

## **ARTICLE 4H:**

### **ARTICLE 4H: – Marine & Environmental Affairs – Jenny Pond Dam Engineering & Permitting**

#### **RECOMMENDATION: Approval \$77,000 (10-0-0) Unanimous.**

The Advisory & Finance Committee recommends Town Meeting approve this appropriation. The Jenney Pond Dam is a Significant Hazard Dam that needs maintenance maintenance and repairs based upon recent inspections. The funding will be from the Environmental Affairs Fund and will allow for the development of engineering plans and to obtain permits for the repairs.

**TOWN OF PLYMOUTH CAPITAL IMPROVEMENT PLAN REQUEST FORM**  
**FY20 FALL ANNUAL TOWN MEETING REQUEST FORM**

Department: Marine and Environmental Affairs		1
Project Title and Description: Engineering and Permitting for Jenney Pond Dam	Total Project Cost:	\$77,000

Department/Division Head: **David Gould**

Cost estimate was developed: Internally  Externally

Basis of Estimated Costs (attach additional information if available)			If project has impact on 5 Year Plan and future operating budgets, insert estimated amounts.		
Capital:	Cost	Comments	Fiscal Year:	Capital	O & M
<i>Planning and Design</i>	\$77,000		<i>FY20</i>		
<i>Labor and Materials</i>			<i>FY21</i>		
<i>Administration</i>			<i>FY22</i>		
<i>Land Acquisition</i>			<i>FY23</i>		
<i>Equipment</i>			<i>FY24</i>		
<i>Other</i>					
<i>Contingency</i>					
<b>Total Capital</b>	<b>\$77,000</b>				

Possible sources and amounts of funding, if known: Environmental Affairs Fund

**Project Justification and Objective:** Jenney Pond Dam is a Significant Hazard Dam that has shown some need for maintenance and repairs based upon its recent inspections. Funding will allow for the development of engineering plans and to obtain permits for these repairs.

**Justification for Request at Fall Annual Town Meeting:** The Environmental Affairs Fund receives funding at the beginning of the fiscal year making FATM the next available opportunity to allocate funds from this account for specific projects. Allocating monies for this project now allows us to start working toward the completion of dam repairs and keeps the Town in good standing with the MA Office of Dam Safety.

**For Capital Project Requests:**

Will this project be phased over more than one fiscal year? If yes, enter it on the next 5 Year Plan Yes  No   
 Can this project be phased over more than one fiscal year? Yes  No

**For Capital Equipment Requests:**

Check if equipment requested is replacement and enter the year, make & model, VIN and present condition of existing equipment

Attach additional information, estimates, or justification. Please see attached back-up materials.

Jenney Grist Mill Dam  
National ID No. MA00907  
Plymouth, Massachusetts  
MMI #1982-08-0  
August 7, 2019

## PROJECT UNDERSTANDING

Milone & MacBroom, Inc. (MMI) is pleased to present our proposal to provide dam engineering and related services to further assess the condition of and recommend improvements to Jenney Grist Mill Dam. It is our understanding that a Phase II inspection and investigation is required as well as regulatory permitting and final design of contemplated improvements.

Jenney Grist Mill Dam is a 160-foot long, earth fill dam with a stone masonry and concrete wall on the downstream face. The upstream face is sloped at approximately 2H:1V and covered with small riprap. The crest of the dam is approximately 50 feet wide, primarily paved with concrete sidewalks and grass shoulders.

The primary spillway, located on the left (west) side of the dam, consists of a 6-foot diameter concrete pipe that extends through the dam embankment. A concrete headwall with stop log slots is located on the upstream end of the pipe. Water discharges into a 4-foot wide concrete sluiceway and can be directed to either the left or right of the grist mill and into the water wheel on the right side of the mill using three sets of wood stop logs. The stop logs are accessed through hatches in the wood deck between the dam and the grist mill. A plunge pool, which is controlled via a set of stop logs, has been installed to the left of the concrete to provide safer passage for migrating fish that inadvertently bypass the dam via the primary spillway rather than the auxiliary spillway/fishway.

