the applicant provide an unaltered copy of the soil map at a scale of 1"=1320' on the plan map for information purposes. Unverified enlargements should not be accepted. It is further suggested that Commissions check their regulations and remove or alter any sections that require applicants to submit enlarged soil survey information.

## WETLAND BOUNDARY INFORMATION

Wetlands on this site were identified in the field by a soil scientist and located on the plot plan. An area within Lot #4 appears to be wetland. It is suggested that the Commission request a re-examination of this area by the consultant soil scientist. The remainder of the boundaries appear to be substantially correct. After re-examination, if the Commission believes a

discrepancy exists, the Tolland County Soil and Water Conservation District can on request review the submitted information for adequacy.

## HYDROLOGY

Mr. Gerald Lang, Hydraulic Engineer, SCS, Storrs has reviewed the drainage report submitted. A copy of his report follows this section. His primary concerns are the adequacy of the inputs to the model and the lack of present condition values for 2, 10 and 100 year storms. The District would appreciate the opportunity to review the revised calculations.

## OTHER

1. A copy of any conservation easement should be reviewed by appropriate agencies including the Tolland County SWCD prior to acceptance.

2. The Ten Mile River along the property boundary was channelized many years ago. Spoil piles were left on the banks at several points. If the area is deeded to the Town as a passive recreation area, a plan to remove these piles from the floodplain should be part of any passive recreation development plans.

3. During the field check, an apparent manure spill was discovered within the wetlands on proposed Lot #5. A portion of this spill will be accessible for cleanup during the construction of the roadway. Otherwise it is probably best left undisturbed. A more important issue is to take steps tp prevent a recurrence of the problem. The District, on request from the farmer, can provide technical assistance on proper waste storage and utilization.

4. The Commission requested a copy of the criteria for streambelts delineation. A copy follows this section of the report.

5. The pond on Lot #16 and #17 is bisected by the lot lines. Our experience has been that a single owner does a better job of maintaining a pond. It is suggested that the applicant consider altering lot lines to ensure that the pond is controlled by one owner.

6. Portions of proposed Lots #2, #3, and #4 are currently being used as a feedlot or loafing area for heifer calves. This area has been excavated and topsoil removed. It is suggested that the developer investigate the areas down gradient of this loafing area for possible nitrate or bacterial contamination or proposed drinking water wells.

## SOILS

SCALE 1" = 1320'

TOLLAND COUNTY USDA-SCS
24 HYDE AVENUE
ROCKVILLE, CT 06066
875-3881

# 4. HYDROLOGY

The entire site lies within the drainage area of the Ten Mile River, which forms the eastern boundary. The Ten Mile River ultimately empties into the Willimantic River. At that point it drains an area of 17 square miles or 10,880 acres. The site, about 70 acres, therefore represents less than 1 percent of the watershed area.

Under natural conditions surface drainage within the site can be divided into several subdrainage areas. Drainage flows downslope to discharge points such as wetlands, streamcourses, and intermittant watercourses and is then routed to the Ten Mile River. It should be pointed out that a man-made pond (expanded from a smaller pond after 1970) between Lot #16 and #17 does not appear to have an outlet. The pond appears to have been created by excavating below the water table. Surface runoff from a small land area feeds the pond. If the water level in the pond rose high enough, it appears that an outlet would form on the south side.

Based on the present lot layout three lots will share approximately 1/3 of the pond. Each property owner needs to understand the potential for maintenance, i.e., weed control of the pond, which will undoubtedly need to be shared by each property owner. There also appears to be a liability potential for each property owner.

The surface water in the Ten Mile River is classified by DEP as B/A. This means that under present conditions the water quality is a fishable/swimmable condition. The State's goal is to upgrade the water quality to Class A which means it may be suitable for drinking water supply.

Present plans indicate that stormwater arising from the proposed access road and in most cases driveways, will be artificially collected in catch basins and piped to wetland areas on the site. Energy dissipators will be necessary at all stormwater outlets (discharge) points to prevent scours in the area and to minimize the potential for downstream erosion. The velocity of concentrated

storm flows are reduced by the energy dissipator. Where possible, every effort should be made to terminate stormwater outlets outside of regulated wetlands. It is understood stormwater will not be discharged to the man-made pond on the site.

The subdivision of the property as planned, followed by the construction of new homes and driveways will lead to some increases in runoff from the property. Due to the presence of wetlands on the site, which have natural detention capabilities and the sites close proximity to Ten Mile River and its accompanying floodplain, there may not be a need for on-site detention basin(s). However, in order to properly assess post-development runoff in the study area, the developer's project engineer should be required to prepare a stormwater management plan. The plan would include all pre and post-development runoff calculations. It is recommended that Connecticut's Guidelines for Erosion and Sediment Control be closely followed with regard to stormwater management on the site. Also, any town regulations must be followed closely. The management plan and calculations should be carefully reviewed by the Town's engineer and other appropriate town officials. The impacts of post-development runoff in the study area should be clearly understood in terms of flooding and streambank erosion.

It is recommended that a written report accompany the plan which states the initial conditions and storm frequencies to be analyzed. A summary table showing the pre-development, post-development and designed system peak discharges for all design frequencies should also be made available to Town officials.

In order to protect streamcourses, wetlands on the site and the Ten Mile River, a comprehensive erosion and sediment control plan needs to be prepared and properly enforced. Disturbed areas should be kept to a minimum and any wetland-road crossing work conducted during the dry time of the year. Town officials or an authorized agent will need to check erosion and sediment control structures on the site to insure that they are functioning properly.

