



CAMP VREELAND
HARTLAND, CONNECTICUT

KING'S MARK
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

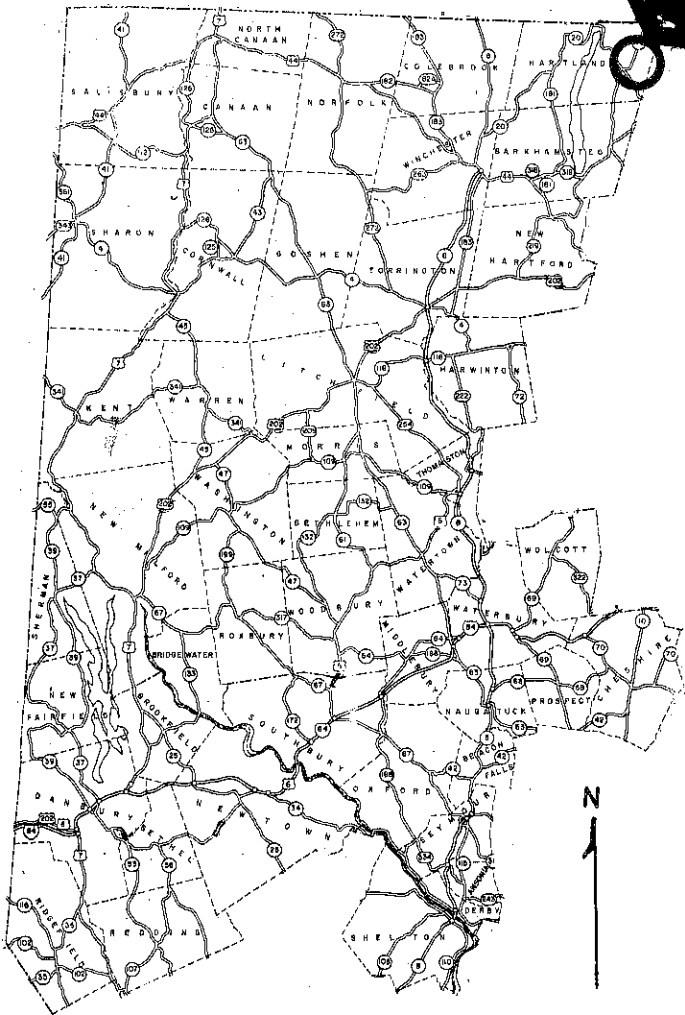
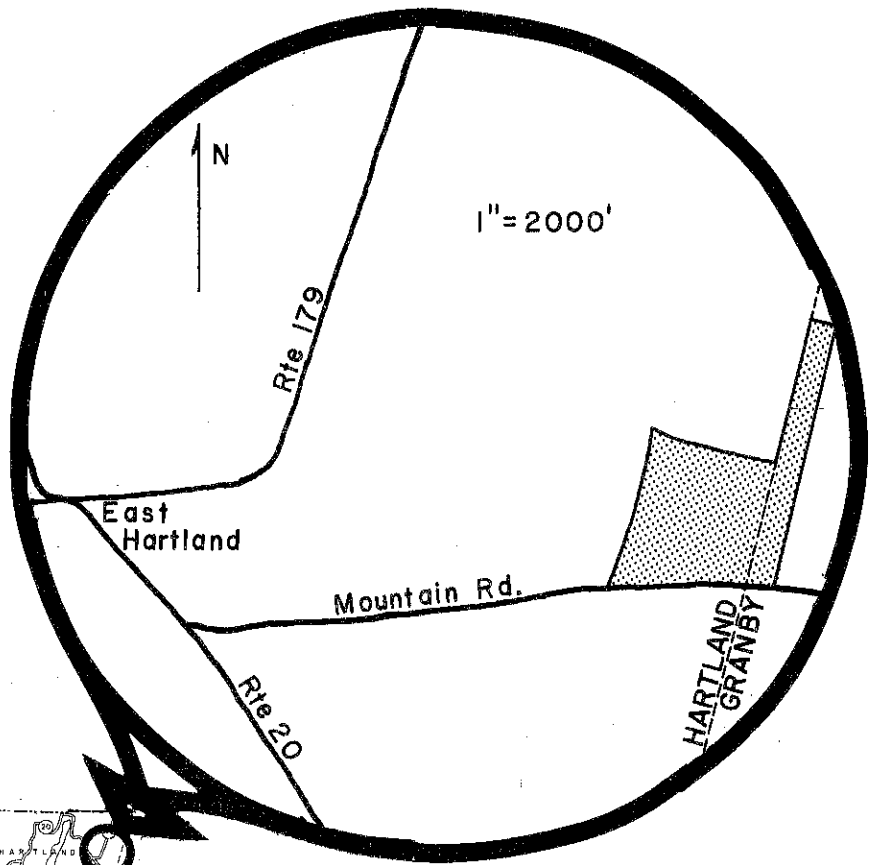
**KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT
on
CAMP VREELAND
HARTLAND, CONNECTICUT
JUNE 1976**

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King's Mark Resource Conservation
and Development Project (RC&D)
Environmental Review Team
P. O. Box 30
Warren, Connecticut 06754

LOCATION OF STUDY SITE

CAMP VREELAND



**ENVIRONMENTAL REVIEW TEAM REPORT
ON
CAMP VREELAND
HARTLAND, CONNECTICUT**

This report is an outgrowth of a request from the Town of Hartland, Connecticut to the Hartford 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 showing the approximate site boundaries were made available to the Team on the day of the review.

