CONNECTICUT RIVER FLOOD CONTROL

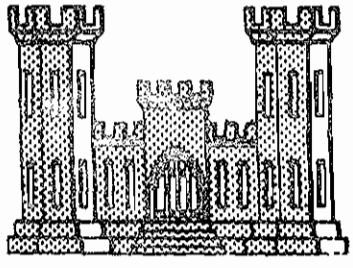
TOWNSHEND

DAM & RESERVOIR

WEST RIVER, VERMONT

DESIGN MEMORANDUM NO. 9

MASTER PLAN FOR RESERVOIR DEVELOPMENT



U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS WALTHAM, MASS.

APRIL 1961

U. S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM 54, MASS.

ADDRESS REPLY TO:
DIVISION ENGINEER

REFER TO FILE NO.

NEDGW

5 April 1961

SUBJECT: Townshend Dam and Reservoir
Connecticut River Basin, Vermont -
Master Plan for Reservoir Development

TO: Chief of Engineers
Department of the Army
Washington, D. C.
ATTENTION: ENGCW-O

1. Submitted for review and approval are four (4) copies of Design Memorandum No. 9, Master Plan for Reservoir Development, together with a copy of this letter bound in each copy of the memorandum, in accordance with EM 1110-2-1150.

2. The plan has been developed to provide for maximum use of the reservoir by the public consistent with the resources of the area and the authorized flood control operation of the project.

3. No additional land is required.

4. Adequate funds are contained in approved project estimate.

5. Early approval is requested as a basis for initiation of construction this spring.

FOR THE DIVISION ENGINEER:

Karl F. Eklund

Incls (quad)
Design Memorandum No. 9
Master Plan for Reservoir
Development, Townshend
Reservoir, Vermont

KARL F. EKLUND
Colonel, Corps of Engineers
Deputy Division Engineer

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FOREWORD

The completion of the Townshend Flood Control Reservoir on the West River in southeastern Vermont will supplement existing public park recreational opportunities in a region where public water areas are scarce.

Within a forty mile radius of the project in Vermont there are three developed National Forest areas, eleven State Forests and seven State Parks. None of these provide facilities for boating and only three have water areas for swimming.

The 100-acre permanent pool retained behind the Townshend Dam will be an important addition to the few existing public recreational areas containing a water body for these uses.

The West River Valley in the vicinity of the project is unspoiled and highly scenic.

In addition to the resident population of Vermont, southwestern New Hampshire, and northwestern Massachusetts which is within the zone of influence of the project, the highly populous northeast section of the country intensively uses this general region for summer vacations and in constantly increasing numbers for winter sports.

The Master Plan has been developed from a study of the recreational requirements of the region and recreation, conservation, and wildlife potentialities of the reservoir area.

The views of other interested Federal, state and local agencies have been carefully considered.

The Master Plan proposes basic initial development by Federal funds to the extent necessary for public access, parking, and sanitation and minimum facilities which will enable the public to enjoy the recreational resources. The approved project estimate contains funds adequate for accomplishing the proposed development.

It is contemplated that subsequent development and management would be by appropriate agencies of the State of Vermont under license agreement.

Interim management and maintenance of the reservoir area for public use will be performed by this office subject to the availability of funds for this purpose.

BIBLIOGRAPHY OF DESIGN MEMORANDUMS

TOWNSHEND RESERVOIR

Design Memo No.		Submission Date	Approved
1	Hydrology and Hydraulic Design	11 Jul 56	30 Aug 56
2	Geology and Soils	1 Oct 56	15 Nov 56
3	Embankment	23 Nov 56	15 Jan 57
4	Spillway and Outlet	28 Dec 56	31 Mar 57
5	General	4 Mar 57	21 May 57
6	Relocations	24 Aug 56	10 Oct 56
7	Real Estate	14 Dec 56	29 Jan 57
*	Concrete Aggregates	31 Dec 56	15 Jan 57
9	Master Plan for Reservoir Development	March 1961	11 May 61

*This memorandum was prepared for North Hartland, North Springfield, Ball Mountain and Townshend Dams

I. INTRODUCTION

1. Authorization. The Townshend Dam and Reservoir is a unit of the comprehensive plan for flood control in the Connecticut River Basin. Authorization of the plan is contained in the Flood Control Act of 1938 (Public Law 761, 75th Congress, 3rd Session) as modified by the Flood Control Act of 1941 (Public Law 228, 77th Congress, 1st Session) and the Flood Control Act of 1944 (Public Law 534, 78th Congress, 2nd Session). Construction of the project was initiated in October 1958 with completion scheduled for June 1961.

Authorization for development and use of reservoir areas for public recreational and other purposes is contained in Section 4 of the Flood Control Act approved 22 December 1944 (Public Law 534, 78th Congress, 2nd Session), as amended.

This Master Plan for reservoir development has been prepared in accordance with EM 1130-2-302, Planning and Administration of Project Lands and Waters, and related manuals.

2. Purpose and Scope. The purpose of this master plan is to present a comprehensive and coordinated program for the development, management and use of the Townshend Flood Control Reservoir Area for public purposes which are not incompatible with the authorized project purpose. This plan will serve as a guide in the operation and control of land and water use for the derivation of maximum public benefits from the resources of the project. It is intended that this plan will be flexible so that adjustments may be made to it as any changing conditions may warrant.

The scope of this plan includes an evaluation of the public recreational potential of the reservoir area in relation to other recreational opportunities available to the public within the area on which the project may be expected to exert influence.

The development and subsequent operation required to carry out the program has not been considered solely a Federal responsibility but rather a partnership with State and local agencies in providing for public enjoyment of the recreational resources of the project.

3. Cooperative Planning. The following agencies participated in studies leading to the recommended master plan:

Vermont Water Conservation Board
Vermont Fish and Game Service
Vermont Department of Forests and Parks
U. S. Fish and Wildlife Service
West River Valley Development Association

In addition, a public meeting, sponsored by the Vermont Water Conservation Board, was held in March 1960 at Townshend, Vermont at which the views of the general public regarding recreational uses of the reservoir area were received.

The recommendations of the State of Vermont, submitted by the Water Conservation Board with the approval of the Governor, are included in Appendix B.

These interests concur in this master plan, as submitted.

II. DESCRIPTION OF AUTHORIZED PROJECT

4. Location. The Townshend Flood Control Dam is located on the West River in the Township of Townshend, Windham County, Vermont. It is in the southeastern part of the State, about 19.5 miles upstream of the confluence of the Connecticut and West Rivers at Brattleboro, Vermont and 22 miles north of the Massachusetts border. It is 9.5 miles downstream of the Ball Mountain Flood Control Dam, another Corps project which is scheduled for completion during the summer of 1961.

5. Pertinent Data. The dam is a rolled earth and rockfill structure 1,700 feet in length with a maximum height of 133 feet above the stream bed. The top of the dam is at elevation 583 feet, mean sea level. It has a side channel spillway 439 feet long at elevation 553 feet mean sea level, and a deck truss spillway access bridge 160 feet in length.

The outlet works include a horseshoe type conduit 360 feet long with an inside diameter of 20.5 feet. Three vertical-lift gates, each 7.5 feet by 17 feet, are operated from a combined tower intake and gate structure. Length through the gated water passages is

107.74 feet. The intake channel is 800 feet long with a bottom width of 42 feet.

The capacity of the reservoir at spillway crest is 33,900 acre-feet, which is the equivalent of a runoff of 6 inches from the net drainage area of 106 square miles below the Ball Mountain Dam. When filled to spillway crest, the reservoir is about 4.5 miles long with a surface area of about 735 acres and a shoreline of about 11 miles.

An operating pool with a surface area of about 100 acres at elevation 478 m.s.l. has been provided for the protection of the gates during the winter. This pool has a maximum depth of about 28 feet at the dam. It is maintained by a concrete weir built around the center gate.

The Townshend Reservoir will be operated primarily to desynchronize flood flows of the West River from flood flows on the Connecticut River. Flow from the reservoir will be reduced whenever forecasts indicate the channel capacity of the Connecticut River would be exceeded. The operation of this reservoir will be coordinated with the operation of Ball Mountain Reservoir and other reservoirs in the Connecticut River Basin to obtain the maximum reduction in overall flood damages.

The cost of the project is estimated at $7,150,000.

6. Description of Reservoir Area. Reservoir land required for the project is estimated at 1,179 acres, of which 985 acres will be in fee simple with flowage easements on the remainder. The reservoir is characteristic of the generally rough relief found throughout the West River Valley, with generally open valley floors and steep hillsides. About 46 percent of the area is wooded, 42 percent is open fields and 12 percent in pool and streams. Willow-alder brush, together with woodland composed chiefly of elm, aspen and sycamore, cover much of the bottom land. The adjacent side slopes are forested with sugar maple, white and yellow birch, and white pine.

The reservoir is elongated in shape with a length of about 4.5 miles, a maximum width of about 2,000 feet and an average width of about 1,500 feet.

The West River flows through the reservoir with an average slope of 22 feet per mile.

7. Climate. The average temperatures for January and July in the vicinity of the project are 19.5 degrees F. and 67.5 degrees F., respectively. The first killing frost occurs about 1 October and the last about mid-May. The growing season averages about 135 days. Precipitation for the year averages about 42 inches and is well distributed among the seasons with a maximum of 57 inches and a minimum of 33 inches being recorded over a 35-year period of record. The average annual snowfall is about 81 inches between the months of November and April. Prevailing winds are from the northeast in the winter and from the south in summer.

III. PROJECT RESOURCES

8. Suitability of Reservoir Area for Recreational Use. The Townshend Reservoir is a single-purpose flood control reservoir and, in accomplishment of its objective, may impound floodwaters to a maximum depth of 103 feet at the dam. Although it is recognized that a flood may occur at any time of the year in the precipitous river basins of New England, the major use of this reservoir will be in the spring of the year with release of the impounded floodwaters occurring as rapidly as downstream conditions and channel capacities permit. Experience over the past twenty years in the operation of other flood control reservoirs in New England indicates that the natural resources of the reservoirs are available for uninterrupted use during most of the summer, fall and winter seasons. Experience has further shown that the important benefits accruing from public recreational development and use, fish and game and forestry management and other uses have proven quite compatible with the authorized flood control purpose of these reservoirs. It is therefore concluded that the project is suitable for the development and use as proposed in the master plan.

The permanent pool of about 100 acres with a shoreline of 3.3 miles will be a major attraction to the visiting public in an area where a dearth exists of such resources in public ownership and where aquatic related activities find the most favor with the general public.

The West River Valley in the vicinity of the project is unspoiled and highly scenic.

The project is readily accessible over an excellent highway system.

The land and water areas of the reservoir are well suited for swimming, picnicking, boating, fishing, hiking and nature study with moderate development of basic facilities.

9. Fish and Wildlife Resources. Hunting and fishing are active sports in the West River Basin. In the vicinity of the reservoir, the West River is clear and unpolluted and flows swiftly over shallow, rubble-bottom riffles and through long deep pools. Local and out-of-state anglers utilize this readily accessible scenic section of the river which provides fair to good fishing for smallmouth bass. Trout are not common in the area and those occasionally taken probably represent individual fish that have moved downstream during spring high water flows. This section of the State supports an abundant white-tailed deer population. The acreage of the site is not large, and evidence of deer use is common. The open bottom-land fields, some of which are reverting to woody vegetation, offer attractive habitat units as adjuncts to the surrounding heavily forested slopes. The site does not present significant small game values. Limited cottontail rabbit habitat is present along abandoned field edges and throughout the brush and woodland fringes. Snowshoe hares are present in limited numbers on the wooded slopes that border the project site. Grouse are making use of the heavy woodland on the steep slopes as well as the woodland and brush units that extend out into the valley floor from the base of the hills. A small amount of woodcock habitat is present in the brushy old stream beds and seepage areas. Raccoons are abundant in the region and along with foxes, include the site as a portion of their range. Other fur animal species are scarce. Waterfowl habitat is poor and little use is made of the area. The effect of the reservoir on specific wildlife groups is briefly described as follows:

Approximately 1.5 miles of West River will be inundated by the permanent pool, but for the 2.8 miles of West River subject to periodic and temporary flooding the stream fishery resource will suffer only slight damage. Operation of the reservoir to retard flood flows may reduce scouring action, thus benefiting the downstream fishery. Townshend Dam will maintain a permanent pool at elevation 478.00 feet, mean sea level, inundating about 100 acres of land and 1.5 miles of stream. Although the pool will have a depth of 25 feet immediately behind the dam, most of it will be less than 10 feet deep. It will be 700 to 1,000 feet wide. Most of the acreage that will be inundated permanently is now in hay and upland brush. Good habitat will be provided for the development of a warm-water fishery resource,

particularly smallmouth bass. Although periodic fluctuations of the water level might interfere with bass spawning during a particular year, it is not expected to be a serious factor in limiting bass populations. In addition, the permanent pool may provide suitable conditions for an early season stocked trout fishery.

