

Dam Safety Inspection Report

Lower Lake Miramichi Dam

Dam I.D. 0017

Section 32, T17N, R08W, Osceola County

Prepared for Owner/Operator:

Lake Miramichi Property Owners Association

2406 Miramichi Drive

Evart, Michigan 49631

December 10, 2023

P&N 2230855

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Section 32, T17N, R08W, Osceola County

PREPARED FOR OWNER/OPERATOR: Lake Miramichi Property Owners Association (LMPOA)

HAZARD POTENTIAL CLASSIFICATION: Low

INSPECTION DATE: October 31, 2023

REPORT DATE: December 10, 2023

DAM'S CONDITION: Satisfactory

INSPECTED AND PREPARED BY: Eric E. Seguin, PE
Michigan License No. 6201055666
Prein&Newhof
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Cadillac, MI 49601
231-468-3456

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1 INTRODUCTION

The purpose of this inspection report is to evaluate the structural condition and hydraulic capacity of this dam as required by Part 315, Dam Safety, and Part 307, Inland Lake Levels, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This report is limited to a discussion of observations based on a visual investigation and review of any previous reports, plans, and data that are available. This report should not be considered an in-depth engineering investigation.

This dam was inspected by Eric Seguin, P.E. of Prein&Newhof, in accordance with Section 315.18 (4) of Part 315 in response to a request from the owner of the dam. All references to “right” and “left” in this report are based on the observer facing downstream.

2 CONCLUSIONS AND RECOMMENDATIONS

The Lower Lake Miramichi Dam is in satisfactory condition. There are no imminent structural or hydraulic deficiencies that could lead to failure of the dam.

The following recommended actions are listed by priority.

1. Monitor the inlet access to the primary and overflow spillways monthly and maintain them in a clear condition at all times.
2. Place new riprap in areas of erosion due to wave action on the upstream embankment.
3. Remove all brush and trees from the upstream and downstream embankments. This work should be completed annually.
4. The dam and its appurtenances should be monitored on a quarterly basis and a journal of regular maintenance, repair and observances kept. This should include observances of water level, looking for changes in the gravel road surface for possible settlement areas on crest of embankment, looking for issues at the culvert outlets, looking for unwanted animal activity, looking for obstructions in the outlet pipes and pictures of the structure to document changes over time.
5. Consider installing a staff gauge near the control structure to identify the current water level.
6. Monitor the condition of the outlet pipe annually.
7. Riprap at the bottom of the outlet pipe/stilling basin should be inspected and replaced as necessary.

It is recommended LMPOA develop an Emergency Action Plan (EAP) for this dam. Having an EAP in place will allow you to identify conditions that could lead to dam failure and pre-plan coordination of necessary actions by the LMPOA in the event of a potential failure.

3 PROJECT INFORMATION

3.1 Description of Dam, Outlet, Spillway and Other Principal Features

The Lower Lake Miramichi Dam is located on Stone Creek in the southeast quarter of section 32, T17N, R8W, in Evert Township, Osceola County, Michigan. The dam is owned, operated, and maintained by the Lake Miramichi Property Owners Association (LMPOA). The location map of the dam is shown in the Appendix A.

The dam consists of an approximately 2100 foot long earthen embankment, a drop inlet spillway structure and two auxiliary emergency spillway culvert outlets. The top of the embankment is a gravel roadway.

Embankment crest width ranges from approximately 30 to 40 feet. The upstream embankment slope is 1V:5H and the downstream embankment slope varies from 1V:2H to 1V:4H. The dam is approximately 19 feet high in the area of the principal spillway.

The service spillway is a drop inlet structure. The concrete inlet box measures 11.2 feet by 11.2 in plan. It has a 4-foot wide Lift gate and wooden stop log bay. After water drops over the stop logs, the water discharges through a 48-inch diameter corrugated metal pipe (CMP). Outflow drops into a stone lined stilling basin. The stop logs and the interface between the 48" pipe and the downstream bank have been reinforced using concrete since the last inspection.