The members of the Environmental Review Team consisted of the following: LaVerne Anderson, District Conservationist, SCS; Charles Reynolds, Soil Scientist, SCS; Karl Niederwerfer, Soil Conservationist, SCS; Elliott Bronson, Geologist, Connecticut Department of Environmental Protection (DEP); Lawrence Bandolin, Fishery Biologist, DEP; George Brown, Forester, DEP; Steven Jackson, Wildlife Biologist, DEP; A. Carl Stamm, Parks and Recreation Specialist, DEP; Hudson Birden, Planner, Litchfield Hills Regional Planning Agency; Carol Youell, Team Coordinator, King's Mark R&CD Project.

The Team met and field reviewed the site on Wednesday, April 14, 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. The report identifies the existing resource base and evaluates its significance to the proposal and also suggests considerations that should be of concern to the Town of Hartland. 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 Town of Hartland would like to acquire a 64 acre tract of land for recreational use. The property was formerly used by the Connecticut Valley Girl Scouts and is known as "Camp Vreeland". It is located approximately one mile east of the center of East Hartland just north of Mountain Road at the Hartland-Granby town line. Of the total 64 acres, approximately 44 are located in Hartland. The site is mostly wooded, containing some open field areas plus a small pond and stream (Ring Brook). Many of the buildings, trails, roadways and other facilities of the former camp still exist and are in very good condition.

The site is planned to be used as a recreation area by residents of the Town of Hartland, and more specifically those of East Hartland where the greatest population center of the Town is located. The Town presently lacks a developed recreation area. There are no recreation facilities, such as the Town desires, on any of the State Forest lands that cover one-third of the acreage of the Town.

The Town would like to develop the area to include general outdoor sports, picnicking, swimming, nature study, horse and nature trails, and ice skating. The goal is to provide an area with "all around" facilities for Town residents. The Town has recently negotiated a one year lease of the property with the Connecticut Valley Girl Scouts for the use of the land this year.

This report will describe the existing resources over the study area and evaluate the site for recreational development, highlighting both its opportunities and limitations. Recommendations or comments made within the report are presented for consideration by the Town in the preparation of its recreational plans and should not be viewed as mandatory or regulatory in nature.

GENERAL DESCRIPTION

The property is located on rolling hillside land consisting of open fields, brushland, and young and mature forest land. The forest land dominates the site. There is a small ±2 acre pond located in the north-western corner of the parcel. The major stream on the property, Ring Brook, passes through the pond and travels in a meandering eastward direction. The site is surrounded by the Tunxis State Forest to the north and to the west.

SURFICIAL GEOLOGY

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.

The property, in terms of its surficial geology, is largely till covered upland but does contain pockets of stratified drift. Till is the geologist's terminology for the predominant overburden material found in Connecticut. It is more commonly referred to as "hardpan" or "boulder clay" by the nongeologist. Till was deposited directly to the land surface of Connecticut some 9,000 to 10,000 years ago when the final melting of the glacial ice released the materials which were suspended within it. Characteristically, till may be described as a fairly compact material consisting of a heterogeneous mixture of various quantities of boulders, gravel, sand, silt, and clay particles, none of which are significantly sorted or stratified according to particle grain sizes, as is the case with waterlain or windblown deposits.

Stratified drift deposits are also the result of glacial activity. Glacial melt waters carried the individual particles from the ice mass and in doing so they were sorted according to size and weight and were deposited in a stratified fashion. The largest of the isolated stratified drift pockets on the property is located directly to the east of the pond (on the Soils Map it is marked Tg). The mapping of this pocket describes it as containing a large proportion of pebble, cobble, and boulder size materials as well as sand and silt. An abandoned gravel pit site is also shown at this location. Possible availability of materials for repair to roads and trails within the property should be investigated, but cautiously.

