MIDDLEBURY COMMERCIAL DEVELOPMENT
MIDDLEBURY, CONNECTICUT

KING'S MARK
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT

on a

PROPOSED COMMERCIAL DEVELOPMENT
MIDDLEBURY, CONNECTICUT
AUGUST 1976

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King's Mark Resource Conservation
and Development Project (RC&D)
Environmental Review Team
P. O. Box 30
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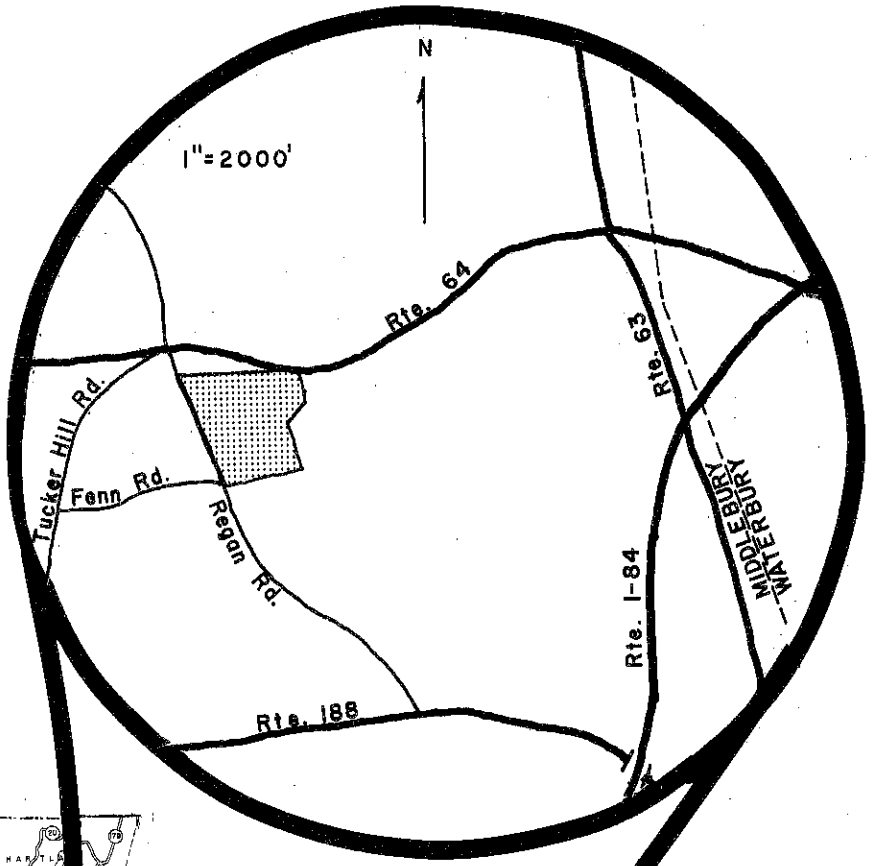
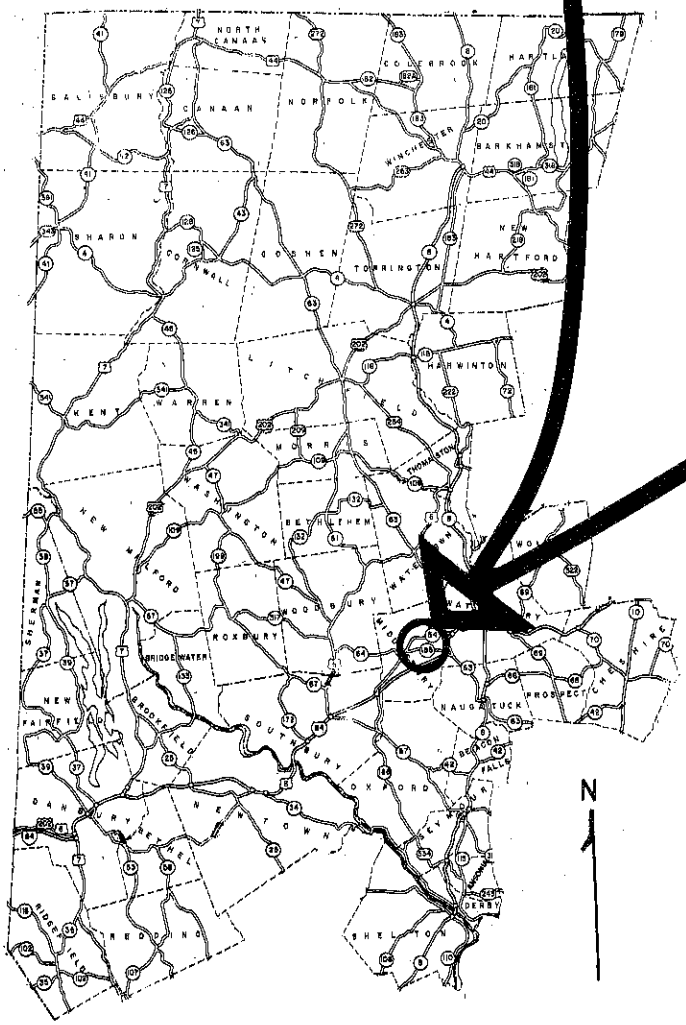
LOCATION OF STUDY SITE

