Pascoag Reservoir Upper Dam

VISUAL INSPECTION / EVALUATION REPORT

Dam Name:	**Pascoag Reservoir Upper Dam**
State Dam ID#:	**016**
Owner:	**Colleen Conley (Main Dam); Chad Dumouchelle (West Dike)**
Town:	**Burrillville**
Consultant:	**Pare Corporation**
Date of Inspection:	**September 30, 2025**

Prepared by:

PARE CORPORATION

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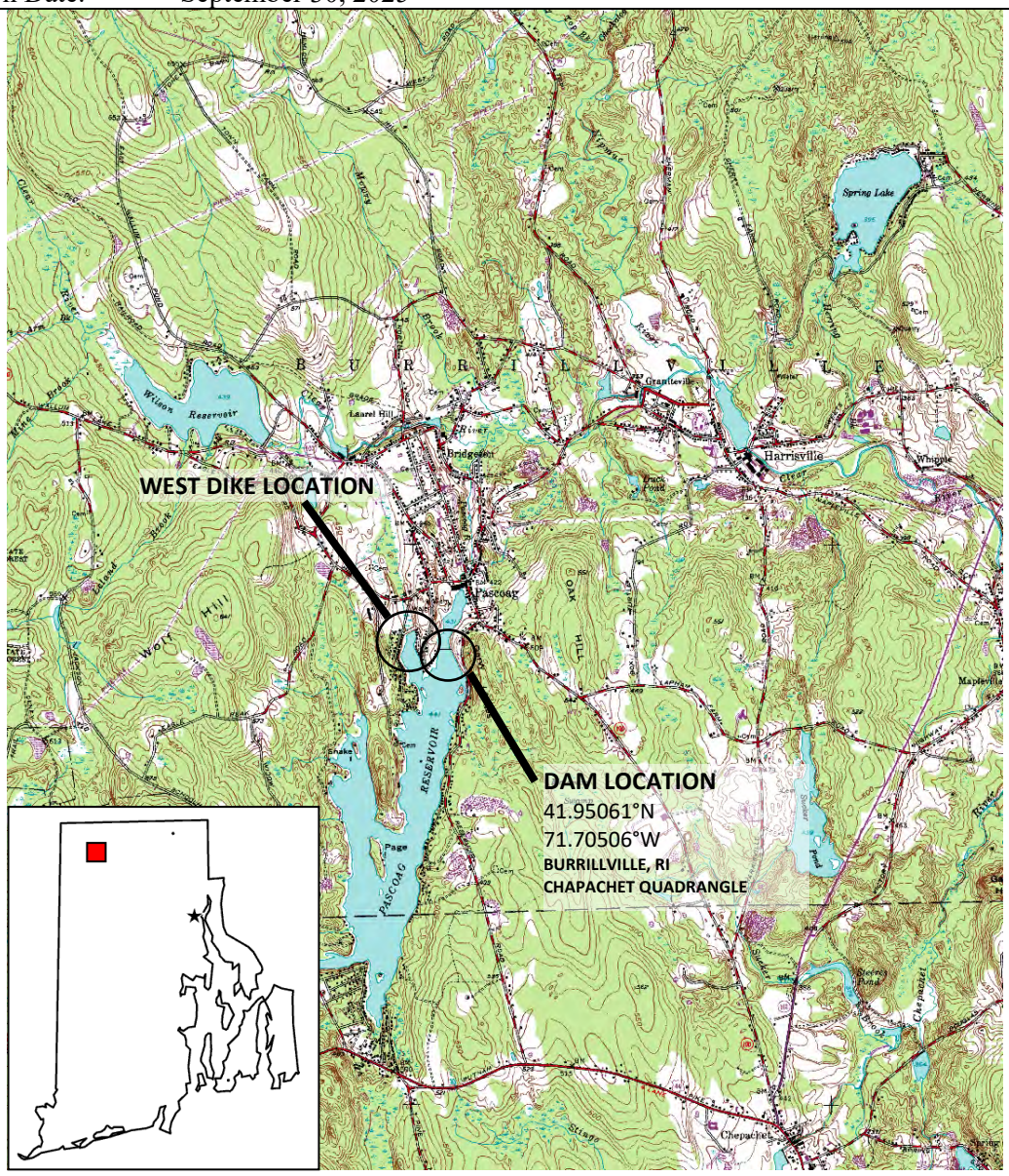
INSPECTION SUMMARY

Dam Name (No):	Pascoag Reservoir Upper Dam (016)
Location:	Burrillville
Hazard Classification:	High
Inspector:	David M. Matheson, P.E.
Inspection Date:	September 30, 2025



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.

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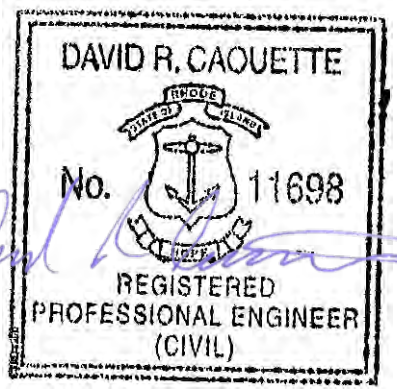

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1.0 DESCRIPTION OF PROJECT

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 Pascoag Reservoir Upper Dam and West Dike along the Brandy Brook in Burrillville, 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 a 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 for additional studies, repairs, 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 Pascoag Reservoir Upper Dam is located at the northern end of the impoundment near coordinates 41.95061ºN/71.70506ºW. The West Dike is located approximately 0.17 miles northwest of the dam near coordinates 41.95201ºN/71.70820ºW. The dam system is accessible via the north end of Lake Drive, located to the west (left) of the dam in Burrillville. Please refer to the inspection summary at the beginning of this report for a locus plan depicting the area of the dam and its immediate surroundings.