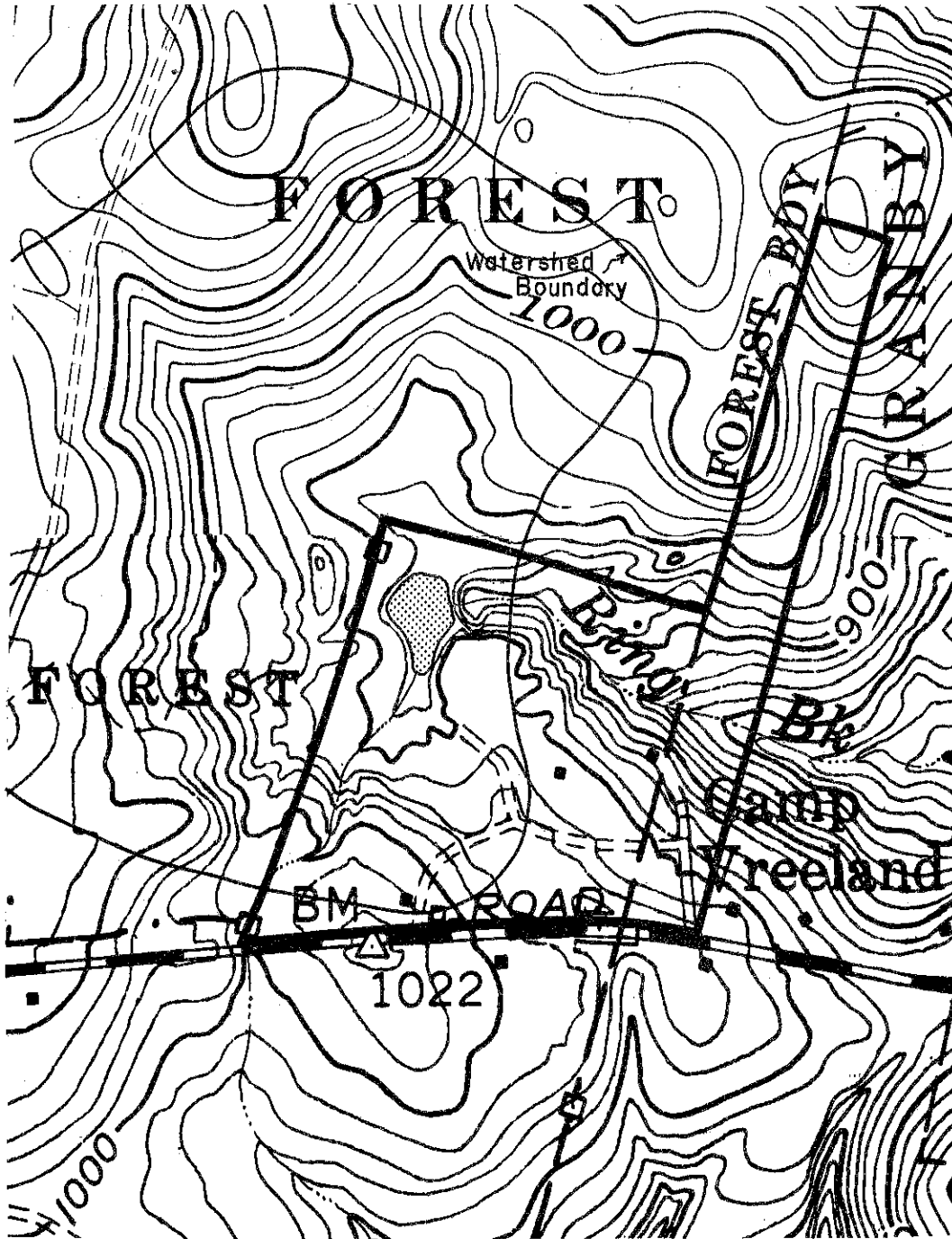
Mention was made of possibly excavating gravel from the Tg area for use by the Town. This is generally not compatible with recreation, wildlife or woodland uses. Steep banks resulting could be a source of sediment and will be difficult to stabilize. They would also be hazardous for recreation uses.

SOILS

A detailed Soils Map of the property 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 1667'/inch scale to 660'/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.

TOPOGRAPHY MAP

CAMP VREELAND



SCALE 1" = 660'

The Soils Limitations Chart indicates the probable limitations for each of the soils for various community and recreational uses including: on-site sewage disposal, buildings with basements, landscaping, streets and parking lots, and athletic fields. An explanation of the numbered ratings for particular land uses is provided on the last page of the Appendix.

With the examination of the soils map and accompanying chart, a correlation between the soils and surficial geology can be seen. All soils in Natural Soil Group A (see first column of chart) are underlain by water deposited beds of sand and gravel (stratified drift). (The property only contains one soil type, Tg, in this category.) Groups B and D are upland soils that were formed in areas of till. Group B is generally found in the thicker deposits of till occurring on hillsides. Group D is found mostly on steep side slopes and narrow ridge tops and is characterized by rockiness and shallow depths to bedrock.

As shown in the chart, a number of the soils on the site present severe limitations for development. The major limiting factors for development are the steep slopes (greater than 8 percent) and the very stony soils, both of which are found sporadically throughout the property. Other limiting factors are the wet areas found on the site as exemplified by the SvB and LcA soil types. Generally, according to the soils of the 64 acres the more favorable land uses for the property are woodland, wildlife and recreation.

HYDROLOGY

The major stream draining the site is Ring Brook which is utilized to feed the small pond. This, with the water from a swamp area to the northwest, constitutes the major inflow to the pond. The potable water supply which was used by the camp is from a bedrock well with an output estimated at 20 gallons per minute. In the proposed uses for recreation, swimming, utilizing the existing pond was suggested. The inclusion of this activity may not be possible because of the inability of the watershed to produce sufficient quantities of water to meet the volume inflow requirement of the State Department of Health. Presently the volume inflow requirement is 1000 gallons of water per swimmer per day.

The following methods are suggested for the evaluation of the incoming water supply to a swimming impoundment:

1. A weir measurement of low flow.
2. Available flow measurements from existing records of low flows.
3. An estimate based on watershed water production formulas. The following explanation describes how one arrives at such an estimate.