The dam structure also has two auxiliary emergency culvert outlets. Both are located in the left embankment. The first outlet is located near the middle of the dam and consists of two 42-inch wide by 29-inch high pipe arch CMP's. Field stone riprap protection is on the upstream and downstream side of the outlet. The twin culverts are approximately 50 feet long.

The second auxiliary outlet is located more southerly along the left embankment. The outlet consists of a 24" X 36" pipe-arch CMP culvert. The embankment on the upstream side at the inlet is protected with field stone riprap. The outlet discharges approximately 20 feet beyond the toe of the embankment. The length of the pipe is approximately 65 feet.

The dam was designed in 1961. Record drawings were prepared in 1974 by Mid-Michigan Engineering of Big Rapids, Michigan. A copy of these drawings was included in the 1998 inspection report. Design, geotechnical, maintenance, construction, and operating data are very limited. Available maintenance and operating data are kept on the file at the Association offices.

Photographs taken on the date of inspection are provided in Appendix E with a sketch of the riser in Appendix D.

Record plans of the dam were not available at the time of the inspection, so they have not been included in the appendices.

3.2 Purpose of the Dam

The dam impounds a 216-acre reservoir lake which is used for recreational purposes by the Lake Miramichi residents.

3.3 Summary of Available Background Information

Limited information is available in files located in the Michigan Department of Environment, Great Lakes, and Energy (MDEGLE), Water Resources Division, Hydrologic Studies and Dam Safety Unit. Other information is available at the LMPOA Office.

Several inspection reports are available for inspections made since inception of the Dam Safety Program. No operating history is available for this dam.

3.4 Reference to Past Inspections

This dam was inspected and reports are available for the following years:

2018	OHM Advisors
2013	Gary Croskey, P.E
2008	Gary Croskey, P.E
2003	Gary Croskey, P.E
1998	Gary Croskey, P.E
1993	Gary Croskey, P.E

4 SITE INVESTIGATION

4.1 Embankment Observations

The embankments are in good condition overall. Previous dam inspections noted evidence of animal burrowing. There was no evidence of burrowing in this inspection. As a normal course of maintenance, any areas of minor erosion or holes from previous animal burrowing activity and other forms of erosion should be filled with topsoil and seeded with grass.

There was evidence of minor seepage at the time of the inspection. Cattails were observed at the toe of the embankment but may be due to the adjacent wetlands. The current seepage is not of concern because it is typical of what has been noted in the past and no movement of embankment soil was noted in association with the seepage. Monthly monitoring to observe any changes to the seepage is recommended.

There are no trees or brush present on the downstream embankments. The LMPOA has been diligent about removal of trees and brush from the embankment. Removal of trees and brush should be done at least annually.

The upstream embankment is protected with field stone rip-rap, and it generally in good condition. There are a few areas southern part of the embankment that some erosion due to waves. These areas should be armored with riprap to prevent further erosion.

The LMPOA has been placing soil from homeowners along the left side of the downstream embankment. The placed soil compacted using a bulldozer. The LMPOA intends to seed this material in the spring. Placing this soil on the downstream side has shallowed the slope significantly in some areas.

4.2 Spillway Observations

The spillway and weir gate are in operable condition.

The service spillway is a drop inlet structure. The concrete inlet box measures 11.2 feet by 11.2 in plan. It has a 4 foot wide lift gate and wooden stop log bay. After water drops over the stop logs, the water discharges through a 48-inch diameter corrugated metal pipe (CMP). Outflow drops into a stone lined stilling basin. The stop logs and the interface between the 48" pipe and the downstream bank have been reinforced using concrete since the last inspection.

5 STRUCTURAL STABILITY

There were no visible indications of any significant structural stability problems. Without knowing the full geotechnical background information for the construction materials and the actual construction practices, an in-depth structural stability evaluation is beyond the scope of this inspection.