MIDDLEBURY COMMERCIAL DEVELOPMENT





ENVIRONMENTAL REVIEW TEAM REPORT
ON A PROPOSED
COMMERCIAL DEVELOPMENT
MIDDLEBURY, CONNECTICUT

This report is an outgrowth of a request from the Middlebury Conservation Commission and Planning and Zoning Commission with permission of the landowners to the New Haven County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the King's Mark Resource Conservation and Development (RC&D) Project Executive Committee for their consideration and approval as a project measure. The request was approved and the measure reviewed by the King's Mark Environmental Review Team (ERT).

The Environmental Review Team draws together a range of professionals in the fields of natural resources, engineering, and planning, who, based upon existing available data and field investigation, formulate an analysis of a proposed land use activity.

The soils of the site were mapped by a soil scientist of the United States Department of Agriculture (USDA) Soil Conservation Service (SCS). Reproductions of the soil survey, a table of soils limitations for certain land uses, and a topographic map of the property were made available to all Team members on the day of the field review of the site.

The members of the Environmental Review Team consisted of the following: Frank Indorf, Jr., District Conservationist, SCS; Howard Denslow, Soil Conservationist, SCS; Timothy Dodge, Biologist, SCS; Richard Hyde, Geologist, Connecticut Department of Environmental Protection (DEP); Virginia Mason, Regional Planner, Central Naugatuck Valley Regional Planning Agency; Carol Youell, ERT Coordinator, King's Mark RC&D Project.

The Team met and field reviewed the site on Wednesday, April 28, 1976. Reports from each Team member were sent to the ERT Coordinator for review and summarization for this final report.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to proposed commercial development of the site and also suggests considerations that should be of concern to the Town of Middlebury, the owners, and potential developers. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

The King's Mark RC&D Project Executive Committee hopes this report will be of value and assistance in making decisions on this particular site.

If any additional information is required, please contact: Carol E. Youell, Environmental Review Team Coordinator, King's Mark Resource Conservation and Development Project, P. O. Box 30, Warren, Connecticut, 06754, 868-7342.

INTRODUCTION

The Conservation/Inland Wetlands Commission of Middlebury requested the King's Mark Environmental Review Team to evaluate a ±30 acre site proposed for eventual commercial development. The land, recently zoned for commercial uses, is located south of Route 64, west of Stevens Road and Edgar Street, and east of Regan Road in Middlebury (see Topographic Map). At the time of the Team's visit, the Commission was already reviewing an inland wetlands application for a proposed commercial development (commercial office building) on a one acre parcel of the land bordering Route 64 and Stevens Road. (This particular development is planned to take place in two stages, totaling two acres.) The Commission is concerned with the ability of the site to support this and other developments and the effect they may have on the surrounding areas.

The site is currently vacant and undeveloped. However, considerable alteration to the land has already occurred, including the wetland areas of the site. The northeastern portion, under immediate consideration, has been filled and the south and southeastern portions of the land surface have been stripped. The west and northwestern areas of the site encompass woodland and wetlands (some of which have also been filled or altered). To the north of the tract, along Route 64, is a developed commercial area, to the east, west, and south are single family residences.

The major concern of site development emphasized by the Team is the potential hazard of flooding to areas downstream from the site during periods of intensive water runoff.