# 5. 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. A copy of the marked up plan noting concerns has been returned to the consultant engineer for information. The major deficiency is the lack of site specific information, detailed narrative noting sequence of activities and installation of measures proposed. A checklist should also be developed for this 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 and 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."**

# 6. SEPTIC SYSTEMS

Soil and percolation testing have been conducted on the site by the applicant's engineer. According to deep test hole data, it appears subsurface sewage disposal systems can be installed on each lot, but that all lots, except Lot #9, will require specially designed (engineered) septic systems. Additionally, septic system notes on the plan indicate that houses on some lots will need to restrict the number of bedrooms to 2 or 3 and/or require ejector pumps to lift sewage effluent to higher elevations on the lots because of subsurface conditions. In regard to the latter, every effort should be made to install gravity fed septic systems. It seems likely that this could be readily accomplished on lots of 50,000 square feet or more.

The Town sanitarian should review the proposed project for septic system suitability and report his findings to the Columbia Inland-Wetlands Commission. It should be demonstrated that each lot can support septic systems in accordance with the regulations of the Connecticut Public Health Code and Technical Standards.

Based on soil and percolation test data, the upper soil layers (outside of wetland areas) exhibited percolation rates that ranged between 2.7 minutes/inch and 20 minutes/inch. Most were in the 5-8 minutes/inch range. Percolation tests should be conducted on each lot in the subdivision.

Of major concern with regard to subsurface sewage disposal on this site is the presence of a seasonally high water table (western parts) and shallow bedrock (eastern parts). The presence of a seasonally highwater table will necessitate the use of curtain drains and/or fill systems to insure that groundwater does not interfere with the proper functioning of the septic systems. The type of groundwater control method used must be determined by the soil condition and topography of each individual lot. In areas of shallow bedrock, it is important to excavate a sufficient number of test holes on each lot so that a good profile of the bedrock surface can be determined.

To conclude, it appears that most of the proposed lots are capable of supporting on-site septic systems. In order to verify this, it appears that additional soil testing may be necessary on some lots (see septic system notes) and engineered plans will be required on all lots except lot 9. Consideration should be given to **not** approving the subdivision plans until such time as each lot is shown to be capable of supporting a septic system in compliance with the State Public Health Code and Technical Standards as determined by the Town sanitarian.

# 7.WATER SUPPLY

Based on hydrogeologic conditions, land-use and water supply in the area, the underlying bedrock appears to be the best source of drinking water to individual wells serving the proposed subdivision.

Wells drilled in bedrock generally supply small (3-5 gallons per minute) but reliable yields of groundwater, that saturate fractures in the rock. Because the yield of a given well depends upon the number and size of water bearing fractures that it intersects and because the distribution of the fractures is highly irregular, there is no practical way of predicting the yield of a well in a specific location, outside of drilling the well first. Experience has shown that most water-bearing fractures occur in the top few hundred feet of the bedrock surface. Based on discussions during the pre-review meeting, town officials and the applicants (who have developed other land in the vicinity) do not have knowledge of unsatisfactory low yielding bedrock wells in the area.

Based on the low density proposed and 50,000 square foot minimum building lot size, the proposed subdivision will cause little change in recharge to the bedrock aquifer. The creation of impervious surfaces should be minimal. (It is estimated to be about 3.0-3.5 acres, including driveways.)

Using some basic assumptions, the Team's geologist evaluated available recharge and predicted water use of the subdivision to estimate the potential impact on the bedrock aquifer. Specifically, recharge calculations show that the amount of water available to the site each day is about 41,670 gallons per day. This is based on groundwater recharge amounts of 8 inches per year for an upland, till-covered site and 63 pervious acres, allowing for infiltration. Predicted water use at the site is estimated at 7,800 gallons per day. This is based on a 75 gallons per day per capita water usage. An assumption of 4 persons per single family residence (26 lots) was used.

Based on these figures, it is estimated that the planned development will receive about 5 times the recharge as is necessary to balance water demand. In addition, induced recharge by properly renovated septic system effluent

(about 95%) plays important role in the groundwater budget. The latter stresses the need for properly designed and installed septic systems.

It must be kept in mind that the discussion in the preceding paragraphs assumes the underlying bedrock is fractured and capable of transmitting water to the proposed wells.

Each well should ideally be located on a relatively high portion of the lot, properly separated from the sewage disposal system or any other potential pollutant (e.g., fuel oil storage tank, etc.) and in a direction opposite the expected direction of groundwater movement. They should all be cased with steel pipe into the underlying bedrock. In order to provide adequate protection of the quality of bedrock water, all wells will need to be properly installed in accordance with all applicable State Public Health Code and Connecticut Well Drilling Board regulations. In addition, the Town sanitarian will need to inspect and approve well locations.

The present lot layout should allow for a spacing of about 200 feet between domestic wells in the proposed subdivision. This will provide about one acre of direct discharge to each well, which should help to minimize the chances for mutual interference between pumping wells. The latter assumes the fractures in the underlying bedrock are saturated and capable of yielding water to a well.

The natural quality of groundwater should be satisfactory. However, the bedrock beneath the site may have elevated amounts of iron and/or manganese minerals, which could lower the overall quality. There are suitable treatment filters available to ameliorate these potential water quality concerns.

Groundwater in the area is classified by the Department of Environmental Protection (DEP) as GA, which means that it is suitable for private drinking water supplies without treatment.

# 8. VEGETATION

The Samuel Hill subdivision is composed of open fields, oak-hickory and mixed hardwood forests. Woodlands cover approximately 50 acres of the tract. They provide a protective influence on soil stability and water quality. They would also periodically provide wood products through proper management into the next century. The forest provides habitat for a variety of wildlife including deer, turkey, coyote, fox, birds of prey and small mammals. Forests have a positive influence on air quality as they convert carbon dioxide to oxygen through photosynthesis and act as terrestrial sinks (collectors) to reduce airborne particulate and gaseous pollutants. Trees also provide shade for cooling. Air temperatures in a forest are cooler than in open areas.