6 HYDRAULICS AND HYDROLOGY

Flood discharge values for the Lower Lake Miramichi Dam were provided by the Hydrologic Studies and Dam Safety Unit of the Land and Water Management Division of the MDEQ. See the Appendix for a copy of the information from MDEQ as well as the calculated structure flow rating curve from previous reports.

Tributary to Big Stone Creek at Lower Lake Miramichi Dam, Dam ID 17, Section 32, T17N, R8W, Evert Township, Osceola County, has a drainage area of 3.6 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 10%, 2%, 1%, 0.5%, and 0.2% chance peak flows are estimated to be 250 cubic feet per second (cfs), 480 cfs, 640 cfs, 780 cfs, and 1000 cfs, respectively. The 1% chance flood volume is estimated to be 500 acre-feet. (Watershed Basin No. 22 Muskegon).

The dam is rated as a low hazard dam, which must safely pass the 1% chance peak flood flow, (100 year flood). The MDEQ has identified the 1% chance design discharge for this dam to be 640 cubic feet per second, (cfs), with a corresponding 1% chance flood volume estimated to be 500 acre-feet.

Hydraulic calculations were completed during the 1993 inspection report to identify the capacity for the principal spillway structure. These calculations were updated in the 2018 report to reflect the new CMP culverts placed in the left side of the embankment. The revised calculations were reviewed, validated and reused in this report. Summaries of these calculations can be found in Appendix D.

If the normal water level is assumed to be 1066.2 feet and the corresponding earthen dam embankment low point elevation is 1069.8, then the 216 acre lake can store the 500 acre feet flood volume without discharging any flood waters and will maintain approximately 1.2 feet of freeboard, with an estimated water elevation of approximately 1068.6 feet.

If the discharging capabilities of the three separate spillways are factored in, then the Lower Lake Miramichi Dam structure system can pass an estimated 210 cfs of flood waters and store the remaining flood waters in the lake, while conservatively maintaining at least 2 feet of freeboard. Therefore, the Lower Lake Miramichi Dam structure system has adequate capacity to store and pass the 1% chance peak flood flow.

7 OPERATION AND MAINTENANCE

In the past, there has not been a formal operation and maintenance program developed for the Dam. It is a good idea that all dam structures have a formal Operations and Maintenance Manual.

The dam is owned and operated by the Lake Miramichi Property Owners Association. General maintenance should consist of mowing the grasses and weeds on the embankments and removing any brush, seedlings or trees that may grow. The mowing of the grasses and weeds will allow for easier visual inspection of the entire structure. The general visual inspection of the embankments, structure, and appurtenances should be performed on a semi-annual basis. It is recommended that an operation and maintenance log be kept so that any changes can be easier identified over time. A written record should be kept of inspections made by owners, including, a log book of pictures of the structure and records of maintenance items performed.

Appendix A

Location Map

DAMI.D. 0017
LOWER LAKE MRAMCHI DAM

EVART TOWNSHIP

LAKE MIRAMICHI

CHIPPEWA TOWNSHIP

90TH AVE

BALSAM RD

95TH AVE

J:\GIS_Client\Osceola-GD\2230855_Lake Miramichi HOA\2230855_Dam Location Map.aprx - 10/31/2023 7:53AM - edampsey



SCALE: 1" = 1,000'

LAKE MRAMCHI PROPERTY OWNERS ASSOCIATION
Section 32, T17N, R08W, Osceola County, MI
LOWER LAKE MRAMCHI DAM
DAMI.D. 0017
Prein&Newhof
2230855

Appendix B

EGLE Discharge Correspondence

Eric Seguin

From: EGLE-wrd-qreq <EGLE-wrd-qreq@michigan.gov>
Sent: Tuesday, November 28, 2023 9:56 AM
To: Eric Seguin
Subject: [External] RE: Flood or Low Flow Discharge Request

Follow Up Flag: Flag for follow up
Flag Status: Flagged

Caution: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. When in doubt, contact your IT Department.