To reach the dam from Interstate I-295 in Rhode Island, take I-295 to Exit 12B (formerly exit 7B) for US-44 West/Putnam Pike towards Smithfield. After 9.5 miles, keep right onto RI-102 North/Putnam Pike/Victory Highway. After 0.1 miles, continue onto RI-100 North/Money Hill Road and continue to follow RI-100 North. After 3.2 miles, turn left onto Pascoag Main Street. After 0.1 miles, take a slight left onto High Street. After 0.1 miles, take a slight left onto Rock Avenue. After 0.4 miles take the first left onto Lake Drive. After approximately 300 feet, Lake Drive ends. The left abutment of the dam is approximately 100 feet to the right/east from the end of the roadway.

The West Dike can be reached from the main dam by heading south on Lake Drive. In about 400 feet, take a right onto Rock Avenue. In about 200 feet, take a left onto Shore Road and continue to the end, which is approximately 0.2 miles. The right abutment of the West Dike is accessible through the yard of a private residence on the left (116 Lake Shore Drive).

1.2.2 Owner/Caretaker

The Pascoag Upper Dam is owned by Colleen Conley. The West Dike is owned by Mr. Chad Dumouchelle. The Pascoag Reservoir Dam Management District (PRDMD) has responsibility for the operations and maintenance of the dam and dike. The following members of the PRDMD Board Members were either contacted or were present during the inspection:

Mark Farrar, President
mf@prdmd.org

Chad Dumouchelle, Vice President & Owner of West Dike
M: 401.309.1427
Email: cd@prdmd.org

Bud Leonhardt, Board Member
M: 978.580.1785
Email: Budleon54@gmail.com

Steve Engle, Board Member
Email: se@prdmd.org

1.2.3 Purpose of the Dam

The dam currently provides an environmental and recreational resource. As stated in previous reports, the dam was originally constructed to provide a continuous supply of process water and hydropower to downstream mills. Since the closing of the mills, the dam no longer serves this purpose.

1.2.4 Description of the Dam and Appurtenances

The following is a description of the dam based upon both field inspection and office review of available previous/historical files pertaining to the dam:

Dam

The Pascoag Reservoir Dam is an earthen embankment structure, approximately 475 feet long and 27 feet high, with an average crest width of 22 feet. The upstream slope has an average slope of

approximately 1.5H:1V and is protected by stone armor. The downstream slope has an average slope of approximately 1.5H:1V. Both the upstream and downstream slopes have areas of steeper slopes closer to 1H:1V.

The spillway structure is located near the left abutment of the embankment and is constructed of cut stone masonry. The spillway weir is a broad crested section, approximately 22 feet long. Discharges from the spillway flow via a roughly 70-foot long, 20-foot wide rocky discharge channel into a tailwater pond (Pascoag Reservoir Lower). A steel-trussed, timber-planked service bridge spans the spillway training walls and provides access to the embankment.

The low-level outlet (LLO) control structure is located on the upstream face of the dam, approximately 50 feet right of the spillway. The LLO intake is constructed of cast-in-place concrete over cut stone masonry. The control mechanism for the 36-inch diameter outlet pipe is a vertical slide sluice gate housed within a concrete block gatehouse atop the intake structure. Water is withdrawn from the impoundment through the 36-inch diameter pipe and is discharged through a submerged outlet at the base of the downstream slope of the dam into the tailwater pond. The intake approach opening has provisions for stoplogs for maintenance purposes.

West Dike

An approximately 240-foot long earthen dike (West Dike) is located in an adjacent cove of the reservoir west of the dam. The vegetated crest has an average width of 25 feet and is supported on its upstream and downstream sides by vertical upstream and downstream stone masonry walls. Two sections of the downstream wall have been buttressed with trap rock. There is one low section of the crest near the left abutment that would likely serve as an informal auxiliary spillway.

1.2.5 Operations and Maintenance

The dam and dike are operated and maintained by the Pascoag Reservoir Dam Management District (PRDMD). Operation and maintenance activities include annual clearing of vegetation from the dam embankment, maintaining and operating the low-level outlet gate to control pool levels and minimum baseflow requirements, and partially clearing vegetation from the West Dike.

1.2.6 Hazard Potential Classification

In accordance with current classification procedures, the RIDEM Office of Compliance and Inspection classifies the Pascoag Reservoir Upper Dam as a **High** hazard potential dam.

2.0 INSPECTION

2.1 Visual Inspection

The Pascoag Reservoir Upper Dam and West Dike were inspected on September 30, 2025. At the time of the inspection, temperatures were near 70°F with partly cloudy skies. Photographs to document the current condition of the dam were taken during the inspection and are included at the end of this report. The level of the impoundment appeared to be below normal operating levels (18 inches below the spillway crest). Underwater areas were not inspected as part of the inspection.

For reference purposes, a baseline was established along the crest of the dam embankment consistent with previous inspection reports. Station 0+00 was located at the left abutment and extended to Station 4+75 at the right abutment. A baseline was established along the West Dike with station D0+00 located at the fence line across the left portion of the dike and station D2+40 on the right abutment; the baseline was extrapolated to near D0-100 at the left abutment. Observations are reported in relation to their location along the baseline as noted herein.

2.1.1 General Findings

The following describes findings of the inspection completed at the Pascoag Reservoir Upper Dam and the West Dike:

2.1.2 Dam Embankment

The following was noted along the embankment portion of the dam.

