CENAE-OD (1105-2-10) 07 November 2011

MEMORANDUM FOR Commander

SUBJECT: Submittal of Updated Master Plan – West Hill Dam, Uxbridge, Massachusetts, November 2011

1. In accordance with ER 1130-2-550 (15 November 1996), District Commanders are responsible for approving master plans, supplements, and updates.

2. The subject updated Master Plan for West Hill Dam Project is attached for your review and approval. The previous Master Plan (Reservoir Development, Design Memorandum No. 9, dated January 1962) for West Hill Dam, West River, Massachusetts, is rescinded.

3. The Master Plan document prescribes an overall land and water management plan, resource objectives, and associated design and management concepts that will provide the best combination of responses to regional needs, resource capabilities, and expressed public interest and desires consistent with the authorized flood risk management function of the West Hill Dam Project.

4. This plan has been prepared by personnel of the New England District Operations Division.

FRANCIS J. FEDELE
Chief, Operations Division

Attachment

CENAE-EX DATE:

FOR Chief, Operations Division

Approved Disapproved

CHARLES P. SAMARIS
COL, EN
Commanding

US Army Corps
of Engineers®
New England District

WEST HILL DAM

Uxbridge, Massachusetts

Master Plan

November 2011

BUILDING STRONG®

Executive Summary

This Master Plan covers 557 acres of federally owned land at West Hill Dam. The Master Plan prescribes an overall land and water management plan, resource objectives, and associated design and management concepts which provide the best possible combination of responses to regional needs, resource capabilities and suitability, and expressed public interests and desires consistent with the project's authorized flood risk management purposes. The Master Plan covers all project resources, including but not limited to fish and wildlife, vegetation, cultural, aesthetic, interpretive, recreational, commercial and out granted lands, easements and water.

Inputs to the planning process included surveys and management plans for natural, wetland and cultural resources, and an analysis of recreational use, capacity and projected needs for project lands. Natural and man-made resources were located, identified and analyzed, including wetlands, exemplary natural communities, and cultural resources that require management efforts for their protection. These were integrated into a series of project wide objectives to protect and enhance project resources and promote and develop, as appropriate, those resources for public use, education, and access.

Recreational opportunities were identified through an analysis of regional needs and the public participation process. The planning process identified opportunities for the improvement of existing recreational facilities, enhancement of boat and beach facilities, picnic area and play fields, and multiple resource management to enhance and protect important natural and cultural resources. Enhancing and preserving the resources by careful management of user conflicts were also identified.

The carrying capacity of the site is constrained by the size of the beach and limitations on the availability of parking. A review of the recreational level of activity and demand did reveal the need for minimal expansion of the recreational facilities that should be addressed by the project manager.

This Master Plan provides guidance for future development at West Hill Dam. The natural and man-made resources at the project will continue to be managed to provide the best combination of responses to regional and ecosystem needs, project resources and capabilities. During the implementation phase period of the Master Plan, the New England District will continue to be responsible for the administration and management of the project.

All specific proposals for recreational or other development at the project must comply with this Master Plan, the Thames River Basin flood risk management requirements, and the National Environmental Policy Act and federal requirements.

1. INTRODUCTION

1.1 Project Authorization and Purpose

The West Hill Dam Project, a unit in the flood risk management operation plan for the Blackstone River Basin, helps protect communities along the West River in Massachusetts and the Lower Blackstone River in Massachusetts and Rhode Island. In addition, it augments the protection provided by the Woonsocket local protection project in Rhode Island and contributes to a reduction of flood levels in areas of Woonsocket outside the effective range of the local project. 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).

Authorization for development and use of the reservoir area for public recreation, wildlife management, stewardship , and other purposes is contained in Section 4 of the Flood Control Act of December 22, 1944 (Public Law 534, 78th Congress), as amended, and the Fish and Wildlife Coordination Act 1958 amendment.

Construction of the West Hill Dam began in June 1959 and was completed in June 1961 at a cost of $2,306,902.

Through September 2011, the facility has prevented approximately $96,692,600 in flood damages.

1.2 Purpose and Scope of the Master Plan

This master plan for the management of natural resources and outdoor recreation has been prepared in accordance with the objectives and policies governing the planning, development, and management of these resources at Corps of Engineers water resources projects. These objectives and policies are outlined in ER 1130-2-540, "Environmental Stewardship Operation and Maintenance Policies"; ER 1130-2-550, "Recreation Operations and Maintenance Policies"; EP 1130-2-550, "Recreation Operations and Maintenance Guidance and Procedures"; ER 1165-2-400, "Recreational Planning, Development, and Management Policies"; and other related or referenced regulations and policies.

ER 1130-2-540 established the following program objectives for management of a project's natural resources.

- Manage natural resources on Corps of Engineers administered land and water in accordance with ecosystem management principles to insure their continued availability.

- Provide a safe and healthful environment for project visitors.

Utilizing this general guidance, ER 1130-2-550 and EP 1130-2-550 provide the specific policy for preparation of project master plans. Each master plan must cover all resources, including, but not limited to fish and wildlife, vegetation, cultural, aesthetic, interpretive, recreational, mineral, commercial and out granted lands, easements, and water. Based on EP 1130-2-550, the primary goals of the West Hill Dam Master Plan are to prepare a concept document that prescribes an overall land and water management plan, and establishes resource objectives and associated design and management concepts, which:

- Provide the best combination of responses to regional needs, resource capabilities and suitability, and expressed public desires consistent with authorized project purposes,
- Contribute towards providing a high degree of recreational diversity within the region,
- Emphasize the particular qualities, characteristics, and potentials of the project,
- Exhibit consistency and compatibility with national objectives and other state and regional goals and programs.

ER 1130-2-550 further defines these goals as they relate to recreation management and established the following program objectives:

- Provide a quality outdoor recreation experience which includes an accessible, safe, and healthful environment for a diverse population,
- Increase the level of self sufficiency for the Corps of Engineers recreation program,
- Provide outdoor recreation opportunities on Corps of Engineers administered land and water on a sustained basis,
- Optimize the use of leveraged resources to maintain and provide quality public experiences at Corps of Engineers water resources projects.

1.3 Planning Process

An interdisciplinary study team consisting of staff from the Corps of Engineers, New England District (Engineering/Planning Division and Operations Division) developed the majority of information contained in the master plan. The team included personnel with expertise in the following disciplines:

- Planning and engineering

- Environmental resources
- Landscape architecture
- Archaeological and cultural resources
- Forestry

Major inputs to the planning process included natural, cultural, and recreational resource inventories and analysis, along with projections of future needs and public desires for use of project lands. This information was integrated into project-wide and compartmental objectives and goals to provide the best use of the 557 acres of federally owned land at West Hill Dam.

Public input was obtained through public notices, coordination with state, regional and local officials, a public meeting held in Uxbridge, Massachusetts to present preliminary study results and receive input, and public review of the draft Master Plan.

The Master Plan is a policy document that serves as an overall management guide for the project while specific management actions are included in the Operational Management Plan (OMP). For consistency with the Master Plan, the existing OMP, dated 1994, will be revised to provide a detailed description of how the objectives and concepts of the Master Plan will be achieved.

1.4 Reevaluation of the Master Plan

The existing Master Plan for Reservoir Development was prepared in January 1962. The Plan proposed the initial development of public access, parking, and sanitation, and minimum number of facilities to enable the public to enjoy their recreation experience. Those facilities were constructed and have been well received. Over the past 40 years, detailed natural resource and cultural resource inventories have been conducted and significantly more information about the resources at the project has become available. Updating the Master Plan will provide direction for project development and use. The master plan is a vital tool for the responsible stewardship of project resources that benefit present and future generations.

The Master Plan is a flexible planning document that will be periodically reevaluated and modified to reflect the current situation. Corps of Engineers staff will review on a periodic basis and revised as needed. The District Engineer will approve supplements and revisions to the Master Plan.

2. PROJECT DESCRIPTION

2.1 Location

West Hill Dam is located in the towns of Uxbridge, Northbridge, and Upton, Massachusetts, on the West River approximately 3 1/4 miles upstream of its confluence with the Blackstone River. The project is located within the Blackstone River Valley National Heritage Corridor. The project lands are comprised of 1,350 acres of both fee and flowage easement. The dam site and office are located at 518 East Hartford Avenue, Uxbridge, MA. (Refer to FIGURE 1 – LOCUS MAP and FIGURE 1a – FEE AND EASEMENT.)

2.2 Project Data

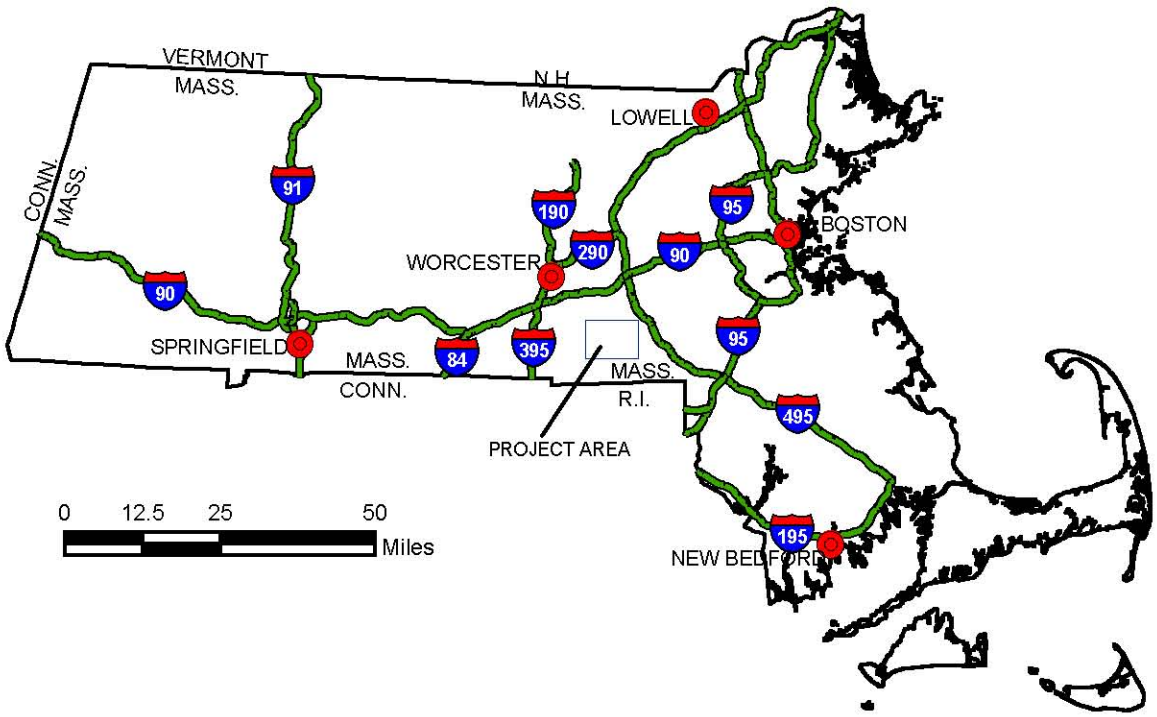
Project operations, composed of the dam and all dikes, make up 50 acres of the project's total acreage. Land set aside for multiple-resource management consists of 330 acres of the total. The developed recreation area, being the park, beach, and associated facilities, consists of 20 acres. Land designated as environmentally sensitive, being the river and its abutting wetlands, comprises 160 acres. (Refer to FIGURE 2 and 2a – LAND CLASSIFICATION PLAN).

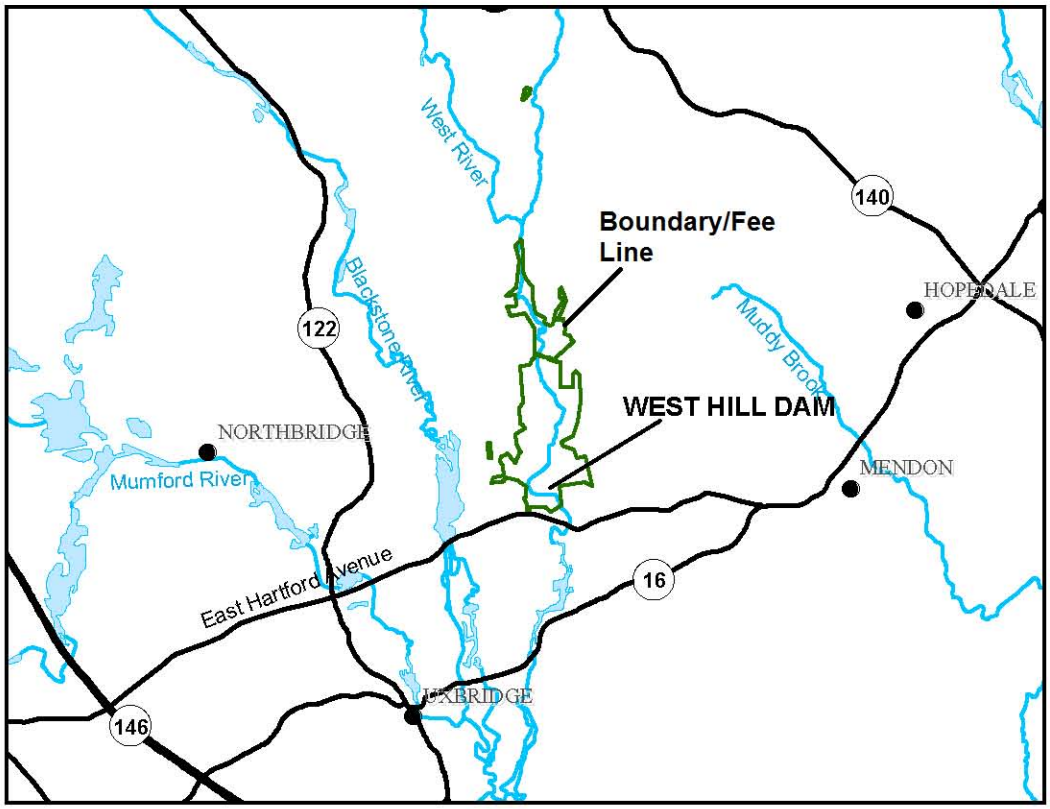
The dam is composed of rolled earth, concrete cut-off wall and rock slope protection, 2,400 feet in length with a maximum height of 48 feet above the river bed. The top of the dam is at elevation 282 feet mean sea level. The dam includes an uncontrolled spillway in a rock cut in the right abutment with three gated conduits through the spillway. Three feet by 5 feet hydraulically operated sluice gates control flow through the conduits. The spillway crest is 50 feet long and is at elevation 264 feet mean sea level. The intake channel is 1,500 feet long with a bottom width of 18 feet. Four small dikes are provided in shallow saddles adjacent to the right abutment. The capacity of the reservoir at spillway crest is 12,350 acre feet which is the equivalent of a runoff of 8.3 inches from the drainage area of 28 square miles. When filled to spillway crest, the reservoir is approximately 5 miles long with a surface area of approximately 985 acres and a shoreline of about 23 miles.

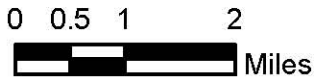
West Hill Dam is run-of-river and has no permanent pool.

2.2.1 Reservoir Management General

West Hill Dam is operated and maintained by the Operations Division of the New England District, North Atlantic Division of the U.S. Army Corps of Engineers. West Hill Dam, Woonsocket Falls Dam and the Charles River Natural Valley Storage projects are staffed by a Project Manager, two Park Rangers, and a facility operator who perform operation, maintenance, and administrative duties. The resources are shared between these three projects. Additional Park Rangers are hired during the summer months. In addition to their primary flood risk management duties, project staff are also responsible for implementation of this Master Plan through the Operational Management Plan, recreation and natural resource management, visitor assistance and interpretive services.







US Army Corps of Engineers®
New England District

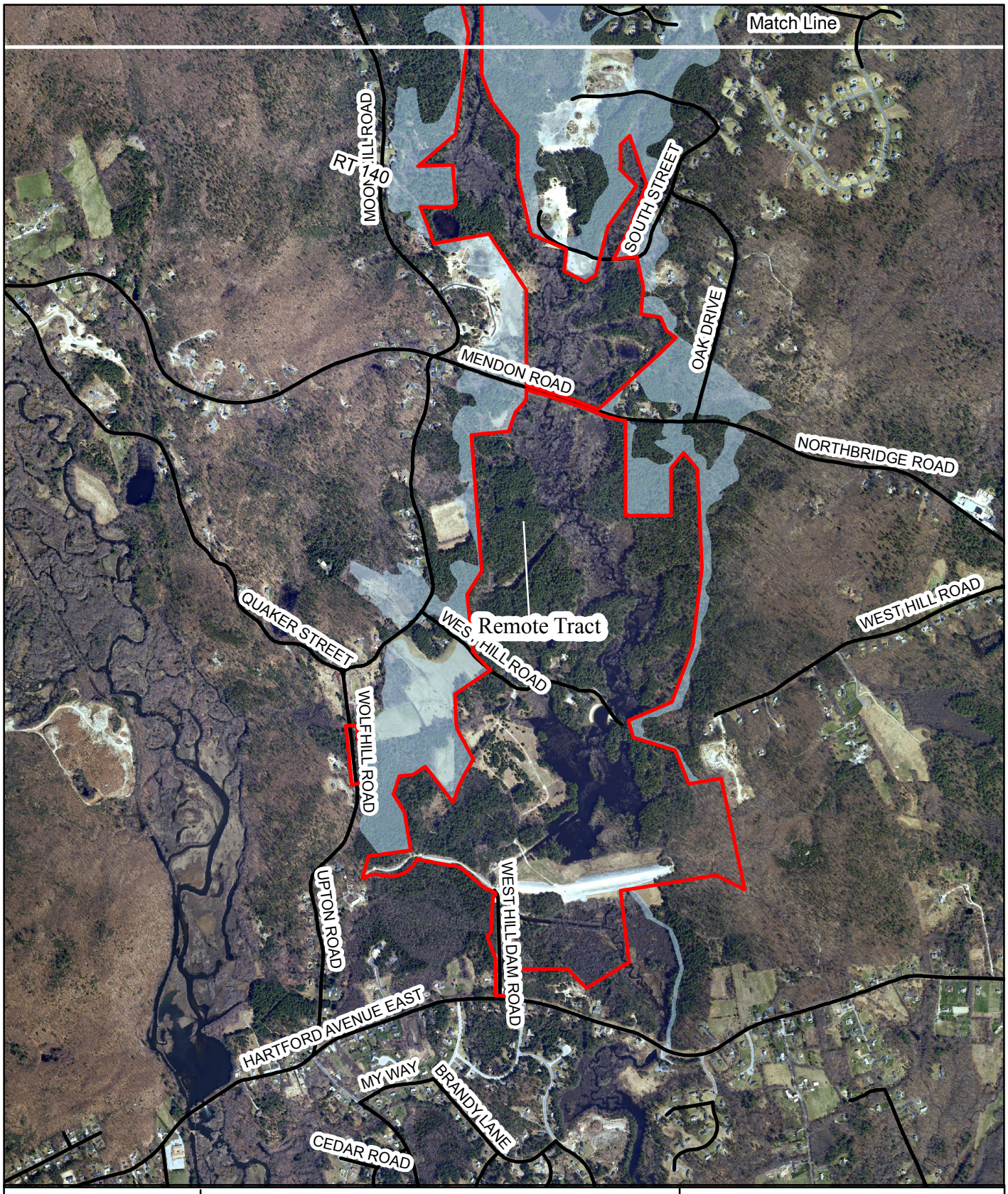
NOTES:

State, Transportation and Hydrography data was obtained from Mass GIS.