We have processed the discharge request submitted by email on October 30, 2023 (Process No. 20230571), as follows:

Tributary to Big Stone Creek at Lower Lake Miramichi Dam, Dam ID 17, Section 32, T17N, R8W, Evart Township, Osceola County, has a drainage area of 3.6 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 10%, 2%, 1%, 0.5%, and 0.2% chance peak flows are estimated to be 250 cubic feet per second (cfs), 480 cfs, 640 cfs, 780 cfs, and 1000 cfs, respectively. The 1% chance flood volume is estimated to be 500 acre-feet. (Watershed Basin No. 22 Muskegon).

Please include a copy of this letter with your inspection report or any subsequent application for permit. These estimates should be confirmed by our office if an application is not submitted within one year. If you have any questions concerning the discharge estimates, please contact Ms. Susan Greiner, Hydrologic Studies and Floodplain Management Unit, at 517-927-3838, or by email at: GreinerS@michigan.gov. If you have any questions concerning the hydraulics or the requirements for the dam safety inspection report, please contact Mr. Michael Size of our Dam Safety Unit at 989-619-4295, or by email at: SizeM@michigan.gov.

From: EGLE-Automated <EGLE-Automated@michigan.gov>
Sent: Monday, October 30, 2023 8:29 AM
To: EGLE-wrd-qreq <EGLE-wrd-qreq@michigan.gov>
Subject: Flood or Low Flow Discharge Request

Requestor: Eric Seguin
Company: Prein&Newhof
Address: 100 E Chapin Street, Suite A
City/State: Cadillac/MI
ZIP Code: 49601
Phone: 2314683456
Date: 10/30/2023
10 percent
2 percent
1 percent
0.5 percent
0.2 percent
Contact Agency:

Contact Person:

Watercourse: Tributary to Big Stone Creek

Local Name:

County: Osceola

City/Township: Evert Township

Section: 32

Town: 17N

Range: 08W

Location: Lower Lake Miramichi Dam, Located on Miramichi Rd. Dam ID #17 USGS Quad: Chippewa Lake North

Lat:43.81852705, Long:-85.29094443 Previous Flow Request File#20180414, Reference#H-98324-1

FFR1: Dam

Email: eseguina@preinnewhof.com

Appendix C

Sketches (from previous reports)

J:\GIS_Client\Osceola-GD\2230855_Lake Miramichi HOA\2230855_Dam Location Map.aprx - 10/31/2023 9:41 AM - edampsey



SCALE: 1" = 400'