The auxiliary spillway/fishway consists of a 24-inch diameter concrete pipe that extends through the dam embankment, with stop log slots on the upstream end. It shares its concrete headwall with the primary spillway. The pipe discharges to a 2-foot wide uncovered concrete slope flume (Denil type) fishway.

The dam has a structural height of approximately 12 feet, and the hydraulic height of the dam is approximately 7 feet based on the elevation of the primary spillway stop logs.

Based on the findings of a December 5, 2017 Phase I Inspection/Evaluation Report of the Jenny Grist Mill Dam, the Department of Conservation and Recreation (DCR) Office of Dam Safety (ODS) is requiring that a Phase II Inspection and Investigation be performed. The dam is classified as an intermediate-size, high hazard potential structure. ODS has determined the dam to be structurally deficient and in poor condition. Specifically, the following general deficiencies were listed in the Phase I Inspection/Evaluation Report as follows:

- Riprap on the upstream slope is undersized for the steepness of the slope, and there is evidence of past sloughing and riprap movement.
- Trees and brush are growing on the upstream slope, along the top and at the toe of the downstream stone masonry walls, and on the abutments within 20 feet of the dam.
- There are areas of bare soil around the upstream spillway headwall and above and at the toe of the downstream stone masonry wall.

- Seepage is occurring at the downstream toe of the dam at the stone masonry wall on the right side.
- There is concrete erosion at the waterline and hairline cracks on the upstream concrete spillway headwall.
- There is limited vegetation and debris on the boom upstream of the auxiliary spillway/fishway inlet.
- There is loss of mortar in the downstream stone masonry walls and moderate cracks in the concrete section of the right downstream masonry wall.
- The dam cannot pass the spillway design flood without overtopping.
- There is no formal Operations and Maintenance Manual.

The ODS has also ordered that a Phase II inspection and investigation be performed to evaluate the structural integrity and spillway adequacy of the dam and to develop/implement a plan to bring the dam into compliance with dam safety regulations. The Phase II submittal is required to provide a proposed time line for final design, permitting, and construction of the selected alternative.

Following analysis of hydrology and hydraulics, and completion of the Phase II inspection, design of improvements will ensue. Given the historic nature and aesthetics of the area surrounding the Jenney Grist Mill, the project does not lend itself to major construction disruption, including major repairs to the dam, spillway, associated appurtenances, or buildings. The anticipated approach to addressing hydraulic capacity and proposed improvements will be to armor for overtopping. This is likely to include fortification of the grass areas to protect against erosion, should the dam be overtopped. Understanding that the visual aesthetics of the site will be critical, the approach may require placement of a hard material, such as articulated concrete blocks below grade with topsoil and grass cover to maintain the appearance of a lawn to maintain the natural character of the area.

Based on our review of the December 5, 2017, Phase I Inspection/Evaluation Report and the ODS-mandated Phase II inspection and investigations, MMI proposes to perform the following scope of work:

## **SCOPE OF SERVICES**

### **Task 1.0 – Phase II Inspection and Investigation**

Using the ODS Phase II Inspection and Investigation outline, MMI will perform the following Phase II services:

- 1.1 Data Review – Review available ODS file information and summarize the existing inspection report information.
- 1.2 Field Inspection – Develop a detailed Phase I surface condition field inspection to supersede the December 5, 2017, Phase I Inspection/Evaluation Report of surface conditions.
- 1.3 Species Review – Perform a listed flora and fauna species review of the project area. We will review the latest Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP) mapping that is publicly available through the online MassGIS tool. At this time, the NHESP mapper does not show any estimated and/or priority habitats for rare wildlife/species within the project area. Therefore, the preparation and submission of a Massachusetts Endangered Species Act (MESA) Information Request is not included as part of this task. In addition, MMI will run a U.S. Fish & Wildlife Services IPaC website model to identify the

project's location as potential habitat for any federally listed endangered and threatened species. This scope of services assumes that the project will have no impact to listed species or their habitat. If this is not the case, and additional level of effort is required (e.g., MESA determination request filing, surveys, mitigation), an amendment will be provided for these services.