Upstream Side

- The upstream slope is steep ranging from about 1.5H:1V to near 1H:1V.
- Between the left abutment (Sta. 0+00) and about 5 feet right of the primary spillway:
    - The upper 5 feet of the slope surface consists of cut grass and weeds with areas of bare ground.
    - Starting at about 3 feet above the waterline, the slope transitions to riprap which extends below the waterline. The riprap is up to about 18 inches in diameter and appears evenly distributed.
- Between about 5 feet right of the primary spillway and the low level outlet control structure:
    - The top 5 feet of the slope is generally covered with bare soil and varying scrub and grass vegetation.
    - Starting at about 5 feet below the crest, and about 10 feet above the waterline, the slope transitions to riprap which extends below the waterline. The riprap ranges from about 12 to 30 inches in diameter with adequate coverage to withstand wave action. The riprap along the right half of the slope has an irregular matrix; however, the larger stones in this area are more than adequate in protecting the slope.
- Between the low level outlet gatehouse and the right abutment:
    - From the crest to about 12 to 18 inches above the waterline, the slope surface consists of cut grass and weeds with areas of bare ground.

        - A surficial slide was observed near Sta. 2+50. The area extended from the top of the slope to above the riprap and was up to 2 feet wide. PRDMD board members present during the inspection stated these types of surficial slides occur often and are readily repaired.
    - Starting at about 12 to 18 inches above the waterline, the slope transitions to riprap which extends below the waterline. The riprap is up to about 18 inches in diameter and appears evenly distributed.

Crest

- The vertical alignment of the crest is irregular Except for the noted depression below, the irregular vertical alignment appears to be an as-built condition.
    - There is an irregular depression along the surface of the crest adjacent to and downstream of the left side of the low level outlet gatehouse. The surface elevation dips down towards the left side of the gatehouse towards the irregularly placed 12- to 30-inch riprap slope.
- The crest is generally covered with maintained grass mixed with weeds with the exception of bare soils along a narrow footpath along the centerline. Vegetation is generally healthy but with areas of thinning coverage.
- No holes, animal burrows, ruts, and puddling were observed across the length of the crest.

Downstream Slope

- From the left abutment to the primary spillway, the roughly 2.5H:1V slope is evenly covered with 4- to 6-inch riprap with no holes, erosion, or signs of unusual movement. The downstream face of the wall left of the spillway was not viewed as part of the field activities due to time constraints.
- From the primary spillway to near Sta. 3+00, the slope is steep at roughly 1.5H:1V and is covered with grass, weeds, vines, brush, briars, and hidden animal burrows.. From near Sta. 3+00 to the right abutment, the slope is near 2H:1V with cut down vegetation across the full length of the slope.
    - Historic sloughing along the lower quarter of the slope was apparent due to the dip continuously in the lower quarter of the slope surface along the full length.
    - Soft, wet soils are present along the lower quarter of the slope. While indicative of seepage, no areas of concentrated flow were observed. No staining was observed along the wet surfaces.
    - No animal burrows were observed.

2.1.3 Appurtenant Structures

Spillway

- The approach and discharge areas are generally clear of debris. Minor plant growth is present along the discharge channel, but not enough to significantly reduce capacity.
- The previously observed built up granite blocks on the left and right sides of the weir have been removed by the Owner since the 2023 inspection, resulting in a near-level weir system.
- The primary spillway training walls and control weir section appeared to have a regular alignment with tight joints and good mortar condition.

- Previously reported leakage through the spillway control section could not be evaluated because water levels were presently below the base of the control section wall (i.e., no differential head).
- The previously reported leakage from the base of the right training wall located approximately 10 feet downstream of the control section was not detected.
- Distinct areas of clear leakage were observed discharging from joints within the exposed rock outcrop located in the spillway discharge area between the training walls. The seepage flow rate was estimated to be less than 0.5 gallons per minute.

Low Level Outlet/Gatehouse

- The approach and discharge areas are free of debris; however, submerged portions could not be inspected.
- Joints in the control structure's CMU blocks are generally in good condition with adequate mortar coverage.
- The foundation wall and upstream training walls appear satisfactory with mortar in good condition.
- The trash rack, reportedly replaced between the 2020 and 2023 inspections, was not inspected.
- No deficiencies were observed within the gatehouse interior.
- The gate was operated during the inspection and functioned properly.
- The downstream headwall masonry is in fair condition, displaying normal alignment but areas of missing mortar and several misaligned stones were observed.
- The outlet end of the conduit was submerged and therefore could not be inspected.

2.1.4 West Dike

Upstream Side

- The upstream wall exhibits generally irregular alignment, with multiple locations showing missing or displaced stones within the joints.
- Several trees, approximately 8 to 15 inches in diameter, are growing near the top of the wall and through the wall face, contributing to displacement of the masonry.
- The wall face is bulging in several areas, with the most pronounced deformation occurring within approximately 15 feet of the right side.
- A collapsed section of the upstream wall is present between Sta. D0+30 and D0+35. The earthen slope behind this area is steep but appears to have reached a stable condition.
- Several years ago, the wall near the left abutment and a portion of the dike embankment were removed during installation of a town sewer line. This created a low area roughly 40 feet long and nearly the full height of the dike. A concrete boat ramp has since been installed within this low area. During a major flood event, elevated impoundment water levels would likely flow through this low area first, resulting in concentrated discharge. Other than established grass growth, there were no indications of any overtopping protection or erosion mitigation measures in this area.
- No evidence of animal activity was observed within the upstream wall system.
- A floating dock is present along the impoundment immediately upstream of the dike between STA 1+75 and 0+35. A concrete sidewalk and paver wall have are present adjacent to the upstream wall from the right abutment to STA 1+75.