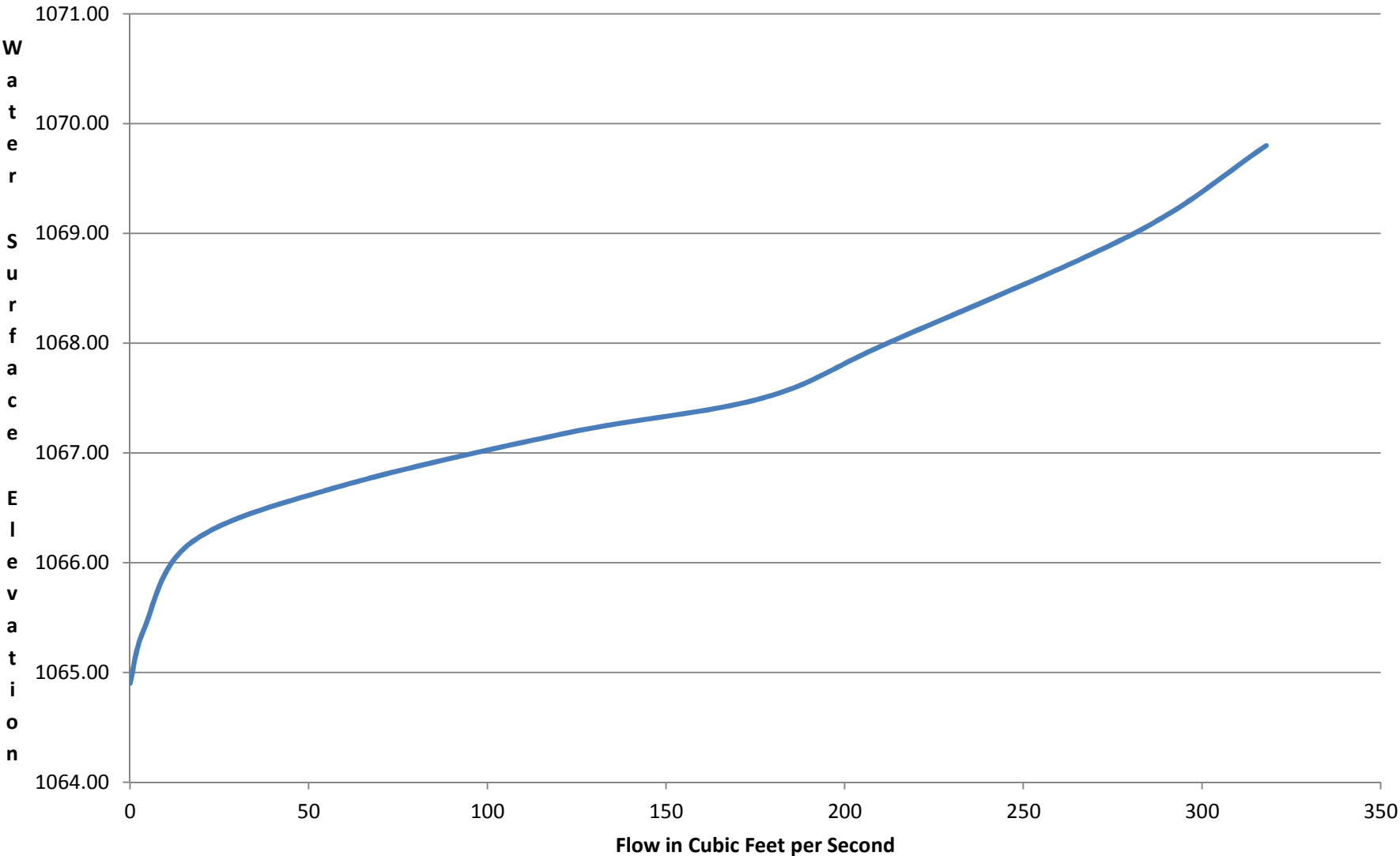
LAKE MIRAMICHI PROPERTY OWNERS ASSOCIATION
Section 32, T17N, R08W, Osceola County, MI
DAMPLAN VIEWSKETCH
DAMI.D. 0017
Prein&Newhof
2230855

Appendix D

Hydraulic Computations (from previous reports)

Lower Lake Miramichi Discharge Rating Table				
Elevation (feet)	Main Spillway Flow (cfs)	Middle Culverts Flow (cfs)	Left Culvert Flow (cfs)	Total Flow (CFS)
1064.90	0			0
1065.40	4			4
1066.18	17	0		17
1066.68	49	8		57
1067.18	101	18	3	122
1067.50	140	30	7	177
1068.00	150	48	14	212
1069.00	165	86	30	281
1069.80	170	108	40	318

Lower Lake Miramichi Dam Structure Discharge Rating Curve



Appendix E

Photographs Taken 10/31/2023



Figure 1: Downstream Embankment Looking Left from Outlet



Figure 2: Inlet Pipe in Lake Miramichi



Figure 3: Concrete Poured at outlet pipe/embankment interface



Figure 4: Downstream Embankment Looking Right



Figure 5: Upstream Embankment Looking Right Near Lake Miramichi Marina



Figure 6: Downstream Embankment Looking Right Near Lake Miramichi Marina



Figure 7: Downstream Embankment Looking Right Near Control Structure



Figure 8: Embankment Crest Looking Left from Control Structure



Figure 9: Dam Crest and Upstream Embankment Looking from North



Figure 10: Southern Overflow Culvert



Figure 11: Upstream Embankment Looking Right



Figure 12: Southern Overflow Pipe and Downstream Embankment, Looking Right



Figure 13: Central Overflow - Dual Pipes