

EXECUTIVE SUMMARY

This Inspection/Evaluation Report details the inspection and evaluation of the Whiting Mill Pond Dam (ME 00291) located in the Town of Whiting, Washington County, Maine. The inspection was conducted on November 29, 2016 by Wright-Pierce.

Whiting Mill Pond Dam is currently classified as an **Intermediate Sized, Low Hazard Potential dam**.

In general, Whiting Mill Pond Dam was found to be in **UNSAFE** condition due to the lack of original construction drawings and stability calculations, the uncertainty of the spillway being able to pass the design flood and the following deficiencies;

1. Significant spalling and delamination of concrete face as well as diagonal, vertical and horizontal cracks on the Dam Crest, Upstream and Downstream Faces and Training Wall.
2. Exposed stone rubble and timber.
3. Leakage through Dam downstream face.
4. Undermining/erosion at interface between bottom of wall and ledge and
5. Inoperable Spillway and Low Level Outlet Gates.
6. Vegetation and brush growth in right downstream shoreline and behind the left downstream training wall.

More detailed descriptions, additional deficiencies, recommended repairs, and opinions of probable repair costs are provided within this report.

There are no previous inspections or reports available for review.

The dam is classified as a Low Hazard Potential structure; therefore, development and maintenance of an Emergency Action Plan (EAP) is not required in accordance with current dam safety regulations.

Based on the size and hazard potential of this dam, the spillway design flood for the dam is 100-year to ½ Probable Maximum Flood (PMF) in accordance with the U.S. Army Corps of Engineers' guidelines, adopted by the State of Maine. There were no detailed hydrologic and hydraulic analyses (H&H) available for this dam; as such, the capacity of the current spillway to accommodate the Spillway Design Flood (SDF) is unknown.

Wright-Pierce recommends that the following actions be taken to address the deficiencies found at the dam during the inspection and evaluation:

1. Perform detailed H&H and Hazard Classification Analysis with recommendations to modify the spillway to pass the SDF as required and verify the Low Hazard Potential Classification.
2. Perform a Structural and Stability Analysis with recommendations to modify the spillway as required.
3. Prepare an Operations and Maintenance Plan.
4. Repair/Replace the Inoperable Spillway and Low Level Outlet Gates.
5. Repair the Significant spalling and delamination of concrete face as well as diagonal, vertical and horizontal cracks on the Dam Crest, Upstream and Downstream Faces and Training Wall, exposed stone rubble and timber, Leakage through Dam downstream face and Undermining/erosion at interface between bottom of wall and ledge or Replace the Dam in its entirety.
6. Remove the Vegetation and brush growth in right downstream shoreline and behind the left downstream training wall.

The repairs and recommendations noted above and described in more detail herein should be made in accordance to standard design practices, specifications and construction methods. Design of the repairs and analyses to confirm the extent of the work should be completed by a qualified professional engineer experienced in the design and rehabilitation of dams throughout the evaluation, design and construction process.

1. ASSESSMENTS AND RECOMMENDATIONS

2. Assessments

In general, Whiting Mill Pond Dam was found to be in **UNSAFE** condition due to the lack of original construction drawings and stability calculations, the uncertainty of the spillway being able to pass the design flood and the following deficiencies;

1. Significant spalling and delamination of concrete face as well as diagonal, vertical and horizontal cracks on the Dam Crest, Upstream and Downstream Faces and Training Wall.
2. Exposed stone rubble and timber
3. Leakage through Dam downstream face
4. Undermining/erosion at interface between bottom of wall and ledge and
5. Inoperable Spillway and Low Level Outlet Gates.
6. Vegetation and brush growth in right downstream shoreline and behind the left downstream training wall.

The following recommendations and remedial measures generally describe the recommended approach to address current deficiencies at the dam. Prior to undertaking recommended maintenance, repairs, or remedial measures, the applicability of environmental permits needs to be determined for activities that may occur within resource areas under the jurisdiction of local conservation commissions, DEP, or other regulatory agencies

3. Studies and Analyses

The following studies or analyses are recommended to further evaluate concerns, and comply with current regulations. These studies and analyses shall be performed by a qualified professional engineer experienced dams and hydrology, maintenance and monitoring activities.

1. Perform a detailed hydrologic and hydraulic (H&H) analysis for the impoundment drainage area, a Flood Hazard Analysis to confirm the current Low-Hazard classification, and a site specific Inflow Design Flood (IDF) study in accordance with Maine Statute and the procedures outlined by the U.S. Army Corps of Engineers.
2. Complete a structural and stability analysis of the spillway structure at the dam to determine the overall stability of this structure and extents of repair that maybe required.
3. Prepare an Operations and Maintenance Manual.