FIGURE 1

LOCUS PLAN
WEST HILL DAM
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
UXBRIDGE, MASSACHUSETTS

OCTOBER 2011



U.S. ARMY CORPS of ENGINEERS ®
NEW ENGLAND DISTRICT

Boundary/Fee Lines

Flowage Easement

Roads

APPROXIMATE SCALE

0 625 1,250 2,500 3,750 5,000 Feet

FIGURE 1a - Page 1 of 2

FEE AND EASEMENT PLAN
WEST HILL DAM
UXBRIDGE, MA
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

October 2011

U.S. ARMY CORPS of ENGINEERS ®
NEW ENGLAND DISTRICT

Boundary/Fee Lines

Flowage Easement

Roads

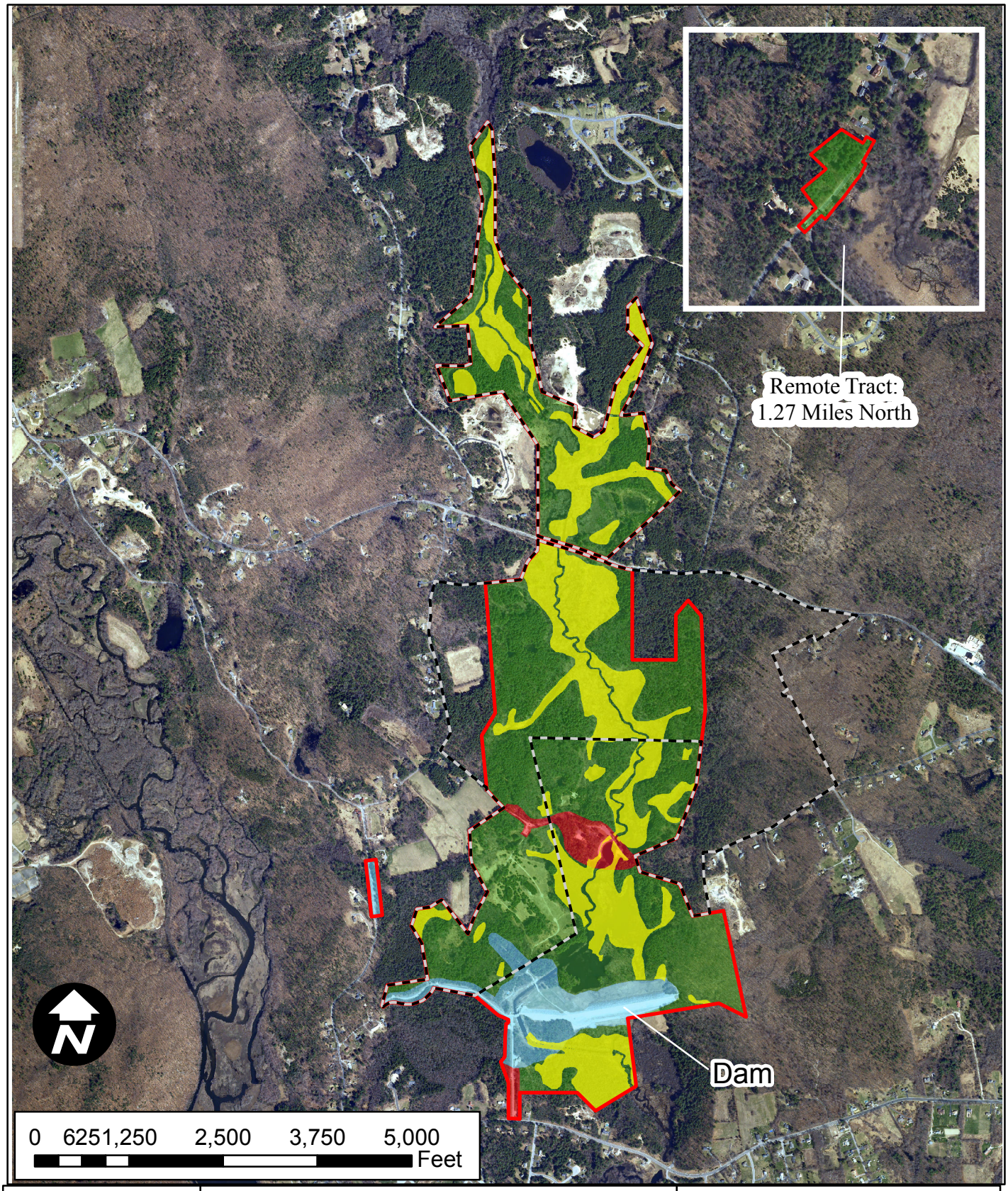
APPROXIMATE SCALE

0 625 1,250 2,500 3,750 5,000 Feet

FIGURE 1a - Page 2 of 2

FEE AND EASEMENT PLAN
WEST HILL DAM
UXBRIDGE, MA
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

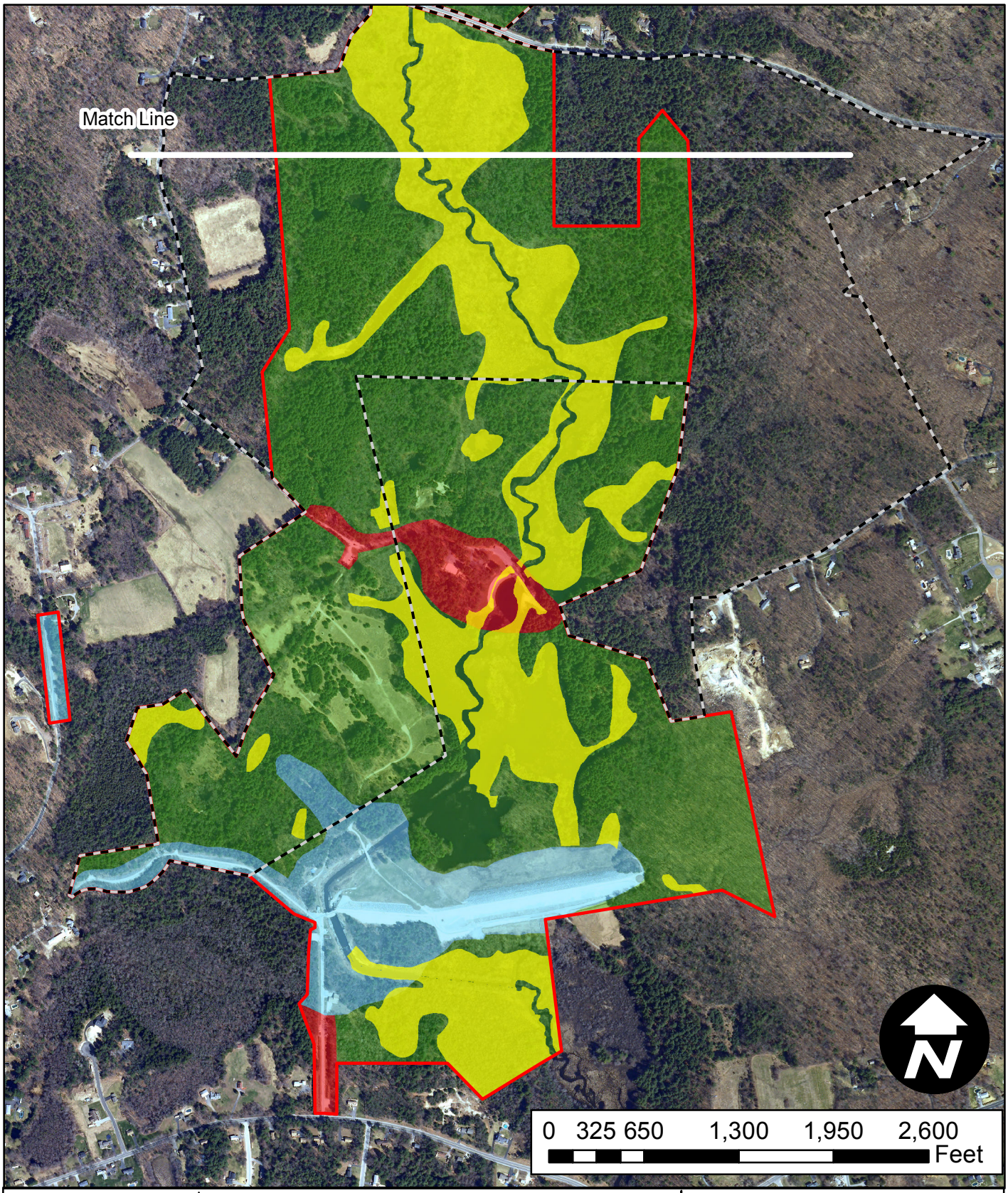
October 2011



U.S. ARMY CORPS of ENGINEERS ®
NEW ENGLAND DISTRICT

- Boundary/Fee Lines
- Recreation
  20 acres
- Environmentally Sensitive
  160 acres
- Wildlife Management Area - MassWildlife
  557 acres total
  300 Corps acres
- Multiple Resource Management
  330 acres
- Project Operations
  50 acres

FIGURE 2
LAND CLASSIFICATION PLAN
WEST HILL DAM
UXBRIDGE, MA
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
OCTOBER 2011



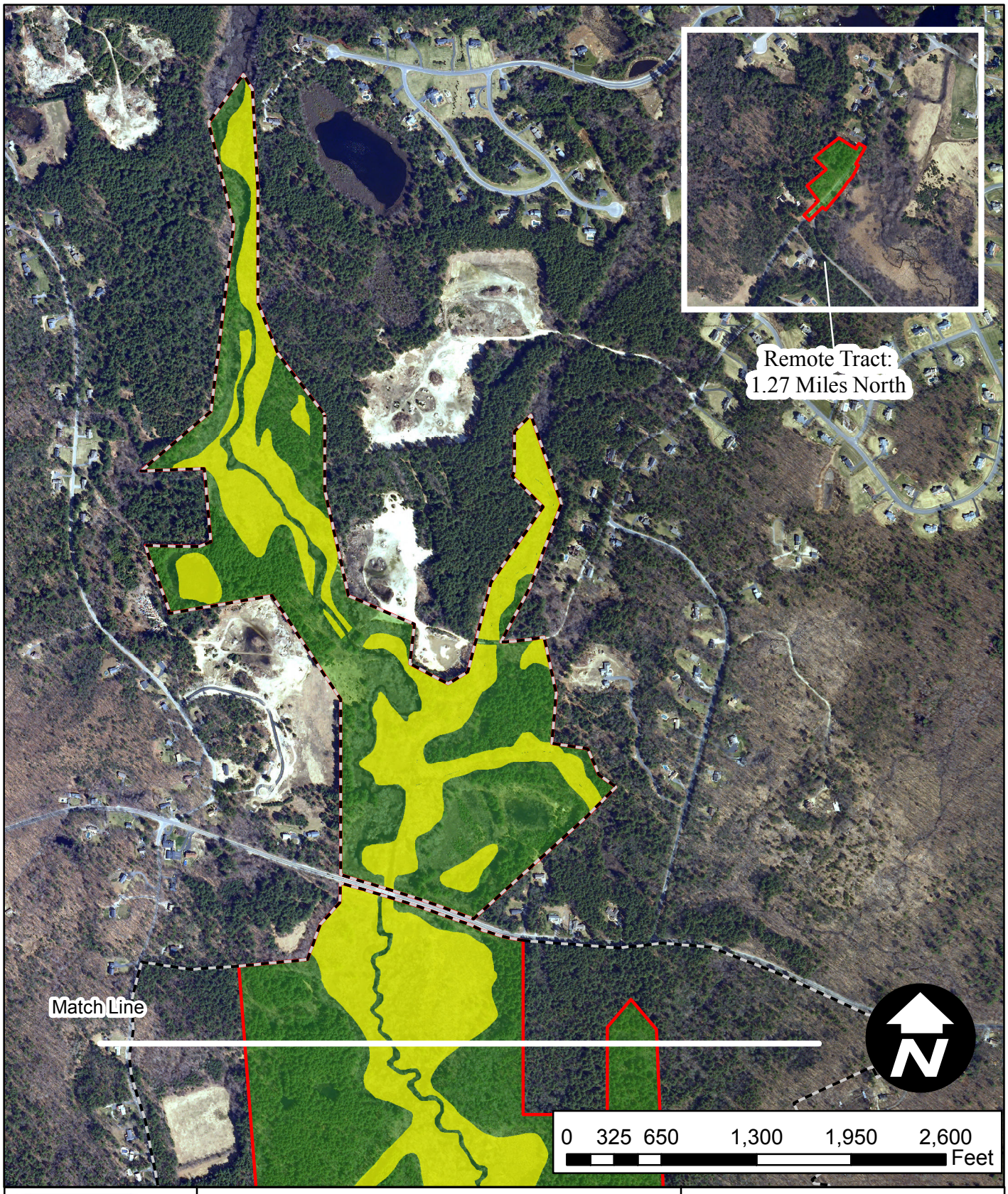
U.S. ARMY CORPS of ENGINEERS ®
NEW ENGLAND DISTRICT

- Boundary/Fee Lines
- Recreation — *20 acres*
- Environmentally Sensitive — *160 acres*
- Wildlife Management Area - MassWildlife — *557 acres total, 300 Corps acres*
- Multiple Resource Management — *330 acres*
- Project Operations — *50 acres*

FIGURE 2a - Page 1 of 2

LAND CLASSIFICATION PLAN
WEST HILL DAM
UXBRIDGE, MA
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

OCTOBER 2011



U.S. ARMY CORPS of ENGINEERS ®
NEW ENGLAND DISTRICT

- Boundary/Fee Lines
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- Wildlife Management Area - MassWildlife — *557 acres total, 300 Corps acres*
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FIGURE 2a - Page 2 of 2

LAND CLASSIFICATION PLAN
WEST HILL DAM
UXBRIDGE, MA
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

OCTOBER 2011

2.2.1.1 Operation and Maintenance

The overall operation and maintenance of West Hill Dam is performed in accordance with the project's Operational Management Plan (OMP) and the project's Operation and Maintenance Manual (O&M Manual). Periodic duties including maintenance, monitoring, inspection, testing, reporting and record keeping requirements are listed in detail in the O&M Manual. These duties provide for the operation and maintenance of the dam and appurtenant structures, buildings, bridges, utilities, roads, and electrical and mechanical equipment and tools. Motor vehicles are not maintained by project staff. Specific plans for related programs are contained in sections of the OMP and include safety, security, visitor assistance, and others.

In addition to inspections and reports required by the OMP and O&M Manual, periodic inspections are performed by a team of specialists from the Engineering/Planning Division and Operations Division of the U.S. Army Corps of Engineers, New England District every five years.

2.3 Real Estate and Land Use

All lands at West Hill Dam were acquired for flood risk management operations at the project. This included areas for permanent structures, construction, borrow, highway relocation, and reservoir. There are currently 557 acres owned in fee and 844 acres held in flowage easement.

Approximately 49 percent of the area is wooded, 17 percent is open field and non-forested and 34 percent is comprised of wetlands.

There is one land management license associated with the project lands. It is the first item listed below. Other existing out grants are also summarized below:

Type	Contract Number	Grantee	Description	Acreage	Expiration Date	Tracts(s)
LICENSE	DACW33-3-94-3	Commonwealth of Mass	Fish & Wildlife Management	300	1-Nov-2013	101
LICENSE	DACW33-3-96-51	National Grid	Electric Service	0	30-Jun-2016	320E
EASEMENT	DA-19-016-CIVENG60-465	Town of Upton	Public Road	0.98	In Perpetuity	400 409

2.4 Flood Risk Management

Regulation of West Hill Dam is performed as directed by the Reservoir Regulation Team (RRT) within the Reservoir Control Center at the New England District Headquarters in Concord, Massachusetts. The RRT is responsible for the regulation of flood risk management reservoirs. Contact is maintained on a weekly basis between RRT and the project office and more frequently during flood events.

Emergency operating procedures are available in the event that the Project Manager is unable to communicate with the RRT by normal or emergency methods.

Guidance for the control of flow from West Hill Dam is summarized in the attached TABLE 1-OUTFLOW GUIDANCE FOR WEST HILL DAM.

Reservoir pool stage levels, tail water levels, and accumulated rainfall measurements are collected locally and stored by a Sutron data collection platform located in the gauge building. A United States Geological Survey (USGS) gauging station is located approximately two hundred and fifty feet downstream from the dam and provides a continuous record of releases from the project. The stored data is transmitted via satellite to the RRT for assistance in regulating project outflows. In addition to the gauge on the West River, the USGS maintains gauges that are also monitored by the RRT on the Blackstone River at Millbury, Northbridge and Uxbridge, Massachusetts and Woonsocket, Rhode Island.

