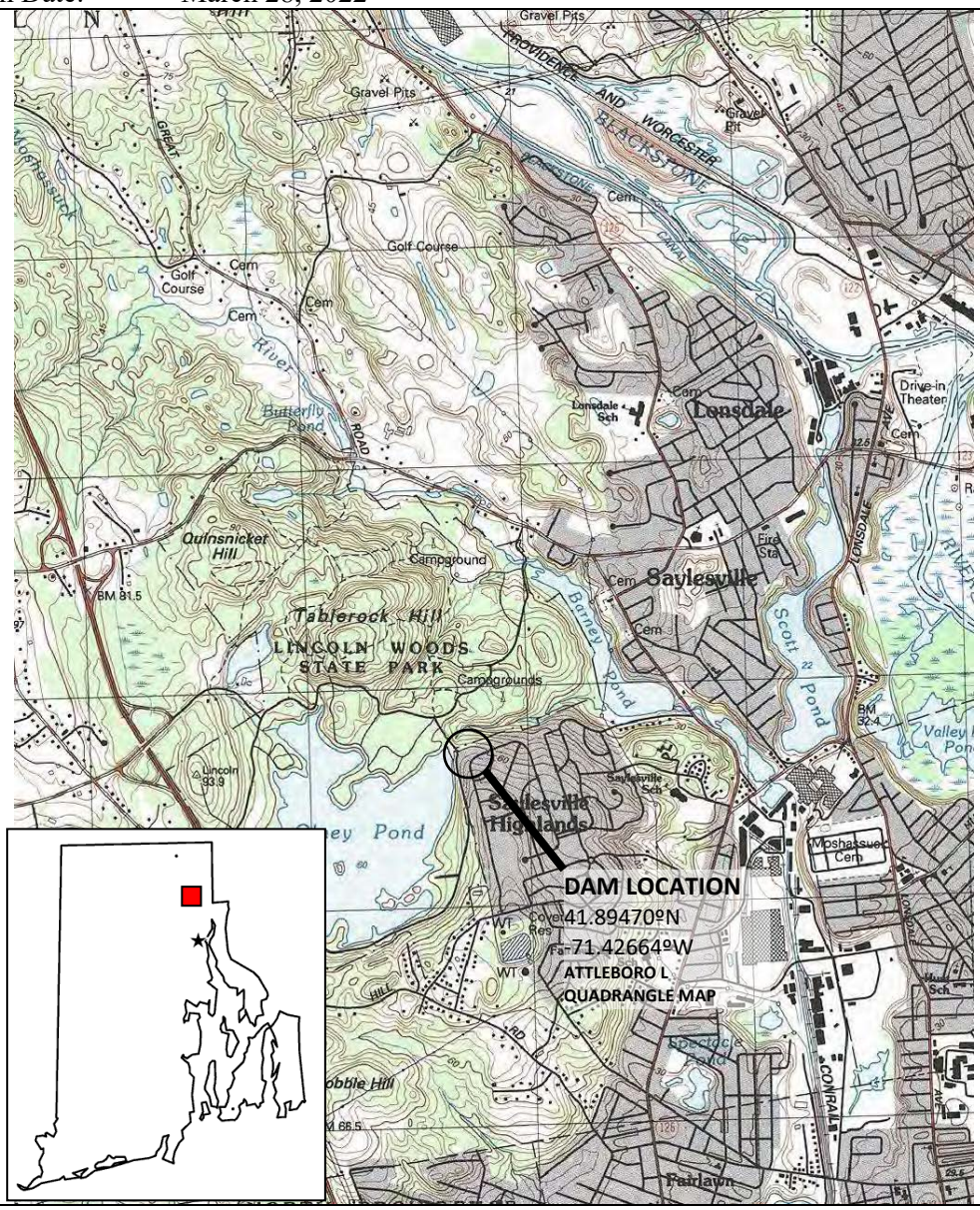
-- OLNEY POND DAM --
VISUAL
INSPECTION / EVALUATION REPORT

Dam Name:	***Olney Pond Dam***
State Dam ID#:	***102***
Owner:	***RIDEM Parks & Recreation***
Town:	***Lincoln***
Consultant:	***Pare Corporation***
Date of Inspection:	***March 28, 2022***

PARE
CORPORATION

INSPECTION SUMMARY

Dam Name (No):	Olney Pond Dam (102)
Location:	Lincoln
Hazard Classification:	High
Inspector:	David M. Matheson, P.E.
Inspection Date:	March 28, 2022



When describing the dam, "left" and "right" refer to the respective sides of the dam as viewed when facing downstream (with normal flow of water).

PREFACE

The assessment of the general condition of the dam reported herein was based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations were beyond the scope of this report unless reported otherwise.

In reviewing this report, it should be realized that the reported condition of the dam was based on observations of field conditions at the time of inspection, along with data available to the inspection team.

It is critical to note that the condition of the dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the reported condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

David M. Matheson, P.E.
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PARE CORPORATION
Senior Project Engineer

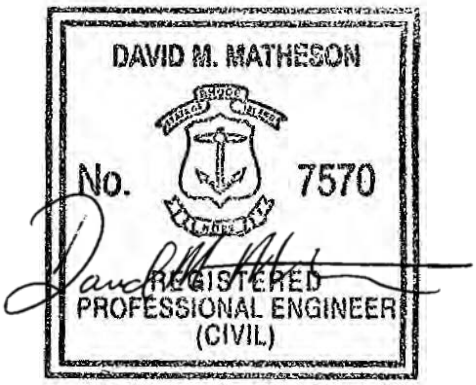

TABLE OF CONTENTS

1.0 DESCRIPTION OF PROJECT

1.1 General

1.1.1 Authority

The RIDEM Office of Compliance and Inspection has retained Pare Corporation (Pare) of Foxboro, Massachusetts and Lincoln, Rhode Island to perform a visual inspection and develop a report of conditions for the Olney Pond Dam along the Thread Mill Brook in Lincoln, Rhode Island. This inspection and report were performed in accordance with current Rhode Island laws.