Crest

- With the exception of the low area near the left abutment, the crest exhibits only a slightly irregular vertical alignment, likely reflecting the original construction.
- The crest surface is covered with a healthy stand of maintained grass.
- Numerous trees previously documented along the crest remain in place, ranging from small saplings to trees approximately 10 inches in diameter. Exposed surface root systems are common.
- Vertical alignment along the crest is variable, with undulating surface conditions observed throughout the length of the dike.
- The low area near the left abutment is approximately 4 feet lower than the typical crest elevation of the dike.
- The crest area left of the low section contains maintained grass, landscaped planting beds, and several mature trees, but no indications of overtopping or erosion mitigation measures were observed.

Downstream Side

- The downstream dry-laid stone wall is in condition similar to the upstream wall, displaying irregular vertical alignment, bulged wall faces, areas of sand discharge within joints, missing and displaced stones, and isolated areas of collapse.
- Two trap rock buttresses are present along the steepest sections of the wall at the locations of the two failures identified in the 2017 inspection.
- Yard waste continues to accumulate near the wall face close to the right abutment, obstructing visibility of the masonry.
- A downstream wetland complex is present beyond the intact portion of the downstream wall.
- The dike functions as a water-retaining structure during flood conditions. At the time of inspection, water levels upstream and downstream were similar, and the dike did not appear to be impounding water. This condition prevented an assessment for seepage.

2.1.5 Downstream Area

The area immediately downstream of the dam is the Pascoag Lower Reservoir, which is impounded by a structure (Union Mill Pond Dam RI015) approximately 1,800 feet downstream of the dam. The perimeter of the Pascoag Reservoir Lower is primarily wooded with light residential development within 350 feet of the shorelines. Immediately downstream of the control structure is an area of moderate commercial and residential development at the intersection of RI-100, RI-107, and Salves Avenue, a local road.

The area immediately downstream of the West Dike appears to be a valley containing a swamp with areas of standing water with Lake Shore Drive with light residential developments along the left side of the valley and wooded areas along the right side of the valley.

2.1.6 Reservoir Area

The dam is located at the northern end of the irregularly shaped impoundment, and the West Dike is located at the northern end of a cove west of the main dam. The immediate perimeter of the impoundment is generally developed with residential structures along the edges of the pond with

wooded hillside behind the residences and one roadway running parallel to the shoreline. Water enters the impoundment from the south and southwest.

2.2 Caretaker Interview

Members of the Pascoag Reservoir Dam Management District (PRDMD) were present during the inspection including Bud Leonhardt, Chad Dumouchelle, and Steve Engle. Information provided by these gentlemen were incorporated into this report.

2.3 Operation and Maintenance Procedures

A formal operations and maintenance manual for the dam was not available for review.

2.3.1 Operational Procedures

The PRDMD keeps a log of the low-level outlet gate operations and exercises the gate during storm flows to control impoundment levels. The log is kept on a clipboard within the gatehouse structure.

The low-level outlet gate is routinely operated to control pool levels and minimum baseflow requirements set forth by RIDEM. As indicated in previous reports, every winter a 5-foot drawdown is implemented and maintained by low level outlet operation. As confirmed during the present inspection, the gate is kept at least 2 inches open to pass the minimum required baseflow to the downstream channel.

2.3.2 Maintenance of Dam and Operating Facilities

Maintenance on the dam includes bi-annual vegetation mowing, periodic masonry repointing work, rodent control/trapping, general maintenance to the bridge and gatehouse structures, and maintaining the low-level outlet controls. Maintenance on the West Dike is limited to maintaining a clear surface on the crest.

2.4 Emergency Warning System

An Emergency Action Plan was developed and maintained by the Town of Burrillville for the Pascoag Reservoir Upper Dam in September 2018 as indicated by the Rhode Island Emergency Management Agency (RIEMA). The EAP was not available for review at the time of developing this report.

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

The following apparent deficiencies and potential dam safety concerns was noted during the inspection of the Pascoag Reservoir Upper Dam and West Dike:

Dam

1. A steep and irregular upstream slope with areas of exposed embankment soils and shallow slides (which are regularly addressed by the Owner).
2. A steep and irregular downstream slope with areas of potential historical sloughing along the toe, areas of possible seepage along the toe, and variable surface vegetation coverage throughout.
3. Leakage through the stone masonry of the spillway.
4. Unknown capacity of the dam to pass the spillway design flood event (½ PMF).

West Dike

1. Irregularly aligned, bulged, and partially failed stone masonry walls with questionable stability.
2. Numerous large trees along the length of the dike.
3. An intentional low area has been created at the left abutment and is now being used as a boat ramp that would function as an unregulated spillway, with no indication of overtopping or erosion protection.
4. Variable vertical alignment along the crest.

The following table lists the major deficiencies and recommended repairs (in italics) at the Pascoag Reservoir Upper Dam as stated within the 2023 Inspection Report and the conditions of the deficiencies as observed during the current inspection.