The West Hill Reservoir is operated primarily to desynchronize flood flows of the West River from flood flows on the Blackstone River. Flows from the reservoir will be reduced whenever forecasts indicate that the channel capacity of the Blackstone River is to be exceeded. Regulation is initiated as a result of heavy rainfall over the Blackstone River watershed and for specific river stages at key locations along the West and Blackstone Rivers.

Reservoir regulation is normally conducted in three phases. Phase I involves the initial appraisal of storm and river conditions that lead to regulation of flows. Phase II concerns regulation during the event as flood flows crest and move downstream. Phase III includes emptying of the reservoir following recession of the flood.

Corps of Engineers personnel located at West Hill Dam are responsible for operation, maintenance, and management activities.

2.5 Significant Flood Risk Management Storages

Historic reservoir flood risk management storages and area capacity / frequency information are summarized in attached TABLE 2 – ANNUAL PEAK POOL LEVELS and TABLE 3 – AREA CAPACITY AT WEST HILL DAM.

2.6 Historic Context

2.6.1 Prehistoric Period

Prehistoric settlement and land use patterns are characterized as limited use of upland areas and more intensive use of terraces above navigable streams and rivers for hunting, fishing and foraging. The project area includes both riverine and tributary stream/wetland habitats that contain high resource potential.

The general attributes of the project are similar to environmental settings in nearby areas of the Blackstone River basin that contain significant numbers of prehistoric sites. Both the riverine and upland stream clusters of previously known sites contain evidence of repeated short-term occupation extending from the periods of Middle Archaic (circa 5,500 years ago) to Late Woodland (circa 1,000 years ago).

2.6.2 Historic Period

Prior to the acquisition and construction of the project in 1961, the reservoir area was in a rural setting consisting of houses, agricultural buildings and fields, and wooded hillsides of predominately mixed hardwoods with hemlock. Based on an examination of historic maps, several sites classified as domestic, agrarian, industrial, and transportation were known to have been located on the property. In general, historic archaeology in New England has centered on individual sites and structures dating back to the Colonial period (17th and 18th Century).

2.7 Climate

The Blackstone River Basin has a variable climate characterized by frequent but generally short periods of heavy rainfall in the summer, and longer periods of less intense precipitation in the winter. The basin climate is influenced by the prevailing westerly and cyclonic storms that move across the country from the west or southwest. The area is also exposed to coastal storms, locally known as "Northeasters," which travel up the Atlantic seaboard. Tropical hurricanes occur less frequently but have historically caused severe flooding in the Blackstone River basin and its tributaries, the most recent being Hurricane Diane and Hurricane Carol in August of 1955.

The mean annual precipitation over the Blackstone basin is about 41 inches which is distributed rather uniformly throughout the year. Floods can be expected in any season, resulting from early spring rains combined with melting snow or heavy rains during the summer and fall. About one-third of the precipitation that occurs during the winter months is in the form of snow. Annual snowfall averages from 36 to 40 inches in the southern portion near the coast to about 60 inches at northerly inland points.

The average annual temperature of the basin is 49 degrees Fahrenheit. Average monthly temperatures are between 69 degrees Fahrenheit and 73 degrees Fahrenheit in July and August. The frost-free season is approximately 135 days in length and varies somewhat with location in the basin.

2.8 Topography

The Blackstone River Basin is generally hilly and rolling with the higher elevations and narrower valleys occurring in the western portion. Elevations vary from a maximum of 1,395 feet NGVD near Worcester to mean sea level in the tidal estuary. The West River watershed is elongated, having a maximum length of twelve miles, a maximum width of nearly five miles, and a total drainage area of thirty-six square miles. The watershed consists of low rolling hills and broad valleys, and scattered lake and

swamp areas. Elevations range from about 200 to 600 feet NGVD. The West River flows in a generally southeasterly direction from its source through West Upton, then gradually turns to a more southerly course to its confluence with the Blackstone River about one mile below Uxbridge. The river falls about 9.4 feet per mile during its 16 mile length. Refer to attached FIGURE 3 -TOPOGRAPHY.

2.9 Project Access

Main access to the project area is provided via Interstate 90 and 495 and Massachusetts Route 122. The entrance to West Hill Dam and administrative office is located on East Hartford Avenue, approximately 3 miles east of Massachusetts Route 122 in Uxbridge. The park entrance is located on West Hill Road, off of Quaker Street in Northbridge.

3. RESOURCE INVENTORIES AND ANALYSIS

3.1 Introduction

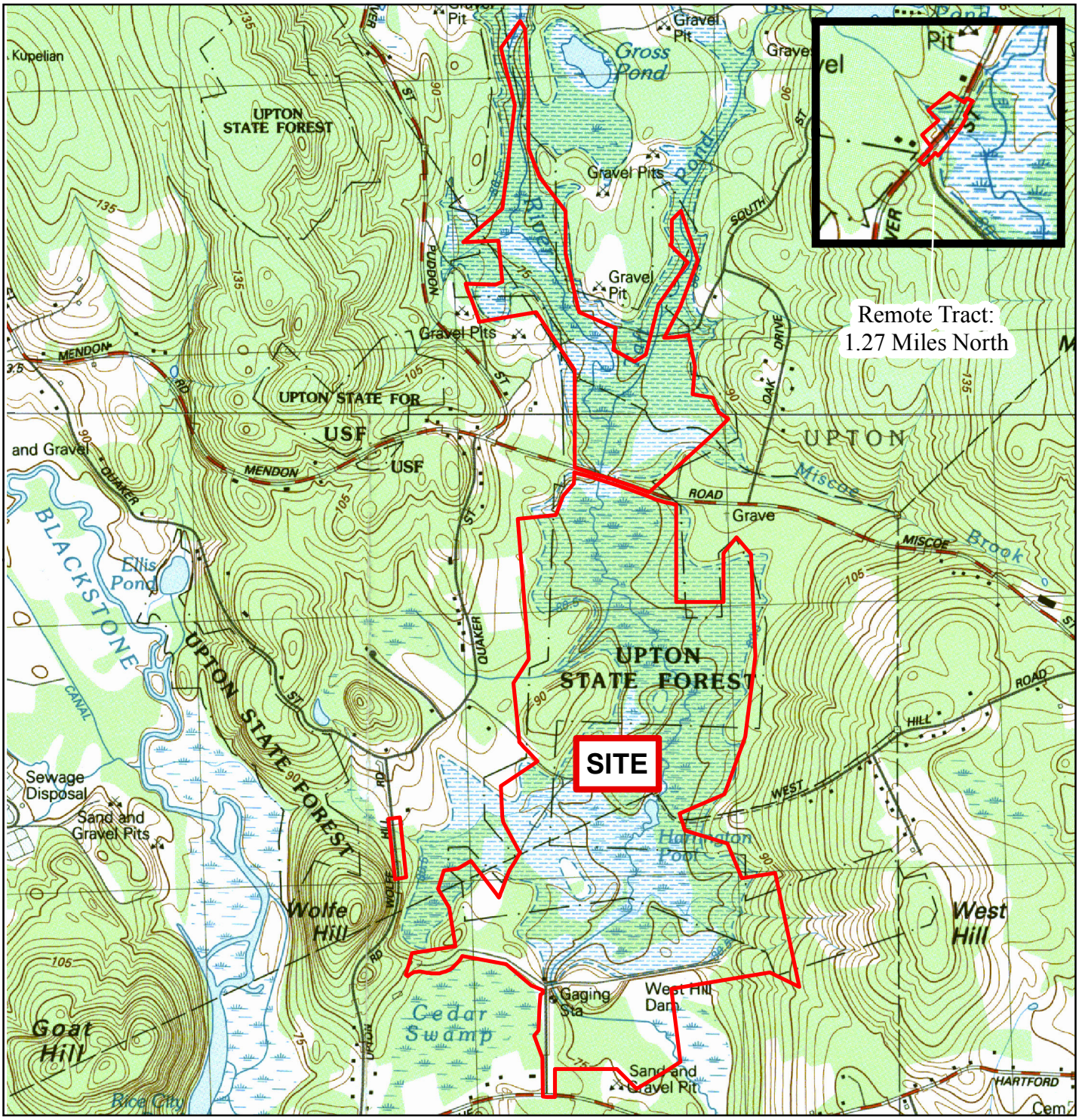
The environmental resources of the West Hill Dam project provide for important and valuable natural resource and recreational opportunities. The project maintains a wide variety of fish and wildlife resources, and provides popular recreational facilities for the surrounding areas. Fish and wildlife management and forestry management programs are carried out on project lands. Recreational activities include swimming, picnicking, boating, hunting, fishing, and hiking.

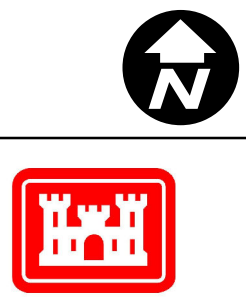
The project area consists of a total of 557 acres owned in fee and 838 acres held in flowage easement. All lands at the project are under the jurisdiction of the Corps of Engineers. Of the 557 acres, 49 percent (274 acres) is forested, 34 percent (190 acres) is wetland habitat, 5 percent (24 acres) consists of maintained fields, and 12 percent (69 acres) is non-forested, i.e. lawns, roads and areas covered by the project structures.

3.2 Natural Resources

3.2.1 Geology and Soils

The project area, which is situated in Worcester County, was subject to glaciation during the Ice Age or Pleistocene Epoch beginning about one million years ago. Glaciation rounded and smoothed the bedrock, hills, and ridges of the area, and covered them with a thin layer of till. The principle evidence of the Late Wisconsin glacial period is stratified and un-stratified drift. Within the reservoir area, bedrock is composed of metamorphic rocks that range in age from pre-Cambrian to Pennsylvanian. They include gneiss, schist, quartzite, and phyllite. All have been folded, and the trend of the folds is in a north-south to a northeast-southwest direction. The soil horizons which have developed on various surficial deposits such as outwash, fill, and ground moraine, are generally similar. The valley floor areas and terraces bordering the West River and other large streams contain sandy loam and subsoil classified as the Merrimac, Hinckley, and Ondawa series. The upland hilly terrain, generally between 300 feet and 600 feet in elevation, is covered with thin topsoil and subsoil horizons classified as Gloucester series soils. These soils range from fine sandy loam to stony loam.





USGS TOPOGRAPHIC MAP

0 500 1,000 2,000 3,000 4,000 Feet

U.S. ARMY CORPS of ENGINEERS ® NEW ENGLAND DISTRICT

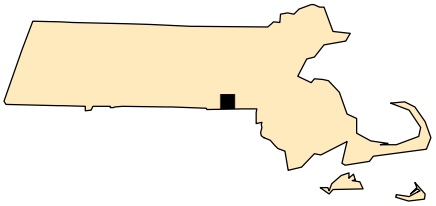


FIGURE 3

TOPOGRAPHY

WEST HILL DAM

UXBRIDGE, MA

U.S. ARMY CORPS OF ENGINEERS

NEW ENGLAND DISTRICT

OCTOBER 2011

3.2.2 Water Quality

The Massachusetts Department of Environmental Protection has designated the waters of the West River and its tributaries at West Hill Dam as class B warm-water fishery. Such waters should be suitable for fish and wildlife habitat as well as primary and secondary contact recreation. They should also be suitable for water supply after appropriate treatment, irrigation and other agricultural uses, and compatible industrial cooling and process uses. Historically, the waters have been of good quality, but there have been problems with elevated levels of bacteria at the beach that have often exceeded state standards. Likely sources of these bacteria include farm animals, septic systems, urban areas in the watershed, and geese at the project. However, no definitive sources have been found.

Water quality monitoring activities by the New England District have been conducted at West Hill Dam since 1971, including the inflow, discharge, and beach stations. The District designated West Hill Dam as a Class III project in 2001 due to the high bacteria counts that began occurring at the beach. As a Class III project, the District generally conducts baseline monitoring every other year.

Baseline Monitoring

Samples are collected from inflow and discharge stations six times from April through October. Parameters analyzed as a means of assessing trophic conditions include dissolved oxygen, pH, temperature, conductivity, turbidity, nutrients (total nitrogen, ammonia, nitrate, and total phosphorus), indicator organisms, trace metals, and chlorophyll a.

Data and observations show that the water quality is generally good and supports most of its intended uses, although mercury contamination in fish is a concern throughout New England. Water temperatures indicate that the project could support a good warm-water fishery in the West River and a naturally reproducing coldwater fishery in at least some of the tributaries. Dissolved oxygen concentrations meet or exceed standards, but the pH levels are low due to the effects of wetlands in the watershed. Levels of phosphorus and nitrogen are somewhat elevated but not a concern at this dry-bed reservoir. The waters are soft with low alkalinity. Turbidity levels are low, but the water has some natural color due to the upstream presence of wetlands.

Beach Monitoring

Beach monitoring is required to protect public health and comply with state standards. In accordance with Massachusetts requirements, water samples are collected within 5 days of the opening of the beach. Subsequent samples are taken at least weekly during the bathing season and prior to reopening the beach after closing for any reason. The samples must be analyzed for E. coli.

Bacteria levels at the park in recent years have exceeded standards, causing beach closings on numerous occasions. Sources of the high bacteria counts are believed to be a result of possible contamination from upstream sites in the watershed and geese in the park, but it remains unknown as to how much either event contributes to the problem. In 2006, counts were often high until Corps of Engineers park rangers made a serious effort to disperse the geese. As a result of this action, bacteria counts for the remainder of the season were reduced, although this may have been a coincidence. A number of likely sources have been identified in the watershed over the years, but it has not been confirmed that any of them are responsible for high counts at the beach. The Blackstone River Coalition, Massachusetts Department of Environmental Protection, and even the U.S. Environmental Protection Agency have taken an interest in the high bacteria counts and have conducted or sponsored investigations in the watershed. It is likely the watershed will continue to be investigated.

Potable Water Monitoring

West Hill Dam has three active wells, all of which are Corps of Engineers-operated and monitored. The project office is connected to the Uxbridge municipal water supply and is not monitored. One of the wells, located at the park, is classified as public, transient, non-community water supplies. The other two serve the project.

Monitoring has shown that the potable water meets appropriate standards for total coliform, nitrates and nitrites, sodium, and volatile organic compounds.

3.2.3 Wetlands

The Army Corps of Engineers New England District, conducted a wetlands determination on the West Hill Dam in 1997 (updated 2007). The aim of this study was to identify and characterize the surface waters and wetland communities on the project site. A modified version of the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979) system was used to identify and evaluate wetlands on the site. Roughly 34 percent (190 acres) of the project area is comprised of wetlands. A variety of wetland classifications occur at the project site and include:

Palustrine Open Water – 1 acre
Palustrine Aquatic Bed – 11 acres
Palustrine Emergent Vegetation - 15 acres
Palustrine Scrub Shrub Vegetation – 35 acres
Palustrine Forested Open Vegetation –110 acres
Riverine – 9 acres
Riverine Aquatic Bed – 9 acres

Wetland mapping for the project is shown on FIGURE 4 - WETLAND CLASSIFICATION PLAN.

3.2.4 Nuisance Species

Nuisance plant species that are a management concern at the project site include purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*). Japanese barberry (*Berberis thunbergii*), autumn olive (*Elaeagnus umbellata*) and multiflora rose (*Rosa multiflora*) are found on disturbed lands and mowed fields. These plants are identified in the Invasive Plant Atlas of New England (IPANE).

3.2.5 Forest lands

Approximately 45 percent of the area, or 274 acres of the 557 acres of land owned in fee, is composed of forests. Much of this forested area is comprised of second growth white pine and white pine-oak communities. The principle species include Eastern white pine (*Pinus strobus*), white oak (*Quercus alba*), Eastern hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), and trembling aspen (*Populus tremuloides*).

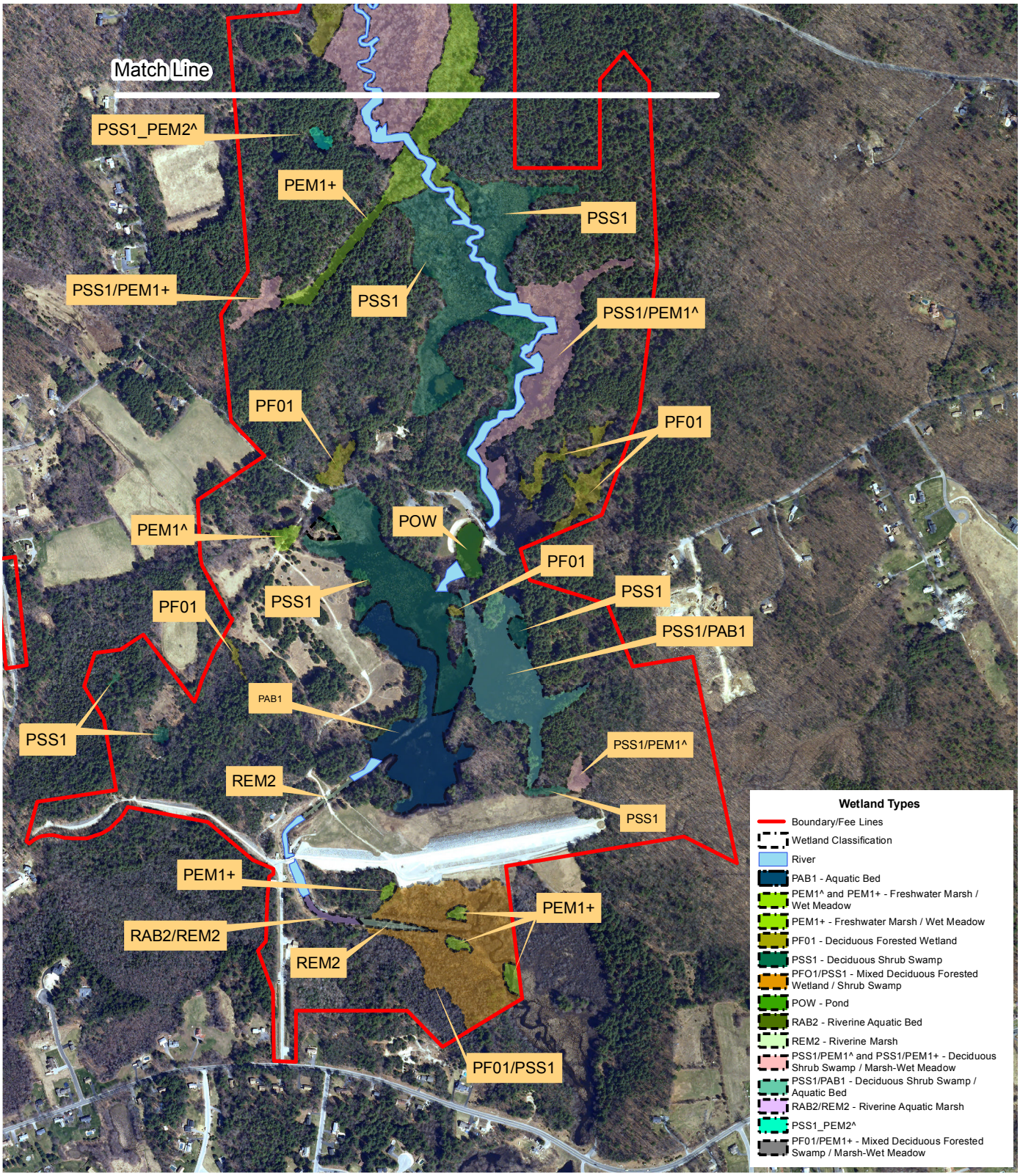
The forest cover is in the 60 to 90 year age class and most stands are evenly aged. The crown closure averages 100 percent in pole and saw log size stands. Due to the large amount of competing undesirable growing stock and cull trees, acceptable growing stock is low to moderate.