Terrestrial wildlife species will lose approximately 15 acres of upland brush, 14 acres of woodland, and 45 acres of agricultural land due to inundation by the permanent pool. Game species such as deer and grouse will not be greatly affected by the loss of habitat because there is an abundance of similar habitat outside the permanent pool area. Snowshoe hares will not suffer measurably. Cottontail rabbits, which thrive in brush land and along the edges of ditches and hayfields, will suffer an initial loss of habitat and this type of habitat is not abundant in the immediate vicinity. Ultimately, however, the cottontail rabbit, and perhaps woodcock, will gain more habitat than they lose. Deer and grouse will also benefit. A considerable portion of the hayland acreage between the permanent pool level and the various flood pool levels will, in succeeding years, revert to fallow field and brush land, thus providing additional habitat for rabbits and to a lesser degree for woodcock. With the creation of additional shoreline, raccoons will benefit to a moderate degree. The existing low populations of beaver, muskrat, and mink will suffer losses from the project. Waterfowl will benefit by the creation of the permanent pool for use as a resting area and the small amount of shoal marsh which will develop at the head end of the pool. The fluctuation of water levels will limit, though not rule out, the possibility of waterfowl nesting within the reservoir area.

10. Report of Wildlife Agencies. A preliminary report on the fish and wildlife resources in relation to the water development plan for the Townshend Reservoir Project on the West River was submitted by the U. S. Fish and Wildlife Service in November 1950 and a detailed report was received in March 1959. These reports were prepared in cooperation with the Vermont Fish and Game Service.

The detailed report concluded that "the effects of the project on wildlife resources will be neutral or slightly beneficial."

11. Other Resources. The forestry resource of the project will be evaluated in cooperation with the Department of Agriculture and appropriate State agencies as required by Public Law 86-717-H. R. 9377, and development and management for this purpose will be accomplished to the extent practicable and compatible with the recommended other uses of the project.

The National Park Service, the Vermont Historic Sites Commission and the Town of Townshend indicated that a covered wooden bridge located across Tannery Brook within the reservoir area was of significant historic interest. The flood control demands of the project required that this structure be removed from the reservoir. In order to preserve this relic of early New England for future generations, this 75 foot bridge was carefully dismantled and stored. It is available to the Town for subsequent erection where desired.

No other known historical, archeological, or mineral resources are affected by the project.

IV FACTORS INFLUENCING RESERVOIR DEVELOPMENT

12. Features of Region Served. Located about 120 miles northwesterly of Boston, 200 miles southerly of Montreal, 90 miles easterly of Albany and 220 miles northerly of New York City, and served by an excellent highway system which is being improved and expanded constantly, this region of Vermont and New Hampshire is a most important factor in satisfying the ever-growing recreational demands of the populous northeast section of the United States and eastern Canada. The beautiful Connecticut River Valley is the centerpiece of a panorama which includes the Green Mountain Range of Vermont and the White Mountain Range of New Hampshire with imposing peaks and sparkling streams. The Appalachian Trail passes through the region. National Forest Areas have been established in both mountain ranges. Lake Champlain and Lake George in the westerly part of the region and Lake Winnipesaukee and Lake Sunapee in the easterly part of the region are major attractions. Other features which add to the interest of the general area are Franconia Notch and the Aerial Tramway, The Flume, The Old Man of the Mountain, the Mount Washington Cog Railway, the Calvin Coolidge Homestead and Quechee Gorge.

This is a land of great historical interest. It is the scene of the savage struggles between the English, French and Indians which so greatly influenced the ultimate destiny of the North American

Continent, and later battles of the Revolutionary War. Great names of early American history and their deeds are still alive in this land - Champlain, Frontenac, Howe, Robert Rogers and his Rangers, Sir Jeffrey Amherst, Montcalm, Wolfe, Ethan Allen and the Green Mountain Boys, Benedict Arnold, Ticonderoga and many others.

All these exert a strong attraction for the vacationist, the hunter and the fisherman, and, in greatly increasing numbers, the winter sports enthusiast.

Reflecting the importance of recreation to the New England economy, and indicative of the growing demand for recreational opportunities, are figures compiled by the New England Council which showed that vacationists put about $1.1 billion into the New England economy in 1960 and current reports of various type activities indicate a further increase this year. Fishermen and hunters will spend an estimated $350 million in New England this year, according to an analysis of the U.S. Fish and Wildlife Service. Vermont and New Hampshire are important participants in the above activities.

Southeastern Vermont and the West River Valley contain small communities whose economy is based principally on tourism and dairy farming. The area is proving increasingly attractive for year-round retirement residences as well as summer homes.

13. Population. The number of persons residing within an hour's drive (40 miles) of the project is estimated at 304,000 by the preliminary 1960 U.S. Census. See Table 1, "Population Data."

The principal cities within a 40-mile radius of the project follow:

City	Population
Brattleboro, Vermont	9,300
Springfield "	9,900
Bennington "	8,000
Keene, New Hampshire	17,600
Claremont, New Hampshire	14,000
North Adams, Massachusetts	19,800
Adams "	12,400
Greenfield "	17,600

The balance of the population is contained in small towns and villages.

TABLE I

Population Data

	Within 10 Miles		Within 25 Miles		Within 40 Miles	
	1960	1950	1960	1950	1960	1950
Massachusetts			1,716	1,637	95,406	93,915
New Hampshire			31,748	28,864	71,050	67,208
Vermont	4,700	4,555	56,803	55,042	94,082	91,165
New York					43,500	42,100
Total	4,700	4,555	90,267	85,543	304,038	294,388

14. Existing Public Recreation Areas. The four states within the 40-mile zone of influence of the project all provide state parks, forests, and other recreation areas for the public. The development of these vary considerably in extent. Plate Number 2 shows the location of existing public recreation areas and available uses. It will be noted that only one Vermont Park provides swimming. The addition of the Townshend permanent pool to supplement the deficiency of public water areas in the vicinity will be of great value.

15. Interest in Public Use. Strong public interest has been shown for the past decade in recreational use and development of the project area. Newspaper editorials have endorsed such use. The people of Townshend, hunters, fishermen, and the West River Valley Development Association have supported this use. The U. S. Fish and Wildlife Service and the Vermont Fish and Game Service recommend fish and wildlife management and public hunting and fishing. The Water Conservation Board of the State of Vermont, with the approval of the Governor, in letter dated 5 August 1960 to the Division Engineer, after due consideration of the many varied, and sometimes divergent views, expressed the interest of the State by a recommendation that the Water Conservation Board be licensed to operate and maintain the reservoir area for uses as proposed in this master plan.

16. Anticipated Public Use. The Townshend and Ball Mountain Reservoirs are only nine miles apart and it is expected that these two reservoirs will serve approximately the same areas. The North Hartland and North Springfield Reservoirs are within an hour's drive northerly of the Townshend Reservoir and will serve a portion of the population within a common zone of influence.

The recreation land and water resources of the Townshend Reservoir are those described as intermediate recreation areas in the 1959 publication by "Resources for the Future, Inc.," titled "The Crisis in Outdoor Recreation." This recognizes the difference between resource-based recreation areas of outstanding natural qualities and user-oriented recreation areas whose most important characteristic is accessibility. An intermediate recreation area is defined generally as a day-use area relatively easy to reach with boating, swimming, hiking, picnicking and fishing as the most common activities. It has pleasing scenic qualities and can readily be adapted to public recreation use. It has been estimated that the demand for this type area will increase as much as sixteen times by the year 2000. The proposed initial development at the project site is designed to accommodate 55,000 visitor-days use by 1964, allowing room for expansion as later demands may warrant.

The procedure used in estimating annual attendance is based upon the population and population trends within an hour's drive of the project, weighed by the experienced relationship between park visits and population. In Vermont there are 1.15 park visits per capita and ever-growing tourism indicates an increasing ratio of out-of-state visitors.

Consideration is then given to other factors such as accessibility, other public and private facilities, vacation patterns, and experienced use of similar type installations.

The anticipated annual attendance of 55,000 by 1964 was arrived at in cooperation with officials of the State of Vermont and is considered conservative. This visitation estimate represents the use of the area annually by 15 percent of the population residing within a 40-mile radius of the project.

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V IMPROVEMENTS NEEDED

17. Requirements for Maximum Benefits. Cooperation of Federal, State and local agencies with the Corps of Engineers will be required in order to obtain maximum recreation, conservation, and wildlife benefits from the Townshend Reservoir. Development by the Corps of Engineers will be limited to minimum access, sanitary and picnicking facilities, parking, boat launching ramp, and provisions to make the recreation area safe for public use. It is expected that the provision of these basic facilities will encourage full development, management, maintenance and services by state and/or local agencies. The Water Conservation Board of the State of Vermont has requested a license for management of the recreation area by an appropriate state agency. The issuance of such a license will be recommended subsequent to approval of this Master Plan.

In order to secure maximum wildlife benefits from the project's resources, a general plan will be developed for fish and wildlife management with the U.S. Fish and Wildlife Service and the Fish and Game Service of the State of Vermont with a subsequent license to the State Fish and Game Service for management and improvement of project areas for wildlife purposes.

The importance of the forestry resource of the project will be evaluated in cooperation with the U. S. Forest Service and the Forestry Division of the State and appropriate improved forestry measures will be initiated.

Cooperation of state and local highway agencies will be required in order to continue desirable road access to the project and to erect suitable direction signs to the project.

18. Type of Facilities Required. It is contemplated that Federal expenditures will be limited to the following types of facilities in the reservoir area: access roads, car and boat trailer parking, boat ramp, picnic facilities including picnic tables, fireplaces and trash receptacles, a beach area, change house structure, pit-type toilets and attendant structures, well water with hand pump, and safety measures as required. Adequate signs will be posted for the information, direction, safety and convenience of the visiting public.

Snow will be cleared to provide a skating area during the winter months, and for the parking of cars, to the extent that the demand for such use warrants.

VI DEVELOPMENT PLAN

19. General. The two areas proposed for initial development have been selected as being suitably located for providing public access and use in the most economical manner and having the further capability of expansion when and if needed. The beach area is located at the site of a borrow area required for project construction and grading was accomplished as a part of the contract requirements at no additional cost. The boat-launching ramp is located adjacent to former Route 30, which now serves as an access road through the reservoir to the permanent pool and which has otherwise been abandoned. The elevation of the pool was selected to provide a suitable water area, to take advantage of existing physical features of public use potential and, most importantly, to provide winter protection for gate operation for flood control purposes.

20. Land Allocation. The tentative allocation of project lands for various purposes is shown on Plate 3. It is contemplated that the area in the immediate vicinity of the dam will be reserved for project operational and maintenance purposes; the West Recreation Area will be reserved for public park purposes; the East Recreation Area essentially for boat launching; an overlook area adjacent to relocated Route 30 for viewing the dam and reservoir with the rest of the project's lands being allocated for fish and wildlife management and improvement. It is further contemplated that the last noted allocation also includes forestry improvement where appropriate since this Division is a firm subscriber to the concept of "Trees and Game - Twin Crops." No outgrants of land for individual or non-public use or purposes will be considered until such time as it shall be demonstrated that it is excess to public need. With the strong demand for public use, this does not appear likely.

21. Plan of Improvement. The development of facilities by the Corps of Engineers in areas to be later licensed to the State or other agencies will be confined to improvements described in this memorandum so that considerable latitude will be allowed the operating agency in its program. The proposed plan of initial improvements follows:

a. Vicinity of Dam. Located in proximity to the heavily traveled Route 5, the main highway north and south through the Connecticut River Valley between southern New England and Canada, and located adjacent to Route 30, a major east-west road across

southern Vermont, the Townshend Dam is expected to exert a significant attraction for visitors, and an access road across the top of the dam, a comfort station, a parking area and an overlook area have been provided in the prime construction contract for the accommodation of the visiting public.

b. West Side Recreation Area. This is the area where development is planned for day-use park type recreation, including a swimming area. The improvement proposed consists of the following:

Access Road
Parking Area
Sanitary Facilities
Well, with hand pump
Picnic Tables and Fireplaces
Trash Receptacles
Fire Barrels
Beach
Change House
Selective Clearing
Safety Measures
(Floats at swimming area, etc.)
Signs, as required

c. East Side Recreation Area. This site is proposed for boat launching and related activities and is designed to keep boats away from the swimming area. The proposed improvements consist of the following:

Boat launching ramp
Auto and boat trailer parking
and turn-around
Pit-type latrine
Well, with hand pump
Picnic Tables, Fireplaces and
Trash Receptacles
Improvement of existing access road

d. General Reservoir Area. Minimum improvement of existing roads and cooperative planning with the State Forestry Department for fire protection and suppression measures.

e. Control of Access Roads. Barriers will be installed on all roads leading into the reservoir area so that they may be closed, as a safety precaution for the public, prior to any impoundment of floodwaters. Suitable signs will also be posted.

22. Criteria. The extent and type of the recommended basic facilities follows guideline criteria as established in EM 1130-2-312. These provisions are in general consonance with park criteria of the State of Vermont and the National Park Service.

The authorized project needs for availability of the reservoirs for the storage of flood flows at all times required some modification of features in order to eliminate hazards to this operation by providing against flotation.

Signs have been designed to blend with the rustic nature of the area.

23. Schedule of Development. The proposed development is scheduled for construction in the last quarter of Fiscal Year 1961.

Funds contained in the approved project estimate are adequate to accomplish the proposed work.

If additional development should be required at some future date because of inadequacy of facilities due to increases in usage greater than anticipated and inability of the prospective licensee to provide such accommodations, then funds will be requested as part of the program for completed projects.

A summary of proposed facilities and estimate of cost are included in Appendix A.