Table 3.1: Pascoag Reservoir Upper Dam Conditions Comparison

Previously Identified Deficiency/Recommendation	*Resolution or Current Condition / Recommendation*
1. Develop and implement a formal monitoring program and evaluation to further assess the leakage downstream of the spillway weir and observed ponded wet area near the toe of the spillway right training wall.	*Leakage remains present at the spillway and wet areas and soft areas remain present along nearly the full length of the downstream toe / Similar recommendation*
2. Continue regular inspection, maintenance, and operations at the dam.	*Ongoing / Similar recommendation*
3. Continue maintenance and removal of unwanted vegetation from the upstream slope left of the spillway; monitor surface erosion.	*Ongoing maintenance task / Similar recommendation*
4. Review conditions and potential relation between the previously observed hole and the sediment transport noted at the base of	*No holes or signs of unusual movement were observed along the downstream slope left of the spillway. The downstream wall face was not viewed as part of this*

Table 3.1: Pascoag Reservoir Upper Dam Conditions Comparison	
Previously Identified Deficiency/Recommendation	***Resolution or Current Condition / Recommendation***
the downstream wall left of the spillway.	*fieldwork / Continue monitoring.*
5. Fill areas of erosion along the embankment slopes.	*Ongoing maintenance task that is being completed by the caretaker / Similar recommendation*
6. Fill the dam crest to a uniform elevation while maintaining the design elevation.	*The depression left of the gatehouse has been filled*
7. Trap and remove burrowing animals from the embankment of the dam and fill holes.	*Completed (and ongoing). No animal burrows were observed during the inspection.*
8. Complete regular mortar maintenance along the spillway structures.	*Ongoing maintenance task / Similar recommendation*
9. Continue gatehouse maintenance including replacing the stop log stanchions at the low level outlet approach.	*It is unknown if the stop log stanchions have been replaced / Ongoing maintenance items*
10. Grub stumps and roots from the embankment.	*Ongoing maintenance task / Similar recommendation*
11. Complete seepage analyses of the dam to evaluate the wet areas along the downstream slope.	*No apparent change / Similar recommendation*
12. Restore the capacity of the primary spillway by saw cutting and removing the excess granite blocks from within the spillway opening to establish a clear rectangular channel.	*Completed*
13. Complete stability analyses to evaluate the stability of the downstream and upstream slopes of the dam.	*No apparent change / Similar recommendation*
14. Based on the results of the seepage and slope stability analysis; design and implement repairs to the dam embankment	*No apparent change / Similar recommendation*

The following table lists the major deficiencies and recommended repairs (in italics) at the West Dike as stated within the 2023 report and the conditions of the deficiencies as observed by Pare during the current inspection.

Table 3.2: West Dike Conditions Comparison	
Previously Identified Deficiency/Recommendation	***Resolution or Current Condition***
1. Clear the trees from the dike embankment, pull the stumps, and grub the roots.	*No apparent change / Similar recommendation*
2. Regrade the crest and reseed.	*No regrading completed; / Similar recommendation for regrading*
3. Complete stability analyses of the dike.	*No apparent change / Similar recommendation*

4.	Implement repairs to both the upstream and downstream walls.	*No apparent change / Similar recommendation*
5.	Evaluate the impact of the breach near the left abutment.	*No apparent change / Similar recommendation*

The following recommendations 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.

3.2 Recommendations

The following present additional studies, routine and recurrent operations and maintenance activities, and repairs recommended to address deficiencies noted during the inspection and the completion of this report. Based on the current inspection, the reported deficiencies along the dam and west dike embankments generally remain similar to that previously reported; however, the Owner has implemented improvements at the spillway. Therefore, the recommendations presented in Pare's 2023 inspection report remain valid as paraphrased below. The recommendations provided below should be implemented in accordance with general dam safety practice. Further, if left unaddressed, many of the conditions identified above will continue to deteriorate and could compromise the future safety of the dam and appurtenant structures.

<u>Main Dam</u>

1. Continue to develop, refine, and implement a formal monitoring program and evaluation to further assess the observed vortices, large flow of leakage, and observed ponded wet area near the toe of the spillway right training wall and flow through the base of the wall 10-feet from the downstream end of the training wall. The program should include procedures for locating sources of flow and recording observed flow rates and ponded levels, in relation to varying levels of the impoundment, and monitoring the wet areas for indications of sediment transport and volume of transported soil.
    a. Leakage conditions appear typical with either flow through open joints of masonry and/or stone masonry founded on bedrock as opposed to flow through embankment soils. Continued monitoring is still recommended; however, a concrete approach slab tied into bedrock or other means of leakage deterrent may be needed to address the ongoing leakage.

2. Continue regular inspection, maintenance, and operations at the dam.
    a. Extend riprap further up the upstream slope. Current riprap coverage is limited to just above the normal summer pool levels and it appears that there is limited capacity for the riprap to adequately dissipate energy from large waves that could develop during high winds especially in combination with a rise in impoundment elevations.

3. Continue to monitor and fill areas of erosion along the embankment slopes.

4. Continue to regularly trap and remove burrowing animals as needed from the embankment of the dam. Properly fill any burrows with compacted fill material.
    a. Consider installing a stone surface (i.e., riprap, etc.) along the entire surface of the slope to not only deter continued burrowing activity, but to aid in apparent slope stability concerns.

This should be completed in conjunction with Item #11 and #12 to address all three potential concerns with one approach.

5. Complete regular mortar maintenance along the spillway structures.

6. The low level outlet downstream headwall was found with shifted stones and minor gaps. Complete maintenance-level repairs including resetting the stones and chinking work.

7. If not already completed, replace the stop log stanchions at the low level outlet approach.

8. Grub stumps and roots from the embankment. Stumps greater than 6 inches in diameter need to be removed, the root systems grubbed from the cleared areas and the resulting holes promptly filled with suitable compacted material. Depending upon the type of tree 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. The impacts to the embankment should be evaluated by a registered professional engineer prior to grubbing roots. ***Given the conditions prevalent at the time of the work, instability, seepage or piping conditions could develop if not undertaken in a controlled manner.***

9. Complete an evaluation of the wet areas along the downstream slope to determine the source of these wet areas. Based on the results of this evaluation, install a blanket drain and/or toe drain designed to control embankment seepage.