## VEGETATION TYPE DESCRIPTIONS

**STAND 1:** Oak-hickory type, 13 acres. This stand is composed of black oak, white oak, red oak, and hickory in the poletimber (6" - 10" diameter at 4.5 feet above ground) and sawtimber (11"+ diameter at 4.5 feet above ground) size classes. The understory is vigorous sugar maple and oak regeneration as a result of a harvest 7 - 10 years ago. The stand shows signs of declining vigor in the black and white oaks due to an insect called the two-lined chestnut borer.

**STAND 2:** Mixed hardwood type, 6 acres. This stand is composed of black birch, gray birch, cedar, elm and white ash. Trees are sapling (2" - 5" diameter) and poletimber. This was once the site of a pasture and barberry and multiflora rose occur in the understory.

**STAND 3:** Oak-hickory type, 23 acres. This stand is composed of hickory, black oak, white oak, red oak and black birch with a sugar maple, birch, hophornbean understory. Trees are sapling, poletimber and small sawtimber sizes. The larger timber was removed in a harvest 7 - 10 years ago and dense regeneration occupies the forest understory.

**STAND 4:** Mixed hardwood type, 8 acres. This stand is on wet soils and composed of white ash and red maple. Elm and yellow birch are also common on this kind of site. The understory ranges from open grass to dense spicebush. Trees are generally sawtimber sized.

**STAND 5:** Open field, 20 acres, mowed hay lots surrounded by some white pine and cedar at the fields edge.

## AESTHETIC CONSIDERATIONS

Trees are very sensitive to the condition of the soil within the entire area of their root systems. Construction practices involving excavation, filling and grading for road building and structures, and compaction from heavy equipment disturbs the balance between soil aeration, soil moisture level and soil composition. Disturbances to soil near trees can cause a decline in tree health and vigor resulting in mortality in three to five years. Cutting or bruising roots with machinery creates breeding areas for root fungi which can also kill a tree in a short time. Trees with cut root systems do not have proper soil holding capacity, wind firmness or water-nutrient absorption ability. This also results in reduced health and vigor and opens the tree for insect and/or disease infestation. Mechanical injury which physically damages bark and scars the surface of the tree can lead to hollow trees which are structurally unsafe around people and homes. The older and/or larger a tree is (like the wide-crowned white oak "wolf" trees on the south west edge of STAND 3), the more readily it is affected by the negative impact of construction related activities. Once houses are built and trees begin to die from past carelessness from construction, the aesthetic quality of an area is reduced. The dead trees become a hazard and expensive to remove when near roads, homes or utility lines.

Research has shown that trees on a houselot will enhance the value of that houselot. In general, only healthy, high-vigor trees should be left on houselots. Individual trees should be straight, well-formed and firmly rooted. Avoid extremely tall or larger diameter trees as they may be more subject to windthrow or mortality due to height or reduced vigor due to age. The best trees to save on houselots would be sugar maple, red oak and hickory. Several of these species are 6 - 10 inches diameter and 30 - 40 feet tall. They would

adapt to being open grown on a houselot more readily than an older, larger tree. Also, red cedar can be left on houselots as it is especially valuable for wildlife. Trees may be left in groups or "islands" to reduce the impact of soil disturbance and mechanical injury. Both individual trees or "islands" can be designated for retention with flagging prior to construction by a professional forester so they will be avoided. No excavation, equipment use or filling should occur within 20 - 50 feet (depending on tree diameter - the larger the tree the further away disturbance should occur) of single trees or groups of trees. A general rule to follow is no equipment or excavation within two times the radial spread distance of the crown. Finally, trees left on site around houses should be away from the house at least for a distance equal to the height of the tree. The negative effects of construction on trees is not usually visible at the time the work is done. However, soil compaction, root injury, and scraped bark contribute to insects and disease infesting the tree after machinery has left the site. This creates hazards and problems for homeowners as trees die several years after construction. These problems can be minimized or eliminated with proper care taken with vegetation during development.

## LIMITING CONDITIONS AND POTENTIAL HAZARDS

Trees grown in a forested condition rely on each other for stability and side support. Openings which allow wind to pass through them will result in uprooted trees. This can occur with single trees in houselots and along newly cut roads. The highest potential for windthrow is in STAND 4 due to the wet soils. In general, road location should not create increased potential for windthrow except in the most extreme weather conditions for a few years after construction.

When making road and grade cuts remove trees back from the cut for a distance of 1 foot for each foot of depth of cut, e.g. 10 feet back for a 10 foot cut. The least damage is done to vegetation when roads are planned, laid out and constructed well in advance of house construction.

Alterations in wetland areas which permanently raise or lower the water table can have a negative effect on vegetation. In crossing wet areas, be sure

flows are not altered, and culverts are properly sized and maintained. Both filling or draining wetlands can kill vegetation.

When highly absorptive forest soils are disturbed, grades on hills cut, or areas filled to create houselots, roads, lawns and driveways, overland flow of water increases because the sponge-like effect of the litter and humus layer is lost. The resulting soil compaction prevents rain from soaking into the soil surface rapidly as it falls. This causes water to collect and run over the lawns and road surfaces. The run-off has the potential to build erosive power in short distances, tear soil loose and cause siltation and sedimentation. Exposed soils on steep slopes (portions of STANDS 1 and 3) should be avoided during and after construction.

## MANAGEMENT CONSIDERATIONS

It would be prudent to consult a private sector forester to advise on a final site plan for vegetation. A forester would be essential to evaluate tree health and vigor, insect and disease problems, species longevity, potential mortality, management of open space for recreational opportunities and wildlife habitat. STAND 1 may benefit from a pre-construction thinning to remove trees infested with two-lined chestnut borer. A more detailed stand evaluation would determine the degree of infestation and procedure for a harvest.