- 1.4 Wetland Delineation and Characterization – A wetland scientist and registered soil scientist will identify, characterize, and flag resource areas (e.g. bordering vegetated wetlands, inland bank, and ordinary high water) in accordance with the provisions of the Rules and Regulations for Plymouth Wetlands Protection Bylaw, Massachusetts Wetlands Protection Act, and Section 404 of the Clean Water Act. Wetlands will be delineated using the methodology provided in the U.S. Army Corps of Engineers (ACOE) *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*. Resource area boundary flags will be surveyed in Task 3 and will be incorporated into the base mapping. This task includes establishment of data plots and completion of ACOE wetland data forms. Following wetland delineation, wetland scientists will prepare a technical memorandum describing the identified wetland resource areas within the project site. This memorandum will include a detailed description of the characteristics of each identified resource area, a brief qualitative assessment of wetland functions, representative photographs, and USACOE wetland data forms. The purpose of this report is to support the project permitting process.
- 1.5 Hydrologic Assessment – Develop a detailed hydrologic study to include analysis of the Jenney Grist Mill Dam watershed. The hydrologic input data will be based on land use/land cover or considerations effecting hydrology. Rainfall depths available through the Northeast Regional Climate Center (NRCC) as well as depths published by the National Oceanic and Atmospheric Administration (NOAA) in Atlas 14 will be used to compute inflow and outflow hydrographs. We anticipate using a Type-III rainfall distribution with a 24-hour duration to develop hydrographs for the 100-year storm event. The detailed hydrologic analysis will be conducted using the *HydroCAD* modeling software.
- 1.6 Hydraulic Assessment – Conduct a hydraulic analysis to determine the outlet capacity of the existing spillway configuration of the Jenney Grist Mill Dam. If the outlet capacity of the existing spillway is found to be deficient, conceptual design of up to three alternatives will be evaluated to modify the spillway and dam to increase the spillway capacity until ODS regulations are met.
- 1.7 Reporting – Prepare a summary of the detailed H&H analyses to be included in the overall Phase II report. The H&H section of the report will provide details regarding the analyses performed and assumptions made to conduct the analyses and will discuss the data and methods used to develop the detailed models, the conceptual design of spillway improvements to meet ODS regulations, and a summary of results. Detailed results and input data will be provided in the Appendix.
- 1.8 O&M Manual – Prepare an Operation & Maintenance (O&M) manual for the dam and appurtenant structures. The O&M manual will embody the following salient elements:
  - Normal and Emergency Operations
  - Inspection Requirements – routine, biennial, post-storm and ice-out
  - Maintenance – routine, other
  - Emergency Response

- Record keeping and reporting
- Schedule

1.9 Phase II Report – Prepare a Phase II dam assessment report to include the various analyses and evaluations that will include the following components:

- Topographic survey
- Wetlands survey results
- H&H analyses
- Conceptual modifications to the dam/spillway necessary to pass the SDF
- Seepage analyses with conceptual elements as necessary to control seepage depending upon the proposed dam/spillway modifications
- Development of opinions of probable costs for recommended improvements

### **Task 2.0 – Regulatory Permitting Assistance and Consultation**

Project permit applications will be prepared following completion of design suitable for regulatory agency review. This scope of services assumes that the contractor will prepare and submit a National Pollutant Discharge Elimination System Stormwater Pollution Prevention Plan, Construction Dewatering Permit, and any other construction-related permits that may be required. Additionally, this scope assumes that impacts to wetlands and fill below ordinary high water will be less than 5,000 square feet and that the Army Corps of Engineers filing will be a self-verification notification form, and not a pre-construction notification. Additionally, the scope assumes that the following permits and approvals will not be required: (1) MEPA Environmental Notification Form, (2) Chapter 91 Waterway License, and (3) Section 401 Water Quality Certificate. Once the concept design has been completed, the project will be screened for compliance of Chapter 91 Waterway License requirements.