10. Complete stability analyses to evaluate the stability of the downstream and upstream slopes of the dam. In order to complete these analyses, the completion of subsurface investigations will likely be required to assess the current composition of the embankment soils. Based on the results of the slope stability analyses, regrade the dam's upstream and downstream embankment slopes to provide stable sections complying with current design standards.

<u>West Dike</u>

1. Clear the trees from the dike embankment. Significant root systems should also be pulled, and the resulting holes properly filled. The impacts to the embankment should be evaluated by a registered professional engineer prior to grubbing roots. *Given the conditions prevalent at the time of the work, instability, seepage or piping conditions could develop if not undertaken in a controlled manner.*

2. Regrade the crest to a level section with compacted fill; reseed to establish grass growth.

3. Complete stability analyses to evaluate the observed bulges and overall condition of the upstream and downstream walls. In order to complete these analyses, the completion of subsurface investigations will likely be required to assess the current condition of the embankment soils.

4. Based on the results of the stability analyses, repair both the upstream and downstream walls. Reset the displaced stones as necessary to form vertically and horizontally regular walls. This may include providing additional chinking stones, repointing, or installing a stone buttress in front of the walls for added stability.

5. Evaluate the impact of the low area in the embankment left of the fence line; determine the necessity to formalize this area to function as an auxiliary spillway or to restore the apparent original dike section across this area. Implement measures as determined to be required.

6. Remove the lawn debris piled up against the downstream wall near the right abutment to establish a clear view of the wall and surface within 15 feet downstream of the wall.

General

1. Implement a program of regular inspection and monitoring of the dam. As the dam is currently classified as a high hazard potential dam, the completion of a formal visual inspection by a RI registered professional engineer familiar with dam engineering is recommended every 2 years.

2. Complete detailed hydrologic and hydraulic (H&H) analyses to assess if the dam has inadequate spillway capacity and evaluate the current level of flood protection afforded to the downstream area. There are no known studies determining the spillway capacity to pass the design storm event. The H&H shall also assess as to whether the low area at the dike will act as an unregulated spillway and what storm event would cause the section to overtop. Pursuant to the Rules and Regulations for Dam Safety, Inadequate spillway capacity for a High hazard potential dam is defined as inability to safely accommodate the ½ probable maximum flood (½ PMF storm event)[1]. The detailed H&H analysis should be completed using generally accepted hydraulic modelling software for dam safety (HEC-RAS, HEC-HMS, HydroCAD, etc.) to review spillway capacity and breach the dam to develop updated inundation mapping. The analysis should account for the routed inflow that utilizes the full storage capacity within the impoundment and drainage area. Analysis should also consider potential build out within the drainage area as well as inflows from storm drainage systems that may be outside of the delineated drainage area but have outfalls inside of the drainage area.

3.3 Alternatives

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: As an alternative to implementing 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 removal 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

[1] It should be noted that RIDEM dam safety regulations (250-RICR-130-05-1) were amended as of May 1, 2025, to include expanded definitions for inadequate spillway capacity.

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.

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Photo No. 1.: Upstream slope as viewed from the left abutment looking right.

Photo No. 2.: Upstream slope as viewed from left of the primary spillway looking right. Note areas of thinning grass and bare surfaces along the upper part of the slope.

Photo No. 3.: Upstream slope as viewed from the crest near STA 2+00 looking left. Note area of shallow sliding failure (circle).

Photo No. 4.: Upstream slope as viewed from the crest near STA 2+60 looking left. Note areas of unraveled grass and shallow sliding failures.

Photo No. 5.: Upstream slope as viewed from the crest near STA 4+10 looking left. Note typical steep slopes and sparse erosion protection.

Photo No. 6.: Crest as viewed from the left abutment.

Photo No. 7.: Crest as viewed from right of the primary spillway looking right.

Photo No. 8.: Crest and downstream slope as viewed from near STA 3+00 looking left.

Photo No. 9.: Overview of the crest looking towards the right abutment as viewed from near STA 4+10 looking right.

Photo No. 10.: Downstream slope as viewed from the left abutment looking right.

Photo No. 11.: Downstream slope as viewed from the primary spillway discharge channel looking left.

Photo No. 12.: Downstream slope as viewed from near STA 1+00 looking left. No riprap was observed up to the primary spillway; however, no erosion is noted.

Photo No. 13.: Downstream slope as viewed from right of the low level outlet looking right. Note the steep slope, and the damp and soft toe as identified by the greener vegetation.

Photo No. 14.: Downstream slope as viewed from near STA 3+00 looking right. Note wet area along toe in the immediate foreground.

Photo No. 15.: Downstream slope as viewed from the crest near STA 4+10 looking at the right abutment.

Photo No. 16.: Overview of primary spillway as viewed from downstream looking upstream and slightly left, including the spillway's left wall, the weir wall, and catwalk.

Photo No. 17.: Primary spillway downstream right wall. Note area of historic leakage (arrow).

Photo No. 18.: Primary spillway upstream right wall.

Photo No. 19.: Primary spillway discharge channel.

Photo No. 20.: Low level outlet structure as viewed from the primary spillway looking right.

Photo No. 21.: Caretakers demonstrating the operability of the low level outlet gate. Photo looking upstream and slightly right.

Photo No. 22.: Low level outlet downstream headwall. Note shifted wall stones and open joints, typical throughout the discharge structure.