VII RESERVOIR MANAGEMENT

24. General. Planning for management of the reservoir area for public use has proceeded on the basis of ultimate management by appropriate agencies of the State of Vermont under a long term license agreement. With the approval of the Governor, the Water Conservation Board of the State has requested such an arrangement. It is contemplated that developed recreation areas will be managed by the Vermont Department of Forests and Parks and the remainder

of the reservoir will be managed in the interest of fish and wildlife by the Vermont Fish and Game Service. Management of the forestry resource will be integrated with this activity where compatible.

It must be recognized, however, that several factors may not permit the immediate undertaking of these responsibilities by the state agencies. The method of funding for necessary personnel and maintenance, and the time when funds shall become available have not yet been fully determined.

In order to make the recreational use of the project available to the public during this interim period, this office will manage, operate and maintain roads and other public use facilities subject to the availability of funds for this purpose.

25. Corps Personnel Required. Operating personnel required for this project to perform its authorized mission of flood control is limited to an operator of the dam and an assistant. Adequate management of the proposed public use program will require the employment of additional seasonal help. Sanitation demands of non-waterborne toilets may require contract services for proper maintenance. Wells will require sterilization after inundation. Supervision of the developed public use area is required in the interest of orderly and safe use. The reconditioning of facilities will be a necessary annual operation. In consonance with intensity of usage which may be experienced, this Division proposes to engage the services of two or three laborers during the months of May to September to perform duties related to the public use program. Proficiency in life-saving techniques will be a requisite for employment.

26. Areas to be Managed by Other Agencies. Prior to drafting any license or lease for use of reservoir lands, the proposed detailed program of the agency, including personnel, financial capacity, proposed practices and schedules of development will be reviewed and approved by this office to insure proper management of the resources.

27. General Plan for Fish and Wildlife Management. On the recommendation of the U.S. Fish and Wildlife Service and the Vermont Fish and Game Service a General Plan for Fish and Wildlife Conservation and Management will be prepared for submission to higher authority and subsequent execution. It is contemplated that the Vermont Fish and Game Service will manage and improve the wildlife resources under a long term license.

28. Other Land Use. Under the existing policy of priority of allocations for land use and the limited value of the reservoir lands for agricultural or grazing uses it is not contemplated that any private outgrants will be made.

29. Fire Protection. Forest covers about half of the reservoir area. The danger of forest fires is ever present, particularly during dry periods of the year. Public recreational use tends to increase this hazard.

The fire protective and suppression services of the Vermont Department of Forests and Parks and surrounding communities are available for use on lands of this reservoir. Public use of the forest lands will be controlled in conformity to conditions as established by that Department. No open fires will be permitted except at fireplaces in the developed recreation areas. Roads throughout the reservoir will be maintained in a manner adequate to permit passage of fire-fighting equipment. Drums filled with water will be placed throughout the picnic areas.

Any supplemental measures recommended by the U. S. Forest Service or the Vermont Forestry Agency during the required review of the project forest resources will be instituted.

Public education in the field of forest fire dangers by Federal and State forest services through the medium of signs, press and radio has been quite successful in New England. No forest fires have occurred on reservoir lands in this Division for the past fifteen years and a fire of significant loss has yet to occur.

30. Health Measures. The U. S. Public Health Service advises that neither malaria nor mosquito-borne encephalitis are recognized as public health problems in the area. The principal insects of public health importance are pest mosquitoes. In order to minimize mosquito problems, flotage, secondary growth and aquatic plants will be removed after impoundments. As part of the maintenance program, surveys to determine the amount of mosquito breeding will be made and chemical measures will be provided to control any significant production. The Bureau of Environmental Sanitation of the Vermont State Department of Health will be consulted on desirable remedial measures for any health problems encountered.

31. Controls and Regulations. The main objective of controls and regulations at reservoir lands and waters is to provide for the health and safety of the public. Signs should be informative, permissive, and inviting. Negative signs and warnings should be held to a minimum. This policy will be followed in administration of the reservoir for public use so that the public may enjoy the greatest freedom without implications of restraint.

32. Monumentation. It has not been deemed necessary to monument project boundaries. The nature of the topography does not require delineation on the ground of the limits of recreation areas except for signs. If a forestry management program which involves timber harvesting should be found desirable, the limits of fee-owned land will be marked by blazing or painting trees. It is contemplated that this would be accomplished by the agency licensed to manage this resource.

VIII CONCLUSIONS AND RECOMMENDATIONS

33. Conclusions. The Townshend Reservoir, including a permanent pool of 100 acres, will be an important supplement to existing public recreation areas.

The proposed plan of improvement will utilize to best advantage project lands which are desirable for public access and recreation and those lands which are valuable for wildlife purposes.

The Master Plan, as presented, complies with the Flood Control Act of 1944, as amended, the Coordination Act of 1958, and the Forest Cover Act of 1960 and Engineering Manuals implementing these Acts. It also has the general concurrence of Federal and state agencies who are interested in the development of the reservoir area for maximum public benefit.

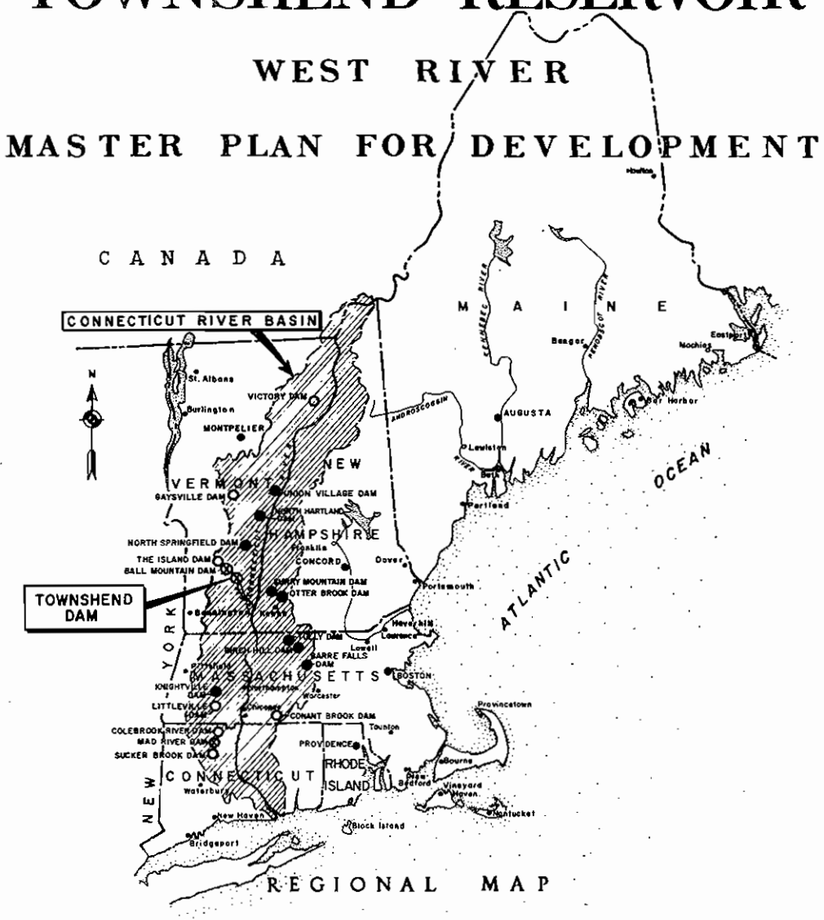
34. Recommendation. It is recommended that this Master Plan for the Development of Townshend Reservoir, Vermont be approved at the earliest practicable date.

CONNECTICUT RIVER FLOOD CONTROL

TOWNSHEND RESERVOIR

WEST RIVER

MASTER PLAN FOR DEVELOPMENT



REGIONAL MAP

LEGEND

RESERVOIRS COMPLETED ●

RESERVOIRS UNDER CONSTRUCTION ⊗

RESERVOIRS AUTHORIZED ○

INDEX

REVISION	DATE	DESCRIPTION	BY

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DF BY WFM-C | TR BY WFM-C | CK BY N.D.P

SUBMITTED BY: J. L. Madden, CHIEF, RES. DEVELOP. SECTION

RECOMMENDED: N.D. Perkins, CHIEF, PL. ANN. & RPTS. BRANCH

APPROVED: Howard Wm. Locke, CHIEF, ENGINEERING DIV.

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR
MASTER PLAN
REGIONAL MAP & INDEX
WEST RIVER VERMONT

DATE MARCH 1961

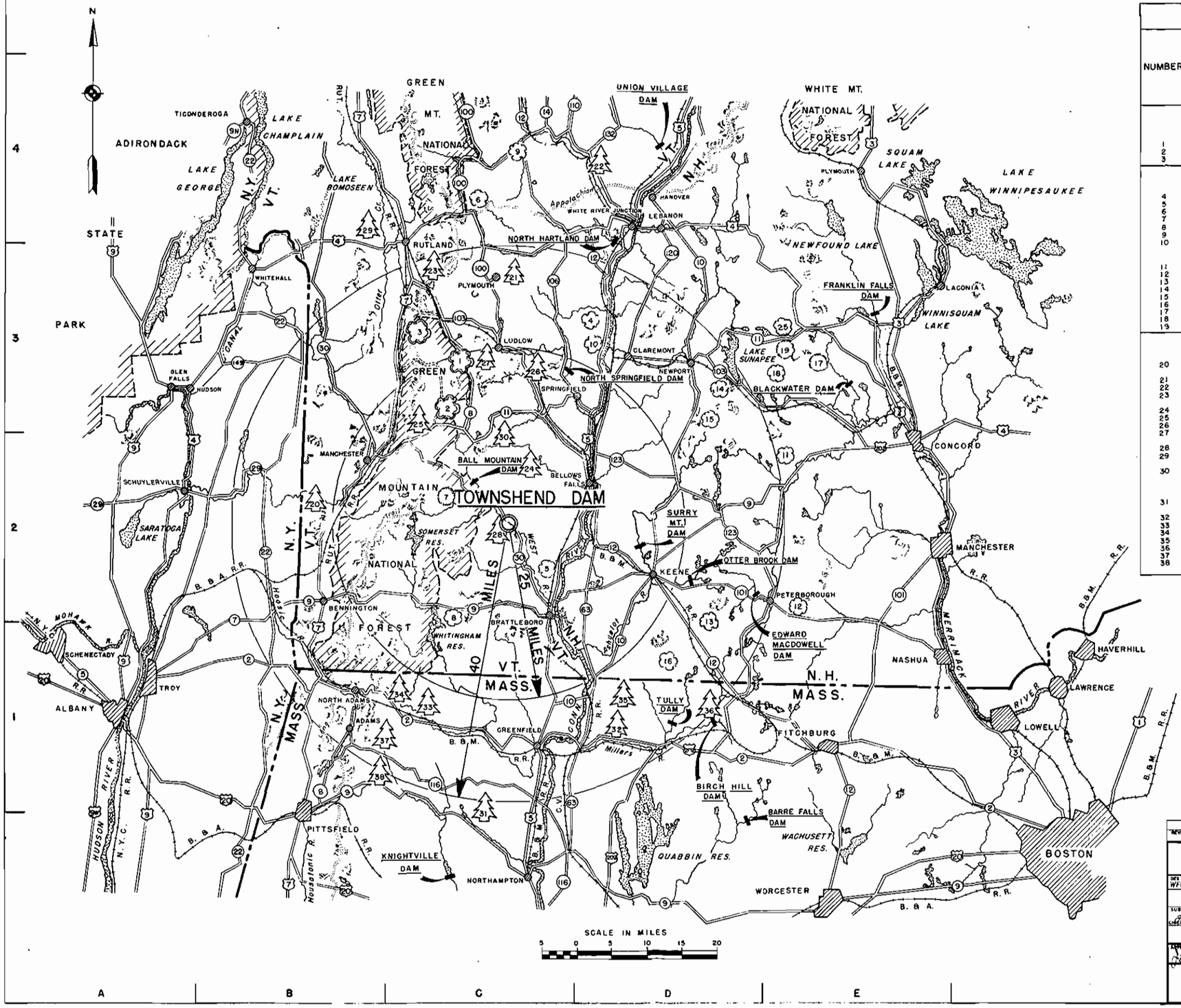
SCALE

DRAWING NUMBER
CT-1-5668
SHEET 1 OF 10

PLATE NO. 1

CORPS OF ENGINEERS

U. S. ARMY



PUBLIC RECREATION AREAS

NUMBER	TYPE OF AREA	INDEX	FACILITIES PROVIDED: SWIMMING	BOATING	CAMPING	FISHING	HIKING	PICNICKING	SCENIC VIEWS	SKIING
	NATIONAL FORESTS (DEVELOPED AREAS)									
	VERMONT									
1	GREENDALE	C-3			X					
2	HAPGOOD POND	C-3	X		X		X	X		
3	WHITE ROCKS	C-3					X	X		
	STATE PARKS									
	VERMONT									
4	ASCUTNEY	C-3			X			X	X	
5	DUTTON PINES	C-2						X		
6	GIFFORD WOODS	C-4			X					
7	JAMAICA (UNDEVELOPED)	C-2	X					X		
8	MOLLY STARK "	C-2								
9	RODD "	C-4								
10	WILGUS "	C-3					X	X	X	
	NEW HAMPSHIRE									
11	FOX	E-2			X			X		
12	MILLER	E-2					X	X	X	
13	MONADNOCK	D-2			X		X	X		
14	MT. SUNAPEE	D-3	X			X	X		X	X
15	PILLSBURY	D-2				X	X	X		
16	RHODODENDRON	D-1					X	X	X	
17	TOLL GATE	E-3						X		
18	WADLEIGH	D-3	X	X		X		X		
19	WINSLOW SITE	D-3					X	X	X	
	STATE FORESTS									
	VERMONT									
20	ARLINGTON (UNDEVELOPED)	B-2								
21	CALVIN COOLIDGE	C-3			X		X	X	X	
22	CHARLES DOWNER	C-4			X				X	
23	GEORGE AIKEN (UNDEVELOPED)	C-3								
24	GRAFTON (UNDEVELOPED)	C-2								
25	HAPGOOD "	C-2								
26	OKEMO	C-3					X		X	
27	PROCTER-PIPER (SELECTIVE FORESTRY)	C-3								
28	TOWNSHEND	C-2	X		X		X	X	X	
29	WEST RUTLAND (UNDEVELOPED)	B-4								
30	WILLIAMS RIVER (UNDEVELOPED)	C-2								
	MASSACHUSETTS									
31	DAUGHTERS OF THE AMERICAN REVOLUTION	C-1	X	X	X	X		X	X	
32	ERVING	D-1	X	X		X				
33	MOHAWK TRAIL	C-1	X		X	X	X			
34	MONROE	C-1				X		X		
35	MOUNT GRACE	D-1				X				X
36	OTTER RIVER	D-1	X		X	X		X		
37	SAVOY MOUNTAIN	B-1	X	X	X	X	X	X	X	
38	WINDSOR	B-1	X		X	X	X	X		

LEGEND

- (1) — National Forest Developed Areas
- (4) — State Parks
- (20) — State Forests
- — U.S.E.D. Flood Control Dams
- (10) — State Highway
- (1) — U. S. Highway

REVISION	DATE	DESCRIPTION

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY WFM. DR. BY WFM. CK. BY N.O.P.