RIDEM will develop an overall condition rating based upon the data presented herein. It is understood that this rating will consider operational and structural deficiencies and will be presented under separate cover.

1.1.2 Purpose of Work

The purpose of this investigation was to inspect and evaluate the present condition of the dam and appurtenant structures in accordance with current dam safety regulations to provide information that will assist in both prioritizing dam repair needs and planning/conducting maintenance and operation.

The investigation was divided into three parts: 1) obtain and review reports, investigations, and data pertaining to the dam and appurtenant structures available within the Rhode Island Department of Environmental Management files; 2) perform a visual inspection of the site; and; 3) prepare and submit a final report presenting the evaluation of the structure, including recommendations and remedial actions.

1.1.3 Definitions

To provide the reader with a better understanding of the report, definitions of commonly used terms associated with dams are provided at the end of this report. Many of these terms may be included in this report. The terms are presented under common categories associated with dams which include: 1) orientation; 2) dam components; 3) hazard classification; 4) general; and 5) condition rating.

1.2 Description of Project

1.2.1 Location

The Olney Pond Dam is located within Lincoln Woods State Park in the Town of Lincoln, RI near coordinates 41.89470ºN/71.42664ºW or approximately 1.9 miles south of the town's center. The dam impounds water along the Thread Mill Brook to form Olney Pond with the dam structure located along the northeastern side of the impoundment. Please refer to the inspection summary for a locus plan depicting the area of the dam and its immediate surroundings.

To reach the dam from I-295, take exit 18A (formerly exit 9A) for RI-146 South. After 0.5 miles keep left at the fork and continue towards RI-146 South/Eddie Dowling Highway for another 0.5 miles. Keep left at the next fork and follow signs for RI-146 S/RI-116 N/Lincoln and merge onto RI-146 South/Eddie Dowling Highway. After 2.5 miles, take Exit 5 for RI-123 towards Breakneck Hill

Road. In 0.2 miles, turn left onto RI-123 East/Breakneck Hill Road and continue to follow RI-123 East. After 1.6 miles, take a right onto Manchester Printworks Road (Entrance to Lincoln Woods State Park). After 1/10th of a mile, Manchester Printworks Road becomes Table Rock Road. Follow Table Rock Road for approximately 0.5 miles to a fork in the road with Lincoln Woods Road to the right and Stump Hill Road to the left. The dam is located along Stump Hill Road about 1/10th of a mile from the intersection. However, since this road is a one-way (against direction of travel), access is best accomplished by foot from the parking area near the intersection.

1.2.2 Owner/Caretaker

According to the Rhode Island Department of Environmental Management (RIDEM) Office of Compliance and Inspection, the Olney Pond Dam is owned by RIDEM Parks & Recreation. Mr. Robert Paquette (Chief, Parks & Recreation) is listed as the Owner's contact and can be reached at 401-667-6200. The Regional Manager (for Region I)/Caretaker, Mr. Anthony Paiva (Park Employee), can be reached at 401-723-7892.

1.2.3 Purpose of the Dam

Olney Pond Dam currently impounds water for recreational purposes.

1.2.4 Description of the Dam and Appurtenances

The following description is based upon RIDEM records and observations during the inspection:

The Olney Pond Dam is an approximately 300-foot-long earthen embankment. Based on the observed topography, it appears that the dam was built over a steep river valley resulting in an approximate 27-foot drop in elevation from the upstream mudline to the downstream toe, resulting in an overall dam height of approximately 35 feet. The upstream side of the embankment is supported by a 5- to 6-foot-high concrete panel-faced-wall. The crest is between 80 and 110 feet wide and supports a paved parking area and roadway with grassed shoulders and a concrete sidewalk near the upstream wall. The downstream slope is protected by armor stone riprap at approximately 2H: 1V. Impoundment levels are normally maintained at the top of stoplog elevation, about 8-inches above the concrete weir at the primary spillway or about 2.5 feet below the top of the upstream wall.

Appurtenant structures include a primary spillway at the left abutment and a low-level outlet near the center of the dam.

The primary spillway is a timber stop log-controlled sluiceway with a steel trash rack along its approach opening. The sluiceway opening is approximately 7-feet wide and 3-feet 3-inches tall. A hinged timber hatch locks to the trash rack to secure the stop log access point. Once water passes over the stop logs it discharges through the sluiceway to a culvert which passes under the roadway before day-lighting from a headwall on the downstream side of the dam and flows through a natural stream channel.

The low-level outlet is controlled by a gate that is manually opened using a T-wrench. Access to the valve operator is via an aluminum hatch in the roof of the concrete vault found along the upstream side of the dam. Water is conveyed via a stone masonry culvert with an apparent bedrock floor from an opening at the upstream wall, through the gate, and then transitions to a 14-inch diameter HDPE conduit through the embankment of the dam, and out of a concrete headwall downstream of the dam to a stone

lined stream channel. A steel rack is present at the discharge opening to deter animals from entering the conduit.

1.2.5 Operations and Maintenance

No formal operations and maintenance manual was available for review at the time of the inspection. It is apparent that the Owner is familiar with the components of the dam and performs regular maintenance and operations at the dam as discussed herein.

1.2.6 Hazard Potential Classification

In accordance with current classification procedures under the State of Rhode Island dam safety rules and regulations, Olney Pond Dam has been classified as a HIGH hazard potential dam by RIDEM.

2.0 INSPECTION

2.1 Visual Inspection

The Olney Pond Dam was inspected on March 28, 2022. At the time of the inspection, the outside temperature was near 70°F with cloudy skies and passing showers. Photographs to document the conditions during the inspection were taken and are included at the end of this report. The level of the impoundment was approximately 18 inches below the top of the concrete right of the spillway about 12 inches below historic normal pool levels. Underwater areas were not inspected as part of the field activity.

For reference purposes, baselines were established along the crest of the dam and dike embankments during the inspection. During the inspection, a baseline was established along the crest of the dam with station 0+00 at the left abutment and station 3+00 at the right abutment. Observations were made in relation to their location along the baseline as appropriate and as noted herein.