2.1 Massachusetts Historical Commission (MHC) Coordination – Coordinate with the Massachusetts Historical Commission (MHC), local Historical Commission, and the Tribal Historic Preservation Officer (THPO) to determine potential project impacts to sensitive historical or archeological resources. A Project Notification Form (PNF) will be submitted to the MHC along with the required accompanying materials, and notification letters will be submitted to the local Historical Commission and THPO. It is assumed that each entity will issue a finding of no significant impact to historical/archeological resources and that no additional coordination or mitigation will be required. If review by any of these entities determines that an additional level of effort is required, an amendment will be provided for these services. Additionally, retainage of an archeological and cultural resource specialist would be necessary.

2.2 Wetlands Protection Act (WPA) Notice of Intent (NOI) – Massachusetts Department of Environmental Protection and Plymouth Conservation Commission – Prepare and submit a WPA NOI (including necessary accompanying materials) to the Plymouth Conservation Commission and Massachusetts Department of Environmental Protection (DEP). This task includes abutter notification and production and distribution of the required number of copies of the NOI to the Conservation Commission and DEP.

2.3 Local Conservation Commission Meeting – Attend one meeting with the Town of Plymouth Conservation Commission. This scope assumes that a public hearing will not be required.

- 2.4 Chapter 253 Permit – ODS – Prepare and submit a Chapter 253 Permit application to the Massachusetts ODS as required for the proposed work. This scope of work assumes that major modifications will not be undertaken at the existing spillway and that no additional data (e.g., borings) will be required.
- 2.3 Application Review – Provide application review assistance as necessary based on comments and questions from the regulatory review agencies.
- 2.6 Comment Response – Respond to comments from regulatory agencies. We assume that 8 hours are required for this task, and that time is included in this task.

### **Task 3.0 – Construction Document Phase**

- 3.1 Concept Design – Develop and present a conceptual design including associated estimated design, permitting, and construction costs to achieve compliance with Chapter 253, Section 44-48 and 302 CMR 10.00 Dam Safety Regulations. This scope assumes design will include armoring for overtopping protection rather than major spillway modification. If major spillway or building modifications are necessary, scope will need to be expanded. Further, this scope assumes no improvements will be necessary to roadway.
- 3.2 Final Design – Complete final design of proposed improvements consistent with the concept design. Drawings will be presented on standard 22-inch by 34-inch cut sheets with title blocks. It is anticipated that the final design drawings will include the following:
  - Title sheet
  - Existing conditions site plans
  - Proposed conditions site plans
  - Sections and details
  - Erosion control plan

The final design drawings will also include technical notes to be incorporated on each plan sheet as necessary. One set of draft design drawings will be submitted to the Town of Plymouth for review and comment. Comments will then be incorporated, and final design set of drawings produced, stamped, and sealed by a professional engineer registered in the Commonwealth of Massachusetts.

- 3.3 Contract Documents – Upon acceptance of the final design drawing set by the Town of Plymouth, Contract Documents and Specifications will be prepared for public bidding purposes. The Contract Documents will include the following general sections:
  - Information for Bidders
  - Bidding Requirements
  - Contract Forms
  - General Conditions
  - Supplementary Conditions
  - Technical Specifications
  - Drawings
  - Prevailing Wage Schedule (if required)

- 3.4     Attend up to two meetings as requested to present findings and designs.
- 3.5     Upon completion of the final design drawing set and contract documents, it is understood that the Town of Plymouth will solicit for construction bids. As requested, MMI will assist during this process as follows:
  - Attend an on-site pre-bid meeting with the Town of Plymouth and potential Contractors.
  - During the bidding process, MMI will respond to bidder inquiries and issue addenda as appropriate.
  - Review Contractor prequalification statements and contact Contractor references and provide a summary of the review.
  - Review and summarize Contractor bids for comparison purposes.

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