SUBMITTED BY [signature] CHIEF, PLANS DIVISION

RECOMMENDED [signature] CHIEF, P. & R. BRANCH

APPROVED [signature] CHIEF, ENGINEERING DIVISION

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR MASTER PLAN
PUBLIC RECREATION AREAS
WEST RIVER VERMONT

DATE MARCH 1961

SCALE

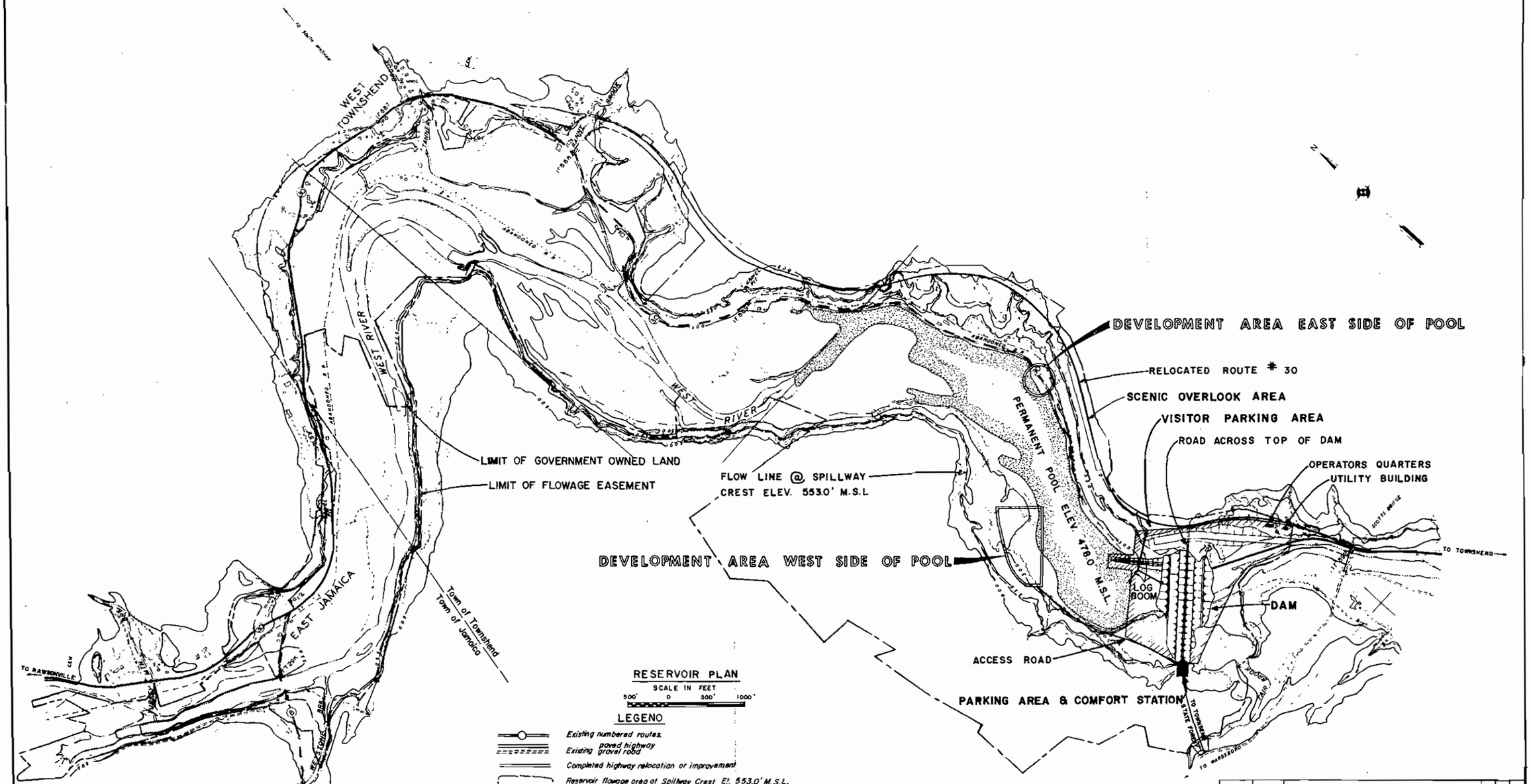
DRAWING NUMBER CT-1-5669

SHEET 2 OF 10

PLATE NO. 2

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



RESERVOIR PLAN

SCALE IN FEET

500' 0 500' 1000'

LEGENO

- Existing numbered routes.
- Existing paved highway / gravel road
- Completed highway relocation or improvement
- Reservoir flowage area at Spillway Crest El. 553.0' M.S.L.
- Limit of Government owned land
- Limit of flowage easement
- Area reserved for project operation

NOTE

PREPARED FROM SHEETS NO 10, 11, AND 12 OF THE WILLIAMSVILLE AERIAL SURVEY (FILE NOS. CT-5-1530, 1531 AND 1532).

REVISION	DATE	DESCRIPTION

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY	DR. BY	CK. BY
WPH&C	E.J.K.	H.D.P.

SUBMITTED BY CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED CHIEF, E & D BRANCH

APPROVED CHIEF, ENGINEERING DIVISION

DATE MARCH 1961

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR
MASTER PLAN
GENERAL DEVELOPMENT PLAN
WEST RIVER VERMONT

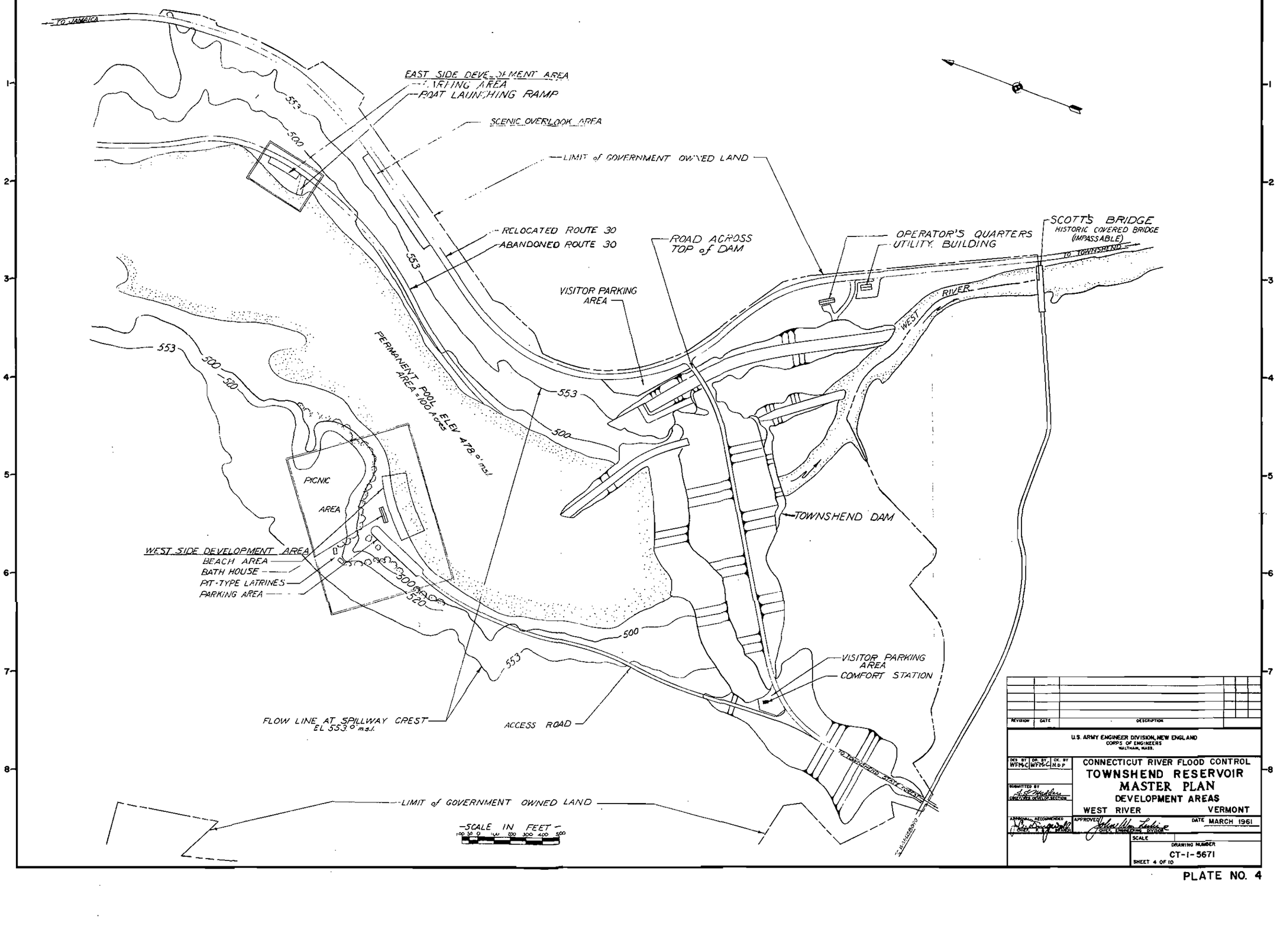
SCALE: 1"= 500'

DRAWING NUMBER
CT-I-5670

SHEET 3 OF 10

PLATE NO. 3

CORPS OF ENGINEERS — U.S. ARMY



REVISION	DATE	DESCRIPTION

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY	DR. BY	CK. BY
WFM-C	WFM-C	N.D.P.

SUBMITTED BY
CHIEF, PLANNING BRANCH

APPROVED RECOMMENDED
CHIEF, ENGINEERING DIVISION

APPROVED
CHIEF, ENGINEERING DIVISION

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR
MASTER PLAN
DEVELOPMENT AREAS
WEST RIVER VERMONT

DATE MARCH 1961

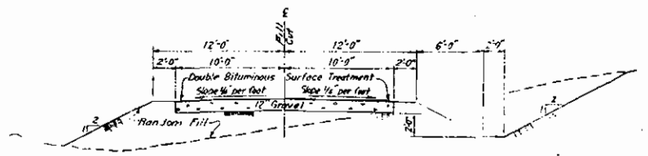
SCALE

DRAWING NUMBER
CT-1-5671

SHEET 4 OF 10

PLATE NO. 4

CORPS OF ENGINEERS — U.S. ARMY



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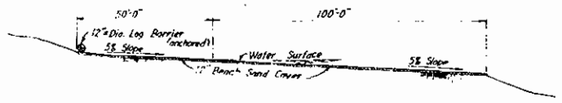
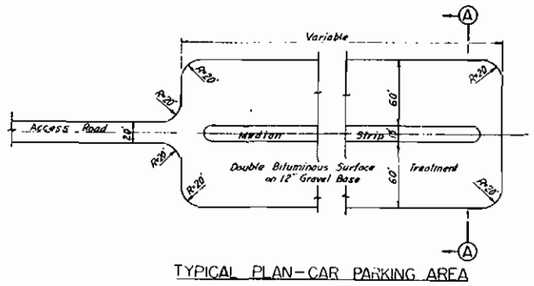
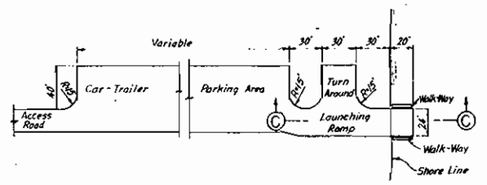