In 1994, the Corps of Engineers completed a detailed forest inventory of the West Hill Dam project. The inventory determined the acreage of the various forest types within a compartment, size, average diameter breast height (DBH), stocking rating, basal area, and age class. The acreages of the forest cover types and treatment suggestions are shown in the following tabulation. The forest cover types and other areas are delineated on attached FIGURE 5 – FOREST CLASSIFICATION PLAN.

The overall quality of the forestry growing stock is fair to medium.

3.2.5.1 Open Lands (Old Fields)

Open areas make up approximately 24 acres, or five percent of the project area. These areas are under the lease agreement with the Massachusetts Division of Fish and Wildlife and are mowed at various intervals during the year to prevent them from gradually reverting to forest. Open grass areas contribute to the diversity of habitat needed for wildlife both within the project and the region. The area is regularly stocked with pheasants during hunting season. Old fields should be maintained in early succession growth through the mowing program. Openings for edge species should occur near existing disturbances and should not disrupt larger tracts of forest.



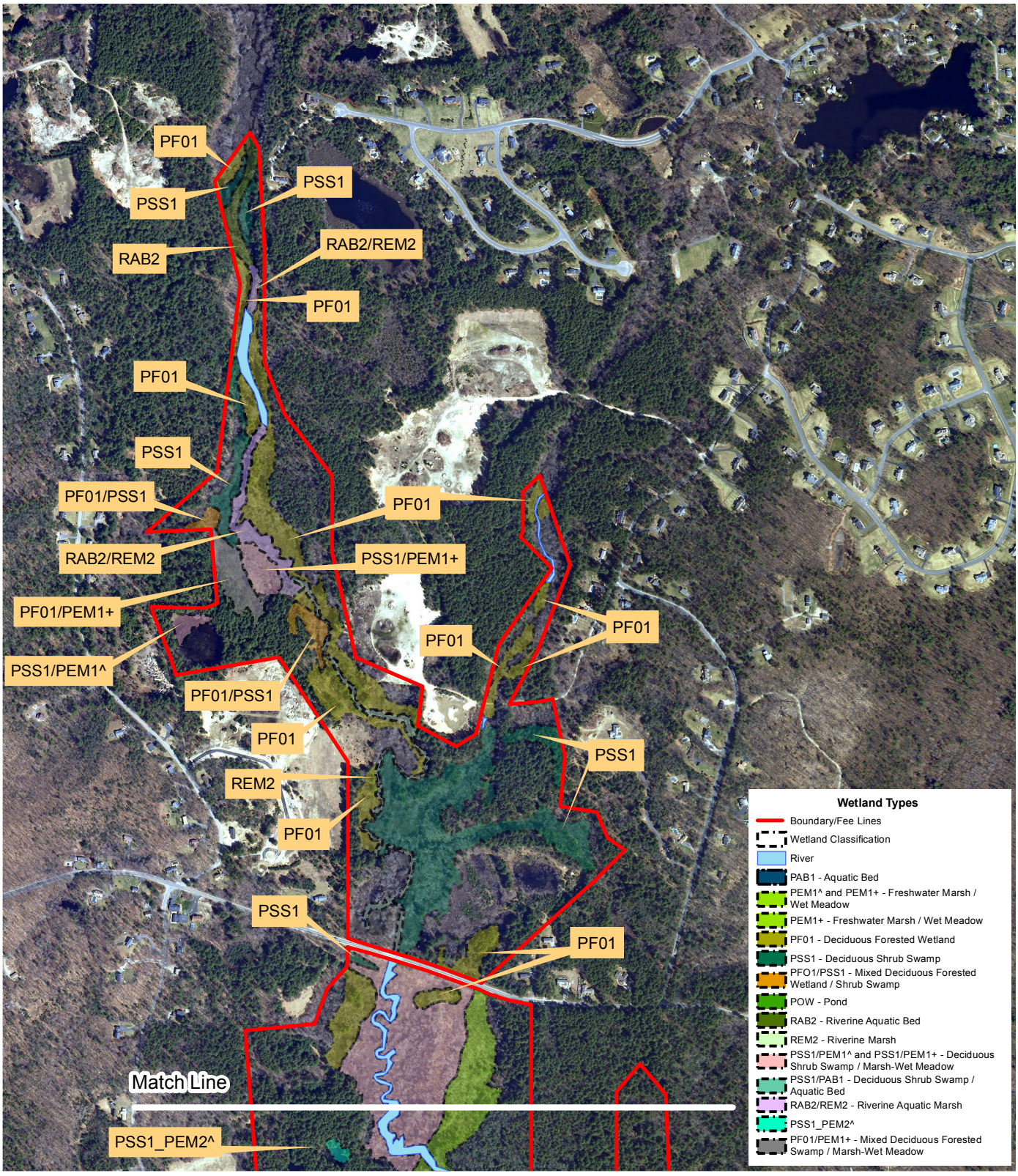
US Army Corps of Engineers®
New England District

0 275 550 1,100 1,650 2,200
Feet

FIGURE 4 - Page 1 of 2

WETLAND CLASSIFICATION PLAN
WEST HILL DAM
UXBRIDGE, MA
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

OCTOBER 2011



US Army Corps of Engineers®
New England District

0 275 550 1,100 1,650 2,200
Feet

FIGURE 4 - Page 2 of 2

WETLAND CLASSIFICATION PLAN
WEST HILL DAM
UXBRIDGE, MA
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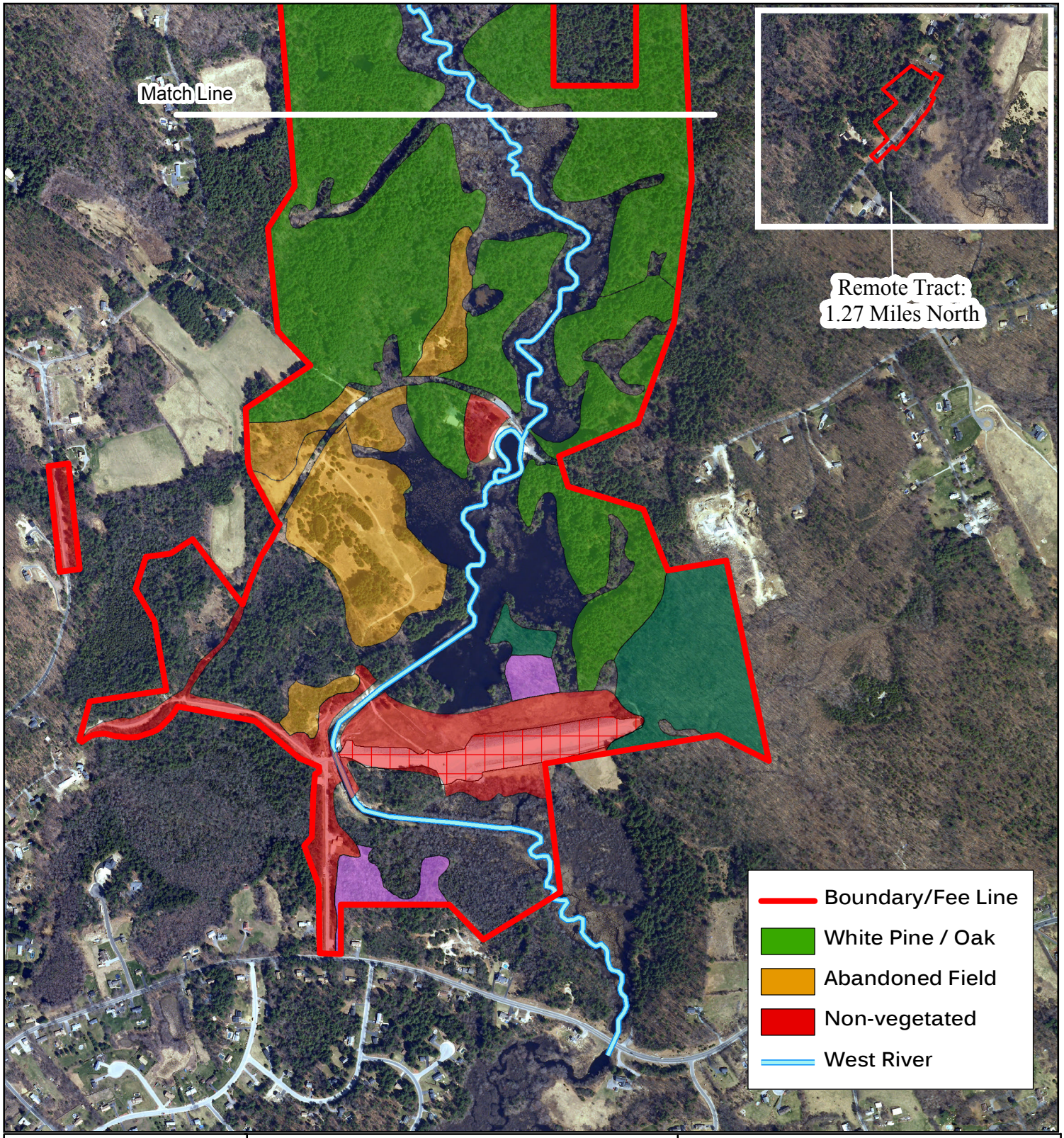

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0 320 640 1,280 1,920 2,560
Feet

FIGURE 5 - Page 1 of 2

FOREST CLASSIFICATION PLAN
WEST HILL DAM
UXBRIDGE, MA
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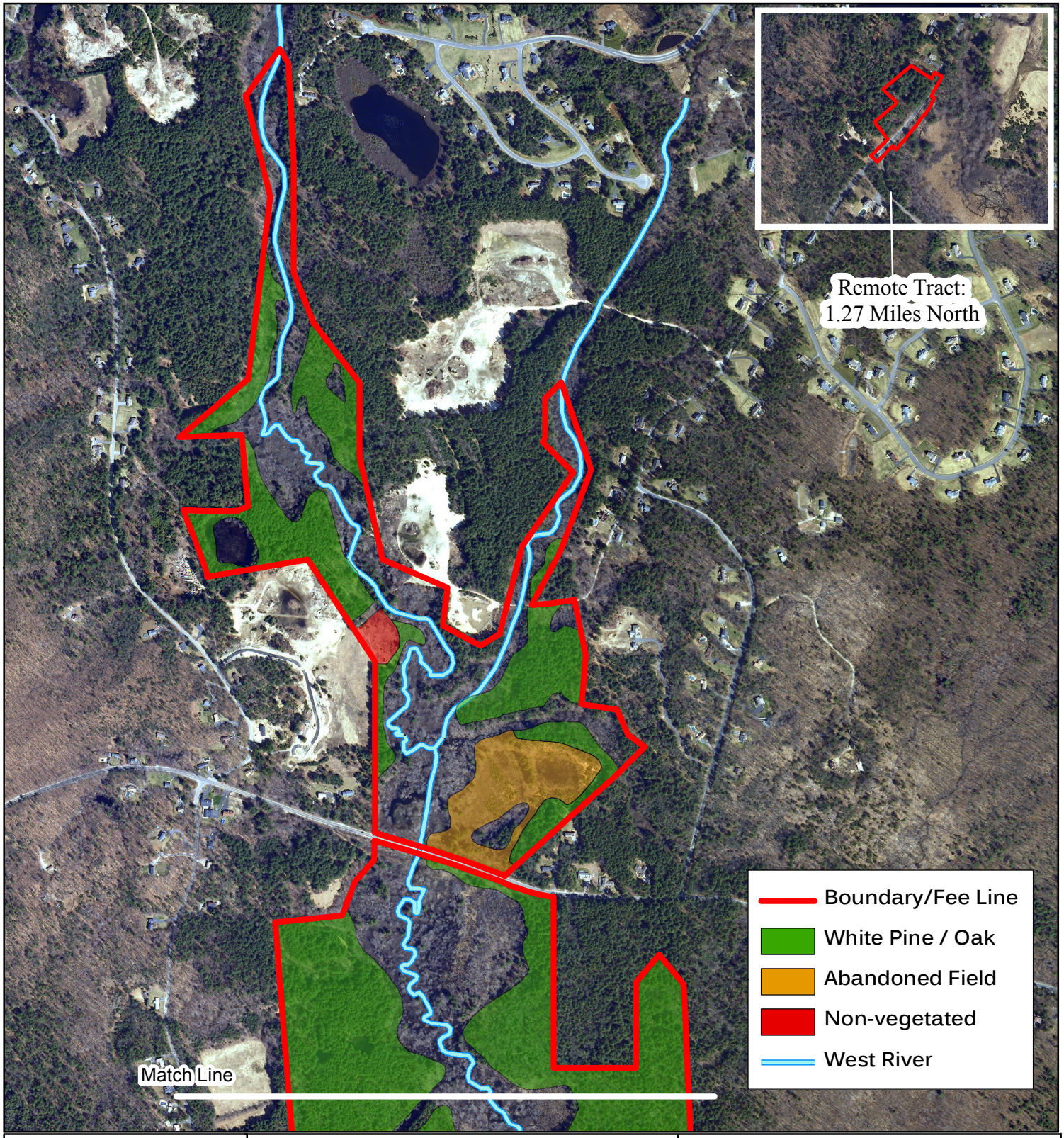

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0 320 640 1,280 1,920 2,560
Feet

FIGURE 5 - Page 2 of 2

FOREST CLASSIFICATION PLAN
WEST HILL DAM
UXBRIDGE, MA
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3.2.5.2 Developed Areas

Developed areas at West Hill Dam include those areas associated with flood risk management structures, recreational facilities, and administration areas. The major structural components were described in Section 2, Project Description. The developed recreational facilities include comfort stations, picnic tables, and picnic shelters. A more detailed description of the recreational facilities is included in this section under Recreational Resources. The administration facilities, located adjacent to the dam, consist of a project office, storage building, garage, and small parking lot.

3.2.5.3 Exemplary Natural Communities

The February 1998 Massachusetts Natural Heritage and Endangered Species Program (NHESP) survey noted several areas of local importance and uniqueness. These include a Southern New England (SNE) Level Bog and two Southern New England Acidic Seepage Swamps: Atlantic white cedar association. Brief descriptions of these areas are provided below.

Southern New England Level Bog: The bog is an exemplary example of a SNE Level bog. It is located north of the overflow parking lot at the West Hill Park. The presence of abundant Sphagnum moss species in association with mostly acidophilic taxa indicates that this wetland is a nutrient-poor fen or acidic bog.

Southern New England Acidic Seepage Swamps: Atlantic White Cedar associations (2). The West Hill Cedar Swamp is located in the lowlands east of the project office. The swamp receives a substantial amount of water from the West River. The forest canopy is primarily Atlantic white cedar and red maple. The Hessel's hairstreak butterfly, listed as a species of Special Concern, can be observed in this swamp. Approximately 50 percent of the Atlantic white cedar stems are either broken or lying in a horizontal position with many of the fallen stems still living. The exact cause of this phenomenon is not known. However, the damage could have been caused by a storm event, or is a result of other natural occurrences.

The Wolf Hill Cedar Swamp is located east of West Hill road and is only partially located on government property. The site has an acidic forest floor which is dominated by Sphagnum moss.

3.2.6 Wildlife

The West Hill Dam property is comprised of a diverse array of natural plant communities. This habitat diversity is, in part, responsible for the great diversity of animals which are present on project lands. Wildlife species that may be expected to occur within the project (per MA Fish and Wildlife) are summarized on attached TABLE 4 – WILDLIFE SPECIES OF WORCESTER COUNTY, MA.

3.2.7 Aquatic Resources

The habitat of West Hill Dam is that of a slow moving stream. A pool is impounded only during flood operations. The West River's extensive wetland supports a large variety of aquatic invertebrates which result in a diversified food chain and aquatic life.

The West River is a locally important river for sport fishing and is subject to heavy fishing pressure. The river environment covers 0.6 miles within the project with a gradual slope. The majority of the river is through open fields, which provides little shading for the river. Water temperatures tend to be warm in the Harrington Pool area. Natural reproduction of trout, the preferred sport fish, is rare within the reservoir but may occur in upstream shaded areas or feeder streams. The Massachusetts Division of Fisheries and Wildlife has designated the West River, Miscoe Brook, and Taft Pond Brook as Coldwater Fishery Resources (CFR). A CFR is defined as water that meets at least one of the following criteria: brook, brown, or rainbow trout have been found and/or slimy sculpin or longnose sucker are present.