This report will describe the existing natural resources on the site and then evaluate the various aspects of development and how they may affect or be affected by the resources. Hopefully, this report will be of assistance in determining the ultimate development of the land. Comments or recommendations made within the report are presented for consideration by the town and potential developers in the preparation and review of development plans and should not be construed as mandatory or regulatory in nature.

GENERAL STATEMENT

Middlebury is a town of 6,000 persons with a projected 1990 population of 7,100. In 1974, the Central Naugatuck Valley Regional Planning Agency estimated that retail sales per capita in Middlebury were approximately $891, significantly below the figure of $2,774 for the State, $2,256 for the Region as a whole, or $1,676 for the suburban portion of the Region. While Middlebury will probably never compete as a regional retail center, as the town population increases, additional retail and other commercial activity should be anticipated, although exact acreage estimates for necessary future commercial space (including parking, choice, etc.) in Middlebury would require a specific and detailed analysis.

TOPOGRAPHY AND SURFICIAL GEOLOGY*

Topographically, the land is flat and generally lowlying. Much of the site's ±30 acres and about all of the one acre parcel to be immediately developed are situated where surface and subsurface drainage accumulates before passing into Long Swamp Brook to the east. The western edge also contains wetlands which drain into Hop Brook to the west.

The entire ±30 acre tract has only a 1 percent to 2 percent slope, but approximately 45 acres of 10 percent sloped land north of Route 64 drain into and through the proposed development site.

Generally speaking, there is little natural surficial geology over the entire ±30 acres because most of it has been stripped away, exposing the bedrock surface to the south, to fill the wetland areas to the west and north. The thickness of the original wetlands deposits in any event are quite shallow, 5 feet to 10 feet down to the bedrock surface. Such wetlands formed and remain wet as a result of the shallow flat bedrock surface restraining fluid movement to Long Swamp Brook.

SOILS

A detailed Soils Map of the site is given in the Appendix to this report along with a Soils Limitations Chart. As the map is an enlargement from the original field mapping 1320'/inch scale to 500'/inch, the soil boundary lines should not be viewed as precise boundaries but rather as guidelines to the distribution of soil types on the property. The Soils Limitations Chart indicates the probable limitations for each of the soils for various community uses including: on-site sewage disposal, buildings with basements, landscaping, and streets and parking lots. An explanation of the numbered ratings for particular land uses is provided in the Appendix.

For the most part, the natural soils on many areas of the site have been altered or destroyed (as previously stated). The soil mapping was completed prior to much of this activity and reflects natural conditions at that time.

Soils classified as 91 and 43M (see map in Appendix) are poorly and very poorly drained soils and are legally classified as inland wetlands. These total approximately 16.7 percent of the total area according to the Limitations Chart. These soils have water ponded on the surface for significant periods in winter and spring. The water table usually remains within 3 feet of the surface throughout the year. These soils have severe to very severe limitations for most urban uses. Intensive and costly drainage and land fill measures are required to overcome wetness.