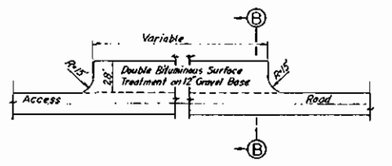
TYPICAL SECTION - BEACH



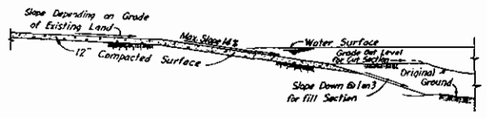
TYPICAL PLAN - CAR PARKING AREA



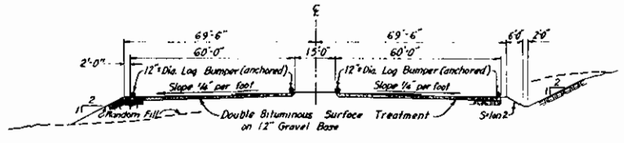
TYPICAL PLAN - BOAT LAUNCHING AREA



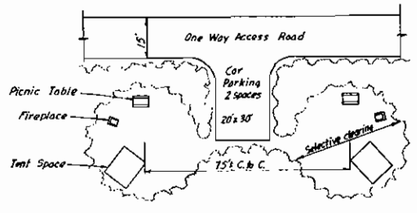
TYPICAL PLAN - CAR PARKING AREA



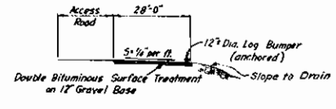
SECTION C-C



SECTION A-A

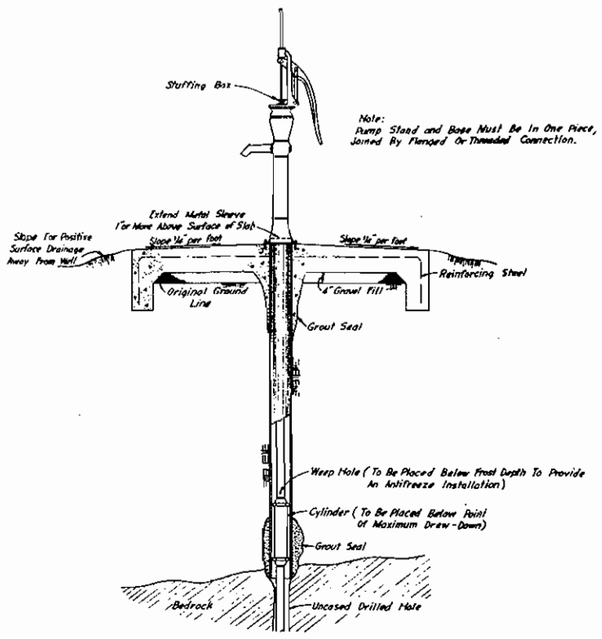


TYPICAL PLAN - CAMPING AREA

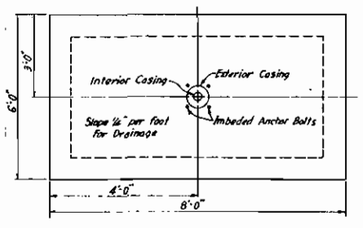


SECTION B-B

CLOSED TOP PUMP



TYPICAL DETAIL - WELL & HAND PUMP



PLAN - CONCRETE PLATFORM

REVISION	DATE	DESCRIPTION

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY: WPW&C | DR. BY: WPW&C | CK. BY: W.D.P.

SUBMITTED BY: Chief, New Engineering Section

RECOMMENDED FOR APPROVAL: Chief, Engineering Division

APPROVED: Chief, Engineering Division

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR
MASTER PLAN
TYPICAL DETAILS
WEST RIVER VERMONT

DATE: MARCH 1961

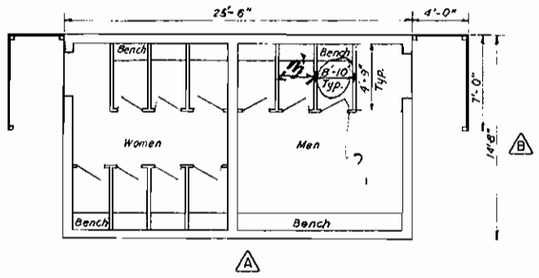
SCALE: NONE

DRAWING NUMBER: CT-1-5672

SHEET 5 OF 10

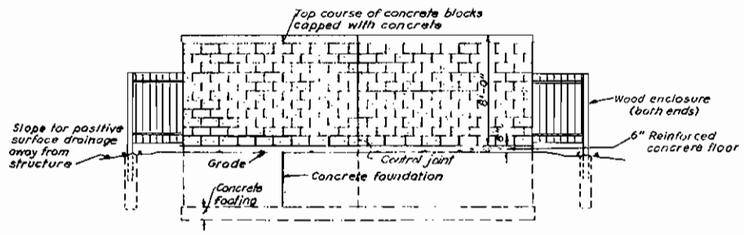
PLATE NO. 5

CORPS OF ENGINEERS — U. S. ARMY

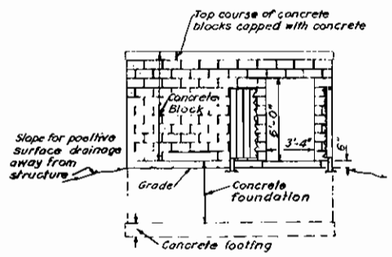


PLAN

NOTES:
Structure is open top (Roofless)
Floor in both men's and women's side to be sloped towards outer edges of structure to provide for drainage.
Every fourth concrete block in the bottom course, all around, omitted to provide drainage from within

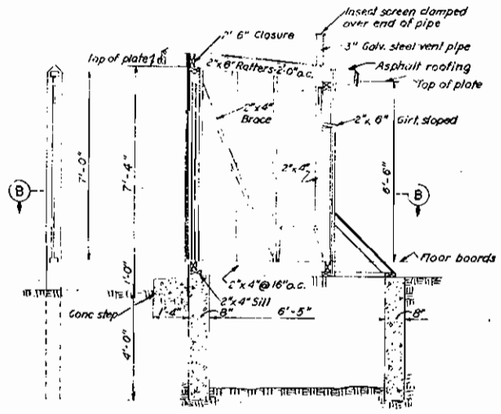


ELEVATION—A

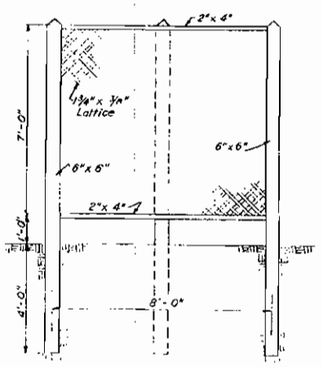


ELEVATION - B

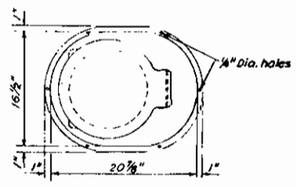
DETAILS CHANGE HOUSE
SCALE: 1/4" = 1'-0"



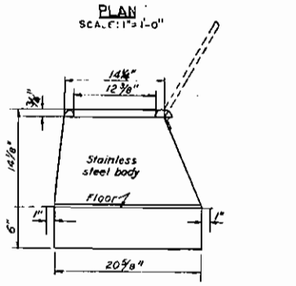
SECTION A-A



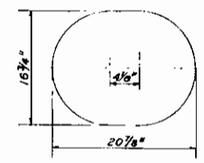
ENCLOSURE



PLAN
SCALE: 1" = 1'-0"

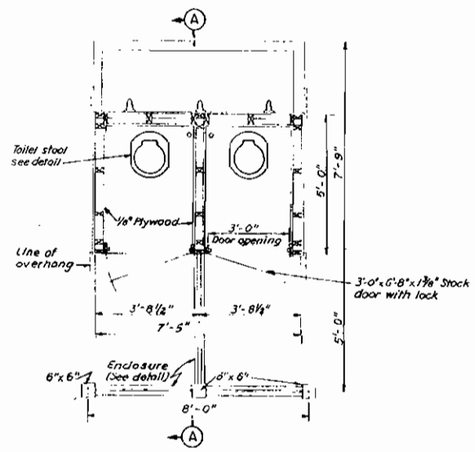


SIDE ELEVATION



FLOOR OPENING

TOILET STOOL
SCALE: 1 1/2" = 1'-0"



SECTION B-B

DETAIL - PIT LATRINE
SCALE: 1/2" = 1'-0"

GRAPHIC SCALES
1/4" = 1'-0"
1/2" = 1'-0"
1 1/2" = 1'-0"

REVISION	DATE	DESCRIPTION

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY: DR. BY: CK. BY: M.D.P.

SUBMITTED BY: CHIEF, PLANNING DIVISION

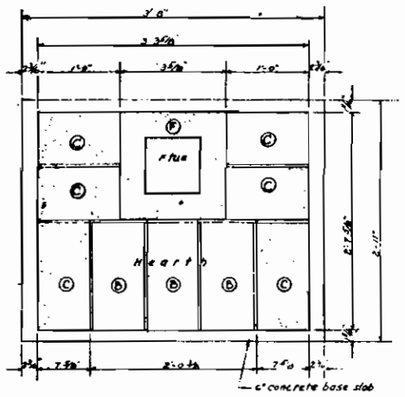
RECOMMENDED: CHIEF, ENGINEERING DIVISION

APPROVED: CHIEF, CONSTRUCTION DIVISION

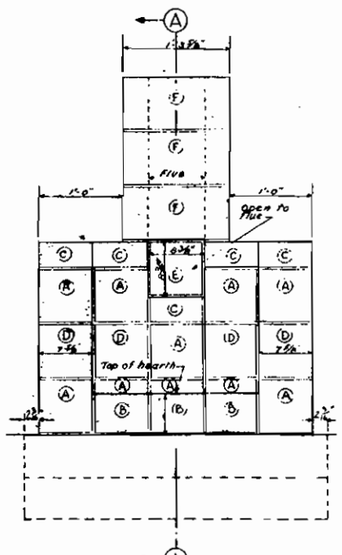
CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR
MASTER PLAN
PIT LATRINE & CHANGE HOUSE
WEST RIVER VERMONT
DATE MARCH 1961
SCALES AS SHOWN
DRAWING NUMBER
CT-1-5673
SHEET 6 OF 10

PLATE NO. 6

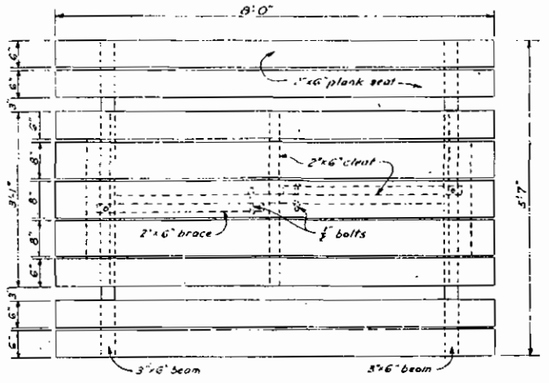
CORPS OF ENGINEERS — U.S. ARMY



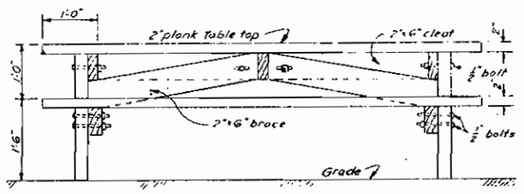
PLAN



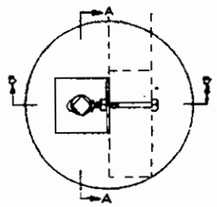
FRONT ELEVATION



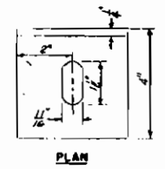
PLAN



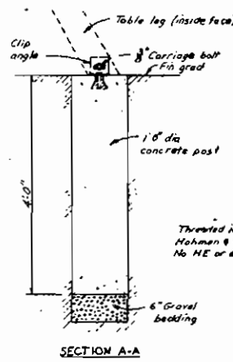
SIDE ELEVATION



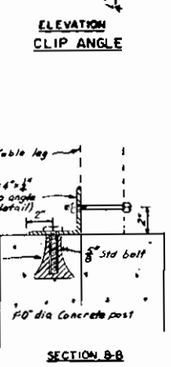
PLAN



PLAN



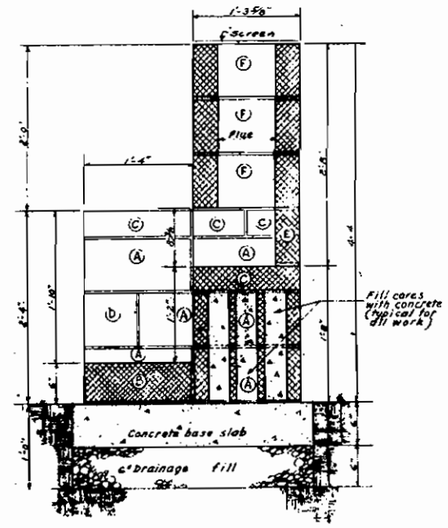
SECTION A-A



SECTION B-B

ELEVATION
CLIP ANGLE

DETAIL OF PICNIC TABLE PIER

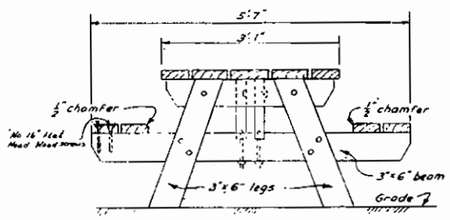


SECTION A-A

MASONRY UNIT SCHEDULE		
SYM	SIZE	TYPE
A	8 x 8 x 16	Hollow concrete blocks
B	6 x 8 x 16	Solid " "
C	4 x 8 x 16	" " "
D	8 x 8 x 8	Hollow " "
E	4 x 8 x 8	Solid " block
F	8 x 16 x 16	Cone chimney blks, 8x8 flue

EQUIPMENT REQ'D.
Furnish and install one metal fire box similar to Model OF-38-S as mfg. by Majestic Co., Inc. Huntington, Indiana or approved equal in each of the fire places.