4. Recurrent (Yearly) Maintenance Recommendations

1. Perform regular monitoring and inspection of the dam, spillway, and gates, including areas of observed concrete deterioration, leakage through walls, unwanted vegetation development, accumulation of debris or other areas of suspected movement or concerns, to check for signs of deteriorating conditions. Complete formal inspections of the dam in accordance with current state regulations. As the dam is currently

classified as a Low Hazard Potential structure, formal inspections are required every six (6) years.

2. Regular maintenance activities should be continued to control and prevent further growth of unwanted vegetation, as was noted in areas during the inspection, as well as remove debris from the spillway. Mowing grass and cutting brush should be performed at least twice per year (i.e., late spring and fall). All cuttings from brush and other vegetation should be removed from the site and properly disposed.

5. Minor Repair Recommendations

The following recommendations should be implemented to maintain the integrity and improve the overall condition of the dam but do not alter the current design of the dam. These recommendations may require design by a professional engineer and construction by a contractor experienced in dam construction or repair.

1. Remove the Vegetation and brush growth in right downstream shoreline and behind the left downstream training wall

6. Remedial Modification Recommendations

The following remedial design and construction measures should be implemented to bring the dam into compliance with current dam safety regulations, improve the safety and integrity of the dam and to extend the life of the structure. These recommendations will likely require design by a professional engineer and construction by a contractor experienced in dam repair.

1. Repair/Replace the Inoperable Spillway and Low Level Outlet Gates.
2. Repair the Significant spalling and delamination of concrete face as well as diagonal, vertical and horizontal cracks on the Dam Crest, Upstream and Downstream Faces and Training Wall, Exposed stone rubble,
3. Stop the Leakage through Dam downstream face
4. Repair the Undermining/erosion at interface between bottom of wall and ledge

7. Alternatives

Given the condition of the dam, the lack of original as built drawings and the fact that the dam has reached the end of its useful life, demolishing or removing and replacing the entire dam should be considered.

8. Opinion of Probable Construction Costs

The following conceptual opinions of probable costs have been developed for the recommendations and remedial measures noted above. The costs shown herein are based on limited investigation and are provided for general information only. This should not be considered an engineer's estimate, as construction costs may be less or considerably more than indicated. It is important to note that the recommendations from the H&H, Breach Hazard Analysis, and Structural/Stability evaluations may have significant impact on the spillway improvements and construction costs as well as any Fish Passage Requirements.

Studies and Analyses

1. Structural /Stability Evaluations	\$ 8,000 -
2. Prepare Operations & Maintenance Manual	\$ 2,000 - \$
Subtotal	\$10,000 -

Recurrent (Yearly) Maintenance Recommendations

1. Regular monitoring and inspection	\$2,000 - \$3,000
2. Regular maintenance	\$2,000 - \$4,000
Subtotal	\$4,000 - \$7,000

Minor Repair Recommendations

1. Remove the Vegetation and brush growth in right

-

downstream shoreline and behind the left downstream training wall

Subtotal

\$ 2,000 - \$ 4,000

\$ 2,000 - \$ 4,000

Remedial Modification Recommendations

1 Mobilize / Demobilize	\$ 30 000 - \$
2 Dewater Impoundment	\$ 15 000 - \$
3 Repair/Replace the Inoperable Spillway and Low Level Outlet Gates	\$ 60 000 - \$
4 Repair the Significant spalling and delamination of concrete face as well as diagonal vertical and horizontal cracks on the Dam Crest Upstream and Downstream Faces and Training Wall Exposed stone rubble	\$ 350 000 -
5 Stop the Leakage through Dam downstream face	\$ 20 000 - \$
6 Repair the Undermining/erosion at interface between bottom of wall and ledge	\$ 40 000 - \$
Subtotal	\$515,000 -
Engineering & Design	\$ 40,000 - \$90,000
Permitting	\$ 10 000 - \$25 000
Construction Administration	\$ 25 000 - \$60 000

<u>Contingency</u>	\$100,000 - \$300,000
Subtotal	\$690,000- \$1,3750,000

REMEDIAL MODIFICATION COSTS TOTAL

Alternates

1. Demolish Dam	\$150,000 - \$ 300,000
2. Replacement of Dam	\$900,000 - \$1,200,000