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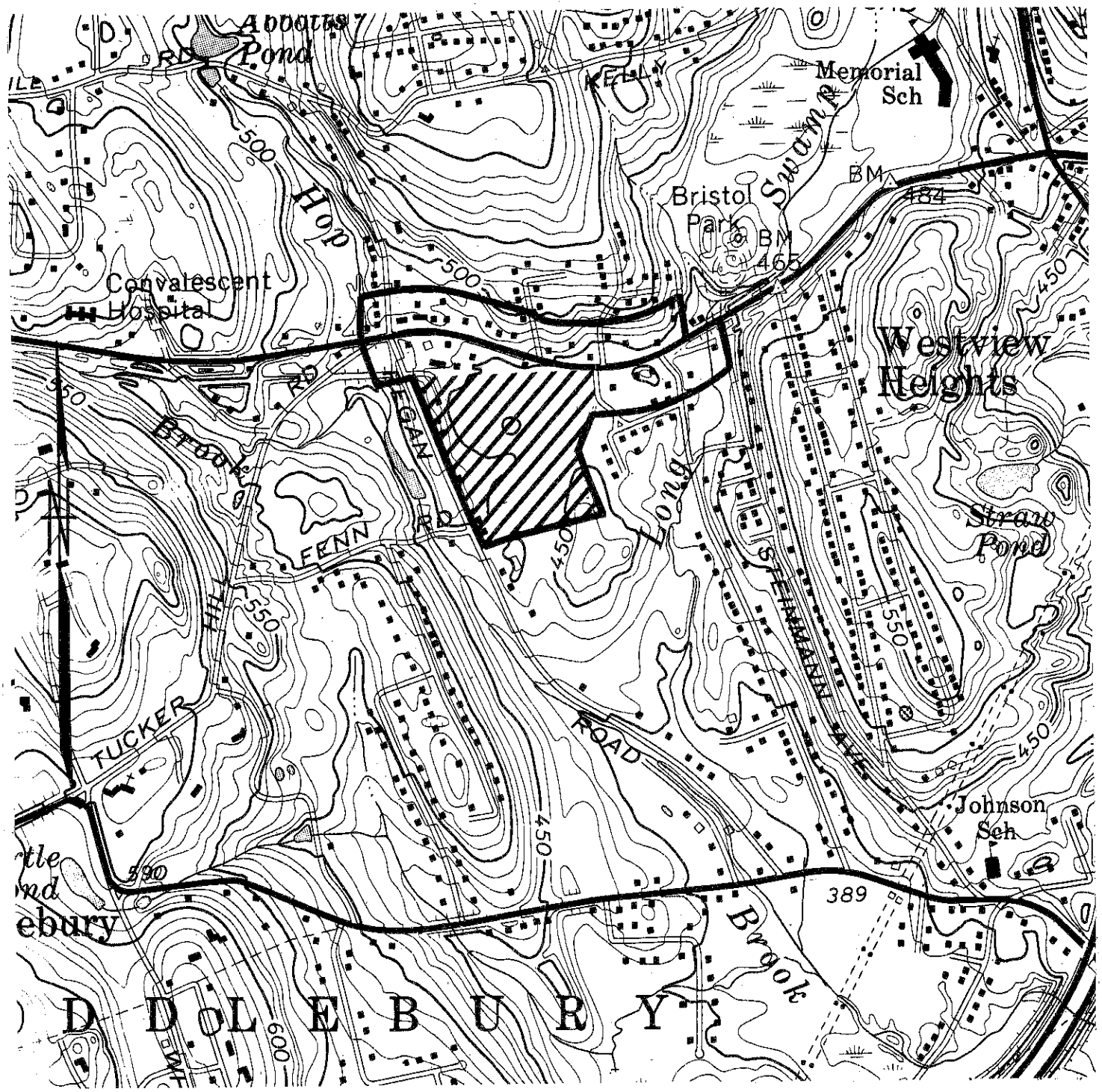
* The surficial geologist is concerned with the primary overburden, unconsolidated deposits, lying on top of the solid bedrock that have been relatively unaltered by the weathering process. The bedrock geologist is interested in the solid bedrock, its structure and composition; while the soil scientist deals with the weathered zone of the surficial deposits, the upper 3 to 5 feet below the land surface.

TOPOGRAPHIC MAP

MIDDLEBURY COMMERCIAL DISTRICT (CB-20)



Portion Investigated by Team ±30 Acres

SCALE 1"=1000'

0 1/4 1/2mi.

0 1000 2000 3000ft.

The mapping unit 17LC covers the greatest area of the site, 66.6 percent, and it is a complex of deep and shallow soils (Hollis-Charlton Complex). It is classified as belonging to Natural Soils Group "D", upland soils that are rocky and shallow to bedrock. These soils are underlain by hard bedrock and areas contain barren rock outcrops. Frequently, hard rock is less than 2 feet below the soil surface, although pockets of deeper soil may be found. Rock outcrops and soils shallow to bedrock cause severe problems when developing this land for urban uses.

A small portion of the northern end of the site is classified as 32B, a well drained upland soil that has developed over friable to firm glacial till. This soil has few limitations for most urban uses.

The mapping unit ML2 consists largely of coarse textured borrow or cut and fill areas where nearly all of the soil horizons have been destroyed or removed. In places, substratum may also have been removed. Cut and fill areas are common to developments.

AESTHETICS AND PRESERVATION

The healthy stands of trees (mixed hardwoods) present on the tract should be preserved wherever possible to maintain the rural aspect of the town and to provide a natural buffer between commercial and nearby residential areas.