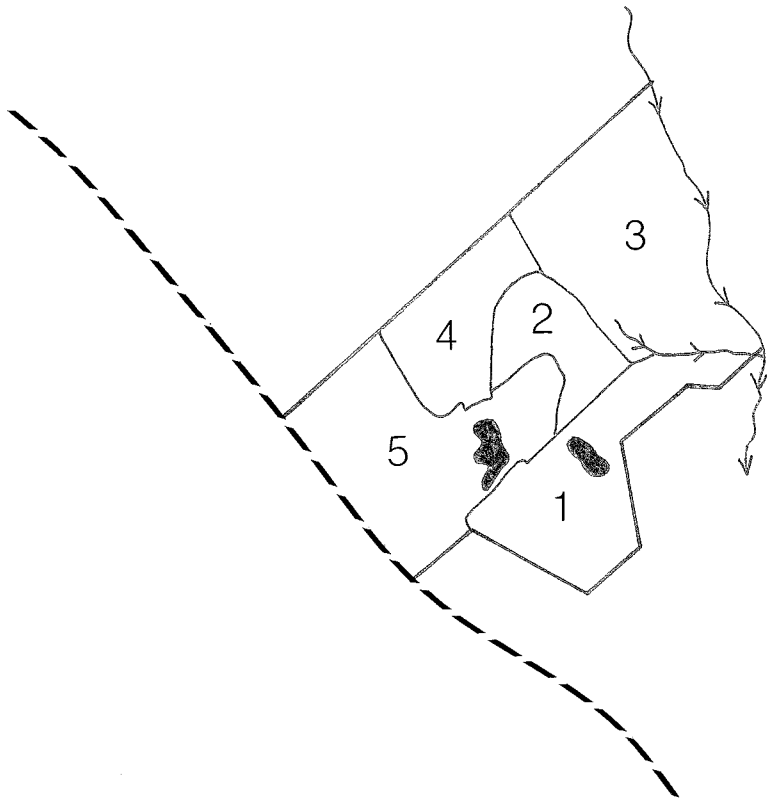
## CONCLUSION

Trees have value in reducing climatic extremes, controlling run-off, filtering out polluting particles from air and water, reducing noise, providing aesthetic enjoyment, creating wildlife habitat, recharging aquifers, supplying wood fiber and functioning as a carbon sink. Healthy vegetation provides these long term amenities. Therefore, a good relationship between urban growth and forest lands must exist. Trees around houses can be healthy, long lived and valuable if treated properly in the conversion from forested habitat to subdivision. What is lost due to development is the wildlife carrying capacity of the forest and its ability to produce wood fiber for generations in the next century and beyond.

## VEGETATION

SCALE 1" = 1000'

BOUNDARY
POND
ROUTE 87
STREAM




STAND 1: OAK HICKORY,13 ACRES,POLE-SAW
STAND 2: MIXED HARDWOOD,6ACRES,SAPLING-POLE
STAND 3: OAK-HICKORY,23 ACRES,ALL SIZES
STAND 4: MIXED HARDWOOD,8 ACRES,SAW
STAND 5: FIELDS

# 9. WILDLIFE RESOURCES

## WILDLIFE HABITAT DESCRIPTION

The area of the proposed Samuel Hill subdivision is composed of three major habitat types; agricultural fields, mixed hardwoods, and wetland/ riparian areas. This area currently offers a diversity of cover types that support a number of wildlife species. Flocks of black-capped chickadees, cedar waxwings, and eastern bluebirds were observed utilizing the area as a winter forage site.

Approximately sixty five percent of the area is agricultural fields which are currently being used for hay crop production and pasturing dairy cows. Hay fields provide habitat for field dwelling mammals and provide an abundance of insects for foraging songbirds during spring, summer, and fall. With the adjacent mixed hardwood habitat, open fields also provide forage areas for raptors preying on small mammals. Hedgerows consist of red and white oak, black cherry, barberry, viburnum, multiflora rose, and beaked hazelnut.

Mixed hardwoods occupy the area north and east of the pond, extending to the Ten Mile river. The overstory is dominated by black birch, white oak, shagbark hickory, and pignut hickory in the eastern portion and sugar maple, black birch, and ash in the northern portion. In areas where clear cutting has taken place there are dense stands of black birch. The understory is dense in many areas due to regeneration. Dominant species in the understory consist of black birch seedlings, red maple seedlings, spice bush, barberry, and juniper.

Wetland/riparian habitat consists of a small pond, wetlands associated with the pond, a small brook, and the Ten Mile River. The pond exists in an open area and is surrounded by little vegetation growth. Immediate shore vegetation consists of multiflora rose, golden rod, and a variety of grasses and sedges. Cattails and phragmites occur in the shallows of the pond. This pond provides habitat for a number of amphibians and reptiles. A small meadow type wetland with few mature red maples exists north of the pond. Dominant

vegetation consists of grasses, sedges, golden rod, multiflora rose, raspberry, and barberry. A red maple swamp exists south of the pond. The understory is dense in some areas and consists of spice bush, silky dogwood, barberry, and multiflora rose. Ground vegetation consists of skunk cabbage, mosses, and grasses. The largest wetland is located in the wooded area northeast of the pond. The overstory is dominated by red maple, red cedar, and elm. The understory consists of highbush blueberry, barberry, winterberry, holly, and spicebush. A number of snags which are important for cavity nesting birds occur in this area. A small brook flows from the largest wetland southeast to the Ten Mile river. Bank vegetation along the brook consists of barberry, spice bush, green briar, and blackberry.

*** Wetland areas north of the pond receive runoff from the adjacent pasture to the southwest resulting in large quantities of manure being deposited in these areas and wetland degradation.**

## WILDLIFE SPECIES

Bird species observed inhabiting the area include eastern bluebirds, black-capped chickadees, cedar waxwings, white breasted nuthatches, downy woodpeckers, cardinals, dark-eyed juncos, ruffed grouse, sparrows, bluejays, crows, and a variety of other songbirds. A belted kingfisher was observed utilizing the Ten Mile river as a foraging site. Owl pellets were found in wooded areas adjacent to hay fields.