DETAIL OF FIREPLACE



END ELEVATION

DETAIL OF 8' PICNIC TABLE

REVISION	DATE	DESCRIPTION

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

DES. BY N.D.P. | DR. BY N.D.P. | CK. BY

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR
MASTER PLAN
PICNIC TABLE - FIREPLACE - DETAILS
WEST RIVER VERMONT

SUBMITTED BY: Chief, New England Section
RECOMMENDED: Chief, Design Branch
APPROVED: Chief, Engineering Division
DATE: MARCH 1961
SCALE:
DRAWING NUMBER: CT-1-5674
SHEET 7 OF 10

PLATE NO. 7

CORPS OF ENGINEERS — U.S. ARMY

TOWNSHEND DAM
WEST RIVER

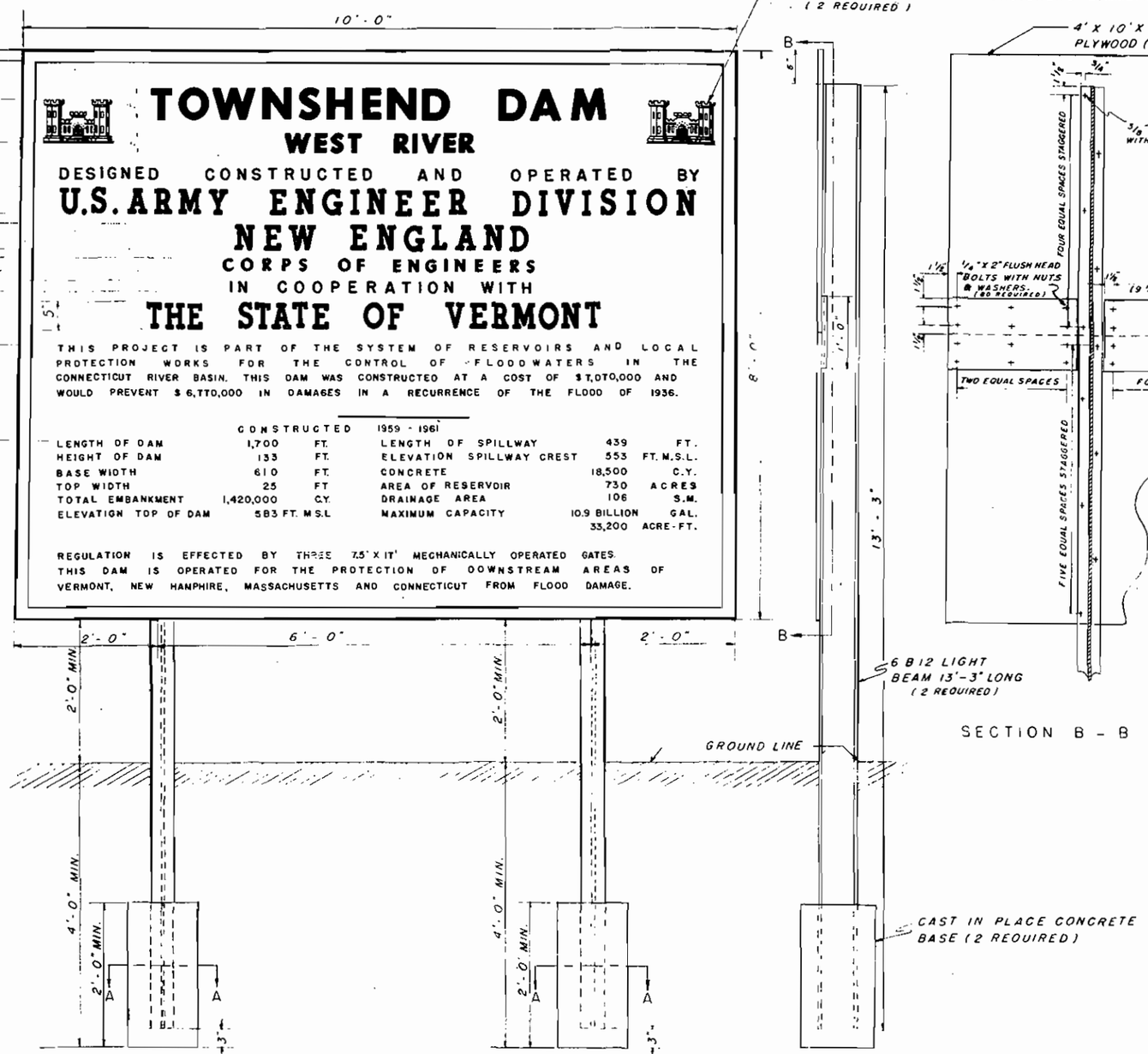
DESIGNED CONSTRUCTED AND OPERATED BY

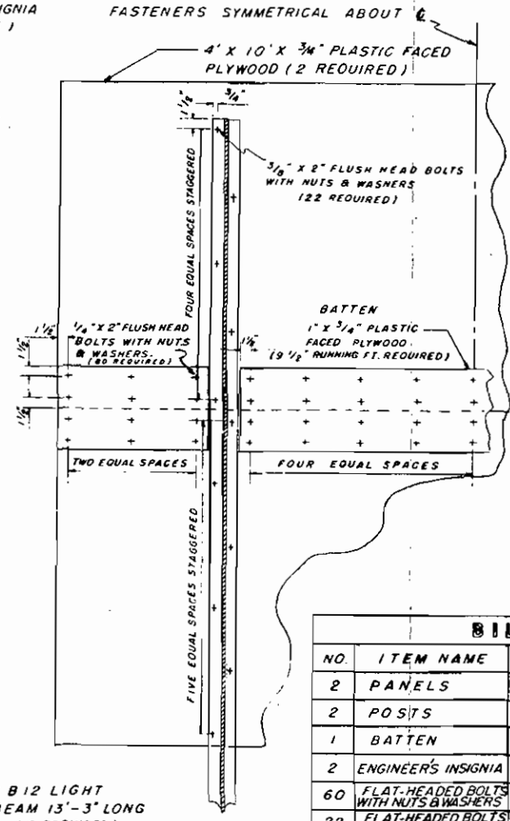
U.S. ARMY ENGINEER DIVISION
NEW ENGLAND
CORPS OF ENGINEERS
IN COOPERATION WITH
THE STATE OF VERMONT

THIS PROJECT IS PART OF THE SYSTEM OF RESERVOIRS AND LOCAL PROTECTION WORKS FOR THE CONTROL OF FLOODWATERS IN THE CONNECTICUT RIVER BASIN. THIS DAM WAS CONSTRUCTED AT A COST OF $T,0T0,000 AND WOULD PREVENT $ 6,TT0,000 IN DAMAGES IN A RECURRENCE OF THE FLOOD OF 1936.

	CONSTRUCTED 1959 - 1961				
LENGTH OF DAM	1,700	FT.	LENGTH OF SPILLWAY	439	FT.
HEIGHT OF DAM	133	FT.	ELEVATION SPILLWAY CREST	553	FT. M.S.L.
BASE WIDTH	610	FT.	CONCRETE	18,500	C.Y.
TOP WIDTH	25	FT	AREA OF RESERVOIR	730	ACRES
TOTAL EMBANKMENT	1,420,000	C.Y.	DRAINAGE AREA	106	S.M.
ELEVATIGN TOP OF DAM	583 FT. M.S.L		MAXIMUM CAPACITY	10.9 BILLION 33,200	GAL. ACRE-FT.

REGULATION IS EFFECTED BY THREE 7.5' X 11' MECHANICALLY OPERATED GATES. THIS DAM IS OPERATED FOR THE PROTECTION OF DOWNSTREAM AREAS OF VERMONT, NEW HANPHIRE, MASSACHUSETTS AND CONNECTICUT FROM FLOOD DAMAGE.





NOTES:

1. SIGN BOARD PAINTED WITH TWO COATS ENAMEL UNDERCOAT FEDERAL SPEC. NO. T T-E-543 AND ONE COAT SYNTHETIC ENAMEL FEDERAL SPEC. NO. T T-E-489 B.
2. LETTERS AND BORDER PAINTED WITH ONE COAT BLACK PAINT FEDERAL SPEC. NO. T T-P-61B
3. STEEL I BEAMS PAINTED WITH ONE COAT RED LEAD FEDERAL SPEC. NO. T T-P-86 A TYPE 2 AND TWO COATS BLACK PAINT FEDERAL SPEC NO. TT-B-61-b.

BILL OF MATERIALS

NO.	ITEM NAME	STOCK SIZE	REMARKS
2	PANELS	4'X 10'X 3/4"	PLASTIC FACED WATERPROOF PLYWOOD.
2	POSTS	13'- 3' LONG	6 B 12 LIGHT BEAM
1	BATTEN	1' X 3/4" X 10'	PLASTIC FACED WATERPROOF PLYWOOD CUT AS NEEDED.
2	ENGINEER'S INSIGNIA	7" HIGH	MASONITE PAINTED REO & BLACK
60	FLAT-HEADED BOLTS WITH NUTS & WASHERS	1/4" X 2"	
22	FLAT-HEADED BOLTS WITH NUTS & WASHERS	3/8" X 2"	
2	CONCRETE BASES	12"X 12"X 2'	CAST IN PLACE

REVISION	DATE	DESCRIPTION

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY WEM-C | DR. BY WFMG | CK. BY N.O.P.

SUBMITTED BY J. C. Madden, CHIEF, RES. DEVELOP. SECTION

APPROVED (RECOMMENDED) Chief, Eng. Div. Branch

APPROVED John W. Leslie, Chief, Engineering Division

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR
MASTER PLAN
PROJECT INFORMATION SIGN
WEST RIVER VERMONT

DATE MARCH 1961

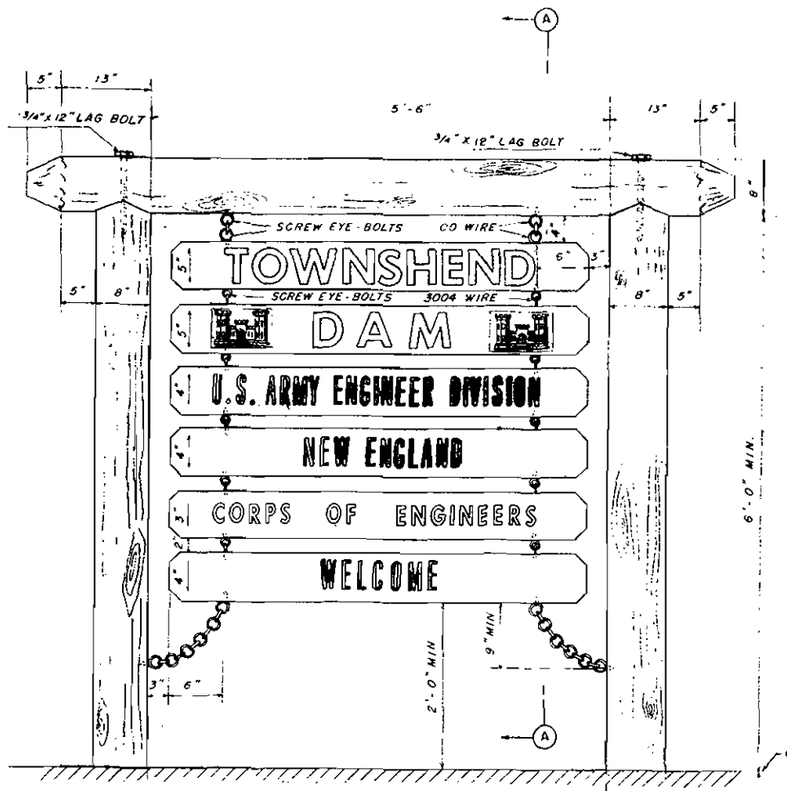
SCALE

DRAWING NUMBER CT-1-5675

SHEET 8 OF 10

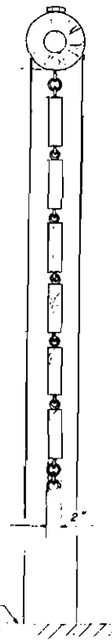
PLATE NO. 8

CORPS OF ENGINEERS — U. S. ARMY



PROJECT IDENTIFICATION SIGN

SCALE 1½" = 1'-0



SECTION A-A

BILL OF MATERIALS

NO.	ITEM NAME	STOCK SIZE	REMARKS
2	POST'S	8"Ø X 10'-0"	NATIVE LOGS PEELED, PRESSURE-
1	BEAM	8"Ø X 8'-6"	TREATED AND PAINTED OR STAINED
6	BOARDS	2" X 7" X 5'-0"	PRESSURE TREATED AND STAINED
24	SCREW EYE BOLTS	3004 WIRE	GALVANIZED
4	SCREW EYE BOLTS	00 WIRE	"
2	CHAINS	3004 WIRE	" (Length as needed)
2	LOG BOLTS	3/4" X 12"	"
4	ENGINEER CASTLE INSIGNIA	5" CASTLE	RED ON WHITE MASONITE

NOTES:

1. ALL LETTERS TO BE ROUTED AND PAINTED WITH WHITE LUMINOUS PAINT ON BOTH SIDES OF SIGN.
2. ALL METAL TO BE GALVANIZED.
3. ALL WOOD TO BE PRESSURE-TREATED AND PAINTED OR STAINED DARK BROWN.
4. POSTS AND BEAMS TO BE NOTCHED TO FIT AS INDICATED IN DRAWINGS.
5. ALL EYE-BOLTS TO BE CLOSED AFTER ASSEMBLEY.