For wildlife, mitigation can include any practice which will create or maintain diversity of plant species and form. Clump plantings of fruiting shrubs and vines for food and cover encourage songbirds, as does planting evergreens for cover. Tall grasses along woody borders and the creation of woody borders between land uses is beneficial to many wildlife species. Maintaining stands of grasses with legumes mixed in is also important. Fertilization is necessary to maintain succulent growth.

With regard to offsetting wetland loses, maintaining natural drainage patterns is important. Development of or maintaining a minimum of 50 feet of natural type vegetation around the wetland perimeter to retain natural functions is desirable. In some cases, fencing may be necessary if excessive use by people is anticipated. Keeping runoff from parking lots and other developed areas (which might be excessive or contain pollutants) away from the wetlands will help insure their quality. (However, keeping runoff away from the wetlands may not be advisable in terms of flood water control, as discussed later in the report.)

There were no scenic vistas sited from the parcel. No national register properties, sites listed on the state inventory of historic sites or generally know local historic sites are in the vicinity of this proposed development.

WATER SUPPLY

On-site water supply sources must be developed since there is no municipal or community service in the area which supplies the site. Private wells are the predominant source of supply for commercial and residential uses in Middlebury.

Bedrock wells are generally dependable sources for small quantity needs, single-family dwellings, and small commercial buildings. Within Connecticut's

western uplands, the crystalline bedrock is hard and dense, consisting of tightly interlocking mineral grains, making the passage of subsurface water through the intergranular openings extremely slow and difficult. For this reason the largest amount of bedrock ground water flow is through and along the cracks and joints within the upper 200 to 250 feet of the land surface. These are what principally feed the drilled wells utilized in single-family homes today. The trend is for the cracks and openings to decrease in number and size with depth, the result of the weight of the overlying strata. Therefore, the capability for crystalline rocks to yield water to a well decreases dramatically below the 200 to 250 foot mark. Statistically, crystalline bedrock wells will yield at least 3 gallons of water per minute in 75 percent of the cases.

The shallow to bedrock soil conditions on a large portion of the site will increase costs for installation of public water to the area if desired in the future.

WASTE DISPOSAL

The site has sewer service in place on Route 64 and on Stevens Road. Pipe sizes vary from 12 inches to 10 inches depending on slope (smaller pipe sizes in areas of steep slopes). Middlebury has a contract to share secondary treatment facilities with the Borough of Naugatuck. As of December, 1973, Middlebury had a per capita capacity of 1.8 million gallons per day (mgd.) and was using 0.45 mgd., indicating significant room for growth.

Waste disposal problems on the site would be minimal because of the availability of sanitary sewers; however, because of shallow to bedrock soil conditions, installation costs could be high.

FOUNDATION DEVELOPMENT

The soils on this site are stable and should present no problems for foundations, for the most part. In some areas where multi-story buildings are to be constructed in locations where wetlands have been filled, further foundation testing may be necessary.

ROADS

Existing

Route 64 is classified as a principal arterial, a connecting rural route from Woodbury and points west to Interstate 84 under the Urbans Systems Program. Average daily trips in 1973 at the junction of Route 64 with Route 188 were 4,800, and 6,600 at the junction of Route 63.

On-site Development

Most of the soils on the site have a severe limitation for street and parking lot construction. However, this should not preclude the use of the area for the proposed land use -- commercial development; the severe limitation here indicates that some problems and increased costs will be involved. There is no sand or gravel present on the site. All of this ma-

terial which should be used as a base course for roads and parking areas will have to be hauled in.

In most instances, the severe limitation for streets and parking lots is either due to slope or shallow to bedrock conditions or both.

HAZARDS

Natural Hazards

As mentioned, approximately 45 acres of watershed north of Route 64 drain into and through the proposed development site. Land slope of the upland watershed averages 10 percent. Vegetative cover is approximately 80 percent, with the remaining 20 percent in impervious urban cover, roads and houses, etc. South of Route 64, the land slope changes dramatically to 1 percent to 2 percent causing this area to act as a drainage sink for overland runoff and as the discharge point for subsurface flow.

The upland drainage area is currently relatively undeveloped and the hydrologic conditions have changed little. However, as development increases and the size of the impermeable surface takes up a larger percentage of the land area, less rain moves into the ground water flow system, overland flow increases, and peak flows become higher over shorter periods.