A fish stocking program at West River in West Hill Park is conducted during April and May by the Massachusetts Division of Fisheries and Wildlife. Brown and rainbow trout are stocked on a "put and take basis." The abundance of wetland areas along the West River are utilized by native fish populations for spawning. High summer water temperatures in the river are inappropriate for sustaining trout year round. A warm water fishery occurs naturally in the West River. The source of the population comes from upstream off-reservoir ponds.

Warm water species likely to be present are: Largemouth bass - *Micropterus salmoides,* Brown bullhead - *Ictalurus mebulosus*, Yellow bullhead - *Ictalurus natalis*, Bluegill - *Lepomis macrochirus*, Pumpkinseed - *Lepomis gibbosus*, White sucker - *Catostomus commersoni*, Yellow perch - *Perca flavescens*, White perch - *Monroe americana*, Chain pickerel - *Esox niger*

Water level fluctuations periodically occur due to reservoir regulations for flood risk management purposes. These fluctuations can be both beneficial and detrimental to fish species. The extent of damage to these fish populations depends on many factors including the time of year, the amount of fluctuation in the water level, and the direction of the fluctuation.

3.2.8 Rare, Threatened and Endangered Species

In 1997, the Massachusetts Natural Heritage and Endangered Species Program (NHESP) contracted with the U.S. Army Corps of Engineers to identify and locate rare or protected species, critical habitat for rare or protected species, and any outstanding natural communities occurring at the West Hill Dam property. NHESP subcontracted with experts in the various taxa to carry out the inventory.

No federally threatened or endangered species were located on the property.

Several species listed as being of Special Concern in Massachusetts were found on the West Hill Dam property, including: the Wood turtle; Hessels's Hairstreak – butterfly; Triangle Floater – mussel; and Climbing fern – plant. Fourteen vernal pools and four priority natural communities were identified: Southern New England Level Bog; two southern New England Acidic Seepage Swamps: Atlantic White Cedar Association; Southern New England Stream bottom Forest.

The West Hill Dam property provides a diversity of habitats. The wetland systems, including the West River, tributary streams, vernal pools, and various wetland habitats, were found to constitute a large core of mixed habitat for rare and common species alike.

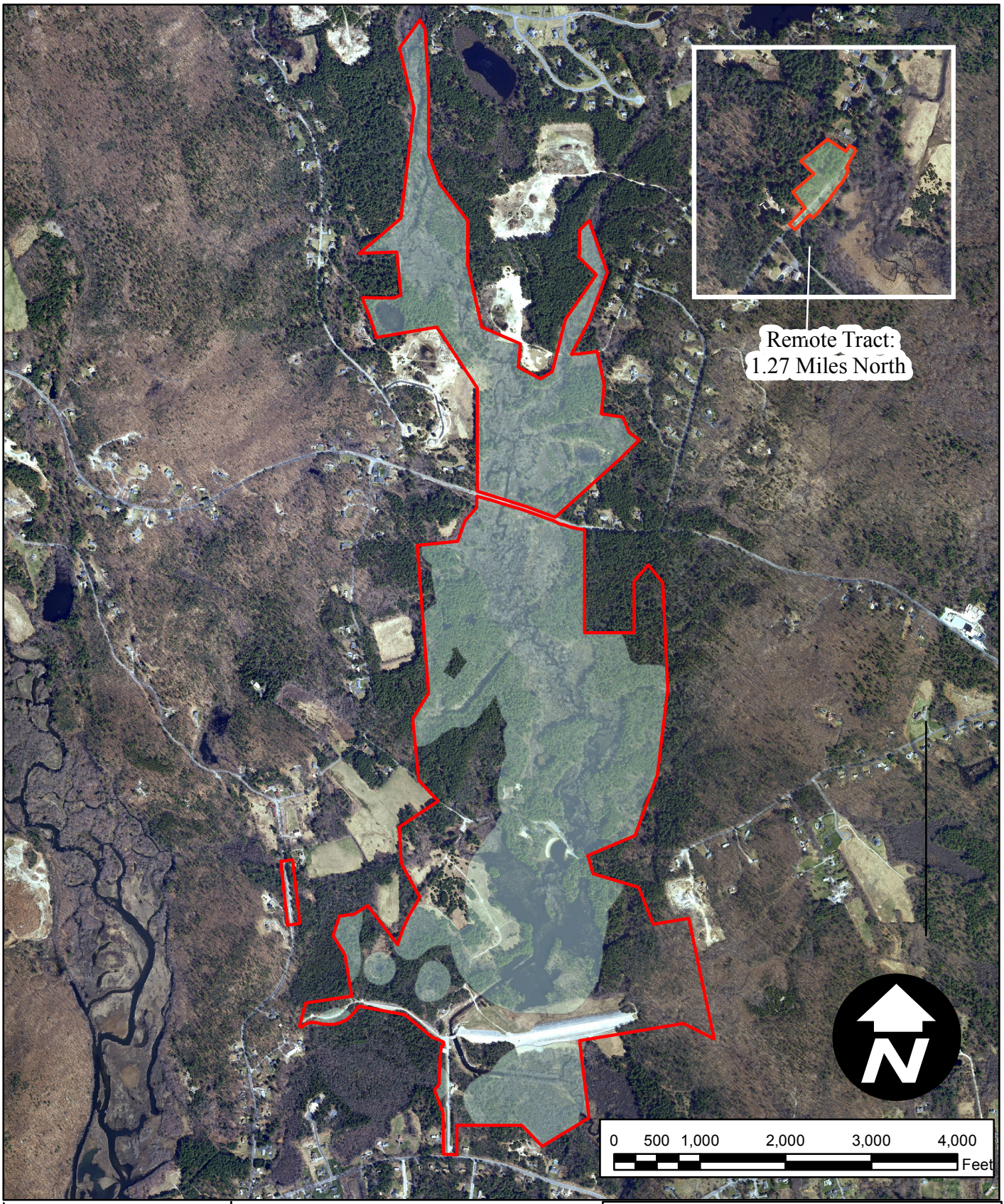
Pine/oak woods make up the forested uplands throughout the project and generally do not support many rare species. Although no listed bird species were found to be breeding on the property, it is the project's diversity of habitat that explains the presence of two uncommon species; the Northern rough-winged swallow (breeding) and the Northern goshawk (non-breeding), a Watch listed species. In addition, the blackpoll warbler and the sharp-shinned hawk, both species of Special Concern, have been observed on the property. The mowed meadow, north of the dam, is found to be critical habitat for butterfly fauna; 68 percent of all butterflies observed on the property have been observed in this area.

Priority habitat is the mapped geographical extent of known habitat for all state-listed rare plants and animals. These areas are shown on FIGURE 6 – RARE SPECIES PRIORITY HABITAT.

3.3 Archaeological Resources

An archaeological reconnaissance survey of the West Hill Dam project area was completed in February 1988 by the Public Archaeology Laboratory, Inc. of Pawtucket, Rhode Island under contract to the Corps of Engineers, New England Division. Goals of this survey were to stratify the project area into zones of archaeological sensitivity (high, moderate, and low) and prepare recommendations for a cultural resources management plan for the West Hill Dam project in compliance with relevant Federal legislation including the National Historic Preservation Act of 1966, as amended. The following information is based upon the "Archaeological Reconnaissance Survey of the West Hill Dam and Reservoir in Uxbridge, Northbridge, Upton and Mendon, Massachusetts."

During the field testing and survey portions of the study, a total of 14 prehistoric and 22 historic cultural resources were identified. Many of these sites were deemed potentially significant and further recommendations for avoidance or additional study were described. In addition, many of the stratified zones of high or medium archaeological sensitivity would require further investigation. Areas of high and moderate archaeological sensitivity are depicted on the attached FIGURE 7 – ARCHAEOLOGY. Recommendations for all known and potential historic and archaeological resources were offered. Please note that archaeological site locations are confidential information that is exempt from the Freedom of Information Act requirements, and cannot be divulged to the general public.



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Notes: Priority Habitat data was obtained from MassGIS

Boundary/Fee Line

Priority Habitat

FIGURE 6

RARE SPECIES PRIORITY HABITAT
WEST HILL DAM
UXBRIDGE, MA
U.S. ARMY CORPS OF ENGINEERS
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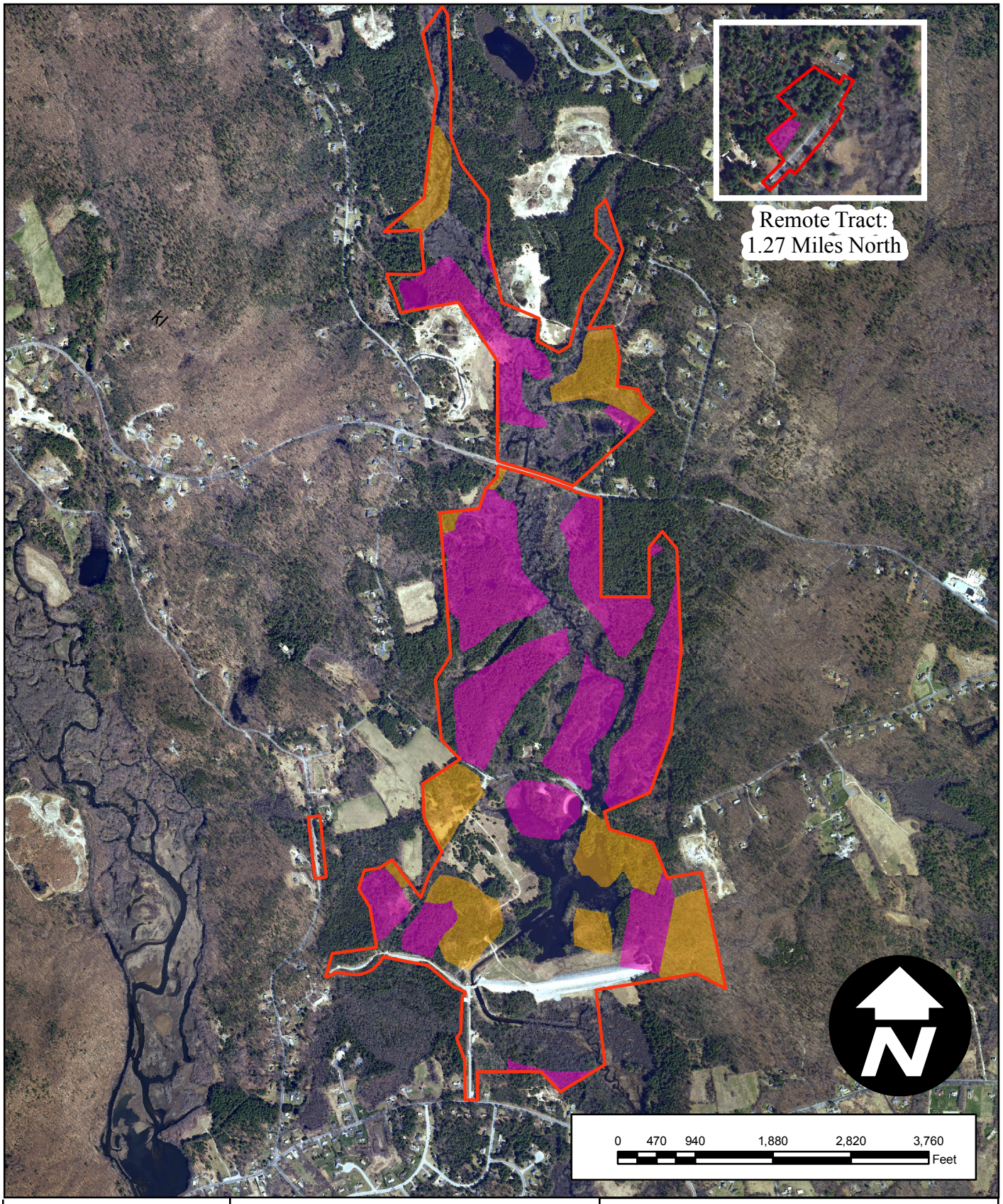

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Legend

- Boundary/Fee Line
- Zone of Moderate Expected Archaeological Activity
- Zones of High Expected Archaeological Activity

FIGURE 7

ARCHAEOLOGY

WEST HILL DAM

UXBRIDGE, MA

U.S. ARMY CORPS OF ENGINEERS

NEW ENGLAND DISTRICT

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3.3.1 Prehistoric Resources

A total of 11 prehistoric archaeological sites on land owned in fee were identified during the Reconnaissance survey. Four of these sites were locations or find spots of cultural material initially recorded during the walkover inspection that were verified as sites through subsurface testing. The other 7 sites were locations within zones of high or moderate sensitivity that were suspected to contain archaeological sites.

The minimal subsurface testing conducted during the survey yielded small samples of cultural material and other information about the probable size and contents of prehistoric sites. Most of the identified sites appear to fall into the general category of small loci with low densities of cultural material. Another fairly frequent category of sites appear to be loci or "field stations" that are very small and contain minimal amounts of cultural material, such as a few pieces of chipping debris. In addition to chipping debris, burnt rock fragments were another frequently collected category of cultural material. Burnt rock fragments suggest that these loci could contain features or facilities such as hearths, fire pits, or burnt rock pavements.

Some of the sites were deemed potentially significant and further recommendations for avoidance and additional study were described. In addition, many of the stratified zones of high or moderate archaeological sensitivity would require further investigation.

Most of the identified prehistoric sites and areas of high and moderate archaeological sensitivity are located in areas that are used primarily for passive recreational pursuits such as fishing, hunting, hiking, and bird watching. Further studies at an intensive level would be required in order to determine the National Register eligibility of the sites identified during the reconnaissance.

3.3.2 Historic Resources

During the 1988 reconnaissance survey, a total of 22 historic sites were encountered. A total of 12 historic sites are located on fee land and 10 historic sites are present on easement property. All functional types were represented including domestic, agrarian, industrial, transportation, and others. These sites designated as HS No.1, etc. were located based on historic map research as part of the background research, from additional information, or during the field reconnaissance investigations.

The New England District, in consultation with the Massachusetts State Historic Preservation Officer, has determined that the Harrington Pool Bridge (HS No.10) is eligible for the National Register of Historic Places.

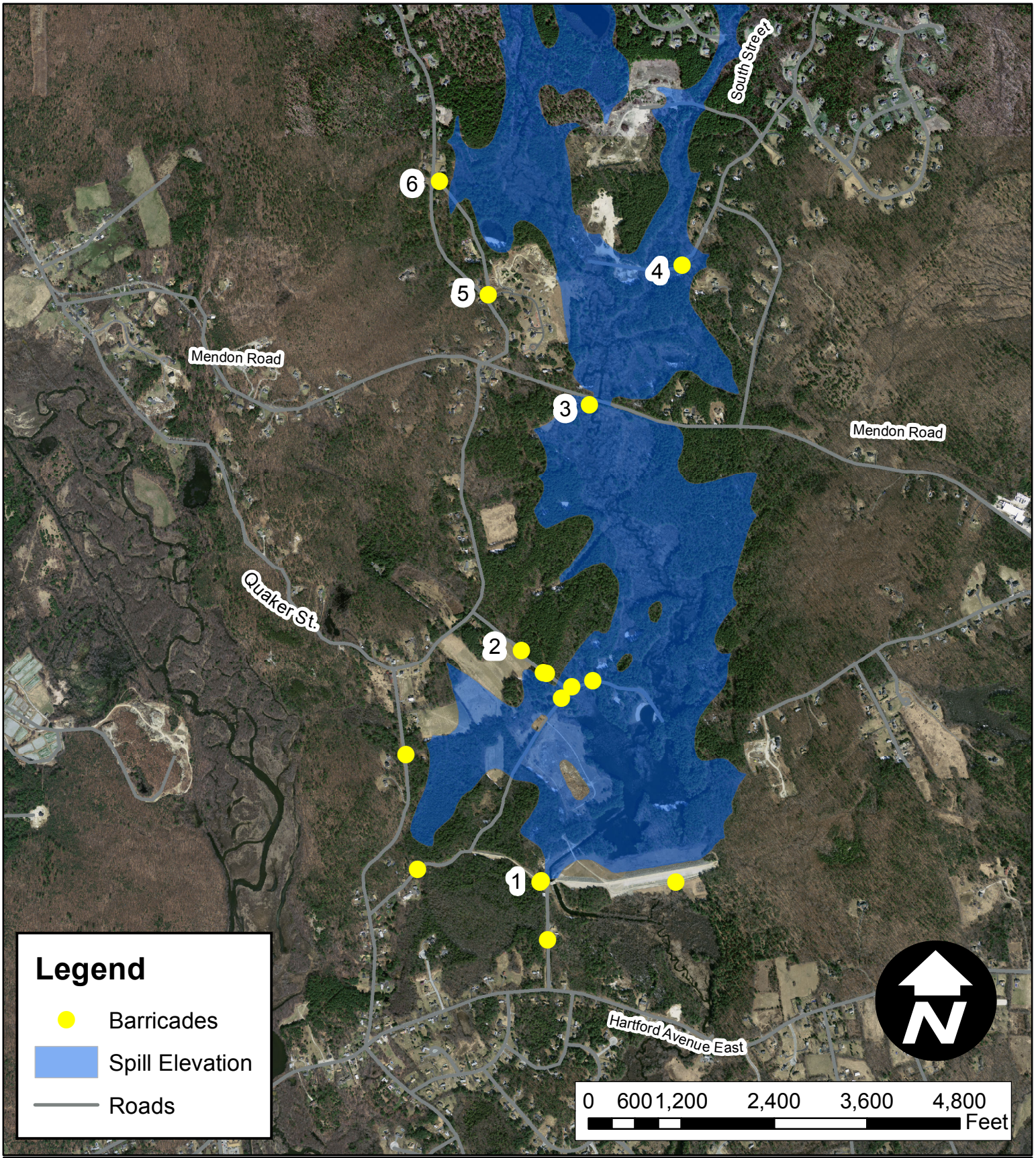
Further archeological evaluation, consisting of subsurface testing and/or additional detailed historic background and deed research, is recommended for five sites: Stream Bridge (HS NO.9), LS & J. Farnum Farm (HS No.11), Pudding Street Boulder Quarry (HS No.12), D. Farnum Farm (HS No.13) and J. Henry/Miss S. House (HS No.15).