Mammalian species inhabiting or utilizing the area include white-tailed deer, gray squirrels, eastern cottontails, raccoons, red fox, mink, and a variety of other small mammals.

With the existence of the small pond and associated wetlands this area also supports a diversity of amphibian and reptilian species.

## EFFECTS OF DEVELOPMENT ON WILDLIFE

As the preliminary plans indicate the entire site will be subdivided into building lots. This type of development will result in fragmentation and elimination of habitat types which will in turn reduce species diversity and richness. Species that are intolerable to human disturbance will be forced to emigrate into adjacent habitat. Species dispersion into adjacent habitats may result in competition with species already occupying the area. Many species will also be forced to inhabit less desirable habitat; decreasing survivorability. Species more tolerant of man such as starlings, robins, house sparrows, and raccoons may increase in number and become a nuisance.

The fourteen acres of wetlands presently provide important habitat for a number of wildlife species and function as areas for absorption of natural runoff. The planned diversion of stormwater into wetlands will increase water flow, sedimentation, and pollution. This will alter the present ecological structure and reduce species diversity. Even though a stormwater retention and filtration plan has been devised, the long term effects of storm water diversion into wetlands tends to be negative. The use of plunge pools and detention basins will help reduce water flow and filter out heavy sediments, but will allow fine silt and pollutants to enter wetlands.

When clearing and excavation occurs on the lots adjacent to or containing wetlands northeast of the pond, runoff will result in sedimentation of these areas. Following the natural contour of the land the end result will be sediment being deposited in the Ten Mile River.

Since fourteen of the proposed building lots contain wetlands there will be a negative impact on these areas if there is any clearing or removal of vegetation within wetlands. Vegetation removal in wetlands would have severe impacts on wildlife, especially reptiles and amphibians. Soil and water types, cover, food, breeding grounds, and hibernation areas may be altered so that species dependant on specialized habitats are eliminated and more adaptable species reduced (Campbell 1973). Barriers to seasonal movement and population dispersal, such as roads are also serious threats (Campbell 1973). The road network crosses wetlands in four locations and there is one driveway

crossing. Removal of snags will reduce potential nest sites for both primary (cavity excavating) and secondary cavity nesting birds (i.e. black-capped chickadees, downy woodpeckers, whitebreasted nuthatches) (Best et al. 1978). Due to the steepness of slope in the four lots adjacent to the Ten Mile River (lots 9-12) there is a high risk of erosion and sedimentation to the small brook and the Ten Mile River.

## MITIGATION OF IMPACTS ON WILDLIFE

Several measures can be taken to minimize the impacts of development on wildlife. There should be a 100 foot buffer surrounding all wetland areas in which no vegetation removal should take place. This may create a problem since a 100 foot buffer would result in elimination of some building lots. As proposed, buildings and septic systems will be at least 75 feet from wetlands. It is important that this 75 feet be left vegetated as a buffer. Owners of lots containing wetlands should be discouraged from any removal of vegetation within this buffer. These buffer strips will help limit disturbance to wetlands and provide important corridors for a number of wildlife species. The proposed positioning of hay bales and erection of silt fences will help limit siltation to wetlands.

A permanent 100 foot buffer extending from the flood plain of the Ten Mile River should be established in which no vegetation removal should take place. This will help protect wildlife inhabiting this riparian habitat from developmental disturbances.

Owners of Lots #16 and #17 should be discouraged from any removal of vegetation in and surrounding the pond. During excavation of adjacent lots care must be taken to minimize siltation of the pond.

Owners of lots in the open field area should be encouraged to plant tree and shrub species that are utilized by wildlife. To attract birds, a variety of plants are needed that are fairly small, bear fruit and have thorns (Geis 1986).

Since many of the proposed building lots in forested areas are 2+

acres in size, as much of each lot as possible should be left wooded. This would reduce vegetation removal, habitat destruction, and be more aesthetically pleasing for the residents of the development.

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# 10. FISH RESOURCES

## SITE DESCRIPTION

The proposed Samuel Hill development, 70 acres in size, will contain 28 single family homes. It will be served by on-site sewage disposal and water supply wells. A total of 4 building lots (Numbers 9-12) border the Ten Mile River. This report will address anticipated impacts to the Ten Mile River, the main aquatic habitat of fisheries concern on this property.

The Ten Mile River is an important tributary of the Willimantic River. This river contains excellent and diverse forms of instream habitat for resident fishes. A well balanced mixture of pool and riffle habitats was observed along the stretch that borders the proposed development. Pools provide beneficial cover "hiding and resting areas" for stream fishes. Upper reaches of riffles are commonly used as feeding areas by fish since aquatic insects, their primary food source, reside in this type of habitat. Average stream width is approximately 20 feet. Dominant stream substrate exists in the form of sands and gravels. Streamside riparian zones are comprised of mixed hardwoods and shrubs. Streamside vegetation provides vital shading and cooling of stream waters.

Surface waters of the Ten Mile River are classified by the Department of Environmental Protection (DEP) as "Class B/A". Designated uses for a "Class B/A" watercourse are: fish and wildlife habitat, recreational use, and agricultural/industrial supply. Long term DEP goals are to upgrade the water quality of all "Class B" streams to "Class A" where they could be used as a potential drinking water source.

The proposed development contains one small pond. Specific limnological features of the pond are not known; however, extensive growth of emergent vegetation in the form of cattails along the shoreline suggest that the pond contains areas of very shallow waters. The pond has probably achieved an "eutrophic", highly fertile, state of lake aging (eutrophication) since it is located

within a fertilized agricultural environment. During the process of eutrophication, a lake or pond typically passes through three major states of succession: oligotrophy, mesotrophy, and eutrophy. The transition from one state to the next may take thousands of years; however, eutrophication can be rapidly accelerated by man-made inputs of nutrients such as excessive soil erosion, stormwater runoff, and septic tank leachate. An "eutrophic" state of eutrophication essentially means that heavy levels of nutrient enrichment have occurred.