2.1.1 General Findings

The Olney Pond Dam was found to have the following deficiencies:

1. Aged, spalled, and shifted concrete along the upstream wall.
2. Depressions along the upstream slope.
3. Seepage at the toe.
4. Areas of overgrown downstream slope/groins.

The specific concerns are identified in more detail in the sections below:

2.1.2 Dam Embankment

The following was noted along the dam embankment:

Upstream Wall

- The upstream side consists of a concrete and mortared wall. The following was noted during the inspection:
  - From the historic water line downward, the face of the wall is deteriorated with scoured concrete surfaces, missing and/or broken mortar, and shifted concrete wall blocks.
  - The horizontal and vertical wall alignments appear normal.
  - Both the spillway and right abutment contact points appear normal with no separations or unusual movement observed.
- The outer edges of the concrete for the low level outlet platform, near the center of the dam, appears in satisfactory condition with minor scour and exposed aggregate at and below the historic normal pool line.

Crest

- The crest consists of the following components (from upstream to downstream) with the

following noted during the inspection:

- Concrete paved sidewalks behind the upstream wall
  - In general, the concrete appears in satisfactory condition with no cracks, spalling or erosion observed.
  - Up to 3 inches of differential settlement is present between two concrete joints near the center of the dam downstream of the low level outlet platform with grass growing out of the joints in these locations. This condition is similar to that observed during the previous inspection.
  - Up to 1 inch of differential settlement is present between a concrete joint upstream of the bend in the wall on the left side of the dam. This condition is similar to that observed during the previous inspection.
- Grassed areas between the concrete walkways and the paved parking area.
  - The surface appears even with a healthy coverage of well-maintained grass.
  - The previously reported holes in the grassed areas were not observed during this inspection.
- Asphalt paved parking area.
  - The pavement appeared in good condition with no cracks, potholes, surface depressions, or separations at the concrete interface.
- Asphalt paved roadway.
  - The pavement surface appeared in good condition with no cracks, potholes, surface depressions, or separations.
  - The crash barrier along the downstream side of the roadway appeared in good condition with a normal alignment.
- Grassed downstream shoulder.
  - Grass along the surface was thin; however, appeared to have full coverage and is well-maintained.
  - The previously observed holes, erosion, and unraveling grass along the transition with the top of the riprap downstream slope was not observed during this inspection. The transition areas appeared in good condition being free of erosion and holes,
  - Exposed geotextile was noted at the transition area with the downstream rip rap slope.

- The surface area above the underground spillway culvert appeared firm with no holes or surface depressions observed. Some surface erosion was present along the upstream side of the roadway in this area, up to 2 inches deep to near the bottom of the asphalt section with no undermining observed.
- The contact points with both the left and right abutments appeared normal with no cracks or unusual movement observed.

Downstream Slope

- The riprap sections appeared in good condition with an even coverage of riprap and normal vertical and horizontal alignments.
- The groin area right of the riprap are free of trees and unwanted vegetation with a well-maintained grass surface.
- The groin area left of the riprap is overgrown with 4-to-6-inch diameter trees with accumulated leaves covering the surface.
- Wetland vegetation is present along the toe of the riprap slope. The ground surface in this area is damp with no seepage flows observed at this time.

- Left of the riprap slope is a stone wall that supports the roadway and also functions as the downstream headwall for the spillway discharge.
    - The wall appears in satisfactory condition with normal alignments and tight joints.
    - A tree stump is present behind the left side of the wall. The Owner's representative stated that the tree associated with the stump was cut down recently.
    - The slope downstream of the dam is earthen and is covered with leaf and woody debris limiting the inspection to general review of alignment. The slope appears even at about 3H:1V.
- The contact points with both the left and right abutments appear normal with no cracks, separations, or signs of unusual movement.

2.1.3 Appurtenant Structures

Primary Spillway

- The approach area is clear of debris.
- At the time of the inspection, one stop log was in place.
- The trash rack is part of a locked mechanism to prevent unauthorized operation of the stop logs. The trash rack was observed with surface rust; however, appeared sound, free of debris, and fully functional.
- Spalled concrete along the top of the right stop log slot was observed. The condition of the left stop log slot was viewed due to the presence/location of the trash rack.
- Leakage estimated to be less than 3 gpm was noted between the stop log and the stop log slot on the right side.
- Leakage estimated to be less than 5 gpm was noted to be passing through the joint between the culvert wall and the base slab just past the stop log section.
- Spalled concrete was observed along the culvert ceiling about 8 feet downstream of the intake with the spalled area about 18 inches in diameter. The depth of spalling is about 1 inch deep with exposed reinforcement observed.
- The stone masonry sidewalls of the culvert appeared in satisfactory condition with a normal alignment and tight joints.
- The discharge channel was clear of debris from the headwall to the natural drop off at the rock face.
- The contact point of the spillway with the left abutment appears normal with no separations or unusual movement observed.

Low Level Outlet

- The approach was below water therefore an inspection was not completed to assess the condition of the intake, trash rack, or accumulated sediment buildup.
- The gate stem was broken during the previous 2019 inspection. Since that inspection, this has been repaired and the gate is now fully functional.
- The gate operator is housed within a locked vault near the center of the dam on the upstream side.
- The Owner's representative demonstrated the gate's operation.
    - Prior to operation, the low level outlet discharge channel was covered with accumulated leaves which covered almost 2/3rds of the discharge opening.
    - The gate opened with ease. The reaction time for outflow was about 5 seconds. The flow from the discharge opening was muddy indicating a heavy sediment buildup at the

intake. The gate was allowed to stay open for about 5 minutes with no change in turbidity. The Owner's representative plans to run this outlet in the future to clear out the sediment.

2.1.4 Downstream Area

Downstream of the Olney Pond Dam is a defined valley, oriented west to east with residential developments beyond the southern edge of the valley and forested lands with apparent park trails to the north. The discharge channel within 100 feet of the culvert exit is bedrock lined with vertical sidewalls of eroded topsoil. Approximately 100 feet downstream, discharges cascade down a 15-foot bedrock cliff and into a natural channel. About 2,200 feet downstream of the dam, flows enter Barney Pond, then pass over the Barney Pond Dam (RI No. 101) about 3,400 feet downstream of the dam.