No further archaeological work was recommended for four transportation sites; Hill Street Bridge (HS No.7), West Hill Road (HS No.19), Pudding Street (HS No.20) and Hill Street (HS No.21).

Two historic period sites, Shoe Shop (14) and Iron Bridge (18), appear to have been destroyed and no further work is considered necessary.

3.4 Recreation Resources

West Hill Dam provides numerous opportunities for recreational pursuits. The natural beauty and scenery provided by the project area continues to attract nearby residents and visitors. The project contains a major developed recreation area, West Hill Park. The reservoir area is also open to the public for hiking, cross-country skiing, horseback riding, hunting, fishing, and snowmobiling. Closure of some project roads and recreation areas may be necessary during flood risk management operations due to inundation by high reservoir levels. A map showing the maximum pool at spillway crest and road closure gates, with information on what is effected by specific reservoir stages, can be found on FIGURE 8- RESERVOIR MAP SHOWING ROAD BARRICADES.



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Map ID	Location/Name	Elevation	Stage
1	Dike A Fishing Access	250	16
2	West Hill Road	243	9
3	Mendon Rd. Fishing Access	250	16
4	South Street	245	11
5	Puddon Street (south end)	258	24
6	Puddon Street (north end)	258	24

FIGURE 8

RESERVOIR MAP SHOWING
ROAD BARRICADES
WEST HILL DAM
UXBRIDGE, MA
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

OCTOBER 2011

3.4.1 Regional Recreation Facilities

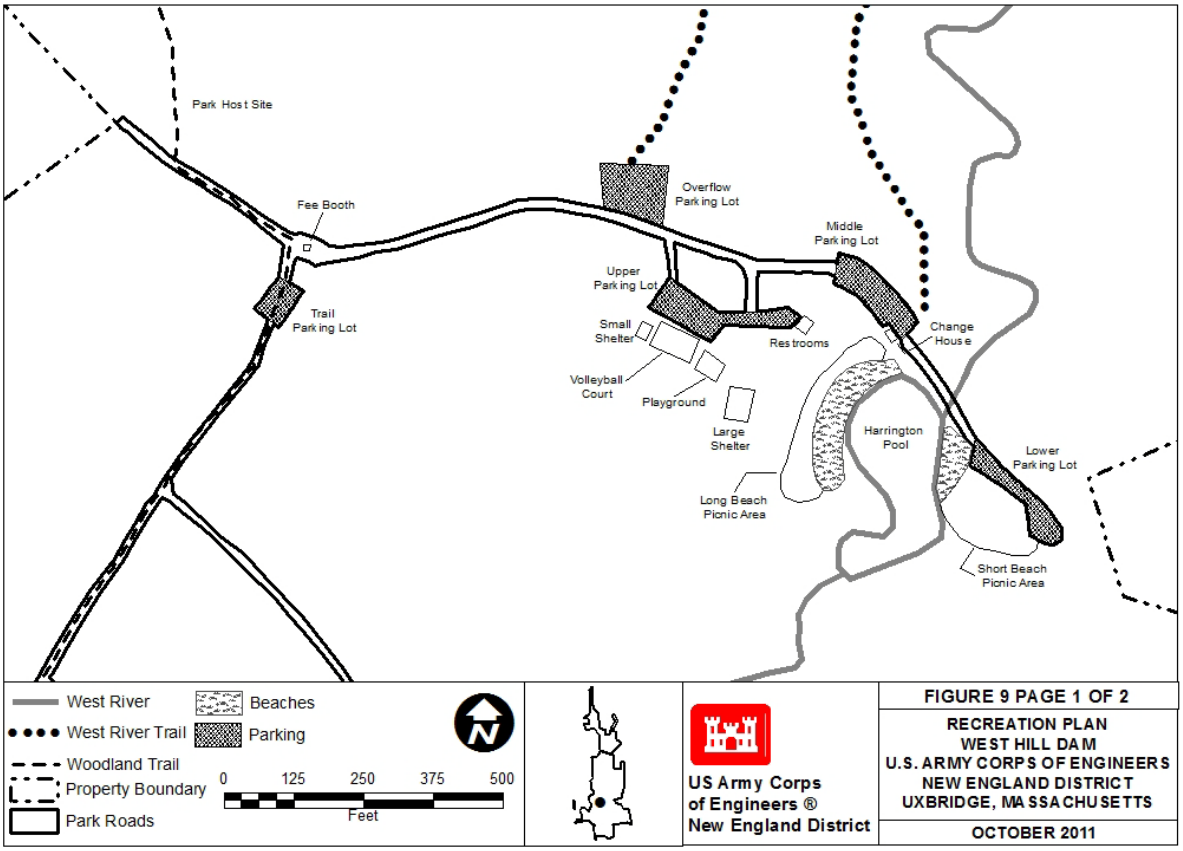
The table below identifies three different recreational areas that are located within ten miles of the project. Surveys of park visitors indicated that the vast majority of visitors to West Hill Dam come from within ten miles of the project. They all provide similar recreational opportunities within the region.

Regional Recreation Facilities within 15 miles of West Hill Dam

Area	Distance (miles)	Boating	Camping	Fishing	Hiking	Hunting	Picnicking	Ski-touring	Snowmobiling	Swimming
Douglas State Forest	10	X		X	X	X	X	X		X
Hopkinton State Park	15	X		X	X	X	X	X		X
Purgatory Chasm State Reservation	7.5			X	X	X	X			

3.4.2 West Hill Dam Area

The following is an overview of the facilities located at West Hill Dam. Recreation facilities are located in the West Hill Park and at the dam site. A general description of the recreational activities and facilities that are presently offered for public use are described below and noted on attached FIGURE 9 – RECREATION PLAN.



3.4.2.1 West Hill Park

The recreation area at West Hill Park consists of approximately 20 acres. The Corps of Engineers charges a small fee to use the area. The park and all its facilities are normally open during the hours of 8:00 a.m. and 8:00 p.m. from the third Saturday in May to the first Sunday after Labor Day in September. Two volunteer host campsites and a visitor station/fee collection booth are located on the access road to the park. During high-use periods, an overflow parking lot consisting of ten parking spaces is provided along the access road.

Beach Areas

"Long Beach" is a 250 - foot long sandy beach, located on the west side of the West River and "Short Beach," a 100 - foot long sandy beach, on the easterly side. The swimming area is clearly marked with a float line and buoys. The maximum depth of the swimming area is 7 feet. Parking is provided within an easy walk of the beaches. The picture on the right shows Long Beach.

The Long Beach parking lot provides 29 paved, delineated parking spaces (3 handicapped) and the Short Beach parking lot provides 30 paved, delineated parking spaces (2 handicapped).

A picnic area adjacent to Long Beach contains 10 picnic tables and 5 grills. The picnic area adjacent to Short Beach contains 20 picnic tables and 13 grills.

A change house and drinking fountain are located adjacent to Long Beach.

Picnic Shelter Area

A picnic shelter area is located on a hilltop overlooking Long Beach. A restroom is available to the public at this site. Each side has one handicapped accessible toilet. Two handicapped parking spaces are located adjacent to the restroom for easy access. A public telephone is located at the restroom. Two wooden stairways lead down to Long Beach.

Two picnic shelters are located in this area and may be reserved for a nominal fee. The larger shelter (30 feet x 44 feet) has 10 picnic tables and 2 group size grills. The small shelter (20 feet x 36 feet) has 4 picnic tables and a group size grill.

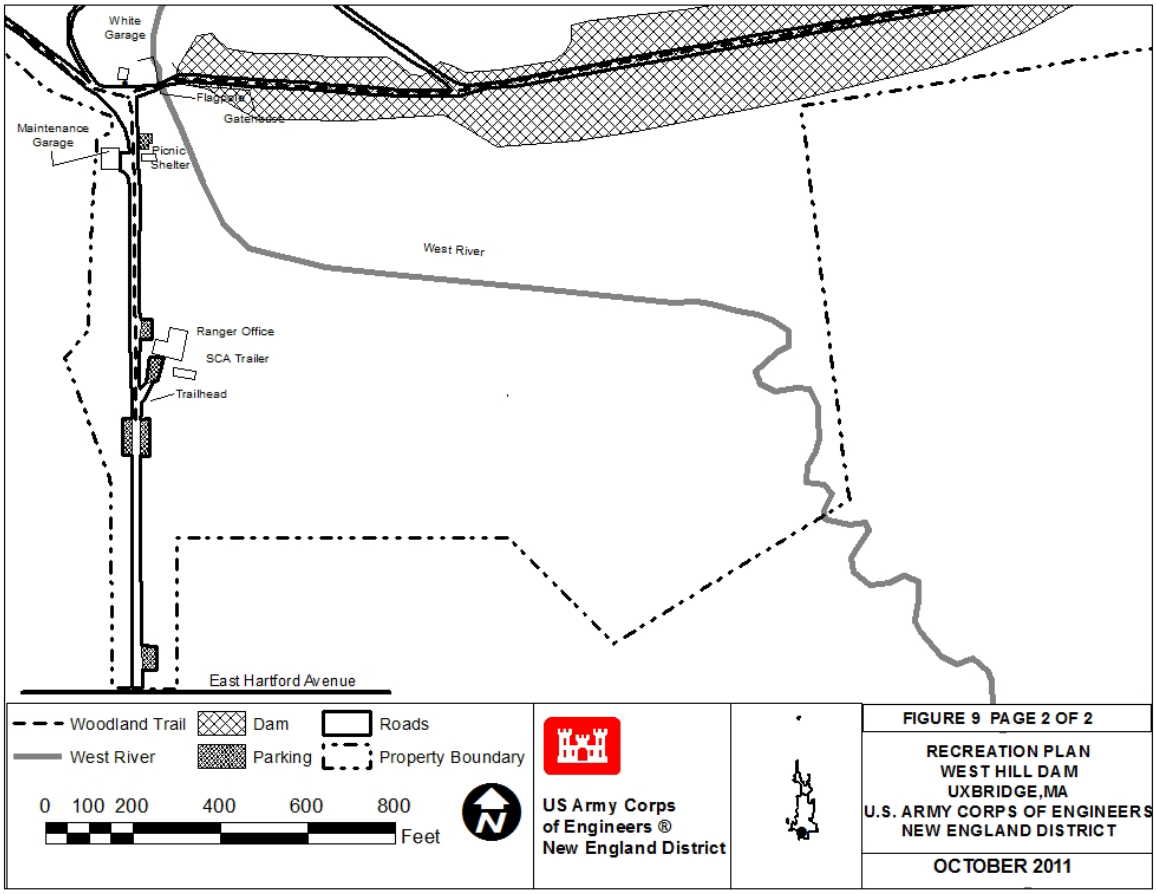
A parking lot containing 29 paved delineated spaces (including 3 handicapped accessible spots) serves this area.

The area also includes a playground, volleyball net, and two horseshoe pits.

Nature Trail

The West River Nature Trail, a self guided interpretive trail, starts near the Long Beach parking lot and ends at the overflow parking lot. The trail is 0.5 miles long and offers interpretive stations.

3.4.2.2 Dam Trailhead and Overlook Picnic Area



A 12 space, paved, delineated parking lot is located on the dam access road at East Hartford Avenue. A 14 space, paved, delineated parking lot for employees and visitors is located at the entrance gate/trailhead with kiosk on the dam access road near the project office.

The picnic area, at the end of the dam access road, includes a small shelter (20 feet x 36 feet) that may be reserved for a fee. This area has three picnic tables and a group-size grill. Two additional picnic tables with grills are located nearby.

A Romtec waterless restroom is available for use by the general public. A drinking fountain is available and located outside of the dam storage garage, a short distance from the picnic area. This facility is wheelchair accessible.

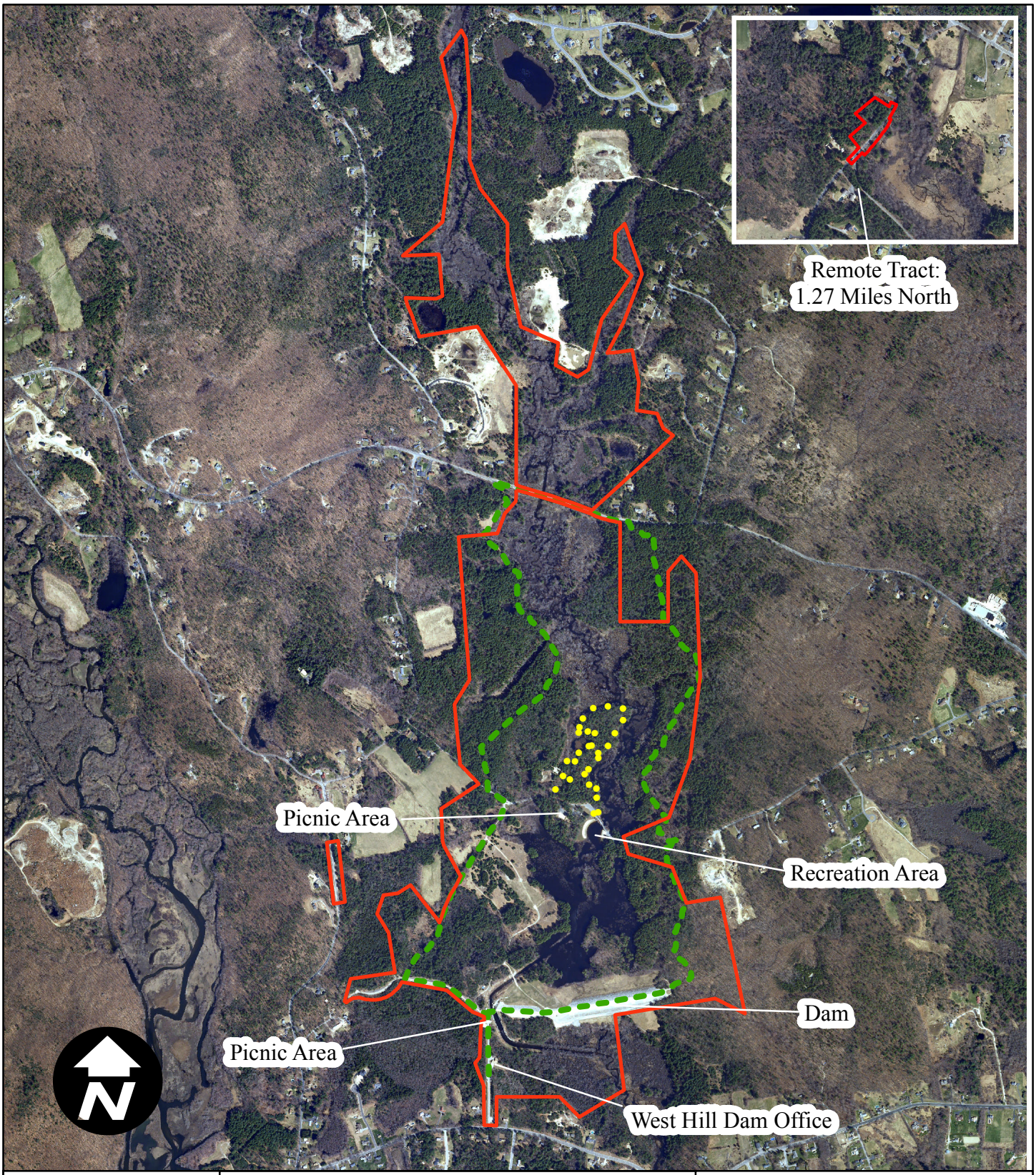
Woodland Trail

The West Hill Dam Woodland Trail starts at the dam and extends North on the east side of the West River up to Mendon Road and then South on the west side of the West River, back to the dam. The trail is 4.8 miles long. A side trail, slightly less than one-mile long, goes through the 24-acre grassland. The trails are used by hikers, mountain bikes, and equestrians. The trail is also used for cross country skiing during the winter months. Refer to FIGURE 10 – SITE PLAN.

3.4.2.3 Other Recreational Activities

Hunting, Fishing, and Trapping

Hunting, fishing, and trapping are permitted on project lands in accordance with applicable Federal and state laws. No hunting is permitted in the West Hill Park or in the immediate vicinity of the dam. Pheasants, stocked by the Massachusetts Division of Fisheries and Wildlife, and white tailed deer are the principle game species.



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Boundary/Fee Line
West River Trail
Woodland Trail

0 500 1,000 2,000 3,000 4,000
Feet

FIGURE 10

SITE PLAN
WEST HILL DAM
UXBRIDGE, MA
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT

OCTOBER 2011

3.4.3 Recreational Analysis

3.4.3.1 Existing Use

The facilities provided at West Hill Dam have been primarily used by local residents. The following tabulation summarizes recreational attendance, in visitor hours, at West Hill Dam from 2003 - 2011.

Table 1: West Hill Dam Visitor Hours from 2003-2011.

FISCAL YEAR*	VISITOR HOURS
2011	235,522
2010	167,316
2009	140,514
2008	113,597
2007	126,105
2006 **	93,280
2005	104,019
2004	109,065
2003	100,593

*Federal Fiscal Year 1 October-30 September

* *Reduced visitation caused by numerous beach closures due to high bacteria levels.

As shown above, use of West Hill Dam facilities has been fairly consistent since 2003, with somewhat lower visitation in 2006.

Table 2: West Hill Dam Estimated Activity Distribution

ACTIVITY	PERCENTAGE
OTHER**	30%
SWIMMING	26%
PICNICKING	22%
FISHING	7%
HUNTING	9%
SIGHTSEEING	2%
WINTER SPORTS	2%
BOATING***	2%

** Includes dog walking, hiking, biking, horseback riding, etc.

*** Includes canoeing and kayaking

The majority of usage involves swimming, picnicking, and other activities. Due to the type of facilities available at the project, it is common for the recreation park area to reach capacity on the weekends during summer months, especially when the weather is hot.

3.4.3.2 Natural and Scenic Qualities

The overlook area at the dam provides views of project features and a combination of topographic relief, open water areas, and a diversity of vegetation.