REVISION	DATE	DESCRIPTION	BY

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

DES BY WFM | DR BY WFM | CK. BY N.D.P

SUBMITTED BY: J.J. Madden, CHIEF, RES. DEVELOP. SECTION

RECOMMENDED: CHIEF, P. & R. BRANCH

APPROVED: John W. Leslie, CHIEF, ENGINEERING DIVISION

DATE: MARCH 1961

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR
MASTER PLAN
PROJECT IDENTIFICATION SIGN
WEST RIVER VERMONT

SCALE

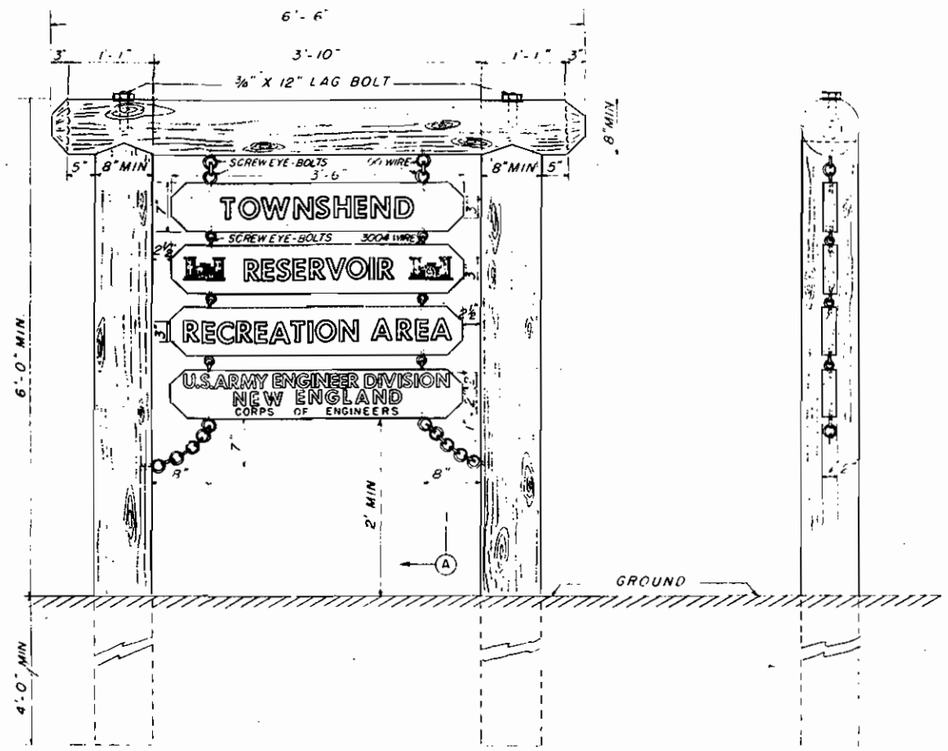
DRAWING NUMBER
CT-1-5676

SHEET 9 OF 10

PLATE NO. 9

CORPS OF ENGINEERS — U. S. ARMY

BILL OF MATERIALS			
NO	ITEM NAME	STOCK SIZE	REMARKS
1	POST	8"Ø X 11'-6"	NATIVE LOGS PEELED, PRESSURE-TREATED AND PAINTED OR STAINED
AS NEEDED	SIGN	2"X 7"X 3'-3"	PRESSURE TREATED AND STAINED
AS NEEDED	BOLTS	1/4"X12" WITH NUTS & WASHERS	GALVANIZED

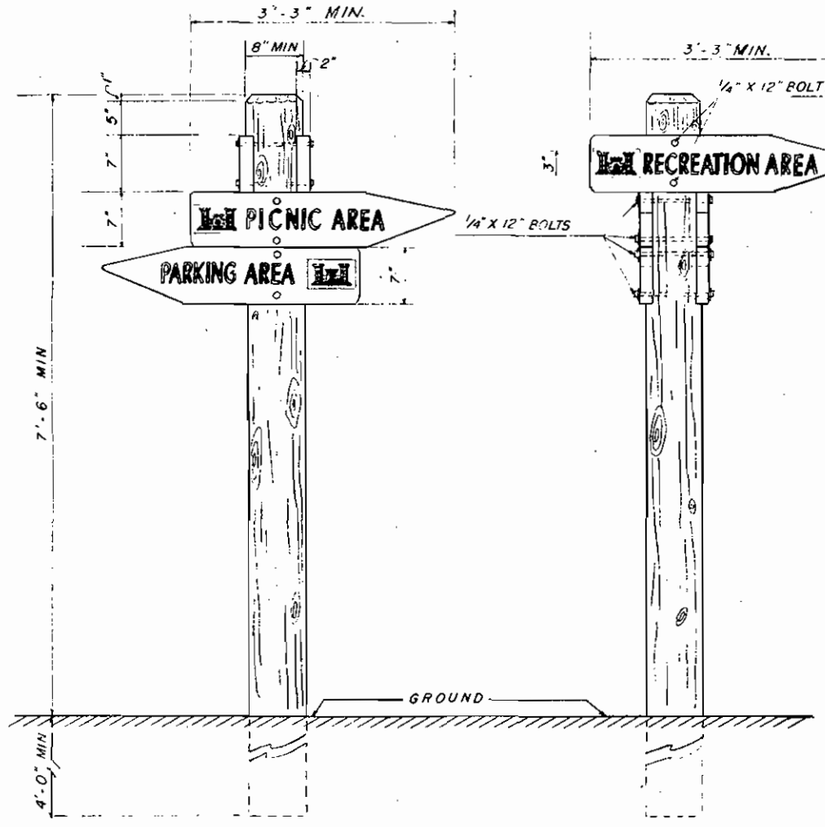


FEATURE IDENTIFICATION SIGN

SCALE. 1½"=1'-0"

BILL OF MATERIALS			
NO	ITEM NAME	STOCK SIZE	REMARKS
2	POST'S	8"Ø X 9'-2"	NATIVE LOGS PEELED, PRESSURE-TREATED AND PAINTED OR STAINED
1	BEAM	8"Ø X 6'-6"	
4	BOARDS	2" X 7" X 3'-6"	PRESSURE TREATED AND STAINED
16	SCREW EYE BOLTS	3004 WIRE	GALVANIZED
4	SCREW EYE BOLTS	00 WIRE	"
2	CHAINS	3004 WIRE	" (Length as needed)
2	LAG BOLTS	3/4"X 12"	"

SECTION A-A



DIRECTIONAL SIGNS

SCALE: 1½" = 1'-0"

NOTES:

1. ALL LETTERS TO BE ROUTED AND PAINTED WITH WHITE LUMINOUS PAINT ON BOTH SIDES OF FEATURE IDENTIFICATION SIGN.
2. ALL METAL TO BE GALVANIZED.
3. ALL WOOD TO BE PRESSURE-TREATED AND PAINTED OR STAINED DARK BROWN.
4. POSTS AND BEAMS TO BE NOTCHED TO FIT AS INDICATED IN DRAWINGS.
5. ALL EYE-BOLTS TO BE CLOSED AFTER ASSEMBLY.
6. DIRECTIONAL SIGNS TO BE USED TO GIVE DIRECTION TO SUCH OTHER FEATURES AS OVERLOOK PARKING AREA OR PICNIC AREA, TO BE LOCATED AND LABELED AS REQUIRED.
7. ENGINEER CASTLE INSIGNIA TO BE BRANDED INTO WOOD AND PAINTED RED ON WHITE BACKGROUND.

REVISION	DATE	DESCRIPTION	BY

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY WFM.C | DR. BY WFM.C | CK. BY M D P

SUBMITTED BY [signature] CHIEF, WATER CONTROL SECTION

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND RESERVOIR
MASTER PLAN
PROJECT FEATURE SIGNS
WEST RIVER VERMONT

APPROVAL RECOMMENDED [signature] CHIEF, ENGINEERING DIVISION

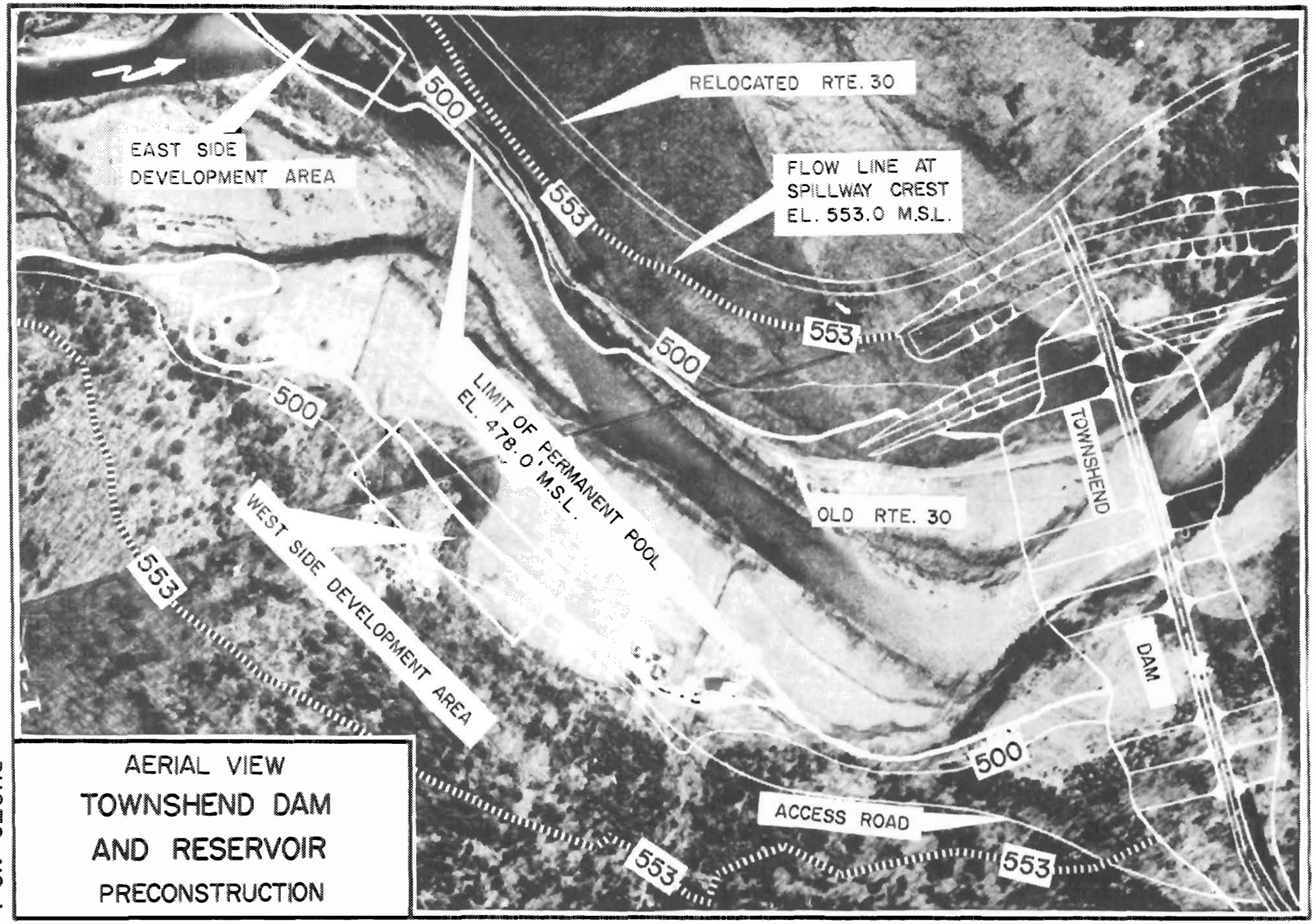
APPROVED [signature] CHIEF, ENGINEERING DIVISION DATE MARCH 1961

SCALE

DRAWING NUMBER CT-1-5677

SHEET 10 OF 10

PLATE NO. 10



AERIAL VIEW
TOWNSHEND DAM
AND RESERVOIR
PRECONSTRUCTION

PHOTO NO. 1

APPENDIX A

ESTIMATE OF COST

APPENDIX A

ESTIMATE OF COST

West Side Recreation Area

Item	Unit Price	Quantity	Cost
Road Improvement	$3,700.00	Job	$3,700
Access Road, new	7,000.00	Job	7,000
Guard Rail	2.25	700 l.f.	1,575
Culverts	12.25	100 l.f.	1,225
Parking Area	1.35	2,333 s.y.	3,140
Beach Area	1.00	5,000 s.y.	5,000
Preparation - Picnic Site	400.00	10 ac.	4,000
Picnic Tables - anchored	80.00	35 ea.	2,800
Fireplaces	100.00	18 ea.	1,800
Trash Receptacles	9.00	18 ea.	160
Fire Barrels	9.00	18 ea.	160
Drinking Water	2,000.00	Job	2,000
Change House	2,000.00	1 ea.	2,000
Pit Toilets	1,800.00	2 ea.	3,600
Signs	200.00	Job	200
Total			$38,360

East Side Recreation Area

Parking Area	1.00	900 s.y.	$ 900
Boat Launching Ramp	1.00	450 s.y.	450
Pit Toilets	1,800.00	2 ea.	3,600
Signs	50.00	Job	50
Total			$5,000

Vicinity of Dam

Signs	200.00	Job	$ 200

General Reservoir Area

Signs and Barriers	440.00	Job	$ 440

SUMMARY OF COST

West Side Recreation Area	$38,360	
East Side Recreation Area	5,000	
Vicinity of Dam	200	
General Reservoir Area	440	
Total Construction Cost (Incl Contingencies)		$44,000
Engineering and Design (10%)		4,400
Supervision and Administration (8%)		3,600
Total Cost		$52,000

Low bid 5/23/61 70,000 ± Rejected

APPENDIX B

COMMENTS OF STATE OF VERMONT

STATE OF VERMONT
WATER CONSERVATION BOARD
MONTPELIER

August 5, 1960

Alden K. Sibley
Brigadier General, U. S. Army
Division Engineer
424 Trapelo Road
Waltham 54, Mass.