2.1.5 Reservoir Area

Olney Pond Dam impounds water along the Thread Mill Brook to form an irregular-shaped pond located within the Lincoln Woods State Park. The perimeter slopes around the pond vary between moderate to steep with numerous bedrock outcrops along shorelines. Park access roads and hiking trails circle the pond with RI-146 to the west. A park beach and maintenance facility are located along the southwestern shoreline. The impoundment is heavily trafficked by the public and used for non-motorized boating, fishing, and swimming.

2.2 Caretaker Interview

Mr. Anthony Paiva, the Region I Parks Director, and Dam Caretaker, was available by phone prior to and after the inspection. Mr. Matthew Knolton, Park Manager, was present during a portion of the inspection. Information from Mr. Paiva and Mr. Knolton was incorporated into this report.

2.3 Operation and Maintenance Procedures

An Operations and Maintenance (O&M) Manual was not available for review, nor is one known to exist. Park staff follows recommendations set forth in these reports to maintain the dam.

2.3.1 Operational Procedures

The primary spillway is controlled with removable timber stop logs and the low level outlet is controlled by a gate valve. The Owner typically leaves one stop log in place and removes it as directed by State Engineers to control the reservoir height. The trash rack for the primary spillway is cleared of debris on a nearly daily basis.

2.3.2 Maintenance of Dam and Operating Facilities

In 1999, the Owner completed several improvements at the dam including raising the dam structure and making structural improvements to increase the strength and reduce erosion. Additional improvements were also made to the water level control system, allowing for an improved capability to control the height of Olney Pond.

Public access improvements included increased parking, sidewalks, ramps, and a fishing platform along the face of the dam for wheelchairs. The platform includes rails and wheelchair stops.

Since the previous inspection, the Owner has filled holes along grassed areas of the crest, cleared trees from near the wall at the spillway discharge, and repaired the low level outlet operator.

Regular maintenance at the dam reportedly includes the cutting of vegetation along the crest; roadway maintenance; daily clearing of the low-level outlet and primary spillway approach areas; clearing the low-level outlet discharge channel; and regular informal inspection. Based on the muddy condition quality of the low level outlet discharge flows, the gate has not been exercised for some time.

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

The Olney Pond Dam was found to have the following deficiencies:

1. Aged, spalled, and shifted concrete along the upstream wall.
2. Depressions along the upstream slope.
3. Seepage at the toe.
4. Areas of overgrown downstream slope/groins, and

Pare previously completed an inspection of the dam on May 28, 2020. Based upon a comparison to reported conditions several of the previously reported deficiencies have been addressed while others remain unchanged.

Previously Identified Deficiency/Recommendation	***Resolution or Current Condition***
Repair the low-level outlet to an operable condition.	Completed. Outlet demonstrated to be operable during this inspection.
Regular maintenance activities should be continued to control and prevent growth of unwanted vegetation.	This activity is being completed as needed.
Areas of potential movement along the upstream portion of the crest.	No change. No new areas of movement observed.
Post tree clearing grub root systems.	No change.
Develop and initiate a program for monitoring the observed settling of the sidewalk.	Unknown; no monitoring reports were available for review.
Develop an initiate a program for monitoring the observed holes and depressions in the crest..	Unknown; no monitoring reports were available for review.
Using an ROV camera, complete an internal and video inspection of the low-level outlet culvert to evaluate its condition and to determine the source of the leakage observed at the discharge.	The leaking gate has been repaired.
Fill cracks, spalls, and expansion joints along the upstream wall face.	No change.
Fill the holes and depressions along the downstream side of the crest at the transition with the riprap slope.	Holes have been filled and reseeded.
Develop and initiate a program for monitoring the seepage along the toe of the dam.	Unknown; no monitoring reports were available for review.
Remove the existing animal guard at the low-level outlet discharge and replace it.	No change.
Develop an O&M	Not completed.

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 RIDEM or other regulatory agencies. These recommendations for engineering studies, evaluations, maintenance repairs, and remedial measures are

generally consistent with those stated in Pare's 2020 Inspection/Evaluation Report for the Olney Pond Dam; therefore, many of the recommendations (but not all) remain unchanged as listed below.

3.2 Recommendations

The following tasks are recommended to address deficiencies noted during the inspection and the completion of this report. The repairs presented below should be implemented to maintain the integrity of the structure. If deferred these maintenance items could develop into larger deficiencies that are more costly to address.

1. Regular maintenance activities should be continued to control and prevent growth of unwanted vegetation including mowing along the crest, roadway upkeep, clearing the approach and discharge areas at the low-level outlet, and clearing the approach at the primary spillway.

   The following deficiencies have not progressed beyond a regular maintenance task; however, should not be delayed before conditions worsen and maintenance turns into repair:

   - Clearing the downstream groins and areas of small trees and brush with 15 feet of the dam. *Note that the downstream right groin has been cleared of trees; however, stumps remain.*
   - Clear the small trees and brush from within 15 feet of the toe of the dam.
   - If not already done so, if dye testing was performed on the previously filled holes over the spillway culvert alignment in conjunction with an internal video inspection, and the holes are connected to the culvert, develop and initiate a cementitious repair patching program on the culvert. If the holes are not connected to the culvert, monitor the development of holes in these locations.

   Vegetation removal, mowing, and fertilizing should be continued and performed at least twice per year to allow a clear view of the riprap and grassed surfaces. Mowing at longer intervals will likely require that the clippings be bagged and disposed of offsite or fully mulched to limit the build-up of thatch and the potential for choking of the grass.

2. Post tree clearing grub root systems larger than 0.5 inches from the embankments and fill the resulting holes with suitable compacted material. Depending upon the type of stumps to be removed, the procedure for removing the root system may vary. Some trees have taproots while others have a shallow network of roots that cover a large area. Impacts to the embankments should be evaluated by an engineer prior to grubbing roots from the dam. Given the location of the stumps on the embankment and the conditions prevalent at the time of the work, instability, seepage, or piping conditions could develop if not undertaken in a controlled manner. Clearing should extend a minimum of 15-feet from all embankment and other structures associated with the dam and include.