## AQUATIC RESOURCES

The Ten Mile River is a very popular recreational fishing area used mainly by local residents. The river is annually stocked with more than 300 yearling brook trout by the DEP Bureau of Fisheries. In addition to stocked trout, other fish which reside in the river are: "native" brook trout, blacknose dace, white sucker, fallfish, common shiner, and tesselated darter.

The small pond is expected to support a warmwater fish population. Fish species which typically inhabit pond ecosystems are: largemouth bass, bluegill sunfish, pumpkinseed sunfish, chain pickerel, brown bullhead, and golden shiner.

## IMPACTS

The following impacts of the Samuel Hill Subdivision on the Ten Mile River can be expected if proper mitigation measures are not implemented:

**1. Construction site soil erosion and sedimentation of the Ten Mile River through increased runoff from unvegetated areas**: During construction topsoil within the proposed building lots will be exposed and susceptible to runoff events. Of special concern are steep slopes (greater than 20%) on Lots #9-#12 which border the river. De-vegetation of steep slopes in this area can lead to the development of serious erosion problems. Additionally, a red maple swamp outlet drains downslope into the Ten Mile River on Lot #13. This drainage will provide a direct avenue for disturbed soils into the river. Erosion and sedimentation due to construction has long been

regarded as a major cause of stream degradation. Excessive sediment deposition could damage the Ten Mile River 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 insects. 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 of the Ten Mile River 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 gills.

(6) Sediment encourages the growth of filamentous algae and nuisance proportions of aquatic weeds. 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.

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

**2. Percolation of septic effluent into the Ten Mile River**: A failure of individual septic systems to operate properly (refer to SEWAGE DISPOSAL section) would be potentially dangerous to a stream environment. Nutrients and assorted chemicals that may be placed in septic systems could possibly enter stream waters in the event of a septic system failure or infiltrate the groundwater during the spring when water tables are close to the surface. The introduction of septic effluent could result in a major threat to fish habitat, public health, and overall water quality conditions. Effluent will also stimulate the growth of nuisance aquatic vegetation and algae in stream environments.

**3. Degradation of wetland habitat**: Proposed building lots will be constructed adjacent to sensitive wetland habitat. Moreover, the proposed road system will cross wetlands in 4 different areas. Wetlands are beneficial in many 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. Development which brings about polluted stormwaters from roadway runoff, excessive stream sedimentation, lawn fertilizers, and lawn herbicides can negatively impact wetland complexes by hindering their ability to properly function.

**4. Transport of lawn fertilizers and chemicals to the Ten Mile River**: Runoff and leaching of nutrients from fertilizers on lawns may stimulate filamentous algae growth in this stream and degrade water quality. Introduction of lawn herbicides into streams has been found to cause fish kills.

**5. Impacts to downstream environments**: Any water quality problems and habitat degradation that occurs within the Ten Mile River can eventually be passed on to downstream regions and enter the Willimantic River which is one of the most important trout streams in the State of Connecticut.

## RECOMMENDATIONS

The following recommendations should be considered by the Town of Columbia to mitigate impacts to aquatic resources:

**1. It is highly recommended that at the minimum, a 100 foot open space buffer zone be maintained along wetland boundaries especially those that border the Ten Mile River**: This buffer can be an effective mitigation measure at this development location, especially if buildings lots that border the Ten Mile River are approved. No construction and alteration of existing habitat should be allowed in this zone. Research has shown that 100 foot buffer zones help prevent damage to wetlands and stream ecosystems that support diverse fish and aquatic insect life (USFWS 1984;USFWS 1986;0DFW 1985). These buffers will absorb surface runoff and other pollutants before they can enter wetlands and stream ecosystems. Additionally, buffer zones can improve the quantity of instream habitat for fishes. For example, research has shown that brook trout habitat units can increase 2,400% when well-vegetated buffer zones are used for stream corridor protection (HEP Notes, 1988).

**2. Install and maintain proper erosion and sedimentation controls during site construction activities**: Silt fences and haybales should be placed within excavated trenches to ensure that all runoff is properly contained. Only small areas of soil should be exposed at one time and these areas should be reseeded and restabilized as soon as possible (refer to SOIL EROSION AND SEDIMENT CONTROL section for specific recommendations). Installation of proper erosion controls is extremely critical on Lots #9-#12 and also near the wetland drainage which outlets to the Ten Mile River. A town official should be responsible for inspecting this development on a daily basis to ensure that contractors have complied with all stipulated mitigation devices. Past stream siltation disturbances in Connecticut associated with residential housing developments have occurred when individual contractors either improperly deployed mitigation devices or failed to maintain these devices on a regular basis. Proper installation and maintenance of these devices is critical to environmental well being.

**3. Properly design and locate individual septic systems** (refer to SEWAGE DISPOSAL section): It is critical that all septic systems be placed in areas that will effectively limit septic effluent. The addition of septic effluent to these streams can be one of the greatest threats to stream ecology. Septic systems should be maintained on a regular basis. Prevent the disposal of

harmful chemicals into septic systems which may negatively effect operation and possibly result in system failure. Residents should be encouraged to utilize non-phosphate laundry detergents.

**4. Limit liming fertilization, and the introduction of chemicals to subdivision lawns** : This will help abate the amount of additional nutrients to the Ten Mile River. Non-phosphorus lawn fertilizers are currently available from various lawn care distribution centers.

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# 11. ARCHAEOLOGICAL REVIEW

A review of the State of Connecticut Archaeological Site Files and Maps indicate three early prehistoric encampments in the general vicinity of the proposed project area. These sites are located on eastern knolls overlooking the Ten Mile River. Two sites are Early Archaic settlements dating between 7,000 and 8,000 years ago and represent one of the oldest occupations in eastern Connecticut. The third site is a Late Archaic camp occupied over 4,000 years ago.