Photo No. 23.: Low level outlet discharge area.

Photo No. 24.: Tailwater pond (Pascoag Reservoir Lower) as viewed from left of the primary spillway. Note clear leakage out of bedrock joint (arrow).

Photo No. 25.: Impoundment as viewed from the primary spillway approach. Note bedrock along the approach below water.

Photo No. 26.: West Dike - Upstream side as viewed from near STA D0+00 looking right.

Photo No. 27.: West Dike - Upstream side as viewed from near STA 0+90 looking left.

Photo No. 28.: West Dike - Upstream side as viewed from near STA 0+90 looking right.

Photo No. 29.: West Dike - Upstream side as viewed from near STA 1+75 looking left.

Photo No. 30.: West Dike - Upstream side as viewed from near STA 1+75 looking right.

Photo No. 31.: West Dike - Crest as viewed from near STA D0+00 looking left. Note the area of the intentional breach at the left abutment

Photo No. 32.: West Dike - Crest as viewed from near STA D0+00 looking right.

Photo No. 33.: West Dike - Crest as viewed from near STA D1+00 looking left.

Photo No. 34.: West Dike - Crest as viewed from the right abutment looking left.

Photo No. 35.: West Dike - Downstream side as viewed from near STA D0+00 looking right.

Photo No. 36.: West Dike - Downstream side as viewed from near STA D0+90 looking right. Note the trap rock buttress.

Photo No. 37.: West Dike - Downstream side as viewed from near STA D0+90 looking left.

Photo No. 38.: West Dike - Downstream side as viewed from near STA D1+50 looking right. Note bulged stone wall.

Photo No. 39.: West Dike - Typical gaps measured within the downstream stone wall. Photo of a 24 inch deep gap measured near STA 1+50.

Photo No. 40.: West Dike - Sand discharge within gaps of downstream wall as viewed from near STA 2+00 looking right.