3. After clearing and grubbing unwanted vegetation grade the downstream slope to a stable geometry and establish a uniform coverage of grass or extend riprap coverage to provide a uniform surface.

4. If not already done so, develop and initiate a program for monitoring the observed settling of the sidewalk along the upstream wall of the dam. If settling continues it may be necessary to

complete a larger analysis to determine the cause of the movement and to determine the effects, it may have on the dam.

5. Fill cracks, spalls, and expansion joints along the upstream wall face. Cracks should be filled with a pressure injected epoxy, while spalls should be filled with a mortar patch.

6. Monitor the performance of the filled holes and depressions along the downstream side of the crest at the transition with the riprap slope for continued development.

7. If not already done so, develop and initiate a program for monitoring the seepage along the toe of the dam. Seepage rates should be recorded through the use of V-notched weirs installed within formed channel(s). The seepage areas should also be monitored for boils and for signs of iron flocculate and/or sediment transport. If conditions advance, the Owner is recommended to retain the services of a registered professional engineer experienced in dam repair to further evaluate the situation.

8. Remove the existing animal guard at the low-level outlet discharge and replace it with a guard that is designed such that full flow can be discharged from the low-level outlet.

9. A formalized Operations and Maintenance Manual should be developed for this structure. This manual should include the following:
   a. Procedures for maintaining the level of the impoundment, including adjusting the level of the impoundment in anticipation of rain events to provide additional free board during the wetter months.
   b. Operational and maintenance procedures required to ensure satisfactory operation and minimize deterioration of the facility.
   c. Record keeping procedures for ongoing inspections and monitoring, including the herein recommended seepage and leakage monitoring program.
   d. A schedule to control and prevent the growth of unwanted vegetation.
   e. A schedule for regular maintenance of the primary spillway and low level outlet structures including regular exercising of the operable components.
   f. Periodic inspection schedules.

10. Implement a program of regular inspection and monitoring of the dam. As the dam is currently classified as a High hazard potential, the completion of a formal visual inspection by a Rhode Island registered professional engineer familiar with dam engineering is required every 2 years.

3.3 Alternatives

At this time, the dam is functioning as designed with maintenance level deficiencies; therefore, no additional studies or alternative repair measures are presented at this time.

The following alternatives are presented based upon a conceptual review of the concerns. Additional studies and or considerations may indicate that some or all of the options presented below are not suitable for the conditions specific to this dam and dam site. In addition to the general activities, appropriate environmental permits will be required to complete many of the alternatives presented below.

Dam Removal/Breaching: Alternative to implementing any of the repairs noted above, breaching of the dam is a viable alternative for addressing safety and stability concerns at the dam. While this alternative

will address the safety concerns at the dam, it will result in the loss of the recreational and environmental resource and reduce flood control capacity provided by the dam and impoundment. Additionally, while this will result in elimination of yearly operating and maintenance expenses, permitting activities and construction costs associated with dam removal may exceed those of rehabilitation and operations and maintenance.

Lower the Dam: Complete modifications to the dam to reduce the dam height, thereby reducing the maximum height and volume of water that may be impounded by the dam. Evaluate the impact of the lowered dam upon the hazard potential. While this alternative may result in reducing the hazard potential, recommendations listed above remain valid and should be implemented in accordance to general dam safety practice. Additionally, permitting activities and construction costs associated with reducing the dam height may exceed those of repair.

COMMON DAM SAFETY DEFINITIONS

For a comprehensive list of dam engineering terminology and definitions refer to State of Rhode Island Rules and Regulations for Dam Safety, or other reference published by FERC, Dept. of the Interior Bureau of Reclamation, or FEMA.

Orientation

Upstream – Shall mean the side of the dam that borders the impoundment.
Downstream – Shall mean the high side of the dam, the side opposite the upstream side.
Right – Shall mean the area to the right when looking in the downstream direction.
Left – Shall mean the area to the left when looking in the downstream direction.

Dam Components

Dam – means any barrier made by humans, including appurtenant works that impounds or diverts water.
Embankment – means the fill material, including but not limited to rock or earth, placed to provide a permanent barrier that impounds water.
Crest – Shall mean the top of the dam, usually provides a road or path across the dam.
Abutment – Shall mean that part of a valley side against which a dam is constructed. An artificial abutment is sometimes constructed as a concrete gravity section, to take the thrust of an arch dam where there is no suitable natural abutment.
Appurtenant Works – means any ancillary feature of a dam including such structures as dikes, training walls, spillways, either in the dam or separate there from, low level outlet works, and water conduits such as tunnels, channels, pipelines or penstocks, either through the dam or its abutments.
Spillway – means a structure, a low area in natural grade or any part of the dam which has been designed or relied upon to allow normal flow or major flood flow to pass over or through while being discharged from a reservoir.

Hazard Classification

High Hazard – means a dam where failure or misoperation will result in probable loss of human life.
Significant Hazard – means a dam where failure or misoperation results in no probable loss of human life but can cause major economic loss, disruption of lifeline facilities or impact other concerns detrimental to the public's health, safety, or welfare. Examples of major economic loss include but are not limited to washout of a state or federal highway, washout of two or more municipal roads, loss of vehicular access to residences, (e.g., a dead end road whereby emergency personnel could no longer access residences beyond the washout area) or damage to a few structures.
Low Hazard – means a dam where failure or misoperation results in no probable loss of human life and low economic losses.

General

EAP – Emergency Action Plan – Shall mean a predetermined (and properly documented) plan of action to be taken to reduce the potential for property damage and/or loss of life in an area affected by an impending dam failure.
O&M Manual – Operations and Maintenance Manual; Document identifying routine maintenance and operational procedures under normal and storm conditions.
Normal Pool – Shall mean the elevation of the impoundment during normal operating conditions.
Acre-foot – Shall mean a unit of volumetric measure that would cover one acre to a depth of one foot. It is equal to 43,560 cubic feet. One million U.S. gallons = 3.068 acre-feet.