Environmental and topographic features that made these sites advantageous as campsites appear in the proposed project area. However, on-site inspection and examination of test holes indicate only two areas of concern: the elevated portions of the subdivision along the open field, and, the outcropping of bedrock in the southern section.

These areas should be tested to ensure that archaeological resources will not be adversely effected by the proposed development. All archaeological studies should be undertaken in accordance with the Connecticut Historical Commission's **Environmental Review Primer for Connecticut's Archaeological Resources.**

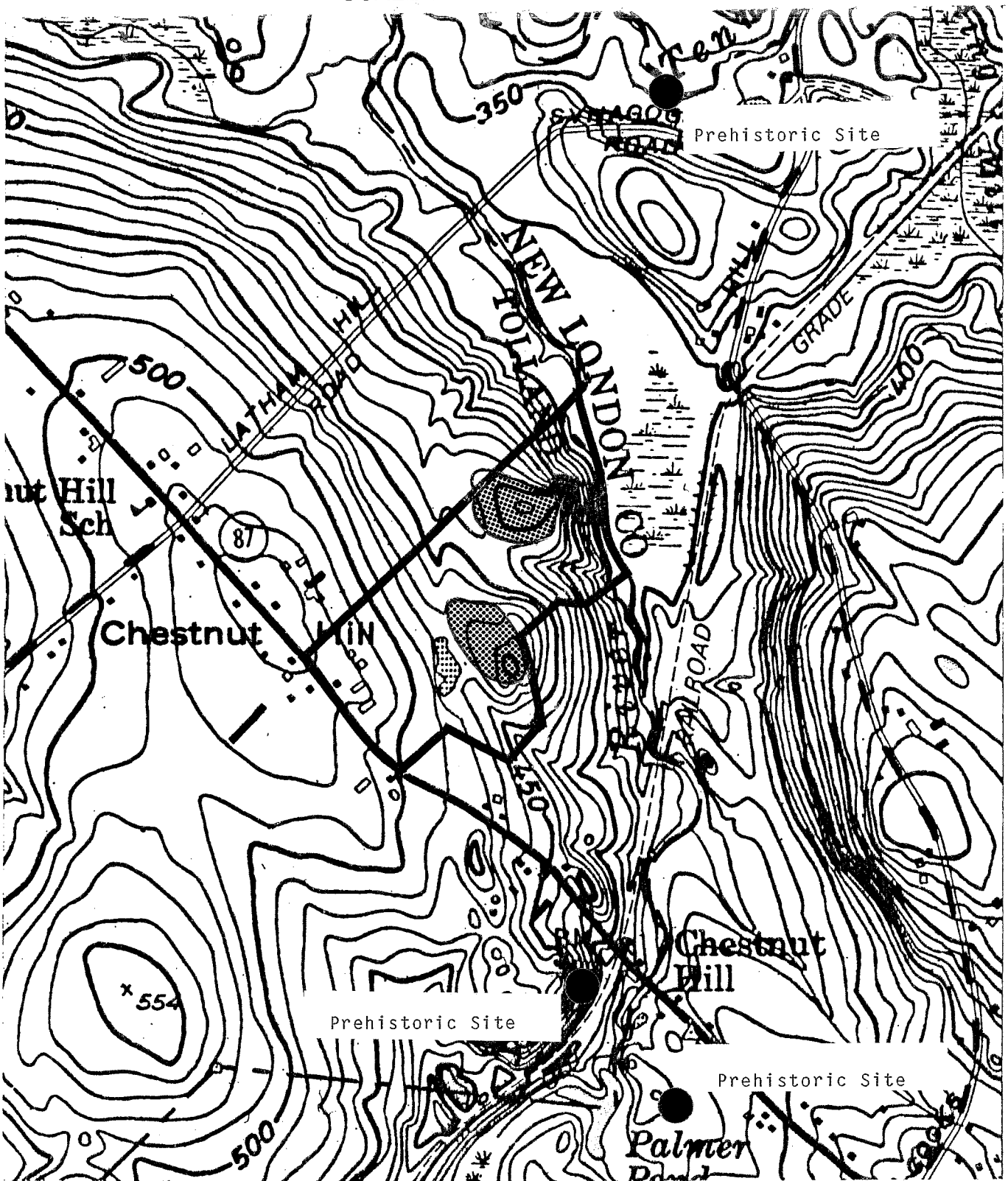
In summary, three prehistoric archaeological sites are located in the vicinity of the project area. Two areas within the proposed subdivision should be tested further to locate possible cultural materials.

## AREAS OF ARCHAEOLOGICAL SIGNIFICANCE

KNOWN PREHISTORIC SITES

POTENTIAL AREAS OF SIGNIFICANCE

SCALE 1" = 1000'



# 12. PLANNING REVIEW

## COMPLIANCE WITH STATE REGIONAL, & LOCAL PLANS

### STATE POLICIES PLAN FOR THE CONSERVATION & DEVELOPMENT OF CONNECTICUT, 1987-92

Most of this seventy acre parcel of land falls in an area designated by the state's plan as a "Conservation Area" by virtue of its consisting of prime agricultural soils. It vas active farmland when the designation was made in 1979-80. A strip of land adjacent to the river is classified as "Rural."

The policy of the State in developing or in supporting the development of Conservation Areas is expressed in the following excerpt from the State Plan.

"Prime agricultural lands should be maintained for food production to the maximum extent feasible by:

**a.** Minimizing development pressure in the placement and design of major facilities.

**b.** Permitting irreversible conversion to other uses only when there is a demonstrated overriding need, alternative sites are not technically feasible or economically justified and the impact of irreversible conversion is weighed. " (Page 129)

The parcel is not active farm land at the present time. Nevertheless, prime agricultural land will be removed from potential use in agriculture with the development of this subdivision.