As a rule of thumb, one square mile of watershed may be expected to produce 50,000 gallons of water per day. As the watershed of the pond is approximately 150 acres, or slightly less than $\frac{1}{4}$ square mile, the production of water would be about 12,500 gallons per day using this rule of thumb method.

Using a rough formula of the United States Geological Survey (U.S.G.S.) (see below) a high minimum inflow of less than 3,000 gallons per day and a low minimum inflow of slightly over 250 gallons per day production from the

pond's watershed might be expected. This flow represents an inflow to the pond which can be expected to be equated or exceeded 90 percent of the time.

Formula:

minimum low flow 7-days out of every 10-years =

$$0.15 \left[\times \text{ drainage area in square miles} \right]^{1.37} =$$

flow in cubic feet per second with a $\pm 83.2\%$ factor.

To determine the number of swimmers per day the pond can safely support, the following formula is utilized:

$$\frac{\frac{V}{180} + F}{1000} = \text{number of swimmers per day}$$

V = volume of pond or lake in gallons

F = minimum inflow in gallons per day

Estimating the pond size at Camp Vreeland to be $2\frac{1}{2}$ acres, with an average depth of 3 feet, the volume of water contained in the pond would be 2,450,250 gallons. Using an inflow estimated by the rule of thumb method at 12,500 gallons per day, the pond would safely support 26 swimmers per day.

It was suggested that it would be possible to augment the inflow to the pond using the existing well. The total output of the well, an additional 28,800 gallons per day would be added to the pond inflow. This additional inflow could increase the number of swimmers which could be accommodated to 55 per day.

Utilizing the U.S.G.S. minimum flow formula for inflow, the high minimum inflow would produce water enough to support 16 swimmers while the low minimum inflow would support 13 swimmers. If the well augmentation flow of 28,800 gallons per day is added, an additional 28 swimmers may be safely accommodated in each instance.

The flow amounts developed through the use of these formulas should in no way be considered as absolute. They do, however, indicate that there may be problems maintaining a flow sufficient to provide water for any substantial use of the pond for swimming during dry periods. Low flows, of course, occur most often in the summertime, the season the pond will receive its highest use. A monitoring of the pond for a couple of years will give a better picture of actual conditions.

FORESTRY

Of the total site acreage, only approximately 10 acres are not forested. The forest area can be broken down into two main types. There is a 12 acre stand of ash and soft maple in the second age class (20 - 40 years) near Mountain Road, and the remaining 40 acres consists of a stand of mixed softwoods and hardwoods that are mature. (See Sketch Site Plan Map.) Hemlock and oak are the predominate species with beech, soft maple and birch the minor components.

Management of the 12 acre stand for timber is not likely as the land it is on appears to be one of the best areas for intensive recreational uses.

If the stand is to be managed, then a weeding that would favor (leave) the ash should be done in the near future.

The remaining 40 acres does afford an opportunity for forest management even if it is to be used for passive recreation. Hemlock, which is a climax species in this area, can be continued on this site indefinitely. It can either be harvested lightly as it matures, or left alone as a primitive forest.

Harvesting activities usually meet with opposition on recreation areas such as this, although such activities can be compatible if carefully executed. The high visibility and heavy use of the area may make logging undesirable or impractical at least on a large scale. A general thinning or improvement cut of the existing 40 acre mixed softwood and hardwood stand (with which the Forestry Unit of the Department of Environmental Protection could assist) would yield approximately 100,000 board feet, which at current prices would return somewhere around \$4,500.00. A thinning would encourage more desirable and better quality trees and shrubs over less desirable species. Access to the major portion of the timber is poor, but there is a good possibility that an arrangement could be made through the Tunxis State Forest.

There is a problem in identifying property boundaries on the site. A considerable amount of time was spent by the forester searching for some indication of accurate boundary lines, which proved unsuccessful. This inability to identify the property has caused some problems in providing accurate information on the forest stands involved. If the property extends further to the southwest than shown on existing maps, then there would be included a considerable amount of large oak that could double the timber value given previously. It is suggested that the property be accurately surveyed, and boundaries be clearly marked on the site. This will be important in terms of future management.

Some of the property contains wet areas that might be better left alone. Logging on these areas will have a negative visual impact that could affect further management activities. Also, logging should not occur on very steep slopes and within 150 feet of either side of the stream which crosses the property.

FISHERIES

Water quality in the small $\frac{1}{2}$ 2 acre pond appears to be excellent. The waters were very clear and clean the day the Team visited the site. No fishlife was observed.

The pond is stream fed by waters cooled by heavy forest cover which are subject to only a minimum number of hours of sunlight per day. Even though the pond is fairly shallow it will support trout on a put-and-take basis. It is doubtful many trout will survive beyond the fishing season because of the small size of the pond and the possible lack of control over the taking of the fish. Therefore, the fish will probably be caught quickly and will not experience exceptional growth. There is, however, a sufficient food supply available to support the fishery at least during the fishing season. The pond will also support such species as sunfish, and bass (to a small degree).