Height of Dam– means the vertical distance from the elevation of the uppermost surface of a dam to the lowest point of natural ground, including any stream channel, along the downstream toe of the dam.
Hydraulic Height – means the height to which water rises behind a dam and the difference between the lowest point in the original streambed at the axis of the dam and the maximum controllable water surface.
Maximum Water Storage Elevation – means the maximum elevation of water surface which can be contained by the dam without overtopping the embankment section.
Spillway Design Flood (SDF) – Shall mean the flood used in the design of a dam and its appurtenant works particularly for sizing the spillway and outlet works, and for determining maximum temporary storage and height of dam requirements.
Maximum Storage Capacity – The volume of water contained in the impoundment at maximum water storage elevation.
Normal Storage Capacity – The volume of water contained in the impoundment at normal water storage elevation.

Condition Rating

Unsafe – Means the condition of a regulated dam, as determined by the Director, is such that an unreasonable risk of failure exists that will result in a probable loss of human life or major economic loss. Among the conditions that would result in this determination are: excessive vegetation that does not allow the Director to perform a complete visual inspection of a dam, excessive seepage or piping, significant erosion problems, inadequate spillway capacity, inadequate capacity and/or condition of control structure(s) or serious structural deficiencies, including movement of the structure or major cracking.*
Poor – A component that has deteriorated beyond a maintenance issue and requires repair; the component no longer functions as it was originally intended.
Fair – Means a component that requires maintenance
Good – Meeting minimum guidelines where no irregularities are observed and the component appears to be maintained properly.

* Structural deficiencies include but are not limited to the following:

- Excessive uncontrolled seepage (e.g., upwelling of water, evidence of fines movement, flowing water, erosion, etc.)
- Missing riprap with resulting erosion of slope
- Sinkholes, particularly behind retaining walls and above outlet pipes, possibly indicating loss of soil due to piping, rather than animal burrows
- Excessive vegetation and tree growth, particularly if it obscures features of the dam and the dam cannot be fully inspected
- Deterioration of concrete structures (e.g., exposed rebar, tilted walls, large cracks with or without seepage, excessive spalling, etc.)
- Inoperable outlets (gates and valves that have not been operated for many years or are broken)

REFERENCES AND RESOURCES

The following were referenced during the completion of the visual inspection and preparation of this report and the development of the recommendations presented herein:

1. "Olney Pond Dam, Visual Inspection/Evaluation Report", Pare Corporation, May 28, 2020.

2. "Olney Pond Dam, Visual Inspection/Evaluation Report", Pare Corporation, May 15, 2018.

3. "Olney Pond Dam, Visual Inspection/Evaluation Report", Pare Corporation, August 18 & 26, 2014.

4. "Design of Small Dams", United States Department of the Interior Bureau of Reclamation, 1987

5. "ER 110-2-106 - Recommended Guidelines for Safety Inspection of Dams", Department of the Army, September 26, 1979.

6. "Guidelines for Reporting the Performance of Dams" National Performance of Dams Program, August 1994.

The following provides an abbreviated list of resources for dam owners to locate additional information pertaining to dam safety, regulations, maintenance, operations, and other information relevant to the ownership responsibilities associated with their dam.

1. RIDEM Office of Compliance and Inspection Website: http://www.dem.ri.gov/programs/benviron/compinsp/

2. "Dam Owner's Guide to Plant Impact on Earthen Dams" *FEMA L-263, September 2005.*

3. "Technical Manual for Dam Owners: Impacts of Plants on Earthen Dams" *FEMA 534, September 2005.*

4. "Dam Safety: An Owners Guidance Manual" *FEMA 145, December 1986.*

5. Association of Dam Safety Officials – Website: www.asdso.org/.

6. "Dam Ownership – Responsibility and Liability", ASDSO.

VISUAL DAM INSPECTION
LIMITATIONS

Visual Inspection

1. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of this report.

2. In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection, along with data available to the inspection team.

3. In cases where an impoundment is lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions, which might otherwise be detectable if inspected under the normal operating environment of the structure.

4. It is critical to note that the condition of the dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Use of Report

1. The applicability of environmental permits needs to be determined prior to undertaking maintenance activities that may occur within resource areas under the jurisdiction of any regulatory agency.

2. This report has been prepared for the exclusive use of the RIDEM for specific application to the referenced dam site in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made.

3. This report has been prepared for this project by Pare. This report is for preliminary evaluation purposes only and is not necessarily sufficient to support design of repairs or recommendations or to prepare an accurate bid.

Photo No. 1.: Overview of the upstream side of the dam from the left abutment looking right.

Photo No. 2.: Upstream side of dam as viewed from the bend near the left abutment looking left. Note the deteriorated and shifted concrete wall sections above the waterline. Circled is the primary spillway.

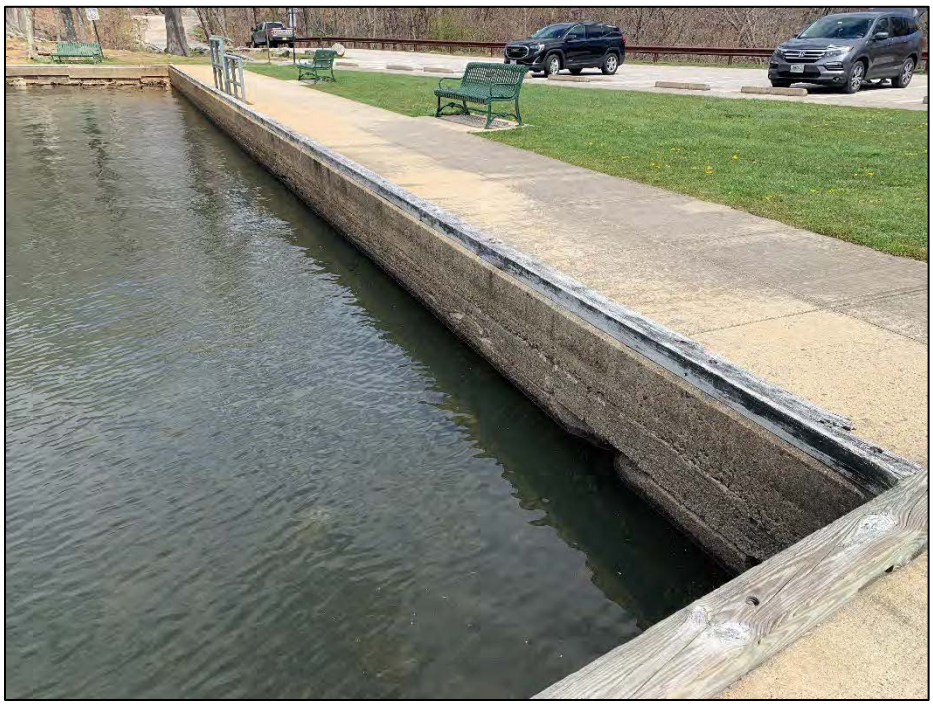

Photo No. 3.: Upstream side as viewed from low level outlet platform looking left. Note concrete spalling along waterline.