3.4.3.3 Projected Use

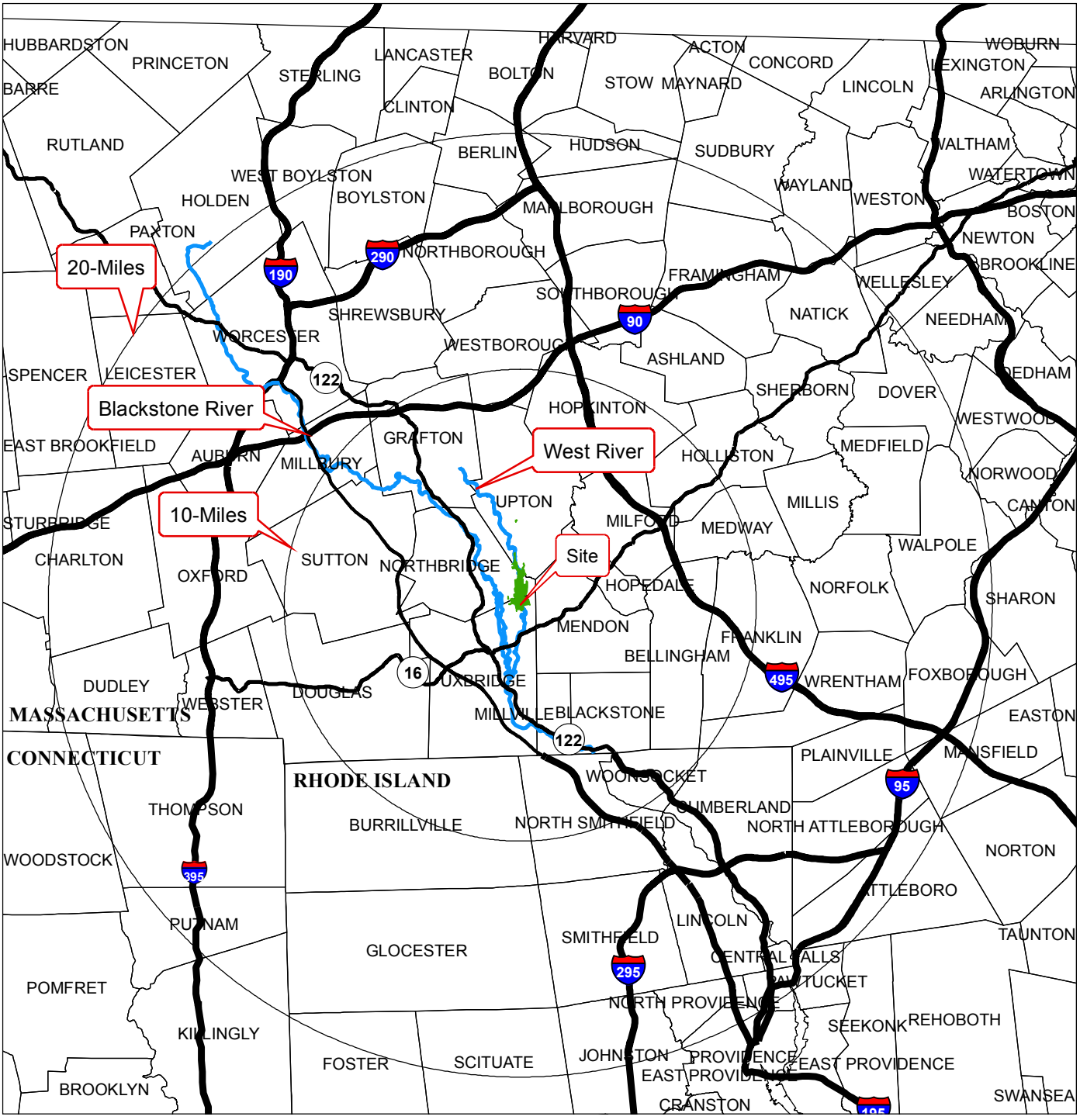
The demand for recreation at West Hill Dam is expected to continue at a high level in the future. This is based on existing and past use of the facility, and the needs identified in the Massachusetts Statewide Comprehensive Outdoor Recreation Plan (SCORP 2006). For purposes of recreational planning, the State is divided into seven regions. West Hill Dam is located in the Central Massachusetts region. Respondents to surveys in this region identified primary desires to be walking (16.5%), swimming (17%), and hiking (14.4%). Community demands also recommended the development and expansion of trail corridors in the Central Massachusetts region, to support hiking and cross-country skiing.

The potential market areas for facilities at West Hill Dam were also assessed to determine the population base that is currently served, and will be served in the future. The primary market area for the dam and reservoir was assumed to be the area within a 10 mile radius of the facilities. These market areas are shown on attached FIGURE 11 – MARKET AREA PLAN. These market areas are consistent with the SCORP 2006, which indicated that visits for fishing, swimming, hiking, and picnicking can be expected from areas within a 15 to 30 minute commute. TABLE 5 – REGIONAL POPULATION PROJECTIONS is attached and indicates the population that was served in 2000 and that which was projected to be served in the year 2010 (actual data not yet available) and is projected to be served in the year 2020.

Another factor affecting recreational use at West Hill Dam is customer satisfaction. Recent surveys using in-house customer comment cards show that respondents have a very positive opinion of West Hill Dam's facilities. The majority of respondents felt that West Hill Dam's recreational facilities are scenic and well maintained. Many of these comments stated that park personnel are highly visible, and are readily available to assist visitors. The demand for this type of quality, staffed facility will continue to be high, especially due to hot summer weather and the closings and fee increases implemented at other nearby recreation facilities.

3.4.3.4 Park Carrying Capacity

At an average of 2.5 people per car and 112 parking spaces, 280 people can visit the site at any given time. The land area in the park has been fully developed and there is no room for expansion. Based on the above analyses, there are no serious carrying capacity deficiencies at West Hill Park. However, since future use of these and other facilities is expected to remain high, continued maintenance and improvement of these and other areas should be practiced to ensure high quality recreation experiences.



NOTES:
State and town boundaries and transportation data was obtained from MassGIS, RIGIS, and CT.gov.

0 1.5 3 6 9 12 15
Miles

N

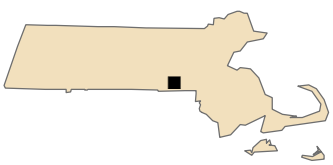


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FIGURE 11

MARKET AREA PLAN
WEST HILL DAM
UXBRIDGE, MA
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NEW ENGLAND DISTRICT

OCTOBER 2011

4. PUBLIC INVOLVEMENT AND COORDINATION

Corps of Engineers staff coordinated with elected officials, other agencies, and the public throughout the planning process. This insured that the Master Plan provided the best response to local and regional needs, project resource capabilities and suitability, and expressed public desires. Public coordination was initiated with the issuance of a Public Notice, a News Release on May 21, 2008 and April 9, 2010 and letters to local town leaders on June 10, 2008. These above documents announced the initiation of the study, solicited input. Only one response from the 2008 notice was submitted. This response was sent by email to Robert Hanacek, Operation Manager, of the Thames River Basin which includes West Hill Dam.

One example of positive feedback is from Kevin Kearnan, an Uxbridge Resident who wrote on June 9, 2009: “I’ve lived near the dam and frequently cycle, run and walk my dog within the park facility. I’ve noticed many improvements over the years, but I’m wondering what plans are in the works for the dam area? The berm re-build, grassland restoration, dog clean up bags, clean swimming area and information boards are some of the improvements I’ve noticed over the years. I read the article in the Worcester Telegram soliciting input, so that’s why I’m writing.”

A formal public meeting was held at the Uxbridge High School during the evening of April 27, 2010. Local citizens and public agencies were represented at this meeting. Two officials from the Town of Uxbridge were present, along with a state official from the Blackstone Heritage State Park. There were three comments or questions that came from the officials. The subject matter of the questions were related to controlled fire burns of fields, maximum water release from the dam and affect to downstream structures and future plans for West Hill Dam recreation trails to be connected to the Heritage State Park. The above meeting taped public comments and responses from the Corps of Engineers were transcribed to a memorandum (see Exhibit A).

5. RESOURCE MANAGEMENT OBJECTIVES

5.1 General

The purpose of this section is to establish resource objectives for the West Hill Dam project. Resource objectives are developed to guide future design, development, and management of the resource base, natural and man-made, to obtain the greatest possible benefit through meeting the needs of the public and protecting and enhancing environmental quality and ensuring sustained use.

These objectives are consistent with authorized project purposes, applicable Federal laws and directives, regional needs, resource capabilities, and expressed public desires.

The overall mission is to provide high quality and responsive management of West Hill Dam's natural and man-made resources, while maintaining efficient and effective flood risk management operations to fulfill the project’s authorized flood risk management purpose

5.1.1 Natural Resources Objectives

The following is a series of natural resources goals and objectives.

- Provide for the management of all natural resources associated with the project to include the protection and preservation of rare, threatened, and endangered species, the harvesting of forest products, the protection of water quality, and the implementation of programs to manage invasive and non-native species.

- Maintain the health and biodiversity of the forest ecosystem. Provide a range of species, age classes, and structural diversity intended to enhance and maintain the biological diversity of species, communities, and ecosystems.

- Manage for species well-adapted to site conditions, as they are more resistant to insects and diseases.

- Manage high value, commercial timber species favoring well-formed trees, healthy trees with large crowns with minimal competition between timber crop trees.

- Designate active management areas open to sustainable harvesting of wood products to provide young forest habitat and to enhance structural habitat attributes (e.g. snags, den trees, mast-producing trees, coarse woody debris) and passive management areas to include forest reserves that will typically be closed to commercial timber harvesting in order to provide biologically mature forest habitat (generally >150 years old). Forest reserves where commercial harvesting of wood products is excluded will capture elements of biodiversity that can be missing from sustainably harvested sites. Small (patch) reserves will conserve sensitive, localized resources such as steep slopes, fragile soils, wet soils and habitat for certain rare species that benefit from intact forest canopies.

- Enhance and protect fish and wildlife habitat for indigenous species through the use of various woodland, wetlands, and open land management activities. Care will be taken to maintain the structural components of the forest (live trees, snags, woody debris, shrubs, and ground cover) that are needed by wildlife.

- Providing for a range of species, age classes, and structural diversity in the forest, will ultimately enhance the biological diversity of wildlife species, communities, and ecosystems.

- Protect and conserve wetlands, rare plant and animal habitats such as vernal pools. Wetlands are highly productive sites for a variety of ecological functions, as well as for the enhancement of water quality. All forest management operations in or adjacent to wetlands will be planned and conducted in a manner that protects these functions. Forest management activities in wetlands will take place on frozen ground during the winter to minimize rutting.

- Conservation management practices will be followed on lands that contain Priority Habitat or Estimated Habitat as determined by the Massachusetts Natural Heritage and Endangered Species Program.

- Care will be taken to minimize soil impacts by limiting the soil area impacted by infrastructure (roads, landings, and primary skid trails) and by careful consideration of timing, equipment being used, and harvesting methods.

- Promote the public's use of the project for both consumptive (hunting) and non-consumptive (bird-watching) activities.

- Visual sensitivity levels should be considered in determining the level of effort appropriate to minimize visual impact during harvesting operations.

- Set aside a forest stand within project lands to be designated as a legacy forest to restore old-growth forest structure and characteristics for future generations.

5.1.2 Cultural Resources Objectives

- Protect known and documented prehistoric and historical archaeological sites.

- Monitor the project area for evidence of unauthorized excavation or collection of cultural resources and damage to sites. Known sites will be maintained and preserved as important project resources.

- Archaeological site and sensitivity maps available at the project office will be examined, and if necessary, the Corps of Engineers archaeologist will be consulted prior to any development or disturbances on Corps of Engineers property.

- Support interpretive programs for historic and archaeological resources where appropriate and in accordance with Federal laws and directives.

5.1.3 Recreation Resources Objectives

- Maintain the facilities in the recreation areas to ensure high quality recreation experiences, barrier free access, and public health and safety.

- Identify and evaluate the development of potential recreation sites, with input from the local community, to afford the public a diversity of recreational opportunities and/or enhance public use of project lands.

- Support the state fish and pheasant stocking programs and use of the project lands for these activities.

- Identify and develop trails through project lands to meet regional and local needs for designated recreational trails, and provide the public with opportunities to view unique natural areas.

- Maintain the existing visitor assistance program including interpretation to enhance the public's understanding and appreciation of the role of the Corps of Engineers in development and administration of West Hill Dam.

6. LAND CLASSIFICATION

6.1 Land Allocation

As stated in Section 2, the entire West Hill Dam project area was initially acquired for flood risk management purposes. Consequently, all project lands are allocated to the Operations category.

6.2 Land Classification

In accordance with U.S. Army Corps of Engineers regulation, ER 1130-2-550, and pamphlet, EP 1130-2-550, these allocated project lands are further classified to provide for development and resource management consistent with authorized project purposes, and the provisions of the National Environmental Policy Act (NEPA) and other Federal laws. Land classification categories are described below.

- Project Operations - This classification includes land required for flood risk management structures, administration and maintenance facilities, and operation of the project.

- Recreation - Land developed for intensive recreational activities by the visiting public.

- Environmental Sensitive Areas - Areas where scientific, ecological, cultural, or aesthetic features have been identified.

- Multiple Resource Management - Lands managed for one or more of, but not limited to, the following activities:

    a. Recreation - Low density having activities such as hiking, primitive camping, wildlife observation, hunting and similar low density recreational pursuits.

    b. Wildlife Management - General fish and wildlife management activities.

    c. Vegetative Management - Management activities for the protection and development of forest and vegetative cover.

    d. Inactive and/or Future Recreational Areas - Recreation areas planned for the future or that are temporarily closed.

- Easement Lands - All lands for which the Corps of Engineers holds an easement interest but not fee title.

The classification of land at West Hill Dam was based on existing land use. Previous sections concerning West Hill Dam's purpose, available natural and recreation resources, and development constraints and opportunities, provided the basis for this land classification. Refer back to FIGURE 2 – LAND CLASSIFICATION PLAN.

7. RESOURCE DEVELOPMENT PLANS

West Hill Dam and its recreation park should continue to be used by the public primarily for day use recreation. The majority of visitors and users come from the local area. As such, the development of public facilities and programs at the project should be guided by regional recreational needs, as compatible with Corps of Engineers policies and project O&M needs. Providing quality and diverse recreation opportunities at West Hill Dam will continue to be the Corps of Engineers' Mission. Management and improvements of the recreation area will continue to be the responsibility of the Corps of Engineers.

Development of new major recreation areas by other public or private entities is possible if done in accordance with ER 1130-2-550, Chapter 16 (dated 30 Mar 2009). Future improvements and developments of this type will require specific proposals for review and approval by the Corps of Engineers.

The Corps of Engineers may carry out development of facilities at the project in compliance with this master plan; project Operation and Maintenance Plan, and current Corps of Engineers regulations.

The Commonwealth of Massachusetts should continue to be given a license for management of fish and wildlife resources on approx. 300 acres of undeveloped project lands.

Specific Management and Improvement Goals are:

- Continue to work cooperatively with local organizations including the John H. Chaffee Blackstone River Valley National Heritage Corridor to collaborate on regional recreational and natural resource endeavors.

- Designate 50 acres of white pine forest as a Legacy Forest, incorporating the restoration of old-growth characteristics and using active management principles as described in a publication by UMass Extension Service (Restoring Old-Growth Characteristics by Professor Anthony D'Amato and Paul Catanzaro, October 2007). Refer back to FIGURE 5 – FOREST CLASSIFICATION PLAN.

- Establish a walking trail through the Legacy Forest for the interpretation, education, and enjoyment by the public and visiting school groups.

8. CONCLUSIONS

This master plan provides guidance for future development at West Hill Dam. The natural and man-made resources at the project will continue to be managed by the New England District to provide the best combination of responses to regional and ecosystem needs, project resource capabilities and suitability, and public desires consistent with the project's authorized flood risk management purpose.

Natural and man-made resources have been identified and analyzed. This included wetlands, exemplary natural communities and cultural resources which require specific management efforts for their protection. Recreational opportunities were identified through an analysis of regional needs and expressed public desires.

Through land use classification, the master plan has designated areas for project operations, recreation, environmental protection, and multiple resource management. About 50 acres in the vicinity of the dam will continue to be reserved for project operations. West Hill has been classified as intensive recreation. Wetlands and exemplary natural communities, totaling about 160 acres, have been classified as environmentally sensitive.

The master plan has identified opportunities for the improvement of existing recreation facilities, vista improvement, and establishment of interpretive trails in areas containing exemplary natural communities.

All specific proposals for recreational or other development at the project must comply with this master plan, the Thames River Basin flood risk management requirements, and the National Environmental Policy Act and other Federal requirements.

9. RECOMMENDATIONS

Corps of Engineers staff recommends that the West Hill Dam Master Plan be approved as a guide to the orderly use and development of natural and man-made resources at the West Hill Dam flood risk management project. Approval of this master plan would replace Design Memorandum No. 9; Master Plan for Reservoir Development, dated January 1962.