WILDLIFE

Wildlife considerations on this property are limited. The area is presently good farm and woodland wildlife habitat. Converting the site to intensive human use would directly reduce wildlife use of the area. The Sketch Site Plan Map indicates those sections of the property which are particularly good wildlife areas. These areas should not be changed if possible. The areas of "edge" between woods and fields should remain brushy to preserve cover for wildlife. Juniper, grape vine, old apple trees, and aspen are species in the areas. These species should be preserved.

This property could be opened to hunting during the fall and winter months, however, few residents would probably take advantage of it. It would, however, be an additional recreational use of the land with little impact on the wildlife in the area. The hunting season is generally after most other major types of recreation have terminated for the year. Since hunting is permitted on the surrounding State Forest land, hunting will already be in the area. It is suggested that natural populations be all that be considered for hunting, and the use of the area be limited to a small number of hunters.

Forestry practices involving timber harvesting and improvement cutting would be beneficial to wildlife in the area on a short term basis.

RECREATION POTENTIAL

Anticipated Use of the Area

The population of Hartland is approximately 1,400 persons, distributed between the separated areas of East Hartland (800 persons) and West Hartland (600 persons). While some use by the West Hartland residents, particularly youth groups, is anticipated, the predominate use of the area and its facilities will probably be by East Hartland residents.

Average weekly use will probably vary between 100-500 persons, depending on the season and activities. Maximum daily use would probably not exceed 200 persons, although the area could accommodate more. The annual use of the site will probably exceed 10,000 visitors per year.

The area can be easily developed to accommodate the recreational needs of the Town of Hartland for the present and for the foreseeable future. The only foreseeable limiting factor on expansion would be the size of the pond and the possible lack of sufficient water exchange during dry seasons.

Recreation Activities

This area has excellent possibilities for the development of many varied types of recreation. Picnicking (family and group), swimming and swimming instruction (on a very small and controlled scale), youth group camping, baseball and other field sports, hiking, fishing, ice skating, and cross-country skiing are all recommended recreational possibilities for the area. Horseback riding on the old woods roads is also possible but maintenance of the roads will be necessary to offset erosion and other damage created by the horses. Foot trails should remain, only with no horse or vehicle use permitted. Due to the small size of the site and conflicts with other more popular winter uses, snowmobile use of the area is not recommended. There will undoubtedly be pressure for such use by the local snowmobile club, but the area and most residents may be better served by fostering the other winter uses.

The land is quite suitable for nature and environmental study by interested residents, scout and other youth groups, and most particularly by school groups and science classes. The area has a number of varied natural habitats and the variety of associated flora and fauna would provide an excellent basis for such studies. Forestry practices may tie in well with this use.

WATER SUPPLY

The present well with 20 gallons of water per minute capacity is evidence of a good water supply in the area. The present well could be used for drinking water, or another well can be added for drinking water if a different location is desired. Water from the present well could be pumped into the pond as a recharge, especially during summer months, to help create healthier swimming conditions for users. Final approval as to the adequacy of the pond for swimming and the number of users per day will be with the Health Department.

WASTE DISPOSAL

Installation of a septic system may not be warranted or desirable for the present proposed uses. Existing and additional privies, with general maintenance, may prove sufficient. However, if in the future, it is determined that an on-site septic system is desired, an area exists centrally on the site where a leaching field may possibly be located. On the Soils Map these soil types would be designated as ChB and ChC (Charlton soils). Of course, on-site testing would be needed to fully substantiate this. Toilet facilities should not be too far from the pond, but should be far enough away and set back away from steep slopes to insure there would be no hazard of ground water pollution. Tg soils should be avoided due to the higher hazard of ground water pollution. Flush toilet facilities would probably require less maintenance.

Sanitary facilities will need to be installed in appropriate places for collection of garbage, etc.

FOUNDATION DEVELOPMENT AND GRADED CONDITIONS

The LcA - Leicester loam soil and HsC - Hollis very rocky loam soil, and all other soils having slopes 8 percent or greater will have the greatest limitations for building locations and grading (see Soils Map and Limitations Chart). The principal limiting factor in the LcA soil will be the existence of a high water table, and in the HsC soil will be the shallow depth of the soil to the bedrock and the steep slopes. The SvB soil will have limitations too, primarily due to the seasonal high water table associated with this soil type.

When removing vegetation from any of the areas of the property, immediate seeding with a temporary or permanent type grass mix is strongly recommended. It will be important to provide for sediment and erosion control as any land development occurs (i.e., cuts, fills, grading, etc.). Assistance regarding approved practices for erosion control can be obtained from the Soil Conservation Service.

ROADS AND UTILITIES

When constructing roads, Town specifications should be followed. Existing roads should be improved and maintained so that service vehicles can reach buildings, trash cans and other facilities. Improvements on the immediate entrance drive and parking area will probably be needed in the near future. It may prove advantageous to wait and observe use patterns (average number of vehicles per day) on the site during the first year while the property is being leased.

No roads should be constructed on a greater than 8 percent grade. Adequate drainage for runoff waters should be installed. Fire truck and other emergency vehicle access may be desirable to the pond. The existing path south of the pond may be improved for this, however, erosion control measures should be applied if the road is improved. It is suggested that no vehicles, other than maintenance or emergency, be allowed to cross the drainage area flowing into the pond.