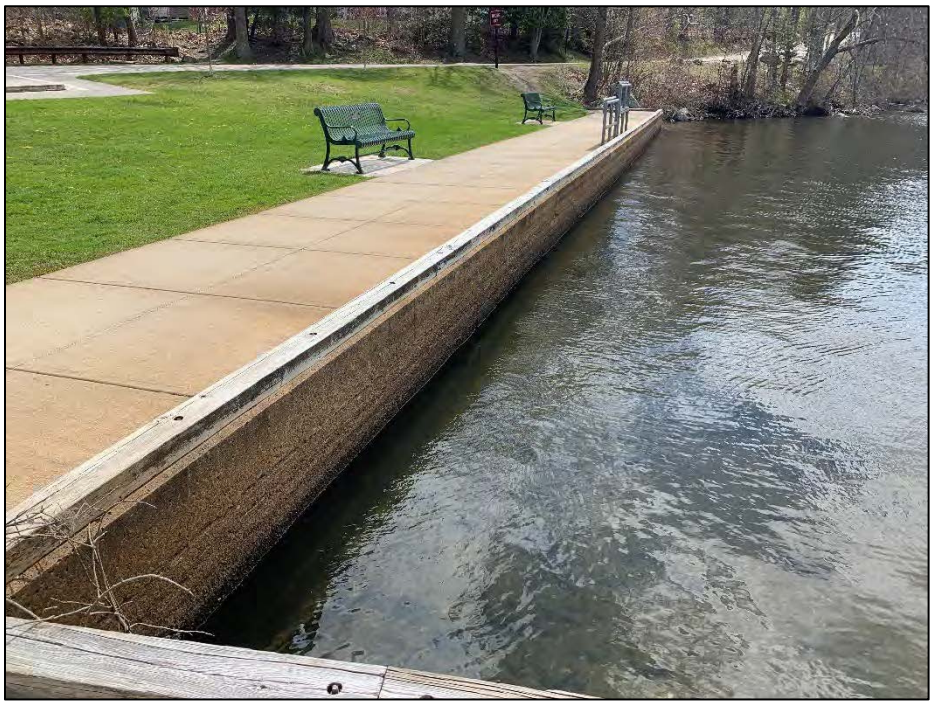

Photo No. 4.: Upstream side as viewed from low level outlet platform looking right.

Photo No. 5.: Crest as viewed from the left abutment looking right.

Photo No. 6.: Upstream side of crest looking right from near the end of the parking area.

Photo No. 7.: Downstream side of crest looking right from near the end of the parking area.

Photo No. 8.: Crest as viewed from the right abutment looking right.

Photo No. 9.: Crest and impoundment as viewed from the right abutment looking upstream.

Photo No. 10.: Crest as viewed from the right abutment looking right and upstream.

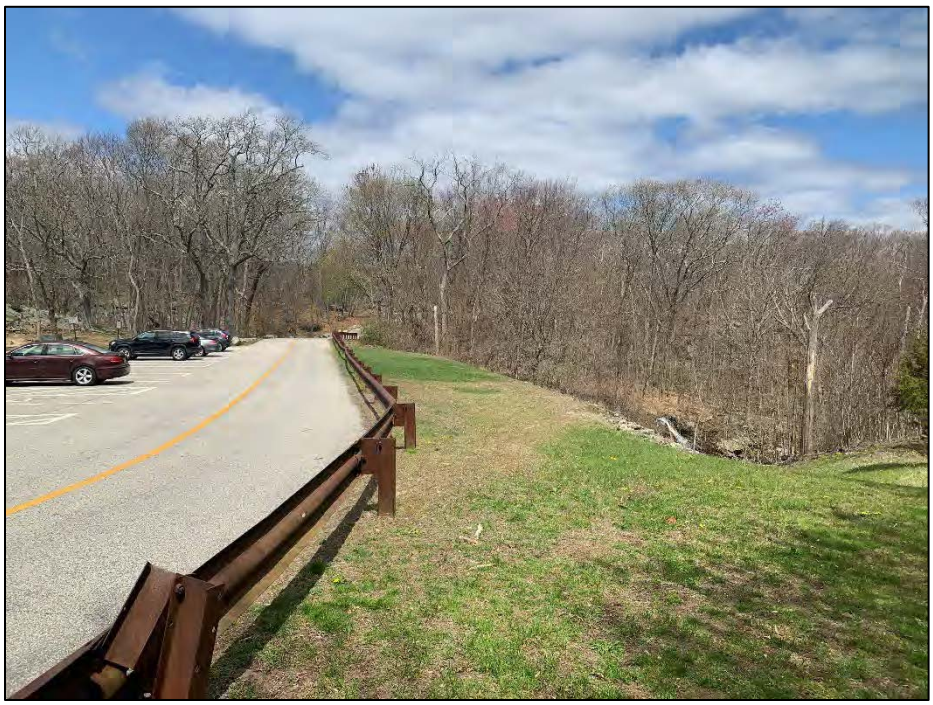

Photo No. 11.: Crest as viewed from the right abutment looking left.

Photo No. 12.: Downstream slope from the left abutment looking right. Note the deadfall cover and tree growth.

Photo No. 13.: Downstream slope as viewed from the primary spillway discharge looking right.