### STATE MASTER TRANSPORTATION PLAN 1988

The only State funded project scheduled in the vicinity of this subdivision is the restoration of the existing bridge on Route 87 over the Ten Mile River. This is planned for 1990. This bridge lies to the south of the proposed subdivision. It is reasonable to expect that most of the vehicular traffic from the subdivision will be directed to the north -- to the center of town and to Route 66, which is a popular commuter route to both Hartford and Willimantic.

## REGIONAL GROWTH & PRESERVATION GUIDE PLAN WRPA 1981

The region's land use plan recommends the use of the portion of the subdivision adjacent to the Ten Mile River as a "River Corridor Preservation District," and the remaining acreage as a "Low Density Rural District." The applicable plan goals and policies for lands so designated are described below.

### *RIVER CORRIDOR PRESERVATION DISTRICT*

**GOAL:** Land within lake watersheds, inland wetlands, and river and stream corridors should be used in a manner vhich minimizes hazards to life and property from flooding, provides public access for recreational purposes (visual and/or physical access), protects water quality, and retains to the maximum extent possible shorelines in an undeveloped state such that their beauty can be enjoyed by future generations. Further development in the Windham Region should not appreciably degrade the vater quality in the region.

**POLICY:** Flood plain and inland-wetland regulations designed to protect life and property should be vigorously enforced.

The possibility of including the Little River and other rivers or river reaches in the National Scenic or Wild River system should be investigated.

State and local entities should be encouraged to acquire rights to land within river corridors to preserve them and to provide public access.

Development within river corridors should be designed and sighted to minimize the visual impact on rivers and to protect river water quality.

### *LOW-DENSITY RURAL DISTRICT*

The low-density rural district contributes the bulk of the aesthetic appeal of the region and offers most of the low density recreational opportunities. Emphasis in planning and land regulation should be on minimizing the development of existing road frontages. People living in this district must be automobile oriented and, due to the high utility and energy costs associated vith

low density development, they must be willing to pay significantly more to maintain this way of life.

### *(Policy for Low-Density Rural District)*

Development incentives should be provided to encourage residential development on internal parcels of land rather than along existing road frontages. Not only will the rural appearance of the region be maintained but traffic flow will be enhanced and traffic accidents reduced through having two or more residences on a single driveway instead of each individual residence having a driveway entering a state highway or town road.

Preservation of agricultural lands and operations should be encouraged.

Two-acre building lots should be the minimum and the prevailing lot size.

Public services such as sewer, water and trash collection should not be available in the district.

Large residential development projects should be discouraged in the low-density rural district. However, if such development occurs, subdivision standards for such developments should be designed to place all possible burdens for serving the residents of the proposed development on the developer (e.g., roads which at least meet town road specifications, drainage, dedication of land for recreation and perhaps additional school facilities or payment in lieu of dedication, etc.). Provisions should be made for allowing small developments (e.g., through zoning incentives) to encourage the development of interior parcels.

Where opportunities to develop recreational facilities or nature preserves of regional or statewide significance exist they should be exploited.

Very light density development and open space preservation techniques should be used to protect areas along streams, watersheds which drain to public water supply sources, and scenic and historic areas.

The development of limited access highway interchanges should be discouraged.

The plan also recommends that compact, efficient, less visible forms of development be encouraged in the "low density rural areas," using such techniques as planned unit developments, transfer of development rights, and cluster design.

The proposed subdivision plan incorporates all of the parcel's acreage into privately owned lots. The three riverfront lots are relatively large (approximately 3.8, 3.8, and 7.0 acres respectively) and the houses on these lots are set back several hundred feet from the river. Nevertheless, public access to the land adjacent to the river is not provided, and the only access to the land adjacent to the river itself is via a 20 foot easement which has been included in the plan to allow for future use with a ten acre parcel on the west side of the river. A preferable plan would reduce the sizes of the riverfront lots and provide a band of open space along the river for public recreational use. Although public access to such a strip of land may be limited at the present time, in the future this open space might become part of a continuous corridor along the river, at least betveen Latham Road on the north and the point at which the river crosses Route 87 to the south. If this part of Ten Mile River is appropriate for recreational uses such as canoeing, it could be dedicated to Joshua's Tract Conservation and Historic Trust to ensure its preservation and public access to the river.

## OTHER ISSUES

### TRAFFIC IMPACTS

Access to the lots in the proposed subdivision will be via a loop road with two entrance/exit points off of Route 87. All driveways are accessible from the loop road only, and none from Route 87 directly.

The 27 housing units would be expected to generate a total of 270 additional vehicular trips per day. Most recent data from the Department of Transportation show an average daily traffic volume of 3100 on the segment of Route 87 between the Lebanon/Columbia town line and Route 66. The traffic

generated by the subdivision would represent an 8% increase. With a current volume to capacity ratio of 0.31, Route 87 should be able to absorb this increase.

One traffic concern noted is the proximity of the subdivision's south entrance to a curve on Route 87. Traffic approaching from the south may not have a sufficient sight line to prepare for traffic entering or leaving the subdivision at this point.

## POPULATION

Based on an average of 2.9 persons per household, the subdividion would increase the town's population by aproximately 78 (1.9%) based on a 1988 population estimate of 4140.

An average of 1.4 school children per three or four bedroom single family home* might be expected from a typical subdivision. General trends indicate that one-third of these students will be of high school age, and two-thirds in grades K-8. This subdivision might add 25 students to the Porter Elementary School (a 4.7% increase to the current enrollment of 527). Columbia's high school students attend schools in other tovns.

**New Jersey County and Municipal Government Study Commission, Housing and Suburbs, Fiscal and Social Impact of Multifamily Development.*

# 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 specialsits, 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.