HAZARDS - NATURAL AND MAN-INDUCED

It is suggested that dead and deformed trees be removed throughout the area where they present a hazard of falling down.

There is presently a rope hanging from a tree on the southeast side of the pond which could be hazardous for children and others. The existing water control structure in the dam has a metal lid that can be lifted off fairly easily. Locking it would be desirable to help prevent people from getting into the spillway structure.

Presently water enters and leaves the pond in various areas. It exits in a channel east of the beach and the concrete weir structure. The channel is not shaped properly and washout could be a problem during a heavy storm. Runoff should be calculated and the spillway constructed to handle high intensity storms. Adequate freeboard and vegetation should be maintained on the dike to prevent erosion. All brush on the front side of the dike should be removed. A lime, fertilizer and mowing program of the dike is encouraged.

Drainage along with a diversion may be necessary to prevent erosion on the beach, and to bring most water flows to one point in this area. For more water supply to the pond, the runoff from the watershed to the north should get into the pond. Some is apparently bypassing the pond below the spillway.

USE OF EXISTING FACILITIES, FUTURE DEVELOPMENT AND MANAGEMENT

Many services and facilities for recreational use already exist on the property. The following are suggestions for the use and management of those and the future development of others. (The following discussion areas correspond to the Sketch Site Plan Map.)

Main Entrance Area by Mountain Road

The former Dining Hall - Lodge with only minor revision and repair can be used as a Town meeting place where group picnics or regular meetings of various organizations can be held, i.e., volunteer firemen, scouts, clubs,

youth center, etc. A natural parking area is available between this building and the road to accommodate 70-100 cars. This should be adequate for anticipated present use. Some grading and use of gravel may be necessary. Additional area could be developed as needed.

The adequate well with its well house is now set up for seasonal operation. Some revision to provide for year-round use of the Main Entrance Area facilities or at least to provide an outside frost free hydrant for year-round use is needed. This installation would consist of a buried well pit and tank (either poured concrete or cement block pit) with submersible pump and buried waterlines.

The former Infirmary could be revised, winterized and attached to the year-round well system so that it could accommodate a live-in caretaker(s). Someone could be hired to provide the on-site supervision, maintenance and control of the area which is so necessary to prevent costly vandalism and to insure proper care and safe use by residents. This person may also serve as a part-time nature and/or recreation director for the Town.

Youth Group Camp Area

The center of the property contains a youth group camp area. Three or four of these buildings should be reserved for the overnight use by local scout troops, or school nature and science groups. One or more of these buildings could be slightly revamped to provide for winter camping.

The other group sites and adjacent tent platforms should be dismantled (if not needed). The lumber should be salvaged, where possible, for the construction of other needed structures in the park.

Future Central Core Facility Area

In general, it would be most desirable to keep the picnic, play, and any intensive use areas on top of the hill to the southeast of the pond.

There is a natural parking area for 40-50 cars with nearby open fields which is the ideal site to provide future beach parking, and parking for baseball and other field sport activities. It is located in a central area and so provides convenient access to the entire property. The location of a flush toilet - bathhouse facility here in the future may also be desirable. Moving several of the vault privies from the outlying campsites would provide adequate facilities for the present and provide winter season facilities for the future.