Photo No. 14.: Downstream slope from the primary spillway channel drop off.

Photo No. 15.: Downstream slope as viewed from near Station 0+60 looking right and downstream.

Photo No. 16.: Top of downstream slope as viewed from near Station 0+60 looking right.

Photo No. 17.: Downstream slope as viewed from beyond the right groin looking left.

Photo No. 18.: Downstream slope as viewed from beyond the right groin looking upstream and slightly left. Note the wetland vegetatoin along the toe.

Photo No. 19.: Stop log-controlled primary spillway intake at the upstream side of the left abutment.

Photo No. 20.: Primary spillway stop log weir section looking left.

Photo No. 21.: Primary spillway stop log weir section right side looking down stop log slot. Note spalling within stop log slot and leakage under wall downstream of stop logs.

Photo No. 22.: Primary spillway culvert as viewed from the intake. Note the spalled areas along the ceiling with exposed reinforcement.

Photo No. 23.: Primary spillway discharge opening. Note tree trunk above the headwall.

Photo No. 24.: View into primary spillway discharge opening.

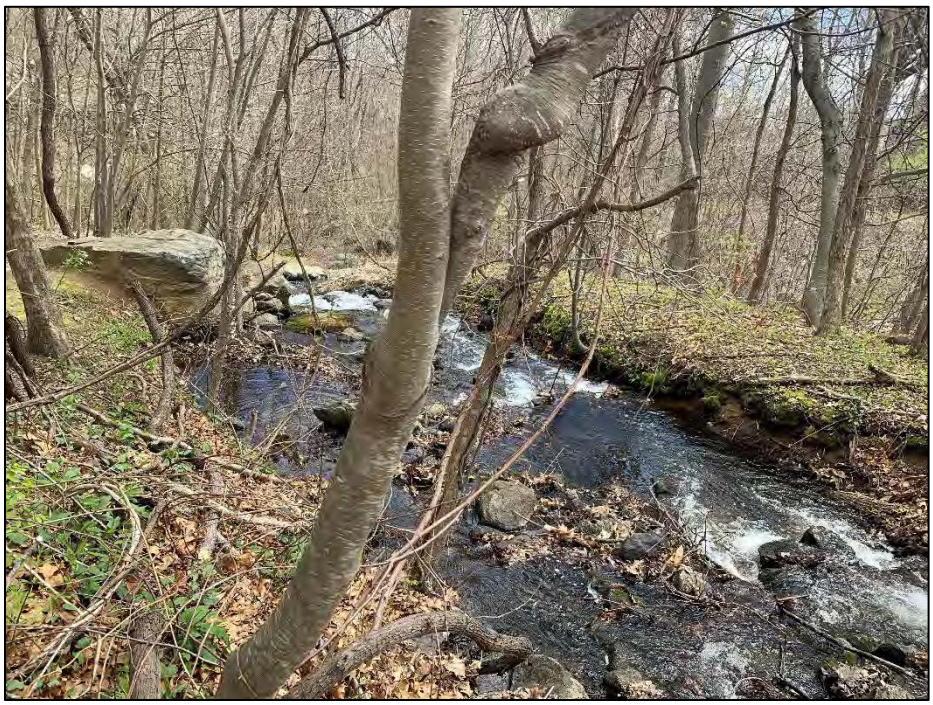

Photo No. 25.: Primary spillway downstream channel looking downstream.

Photo No. 26.: Low level outlet control access hatch.

Photo No. 27.: Low level outlet discharge opening. Note buildup of leaves against opening.

Photo No. 28.: Low level outlet discharge opening following initial gate opening. Note the muddy flow likely from one year of sediment buildup at the intake.

Photo No. 29.: Low level outlet discharge channel. Note deadfall cover within channel bottom.

Photo No. 30.: Low level outlet discharge channel following initial gate opening.

Photo No. 31.: Overview of the impoundment.

OLNEY POND
(IMPOUNDMENT)

PRIMARY SPILLWAY STOP
LOG CONTROL STRUCTURE

1–INCH GAP IN WALL

CONCRETE PANEL–FACED WALL, TYP.

PREVIOUSLY OBSERVED SMALL HOLES
(NOT OBSERVED THIS INSPECTION)

LOW LEVEL OUTLET
CONTROL VAULT

SIDEWALKS

1.5 INCHES SIDEWALK SETTLEMENT

SPALLING AND SHIFTED
ALONG CONCRETE

PREVIOUSLY OBSERVED DEVELOPING
HOLES (NOT OBSERVED THIS INSPECTION)

SPALLING AND SHIFTED ALONG CONCRETE

1–INCH SIDEWALK SETTLEMENT

END OF DAM

3+00 2+00 1+00 0+00

CREST

ONE WAY ROADWAY

MONITORING
WELL

END OF DAM

STUMP

SPILLWAY
DISCHARGE

VERTICAL DROP
IN CHANNEL

FLOW CHANNEL
OF LEAKAGE
WITH STAINING

LOW LEVEL OUTLET
DISCHARGE

SITE SKETCH

SCALE: 1"=30'±

NOTES AND LEGEND

1. PLAN DEVELOPED FROM NOTES TAKEN DURING THE INSPECTION AND AVAILABLE AERIAL IMAGERY FROM RIGIS. INFORMATION IS PROVIDED FOR REFERENCE PURPOSES ONLY.

◀(#) DENOTES APPROXIMATE LOCATION AND DIRECTION OF PHOTOGRAPH.

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SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING.

OLNEY POND DAM
RI DAM No. 102
LINCOLN, RHODE ISLAND
OWNER: RIDEM PARKS & RECREATION

REVISIONS:

PROJECT NO.:	22045.00/006
DATE:	MARCH 2022
SCALE:	AS NOTED
DESIGNED BY:	DMM
CHECKED BY:	DRC
DRAWN BY:	LMC
APPROVED BY:	JMB

SITE SKETCH

FIGURE NO.: 1

Y:\JOBS\22 Jobs\22045.00 RIDEM FY22 Dam Inspections\Task 006 – Olney Pond\DWG\FIG 1 SITE SKETCH.dwg