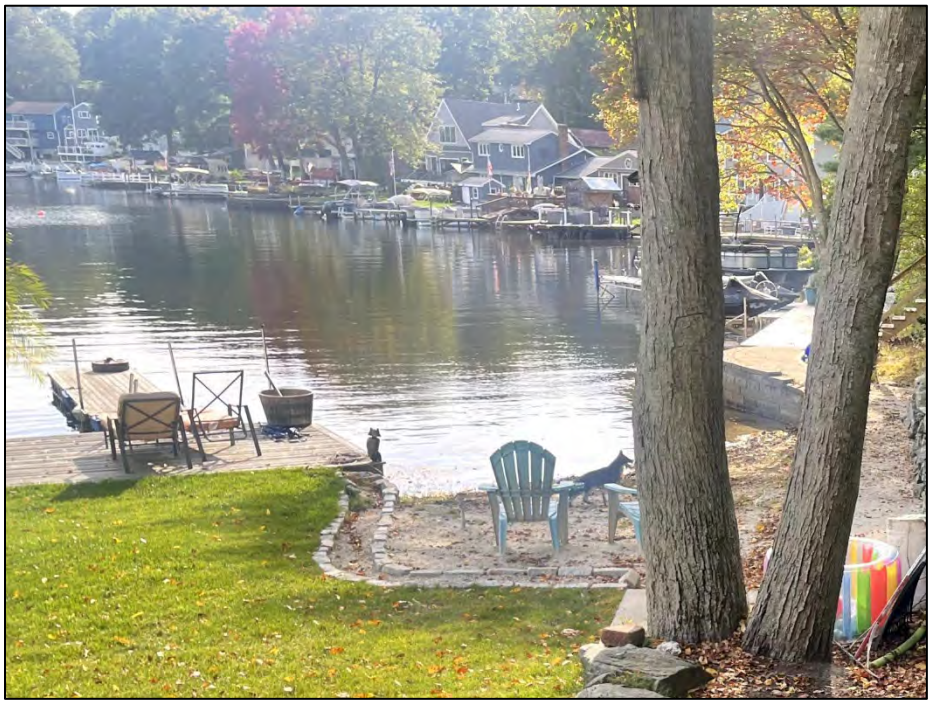
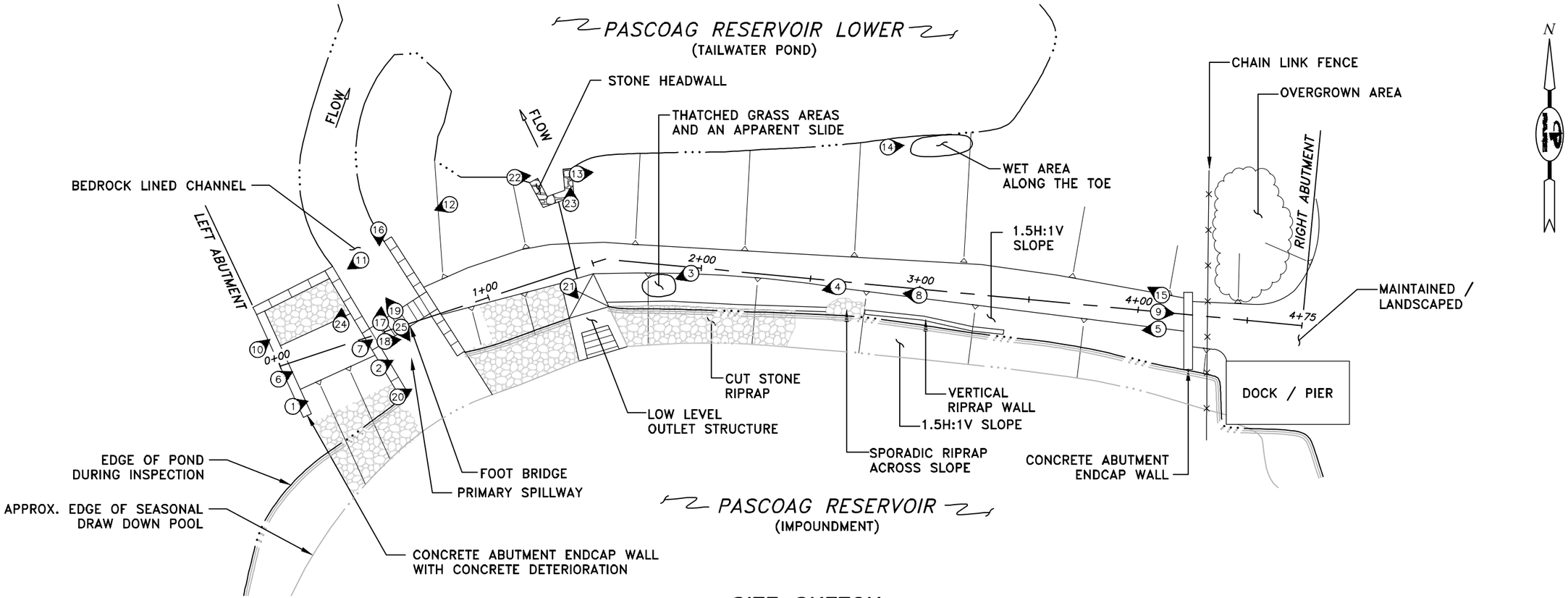
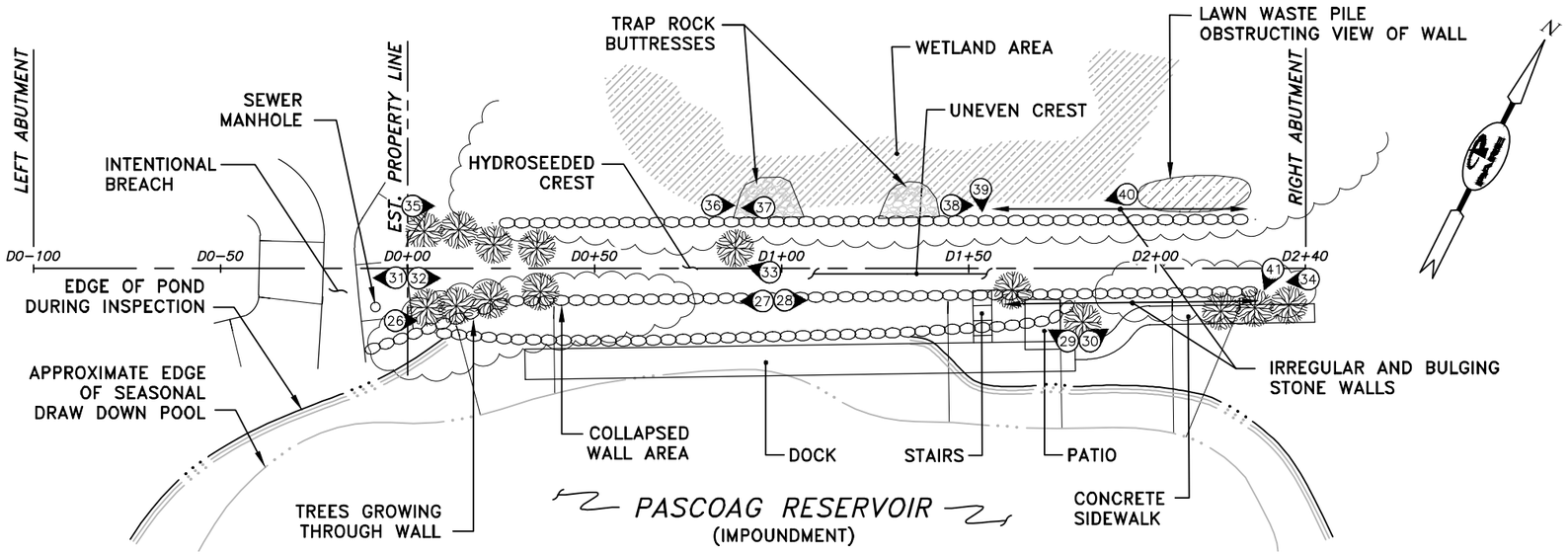


Photo No. 41.: West Dike - Impoundment as viewed from the right abutment.



SITE SKETCH

SCALE: 1"=50'±



WEST DIKE SKETCH

SCALE: 1"=40'±

NOTES AND LEGEND

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

(#) DENOTES APPROXIMATE LOCATION AND DIRECTION OF PHOTOGRAPH.

1+00 BASELINE AND STATIONING

PARE CORPORATION
www.parecorp.com

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

PASCOAG RESERVOIR UPPER DAM
RI DAM #016
BURRILLVILLE, RHODE ISLAND
CHAD DUMOUCHELLE

REVISIONS:		

PROJECT NO.:	25122.00/001
DATE:	SEPTEMBER 2025
SCALE:	AS NOTED
DESIGNED BY:	DMM
CHECKED BY:	DRC
DRAWN BY:	LMC
APPROVED BY:	ARO

SITE SKETCH

FIGURE NO.: 1

Y:\JOBS\25 Jobs\25122.00-RIDEM-2025 Dam Inspections Northern RI-RI\001 - 016 Pascoag Reservoir Upper\Report\FIG 1 SITE SKETCH.dwg