Re: Recreation Developments at
Flood Control Developments
N.E.D. projects in Vermont

Dear General Sibley:

I have been working closely with your Mr. Madden on the recreation facilities that Vermont would like to see developed in conjunction with the four flood control structures now being built. We have had numerous conferences and meetings to air various problems that must be overcome to allow the facilities to become a working part of our state and locally operated recreation projects. Naturally, such developments have many hurdles and obstacles to overcome.

In an effort to consolidate the many varied, and sometimes divergent views, our staff prepared a report on the proposed recreation facilities at the North Hartland, North Springfield, Townshend and Ball Mountain Flood Control Dams. This report was primarily prepared for the consideration of our Board, who the Governor felt, should coordinate and eventually lease from federal interests these developments. This report has been carefully considered by our Board and found to be a reasonable program for State adoption. A copy of this report was given to Mr. Madden to serve as a guide in his activities in this area of development.

Mr. Madden has expressed the desire that this report be officially recognized as the State plan. Accordingly, I do hereby submit a copy of this report as the basis for these developments. You will note that this plan has the endorsement of His Excellency, Robert T. Stafford, Governor of Vermont.

Sincerely,

R. W. Thieme

Commissioner

Plan Approval

Governor, State of Vermont

RWT:ms

STAFF REPORT ON PROPOSED RECREATION FACILITIES AT THE NORTH HARTLAND, NORTH SPRINGFIELD, TOWNSHEND AND BALL MOUNTAIN FLOOD CONTROL DAMS

Recreation has become one of the State's leading industries and there continues to be an ever growing demand for recreational opportunities and facilities. Although the state has a greatly expanded program in park development and park service, the attendance at many of these facilities has increased at such a rate that many of the accommodations are overcrowded. Camping continues to grow at a phenomenal rate and the number of campers has been constantly increasing in the state ever since the state parks were open to this form of recreation. It is also found that record attendance and over-crowing has been most noticeable at the state facility that has any type of water for an attraction.

Fishermen and hunters will find a great attraction to these areas as well as persons seeking recreation in other forms.

The staff feels that recreational developments at the flood control dams could in part compensate the local people as well as the state for the real estate taken out of the economy by reason of federal ownership.

All park-type developments should be in keeping with present Department of Forests and Parks policies and should tie in with the overall program of state parks.

NORTH SPRINGFIELD DAM

On February 9, 1960 the Water Conservation Board called a public meeting at Springfield to inform the public of the recreational possibilities in the flood control area and to obtain the views of the public as to what they would like for the area. There were approximately 90 people present and these people informed the Board as to what they would like in the way of facilities. Since this meeting various organizations have had their own meetings and we have received their views on the subject. We have also received letters and suggestions from various state departments and other interested persons. A tabulation of the various petitions and letters follows:

1. Letter from Fish & Game Service in support of parking area and boat launching ramp for both pools, improvement of Snide Brook for trout, improvement of low-lying areas for waterfowl management, and of the whole area for fishing and hunting.

2. Letter from General Billado, Adjutant, Inspector and Quartermaster General for Vermont, requesting training area for tracked vehicles.

3. Letter from Springfield Chamber of Commerce showing interest in any recreational development possible in the area.

4. Letter suggesting location for access road to upper pool.

The staff has viewed the beautiful impoundment erected by the Corps in the construction of the town road across the reservoir area and we feel that all who worked to obtain this picturesque body of water should be highly commended. The two permanent pools, as well as providing a great recreational advantage to the area, will provide a vastly improved scenic attraction to the ever increasing tourist business.

The staff has considered all the data presented to the Board and does now recommend that the Board request insofar as possible that the Corps of Engineers carry out the following program for the North Springfield Dam and Reservoir Area.

1. A permanent pool at approximately 467' elevation be maintained year-round behind the Flood Control Dam.

2. That the pool formed by the town road crossing on the North Branch be maintained as at present.

3. That an access road be constructed and maintained leading from the top of the dam on the west side of the North Branch Pool down to "Patch Point," so-called.

4. That an access be constructed and maintained on the east side of the North Branch Pool leading from the cemetery to the Stoughton place and a boat launching site and parking area be constructed near the site of the old covered bridge in that area.

5. That a parking area, boat launching ramp, and picnic area with facilities and bathing beach be constructed at or near Patch Point on the North Branch Pool.

6. That an access road parking area, bathing beach, picnic area and attendant facilities be constructed on the lower pool on the F. H. Knapp property.

7. That the low lying areas such as tracts C 301, C 308, C 310 and C 326 be considered for use by the Fish & Game Service for wild fowl propagation.

8. That the brook leading through the Snide property be considered for improvement for trout fishing.

9. That part of the government property, possibly parts of Snide and War properties, be set aside for National Guard use if it will not interfere with other recreational uses.

10. That all roads in the area that are no longer of use for automobiles, be reserved for walking, bicycles, and horseback riding.

The staff in its investigation of the area has just become aware that there is some 140 acres of federally owned land above the 550' contour on the Patch and Stoughton property overlooking the North Branch recreation pool. For this reason, we would recommend that a park type development consisting of access roads, picnic area, camping area, bath house and other related facilities be considered for this area.

NORTH HARTLAND DAM

On January 20, 1960 the Water Conservation Board called a public meeting at White River Junction to inform the public of the recreational possibilities in the flood control area and to obtain the views of the public as to what they would desire. There were approximately 60 people present and the views of these people were obtained. Since the meeting, various groups and organizations have had meetings and we have received their views on the subject. We have also received letters and suggestions from various state departments and other interested persons. A tabulation of the various petitions, letters and interests follows:

1. 720 names (signatures) on petition worded:

"We, the undersigned, appreciate this opportunity to make a recommendation with respect to the development of the area resulting from the construction of the North Hartland Dam.

We firmly believe that a State Park complete with all recreational facilities, around the Gorge area and including the Mill Pond, would be a tremendous asset to this community and to the State of Vermont.

We further believe that as much Federal funds as is presently available should be used for this purpose."

(Note: This petition was originated by the Recreation Committee of the Town of Hartford, Senator Carl B. Kelton, Chairman)

2. Correspondence has been received from the State Fish and Game Service and the Federal Fish & Wildlife Service in which they have indicated the desire on the part of the Vermont agency to utilize the Quechee Mill Pond and the area downstream from Quechee Gorge to implement the propagation of fish life and waterfowl. Correspondence from Mr. George W. Davis, Director, Vermont Fish and Game Service, states that while it is desirable on their part to utilize the Mill Pond for this purpose, it is recognized that a conflict of interest may exist. For this reason, they would relinquish this area in favor of the lower area if required. Mr. Davis has indicated that his Service would participate in the development on a cost-sharing basis if this is necessary to bring the plan to fruition.

3. Correspondence from the Veterans of Foreign Wars at both local and state level, requests that a memorial consisting of a flag pole and row of set-out maple trees be allowed. This could be done by this organization without state or federal funds if an area were set aside for such a purpose.

4. The Child Study Group of White River Junction, in addition to supporting the general plan as advanced by the Corps, requested that consideration be given to winter facilities. Also, they requested that sections of the proposed state park be fenced off and set aside for the use of children under six years of age. This would conflict with the general purpose of a state park and the type of development which the Corps is authorized by law to provide.

5. A number of organizations (3) and individuals in the Town of Hartland have requested that either a new swimming area be provided in the lower pool or that their old pool below Route 5 (which was silted in by construction operation at the dam) be dredged out.

6. All correspondence which was received in support of the plan for development which the Corps has proposed. There has been no written opposition. A breakdown of correspondence shows that in addition to Senator Kelton's petition, letters were received as follows:

In support of State Park	15
In support of Wildlife Sanctuary	3
Requesting a War Memorial	3
Requesting swimming in lower pool or cleaning old pool	2
General support of project	2

Having considered all the data presented, the staff does now recommend that the Board request the Corps of Engineers insofar as possible to carry out the following program for the North Hartland Dam and Reservoir Area:

1. That the recreational development as proposed in the Corps of Engineers booklet of November 1959 be implemented in cooperation with the State of Vermont.

2. That a small dam be placed across the river at the upper end of the operation pool to flow the low-lying meadows for wild fowl propagation. This dam should provide for water level manipulation.

3. That any and all areas not used for other recreational purposes be considered for management by the Vermont Fish and Game Service for fishing and hunting.

4. That the beach at Deweys Mills pond be so constructed that a slight variation in water level for water fowl management may be obtained.

TOWNSHEND AND BALL MOUNTAIN DAMS

On March 15, 1960 the Water Conservation Board called a public meeting at Townshend to inform the public of the recreational possibilities in the flood control area and to obtain the views of the public as to what they would like. There were approximately 240 people present. We have received letters and suggestions from various state departments, organizations and interested persons. A tabulation of the various petitions and letters follows:

1. 560 names (signatures) on petition worded:

"We, the undersigned, residents and/or property owners of Vermont, do petition the Commissioner of Water Resources of the State of Vermont to request the U.S. Army Corps of Engineers to include in the plans for the construction of Ball Mountain Dam and Reservoir the following: the construction of a series of weirs to provide fishing pools in the Ball Mountain Dam area.

2. 40 names (signatures) on petition worded:

"We, the undersigned, residents of Jamaica, Vermont, hereby petition the Water Conservation Commission, State of Vermont as follows:

Whereas the United States Government, in accordance with the New England Flood Control Pact, has contracted for the construction of one Ball Mountain Flood Control Dam in the Town of Jamaica, and

Whereas, the construction of the Ball Mountain Dam, alone, will afford no direct benefit to the residents of Jamaica, and

Whereas, the residents of Jamaica have been advised that the United States Government will consider incorporating in the above-mentioned Ball Mountain Flood Dam construction, the creation of one or more permanent water areas, above the Dam for sport and recreation.

We, therefore, call upon the Vermont Water Conservation Commission to use its good offices without delay to the end that such sport and recreation areas be planned for and provided during the construction of the Ball Mountain Flood Control Dam, for the public use and good.

3. Fourteen letters in support of the construction of the weirs in the Ball Mountain Reservoir area.

4. Three letters signed by selectmen of Jamaica, Londonderry and Townshend in support of weirs.

5. One letter in support of improvement of fishing in general.

6. Three letters in support of the general recreational improvement for the reservoir area.

7. Two letters in support of construction of picnic, parking, swimming beach and boating for the area.

8. One letter signed by twenty-one other plus four other letters in support of regulation of flow from Ball Mountain Dam to benefit white water canoeing.

The staff has considered all the data presented and does now recommend that the Board request the Corps of Engineers insofar as possible to carry out the following program:

TOWNSHEND DAM

1. That a permanent pool be maintained at the dam.

2. That an access road, picnic, parking and swimming area be provided on the west side of the pool.

3. That boat ramps be provided to the pool on the East and West sides of the pool.

4. That the old Route #30 be maintained as an access to the pool.

5. That a parking, picnic area and lookout be provided off the new Route 30 where excess material was placed.

6. That a road be provided to the Townshend State Park from the West side of the dam.

7. That all areas not used for recreational purposes be considered for management by the Vermont Fish and Game Service for fishing and hunting.

The staff in reviewing the properties that the Federal government will acquire find that there is approximately 300 acres above the flow line of the reservoir on the Ragle, Reed and Lind properties overlooking the operation pool. We would recommend that a park type development consisting of access roads, picnic area, camping area, bath house and other related facilities be considered for this area. This park could be operated in conjunction with the Townshend State Park just a short distance downstream.

BALL MOUNTAIN DAM

1. That a permanent pool be maintained at the dam.

2. That a picnic area with parking be provided on the access road leading to the top of the dam.

3. That a picnic area with parking be provided in the vicinity of Winhall River.

4. That two fishing weirs be provided, one at the old railroad bridge near the mouth of Winhall River and one at the construction bridge upstream from the dam.

5. That a system for regulated flow be worked out for the white water canoeing.

6. That any and all areas not used for other recreational purposes be considered for management by the Vermont Fish and Game Service for fishing and hunting.

For all four flood control dams we recommend:

1. That all other properties now owned by the government or that will be purchased by the government and which may be declared excess and not needed for flood control purposes not be sold by the government until a further study can be made by the state for possible use in the overall recreational program for the area.

2. That the Water Conservation Board be the agency that would be licensed to operate and maintain the area and they in turn would sub-license the various parts of the area dependent on the facilities provided and the use intended.