Athletic Fields

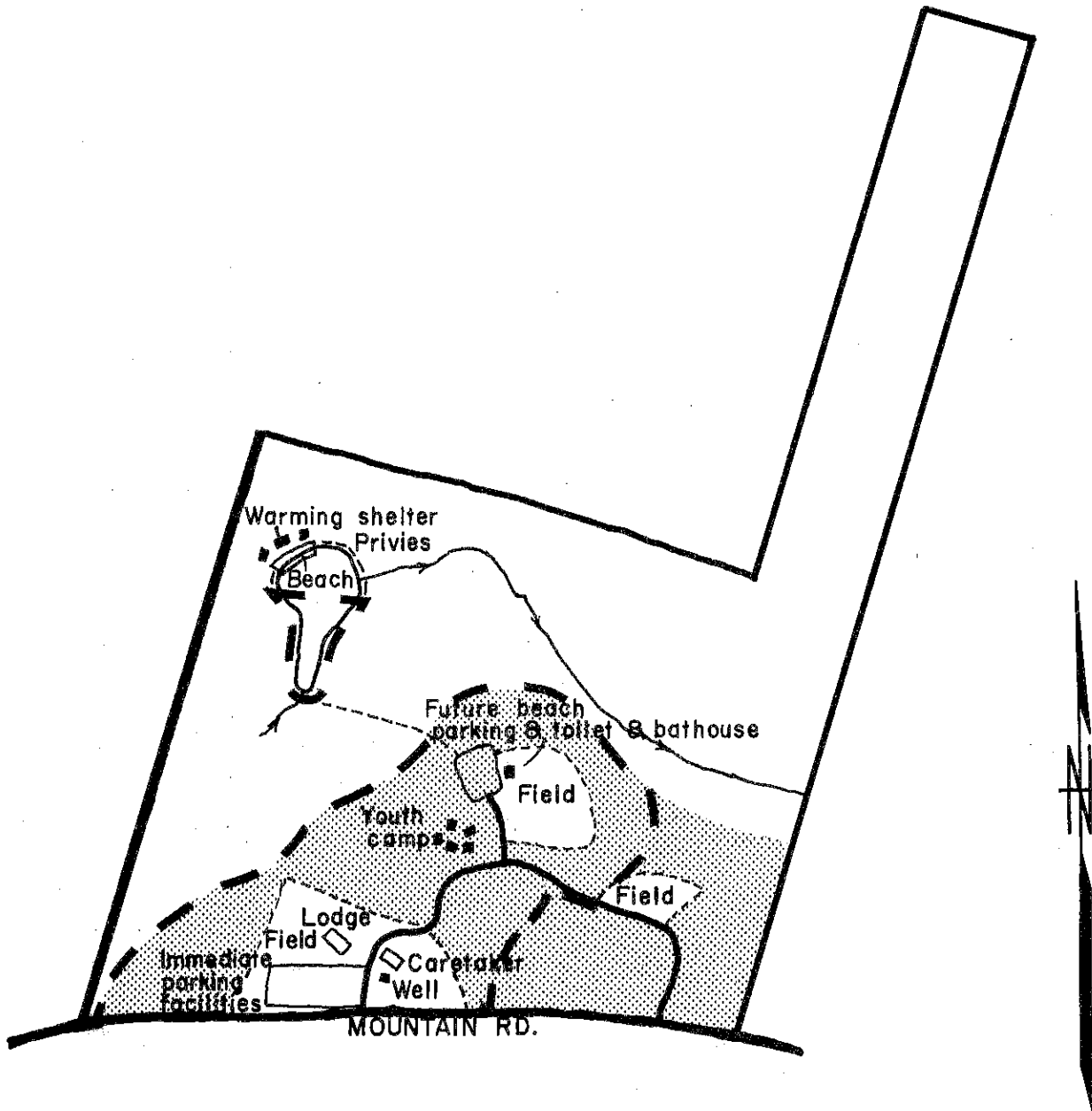
There is a possibility of locating a ball diamond between the service road and Mountain Road in the southeastern portion of the property. The area referred to for the diamond has young trees that can easily be cleared and topographically it is relatively level. Soils checked by a Soil Conservation Service Soil Scientist were found to be suitable for athletic fields. The soil shown as SvB in this area does not appear to be as extensive on-site as shown on the soil survey.




Pond and Beach Area

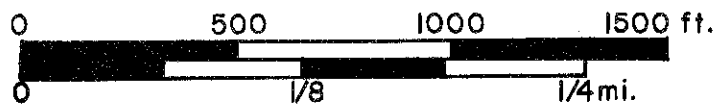
The present sandy beach area should be adequate for the limited anticipated use of the pond, although some regrading and sand will be needed in the future. The present brushy shoreline should be maintained as is or

SKETCH SITE PLAN

CAMP VREELAND



-  Wildlife Habitat (Except Fields)
-  Ash & Soft Maple Stand
-  Mixed Softwood & Hardwood Stand



SCALE 1" = 450'

gradually converted to coniferous trees to prevent shoreline erosion, siltation and accumulation of leaves in the pond. The east side of the pond, a steep slope covered with birch and evergreens, should be left as is with no cutting. The existing vegetation is important in preventing soil erosion and provides a view from the opposite shore which is aesthetically pleasing. These advantages probably make up for any disadvantages of leaves falling into the pond.

Two sealed vault type privies should be installed for emergency use by beach patrons. This will assist in keeping the water clean and will also serve skaters in the winter. Installation of skating lights would be very expensive and therefore daylight use of the area only is recommended. A skaters' warming shelter might also be considered for this area.

Trails

The trail system and its permitted uses should be carefully planned and mapped so that development can occur on a sound basis. Existing trails could be expanded for hiking and cross-country skiing. It may also be feasible to use State Forest land for trails. If this is done, it should be coordinated with Department of Environmental Protection approval. Fire access to the pond may be desirable by the State with an access road into State land which could be used for hiking as well.

COMPATIBILITY OF SURROUNDING LAND USES

The proposed use for the site, as a Town recreation area, is in harmony with land use in the surrounding area which is primarily open space (State Forest), with some agriculture and low density housing. The proposed use should further the Litchfield Hills Regional Planning Agency's goal of improving and conserving the quality of the environment.

ALTERNATIVE LAND USES

Woodland for timber management is probably the best alternative land use. It can still be incorporated into the plan as a secondary use.