Any use of the land south of Route 64 must take into consideration the natural hydrologic processes occurring throughout the entire drainage basin and any development proposals, therefore, must include measures to accommodate potential flood hazards today and in the future. Generally, the development area should be filled with clean fill to an acceptable level to accommodate calculated hydrologic conditions; the current drainage system should be upgraded to facilitate rapid and easy movement of water resulting from maximum high flows (as explained below); and to insure continuous performance of the drainage system, a periodic cleaning and maintenance program should be instituted.

Man-Induced Hazards

The major man-induced hazards possible resulting from site development would be siltation to nearby wetlands and streams during construction and an increased rate of water runoff following development. Both of these effects should be commented on by the Army Corps of Engineers in Waltham, Massachusetts as the property is within the watershed of the Hop Brook Reservoir. The Corps built and maintains the Hop Brook Reservoir on the Middlebury-Waterbury border and may be concerned with potential effects to that reservoir.

Hydrologic Data*

The entire drainage area in which most of this ±30 acre tract lies is approximately 72 acres (including the tract itself). As the drainage area presently exists, the rainfall runoff has been calculated at very approximately 90 cubic feet per second. This peak discharge based on a 10 year storm frequency would require a 60 inch diameter pipe to convey the water runoff to Long Swamp Brook. Noting that much smaller culvert pipes presently carry water beneath Stevens Road and adjacent to yards of homes, flooding in the total area probably has been witnessed and can be expected.

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* Data was ascertained following consultation with both Leon Gardner, Engineering Specialist, and Martin Drobney, Hydrologist, of the USDA Soil Conservation Service.

Anticipating future residential development north of Route 64 and commercial development of the ±30 acre tract south of Route 64, a peak discharge rate of 130 cubic feet per second has been calculated, again based on a 10 year storm frequency. This would require a 66 inch diameter (or larger) pipe. Piping the runoff from the proposed development area to Long Swamp Brook -- continuously in a pipe -- would probably require a pipe larger than 66 inches due to friction losses within the pipe, etc.

The wetland areas soil mapped as 43M and 91 on the ±30 acre site serve as water retention areas and should remain as water retention areas. They do have limited flood storage value at present and if they are eliminated by additional filling any storage value now existing will be lost. Their present and unsightly condition, due to dead or dying trees and algal growth, would lead to the idea that the wetland types should be converted from the present wetland type to an open water type, such as a pond with flood retention.

What is needed, even at present since the current culvert pipes are too small, is some sort of storage pond which would hold an increase in runoff not only from the watershed land south of Route 64, but from the hillside north of Route 64. This poses a problem since the land is relatively flat and the water table fairly high. The elevation of the lower exit level of the culvert carrying storm runoff beneath Route 64, as well as the low elevation of Stevens Road, would have to be considered.

Certainly before the total ±30 acre site is developed in small pieces, overall consideration should be given to this rather complex storm water runoff problem. Runoff increases should be calculated and stored in a storage pond. Storage will only be gained above the winter's high water table as is seen in the wetland areas. Detailed engineering plans based on hydrological and hydraulic data should be expected. The Soil Conservation Service would assist the town in a review of such plans.

Since culvert sizes are insufficient and flooding is likely a problem now, the town should realize that permitting commercial development of parts of the ±30 acre tract will only augment downstream problems unless increased runoff can be stored on the tract itself.

COMPATIBILITY OF SURROUNDING LAND USES

The Regional Plan of Development of the Central Naugatuck Valley Regional Planning Agency shows this area in commercial and residential uses. Residential densities of 2 to 4 dwelling units per acre and the provision of utility services are recommended for the southern portion of the site. For the property bordering Route 64, commercial uses and utility services are planned. The policies of the Land Use Element calls for the development of economic activities, services, and medium residential densities in the secondary town clusters. This parcel therefore, is generally in conformity with the Regional Plan.

Adjacent land uses as planned are compatible with proposed commercial development of this site. Roads fronting the parcel appear to have sufficient capacity to handle increased traffic.