TABLES

TABLE 1 – OUTFLOW GUIDANCE FOR WEST HILL DAM

OUTFLOW GUIDANCE for WEST HILL DAM
WEST RIVER, MASSACHUSETTS

Chief, Operations Division — Date: 10/31/2011
New England District Dam Safety Officer — Date: 10/31/2011

		Maximum Outflow (cfs)	Minimum Outflow and Aquatic Base Flow (ABF) (cfs)			Maximum change in Outflow (cfs/hr)	
			Oct – Feb ABF=30 cfs	**Mar – Apr ABF=110 cfs**	**May – Sep ABF=15 cfs**	Increase	Decrease
WEST HILL DAM (DA = 28 sq.mi.)	FLOOD CONTROL	425	30 cfs			100 cfs/hr to 300 cfs then 25 cfs/hr	150 cfs/hr
	NORMAL OPERATION	NA	30 cfs or inflow whichever is less	110 cfs or inflow whichever is less	15 cfs or inflow whichever is less	Incremental gate changes as needed to closely mimic run-of-river flow conditions	
	MAINTENANCE	NA				30 cfs/hr above 110 cfs and 15 cfs/hr below 110 cfs	

NOTES:
1. When storing water to raise the pool to a target level, and inflow is less than the seasonal ABF, outflow will be equal to 70% of inflow, therefore, only storing 30% of inflow.
2. Normal Pool Level: 0.0 Ft (234.0 NGVD); Spillway = 264.0 NGVD

TABLE 2 - ANNUAL PEAK POOL LEVELS AT WEST HILL DAM

Date	Peak Pool Level	Number of Acres Flooded
1962 APR	14.1	330
1962 OCT	10.0	226
1964 MAR	6.7	175
1965 MAR	10.5	236
1966 FEB	6.5	172
1967 MAY	14.7	349
1968 MAR	24.3	734
1969 MAR	17.4	461
1970 FEB	17.7	469
1971 MAR	6.8	179
1972 MAR	17.0	422
1973 FEB	12.4	280
1974 MAR	9.0	209
1975 JAN	6.4	174
1976 JAN	15.4	374
1977 MAR	9.9	223
1978 JAN	15.5	377
1979 JAN	24.2	729
1980 MAR	14.5	345
1981 FEB	10.9	245
1982 JUN	21.3	558
1983 MAR	17.9	450
1984 JUN	20.5	526
1985 FEB	6.0	168
1986 JUN	16.1	396
1987 APR (record pool)	**25.5**	**799**
1988 MAR	8.8	206
1989 MAY	8.2	198
1989 OCT	12.6	286
1991 AUG	8.2	198
1991 NOV	9.2	212
1993 APR	22.5	624
1994 MAR	9.0	209
1994 DEC	6.2	185
1996 JAN	15.1	364
1996 OCT	11.1	248
1998 MAR	13.4	309
1999 FEB	7.6	190
2000 APR	8.8	206
2001 MAR	16.9	420
2002 MAY	4.9	148
2003 APR	18.7	471
2004 APR	11.9	267
2005 APR	14.6	382
2005 OCT	19.7	500
2007 APR	16.3	401
2008 MAR	16.2	398
2008 DEC	18.1	453
2010 APR	20.9	541

TABLE 3 - AREA CAPACITY AT WEST HILL DAM

Pool Stage (ft)	# Acres flooded	
0	0	
1	4	
2	40	
3	80	
4	120	
5	150	
6	168	
7	182	
8	196	
9	209	
10	226	On average, an event will produce this pool stage every year. There is a 100% chance it will occur in any year.
11	245	
12	269	
13	297	
13.5	312	On average, an event will produce this pool stage every 2 years. There is a 50% chance it will occur in any year.
14	328	
15	362	
16	393	
17	422	
18	450	
19	480	On average, an event will produce this pool stage every 5 years. There is a 20% chance it will occur in any year.
20	509	
21	544	
22	592	On average, an event will produce this pool stage every 10 years. There is a 10% chance it will occur any year.
23	656	
24	718	
24.7	756	On average, an event will produce this pool stage every 20 years. There is a 5% chance it will occur in any year.
25	772	
26	826	
27	879	
27.8	920	On average, an event will produce this pool stage every 50 years. There is a 2% chance it will occur in any year.
28	930	
29	980	
30	1025	On average an event will produce this pool stage every 100 years. There is a 1% chance it will occur in any year.

TABLE 4 - WILDLIFE SPECIES OF WORCESTER COUNTY, MA

Common Name	Scientific Name	Common Name	Scientific Name
Virginia Opossum	*Didelphis virginiana*	Northern River Otter	*Lontra canadensis*
Masked Shrew	*Sorex cinereus*	Striped Skunk	*Mephitis mephitis*
Smoky Shrew	*Sorex fumeus*	Bobcat	*Lynx rufus*
Common Water Shrew*	*Sorex palustris*	White-tailed Deer	*Odocoileus virginianus*
Northern Short-tailed Shrew	*Blarina brevicauda*	Moose	*Alces alces*
Hairy-tailed Mole	*Parascalops breweri*	Blue-spotted Salamander*	*Ambystoma laterale*
Star-nosed Mole	*Condylura cristata*	Spotted Salamander	*Ambystoma maculatum*
Little Brown Bat	*Myotis lucifugus*	Marbled Salamander*	*Ambystoma opacum*
Northern Long-eared Bat	*Myotis septentrionalis*	Eastern Newt	*Notophthalmus viridescens*
Eastern Red Bat	*Lasiurus borealis*	Northern Dusky Salamander	*Desmognathus fuscus*
Hoary Bat	*Lasiurus cinereus*	Eastern Red-backed Salamander	*Plethodon cinereus*
Silver-haired Bat	*Lasionycteris noctivagans*	Four-toed Salamander*	*Hemidactylium scutatum*
Eastern Pipistrelle	*Pipistrellus subflavus*	Spring Salamander	*Gyrinophilus porphyriticus*
Big Brown Bat	*Eptesicus fuscus*	Northern Two-lined Salamander	*Eurycea bislineata*
Eastern Cottontail	*Sylvilagus floridanus*	Eastern Spadefoot*	*Scaphiopus holbrookii*
New England Cottontail	*Sylvilagus transitionalis*	American Toad	*Bufo americanus*
Snowshoe Hare	*Lepus americanus*	Fowler's Toad	*Bufo fowleri*
Eastern Chipmunk	*Tamias striatus*	Spring Peeper	*Pseudacris crucifer*
Woodchuck	*Marmota monax*	Gray Treefrog	*Hyla versicolor*
Eastern Gray Squirrel	*Sciurus carolinensis*	American Bullfrog	*Rana catesbeiana*
Red Squirrel	*Tamiasciurus hudsonicus*	Green Frog	*Rana clamitans*
Northern Flying Squirrel	*Glaucomys sabrinus*	Pickerel Frog	*Rana palustris*
Southern Flying Squirrel	*Glaucomys volans*	Northern Leopard Frog	*Rana pipiens*
American Beaver	*Castor canadensis*	Wood Frog	*Rana sylvatica*
White-footed Mouse	*Peromyscus leucopus*	Snapping Turtle	*Chelydra serpentina*
Deer Mouse	*Peromyscus maniculatus*	Eastern musk turtle	*Sternotherus odoratus*
Southern Red-backed Vole	*Clethrionomys gapperi*	Painted Turtle	*Chrysemys picta*

TABLE 4 - WILDLIFE SPECIES OF WORCESTER COUNTY, MA CONTINUED

			Clemmys guttata
Meadow Vole	*Microtus pennsylvanicus*	Spotted Turtle	
Woodland Vole	*Microtus pinetorum*	Wood Turtle*	*Gleptemys insculpta*
Common Muskrat	*Ondatra zibethicus*	Blanding's Turtle*	*Emydoidea blandingii*
Southern Bog Lemming*	*Synaptomys cooperi*	Eastern Box Turtle*	*Terrapene carolina*
Meadow Jumping Mouse	*Zapus hudsonius*	Eastern Wormsnake*	*Carphophis amoenus*
Woodland Jumping Mouse	*Napaeozapus insignis*	Eastern Racer	*Coluber constrictor*
Common Porcupine	*Erethizon dorsatum*	Ringnecked Snake	*Diadophis punctatus*
Coyote	*Canis latrans*	Eastern Ratsnake*	*Elaphe obsoleta*
Red Fox	*Vulpes vulpes*	Eastern Hognosed Snake	*Heterodon platirhinos*
Common Gray Fox	*Urocyon cinereoargenteus*	Milksnake	*Lampropeltis triangulum*
Black Bear	*Ursus americanus*	Northern Watersnake	*Nerodia sipedon*
Common Raccoon	*Procyon lotor*	Smooth Greensnake	*Opheodrys vernalis*
Fisher	*Martes pennanti*	DeKay's Brownsnake	*Storeria dekayi*
Ermine	*Mustela erminea*	Red-bellied Snake	*Storeria occipitomaculata*
Long-tailed Weasel	*Mustela frenata*	Eastern Ribbonsnake	*Thamnophis sauritus*
American Mink	*Mustela vison*	Common Gartersnake	*Thamnophis sirtalis*

TABLE 5 - REGIONAL POPULATION PROJECTIONS

Town	Population (2000)	Population (2010 est.)	Population (2020 est.)
BLACKSTONE	9,800	9,600	10,600
BELLINGHAM	15,300	14,700	14,200
DOUGLAS	7,000	9,400	12,600
FRANKLIN	29,560	35,062	41,150
GRAFTON	14,900	16,300	17,900
HOLLISTON	13,800	13,000	13,500
HOPEDALE	5,900	6,800	8,100
HOPKINTON	13,300	16,000	18,700
MEDWAY	12,500	13,800	15,100
MENDON	5,300	6,300	7,500
MILFORD	26,800	27,400	27,900
MILLBURY	12,784	12,845	12,799
MILLVILLE	2,700	3,300	4,200
NORTHBRIDGE	13,200	13,300	13,500
SUTTON	8,200	9,100	9,800
UPTON	5,600	6,400	7,200
UXBRIDGE	11,200	12,600	14,300
WESTBOROUGH	17,997	19,730	21,170
WRENTHAM	10,554	11,984	13,838
TOTALS	236,395	257,621	284,057
		9% Increase	10% Increase

Source: Massachusetts Institute for Social and Economic Research, Univ. of Mass. Amherst, MA

Appendix A

Application of Federal Laws

The following laws and regulations provide for the development and management of Federal projects:

1. The Historic Sites, Buildings and Antiquities Act of 1935 (16 U.S.C. 461-467), commonly known as the Historic Sites Act, declares a national policy to preserve historic sites and objects of National significance including those located on refuges. It provides for designation, acquisition, administration, and protection of such sites. Additionally, National Historic Landmarks are designated under the authority of this Act.

2. Public Law 78-534 (The Flood Control Act of 1944) as amended by the Flood Control Acts of 1946, 1954, 1960 and 1962, authorizes the Corps of Engineers to construct, operate and maintain public park and recreation facilities at water resource development projects, and permit local interests to construct, operate, and maintain such facilities.

3. Public Law 85-624 (The Fish and Wildlife Coordination Act) requires that the Corps of Engineers and any agency impounding, diverting, or controlling water, consult with the United States Department of the Interior, Fish and Wildlife Service. The Department of the Interior would evaluate proposed water resources development measures, and determine potential impacts on wildlife resources and measures needed to prevent such impacts.

4. Public Law 86-717 (Forest Cover Act, 6 September 1960) provides a statutory mandate for multiple use forest management, or other vegetative cover management, on project lands and waters.

5. Public Law-72 (The Federal Water Project Recreation Act of 1965), accompanied by House Committee Report No. 254, requires that the Corps of Engineers and other Federal agencies give full consideration to fish and wildlife enhancement. It also provides for non-Federal participation in land acquisition, and in the development and management of recreational facilities and fish and wildlife resources.

6. Public Law-190 (The National Environmental Policy Act of 1969), directs the Corps of Engineers and other Federal agencies to prepare environmental impact statements or assessments that describe the environmental effects of proposed projects and measures necessary to minimize any adverse effects.

Appendix A (cont.)

7. Public Law 91-604 (The Clean Air Act, as amended), specifies that any Federal activity, which may result in discharge of air pollutants, comply with Federal, state, interstate, and local requirements concerning control and abatement of air pollution.

8. Public Law 03-205 (The Endangered Species Act of 1973, as amended) requires Federal agencies to utilize their authorities to carry out programs for conservation of endangered and threatened species protected by the Act.

9. Executive Order 11990 (Protection of Wetlands, 24 May 1977) requires that all Federal agencies take action to minimize destruction, loss or degradation of wetlands. It stipulates that Federal agencies must avoid providing assistance for new construction located in wetlands unless no practicable alternatives exist, and the proposed action includes measures to minimize harm to wetlands.

10. Public Law 95-217 (Clean Water Act of 1977, as amended). Section 404 imposes requirements with respect to dredge and fill activities in waterways of the United States, including wetlands. Any fill activities in wetlands must comply with Section 404(b) (1), Guidelines for the Specification of Disposal Sites for Dredge or Fill Material. These guidelines allow fill activities for only the least environmentally damaging practicable alternative.

11. Public Law 96-95 (Archaeological Resources Protection Act of 1979 - RPA). This statute provides protection for archaeological resources by requiring any interested parties to apply for a permit from the controlling Federal agency to excavate, or remove any archaeological resource located on public or Indian lands. The Act also provides for civil and criminal penalties for individuals disturbing or looting sites (including military personnel that allow such actions).

12. National Register of Historic Places, Nominations by States and Federal Agencies (36 CFR 60). These regulations govern the process whereby State and Federal agencies nominate specific resources under their control to the National Register of Historic Places. This is the country's basic inventory of historic resources and it is maintained by the Secretary of the Interior. This inventory includes buildings, structures, objects, sites, districts, and archaeological resources that may be significant at the national, state or local level.

13. Advisory Council on Historic Preservation, Protection of Historic Properties (36 CFR 800). These are the implementing regulations which govern the Section 106 review process established by the National Historic Preservation Act of 1966, as amended for Federal agencies. These regulations implement procedures for assessing the effects of federally approved, assisted, or funded undertakings on properties which are, or may be eligible for listing on the National Register of Historic Places.

Appendix B

U.S. Army Corps of Engineers Guidance

The Master Plan has been prepared in accordance with guidance contained in the following U.S. Army Corps of Engineers regulations, pamphlets, and manual:

ER 1130-2-500	Project Operations, Partners and Support, Work Management Policies
ER 1130-2-540	Environmental Stewardship, Operations and Maintenance Policies
ER 1130-2-550	Recreation, Operations and Maintenance Policies
ER 1165-2-400	Recreation Planning, Development and Management Policies
EP 1130-2-500	Project Operations, Partners and Support, Work Management Guidance and Procedures
EP 1130-2-540	Environmental Stewardship, Operations and Maintenance Guidance and Procedures
EP 1130-2-550	Recreation, Operations and Maintenance Guidance and Procedures
EM 1110-1-400	Recreation Planning and Design Criteria

Appendix C

Prior Pertinent Reports

The following design memoranda, prepared by the New England Division, Corps of Engineers, provided basic data concerning the project.

Memorandum No.	Title	Date
1	Hydrology	SEP 1957
2	Geology and Soils	Oct 1957
3	Embankment Design	Mar 1958
4	Structures	Dec 1957
5	General	Nov 1957
6	Relocations	May 1958
7	Real Estate	Jan 1959
8	Concrete Materials	Oct 1957
9	Master Plan for Reservoir Development	January 1962

Other New England Division* reports that were reviewed and evaluated as part of this recreational master planning effort include the following:

1. "Operation and Maintenance Manual, West Hill Dam, Uxbridge, Massachusetts," dated June 1972.

2. "Master Water Control Manual, Blackstone River Basin," dated July 1980.

3. "West Hill Dam Water Quality Evaluation," dated March 2007.

4. "Operational Management Plan, West Hill Dam," dated July 1994.

*The New England Division was converted to the New England District as of 1997.

Appendix C (cont.)

In addition, the following reports provided information on recreation, archaeological, and natural resources in the project area.

- Massachusetts Outdoors 2006, Statewide Comprehensive Outdoor Recreation Plan, Massachusetts Division of Conservation Services.

- "Archaeological Reconnaissance Survey of The West Hill Dam and Reservoir in Uxbridge, Northbridge and Upton, Massachusetts," prepared by The Public Archaeology Laboratory, Inc., Providence, Rhode Island, under contract to the New England Division, Corps of Engineers, 1988.

- "Rare or Protected Species and Exemplary Natural Communities Survey, 1998, West Hill Dam Property," prepared by the Massachusetts Natural Heritage and Endangered Species Program, under contract to the New England District, Corps of Engineers.

Exhibit A

CENAE-OD-WH (1130-2-550) Bramel/(978)318-8417
25 Jan. 2011
Memorandum For: Record

Subject: Minutes Public Comments
West Hill Dam Master Plan Meeting, 21 April 10 Uxbridge High School

1. Attendees signed in:
   Val Stegemoen - Department of Conservation and Recreation, Blackstone Heritage State Park, Uxbridge, MA.
   Peter Emerick- Uxbridge MA, Emergency Management Officer representing Department of Public Works, Uxbridge, MA.
   John Morawski- Mendon Street, Uxbridge, MA, Fire Department

2. Public Comments and responses were as follows:
   A. **John Morawski**- concern fire suppression, will controlled burns be used, have they been used or are any scheduled for West Hill Dam?
   Merl- PM (Project Manager) - none scheduled, none planned, not one of our regular tools. John M. concern, hope you will consider them as a resource tool as access by fire crews to upper reservoir areas (no public roads) is difficult and a concern.
   B. **Val Stegemoen**- question will West Hill trails be connected to Blackstone Heritage State Park, any efforts on the part of the Corps of Engineers for access of public neighbors/abutters for this connection?
   Merl- PM- Will continue current public notices at kiosks and other information areas to let the public know of this resource. No plans to acquire any private abutter cooperative arrangements.
   C. **Peter Emerick**, MEMA Officer, Uxbridge, MA With the last two high water incidents and the Hartford Avenue loss of a dam breech, can you explain maximum release amounts and how they are determined? Do you have any concerns for a future mishap or problematic structures downstream of West Hill Dam?
   Merl- PM- Our releases are guided by and based upon computerized models and staff reconnaissance observations over the years and the US Army Corps of Engineers Reservoir Regulation Team, Concord, MA. We have 3 gates, we can not release until Woonsocket is at 6 feet (crest stage) or below to curtail downstream flooding. We use the bench mark, on the MA State Route 16 Bridge, Uxbridge, MA and do not go above the concrete sidewalls of the concrete dam foundation just upstream of the Route 16 Bridge (stay one inch below the top surface). We use to use (Viola helped name Waucantuck Mill) foundation brace for our channel capacity guide. As Viola mentioned, Rock Meadow Brook contributes runoff of about 100

cubic feet per second which impacts the Route 16 benchmark and the benchmark includes this adjustment.

Woonsocket Falls Dam- is no longer an LPP and was returned to the US Army Corps of Engineers about two years ago, with the Cape Cod Canal given permission to return operation to field personnel at West Hill Dam in 2009.

*Source: notes based upon cassette recording at public meeting, recorder Charlene Berry-TRB-BO.