GENERAL COMMENTS

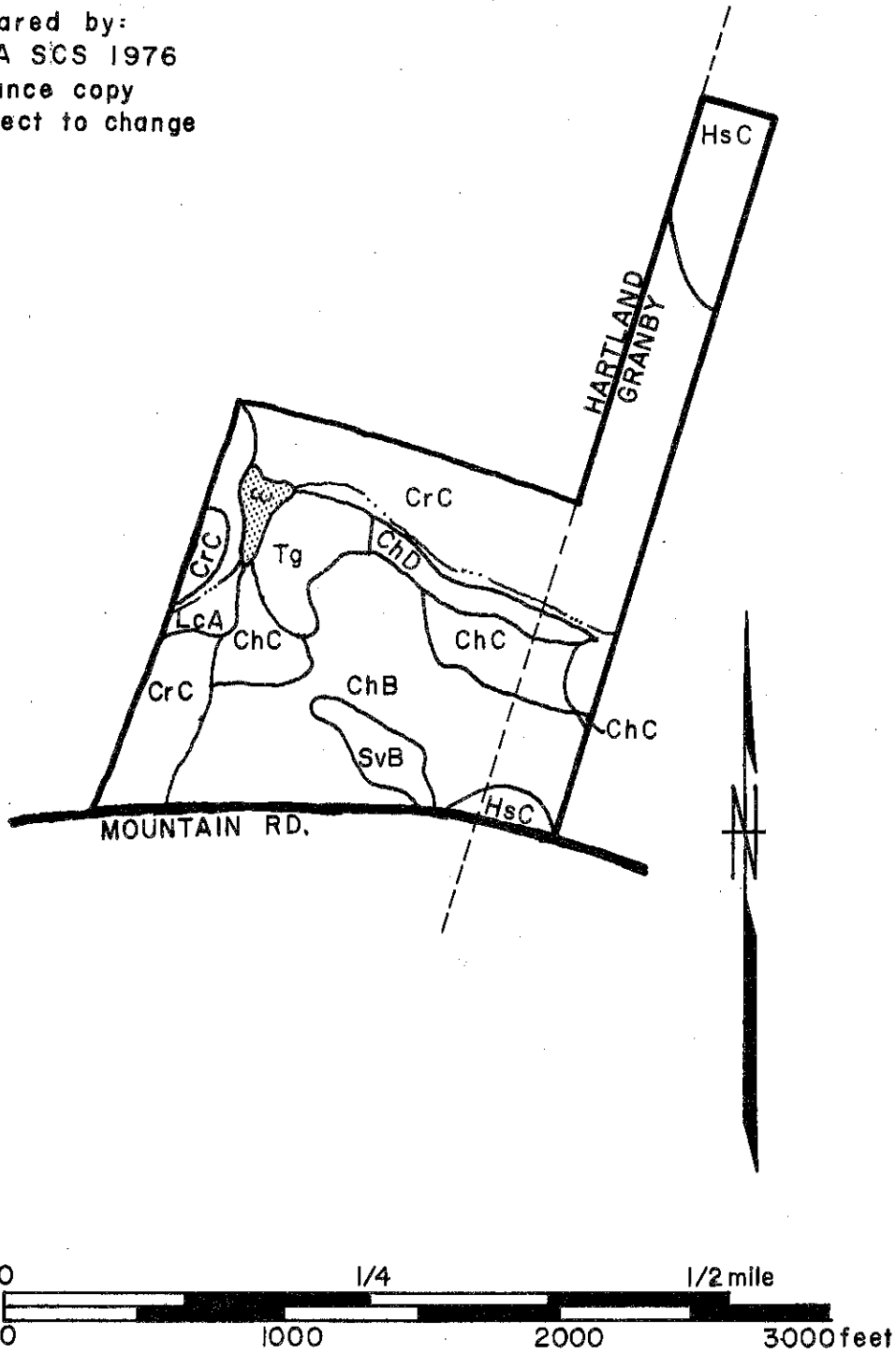
A good overall recreation and resource management plan for the entire area should be made prior to actual development. It would be desirable to incorporate some of the uses and management suggestions mentioned in this report. The final plans and projected costs of all proposed development or improvements to existing facilities should be reviewed by the Town so that priorities for the development of the area can be established. In this way a course of action will be taken that will hopefully best serve the needs and desires of the Town. Thus, wasted effort, false starts, and conflicts of use can be avoided.

The plan should then be reviewed again after several years of use of the property to reassess the priorities and demands of the Town.

SOIL MAP

CAMP VREELAND

Prepared by:
USDA SCS 1976
Advance copy
Subject to change



SCALE 1" = 660'

SOILS LIMITATIONS CHART
Camp Vreeland, Hartland

Limitation Ratings for:*

Natural Soil Group	Mapping Symbol	Slope %	Approx. Acres	Percent of Total Acres	On-site Sewage	Building with Basement	Land-scaping	Streets and Parking	Athletic Fields	Principal Limiting Factors
A-1c	Tg	15-35	3.5	5.5	3	3	3	3	3	slope, droughtiness
B-1a	ChB	3-8	17.0	26.6	1	2	2	2	2	stoniness, slope
B-1b	ChC	8-15	5.5	8.6	2	2	2	3	3	slope, stoniness
B-1c	CrC	3-15	25.0	39.1	3	3	3	3	3	stoniness, slope
B-1d	ChD	15-25	2.0	3.1	3	3	3	3	3	slope, stoniness
B-2a	SvB	3-8	2.0	3.1	2	2	1	2	2	seasonal water table, slope
B-3a	LcA	0-3	2.5	3.9	3	3	3	3	3	high water table
D-1	HsC	3-15	4.5	7.0	3	3	3	3	3	shallowness, slope
(Pond)	w		2.0	3.1						
Total			64.0	100.0						

* Limitations: 1 - slight; 2 - moderate; 3 - severe (see following page for further explanation of limitation classifications).

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.