ALTERNATIVE LAND USES FOR AREA

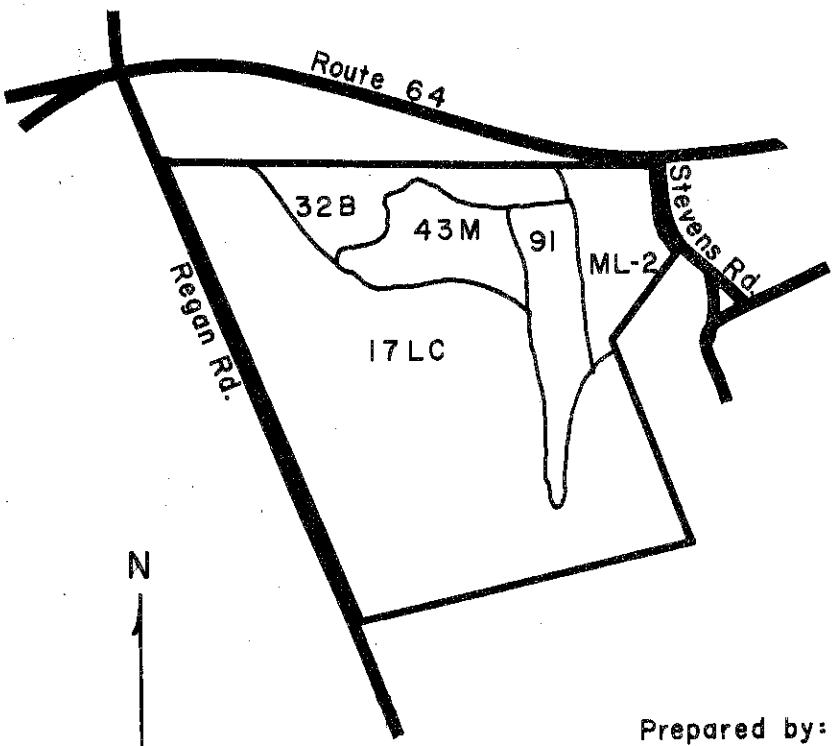
The two obvious alternative uses for this site are continuation of its present use (vacant) and development under zoning. The site falls within a

town designated CB-20 district (see Topographic Map). According to the Zoning Regulations of Middlebury, adopted May 29, 1975, a CB-20 district shall have a minimum lot area of 20,000 square feet and maximum lot coverage of 25 percent. Parking requirement for stores and offices set a minimum of 1 space for each 150 square feet of ground floor area and 300 square feet of upper floor area. The parking must be within 300 feet from the building. A lot of 20,000 square feet could potentially have a building of one story covering 5,000 square feet with another almost 6,000 square feet for minimum required parking, (180 square feet per space).

APPENDIX

SOIL MAP

MIDDLEBURY COMMERCIAL DEVELOPMENT



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USDA SCS 1976
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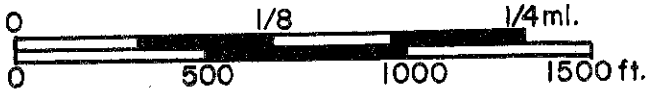

SOILS LIMITATIONS CHART
Middlebury Commercial Development

Natural Soil Group+	Mapping Symbol	Slope %	Approx. Acres	Percent of Total Acres	Limitations Ratings* for: On-site Sewage	Buildings with Basements	Land-scaping	Streets and Parking Lots	Principal Limiting Factor(s)
A-3b	91	-	2.5	9.3	3	3	3	3	very high water table, organic material
B-1a	32B	3- 8	2.0	7.4	1	1	1	2	slope
B-3b	43M	0- 5	2.0	7.4	3	3	3	3	very high water table, stoniness
D-1	17LC	3-15	18.0	66.6	3	3	3	3	slope, shallowness
U	ML2	-	2.5	9.3	V	V	V	V	variable (borrow and fill land, sandy, gravelly)
Total			27.0	100.0					

* Limitations: 1 - slight; 2 - moderate; 3 - severe.
\+ Refer to Know Your Land, Natural Soil Groups for Connecticut, Soil Conservation Service, USDA, Connecticut Cooperative Extension Service, for further explanation of the natural soils groups.
V Variable
U Unclassified

SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations"; slight or no limitations, moderate limitations, and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. Detailed on-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of the land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

1. Slight Limitations. Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

2. Moderate Limitations. In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations. The additional cost ranges from average to higher than average outlay when such areas are compared with areas rated as having slight limitations.

3. Severe Limitations. Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.