

# Dam Safety Inspection Report

for the

## Little Black Lake Dam

Located on the Little Black Lake Drain  
in Muskegon County, Michigan

## Michigan Dam ID #1687 A Low Hazard Potential Structure

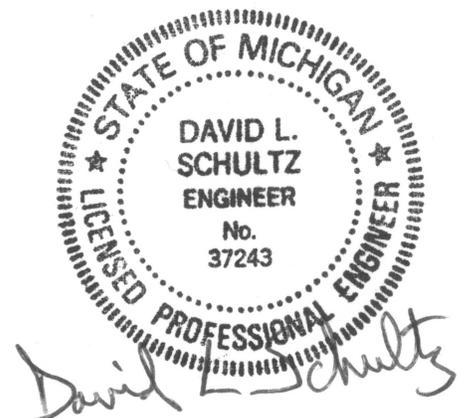
### Owned, Operated and Administered By:

Little Black Lake Drain Intercounty Drainage Board  
Michael Gregg, Chair  
Michigan Dept. of Agriculture & Rural Development  
525 West Allegan Street  
Lansing, Michigan 48909  
(517) 284-5622  
[e-mail: GreggM@michigan.gov]

### Inspected By:

David L. Schultz, P.E.  
Schultz Land & Water Consulting  
4859 Townsend Court, P.O. Box 301  
Montague, Michigan 49437  
(231) 893-7177  
[e-mail: DavidLSchultz@charter.net]

Inspected on July 25, 2017



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## Conclusions and Recommendations

The Little Black Lake Dam is in sound condition, both structurally and hydraulically. All concrete and riprap are in sound and serviceable condition. No erosion, leakage or seepage was noticed at or near the dam during the 7/25/17 inspection.

No deficiencies are present at the Little Black Lake Dam that could lead to the failure of the dam at this time. The presence of an irrigation pipeline for an adjacent golf course slightly reduces the conveyance capacity of this structure. However, sufficient spillway capacity is presently available, making this pipe's presence unimportant.

The only deficiency noticed during this inspection cycle is the continued deterioration of concrete members via spalling and cleaving, as shown on enclosed photographs. Future inspections should focus on the progression of concrete spalling and make note when it erodes to the point of jeopardizing structural stability.

No maintenance, repair or alterations are recommended for the Little Black Lake Dam as a result of my inspection or calculations.

**From this work, we assess the Little Black Lake Dam's condition as SATISFACTORY.**

## **Project Information**

The Little Black Lake Dam spans the Little Black Lake Drain in Section 31, T9N, R16W, in the City of Norton Shores. This is the natural outlet for Little Black Lake, and the dam (weir) is at the outlet end of a road crossing structure under Black Lake Road. Please notice the attached map illustrating the dam's location.

The structure's purpose is to control the water level on Little Black Lake, located immediately upstream. The dam spans the full width of the creek, and consists of a free overflow weir possessing slotted piers intended for use with 2 stop logs. Although not in place, the lake water level can be raised by 12" if stop logs are installed. Please notice the attached weir profile, which was used for the hydraulic analysis.

The available background information consists of the most recent dam inspection report, dated 9/23/03. This report was reviewed to determine if any physical or regulatory factors had changes over the last 14 years. We were also made privy to a 1998 inspection by Brechting Bridge & Engineering that followed shortly after the old bridge was replaced with a new timber bridge in 1997 in order to widen the road.

The Little Black Lake Dam is a very low maintenance structure with no need for an Operation and Maintenance Plan, and is a low hazard structure so an Emergency Action Plan is unneeded.

## **Field Inspection**

The Little Black Lake Dam was inspected on July, 25, 2017. Brenda Moore, the Muskegon County Drain Commissioner, accompanied us on this date. The entire structure was easily accessed, allowing for close-up inspection of all members.

All of the concrete of the structure was found in serviceable condition, although spalling and cleaving of concrete surfaces has worsened over time. The inlet and outlet channels are in excellent condition, with no unusual erosion or downcutting. The riprap and stone armor appear to be of adequate amount and stability. Please refer to the attached photographs to observe the condition of the structure during my on-site inspection. Also, please notice the attached, completed inspection report form that details the result of the 2017 inspection.

## **Structural Stability**

As stated above, all of the concrete and rock structural members are in serviceable condition, although spalling and cleaving has continued over time. The replacement of the road crossing with a clear-span bridge increased the stability of this structure by transferring the roadway's dead and live loads from the concrete structure to the newer timber bridge and foundation.

Ninety years after its construction, no substantial concrete settlement has been noticed, and the structure remains stable. If future inspections notice shifts in alignment, it would be prudent to have a surveyor measure the exact location of the slabs, sides and wingwalls at that time. Also, if further degradation of the concrete is noticed, those damaged areas should be repaired and/or tests should be done to determine the strength and integrity of the wingwalls.

## **Hydrology and Hydraulics**

The 1% annual chance flood discharge for the Little Black Lake Drain at the Little Black Lake Dam is 1300 cubic feet per second (cfs), as calculated by the Hydrologic Studies Unit of the MDEQ. Please notice the attached e-mail correspondence from them dated June 22, 2017. This is the same as was determined in 2003, so revised hydrologic and hydraulic calculations were not repeated. However, the primary results of that work are included in the following paragraph.

Flood routing was performed as part of the 2003 inspection, using a peak flow of 1440 cfs, 10% greater than the value calculated by the MDEQ, and a runoff volume of 1200 acre-feet. Using a larger discharge adds a factor of safety to the results and conclusions. Little Black Lake stores 2230 acre-feet of stormwater between elevations 597.25 and 603.0, implying the entire 1% annual chance runoff can be held in the lake with zero discharge and without overtopping the road. Routing the 1% annual chance flood hydrograph past the dam results in a lake level of 600.21. This results in a peak outflow of 188 cfs, and storage of 900 acre-feet in Little Black Lake. This correlates well with the FEMA floodplain elevation of 601.0, and provides more than 3' of freeboard between the 1% annual chance water level and the low chord of the bridge.

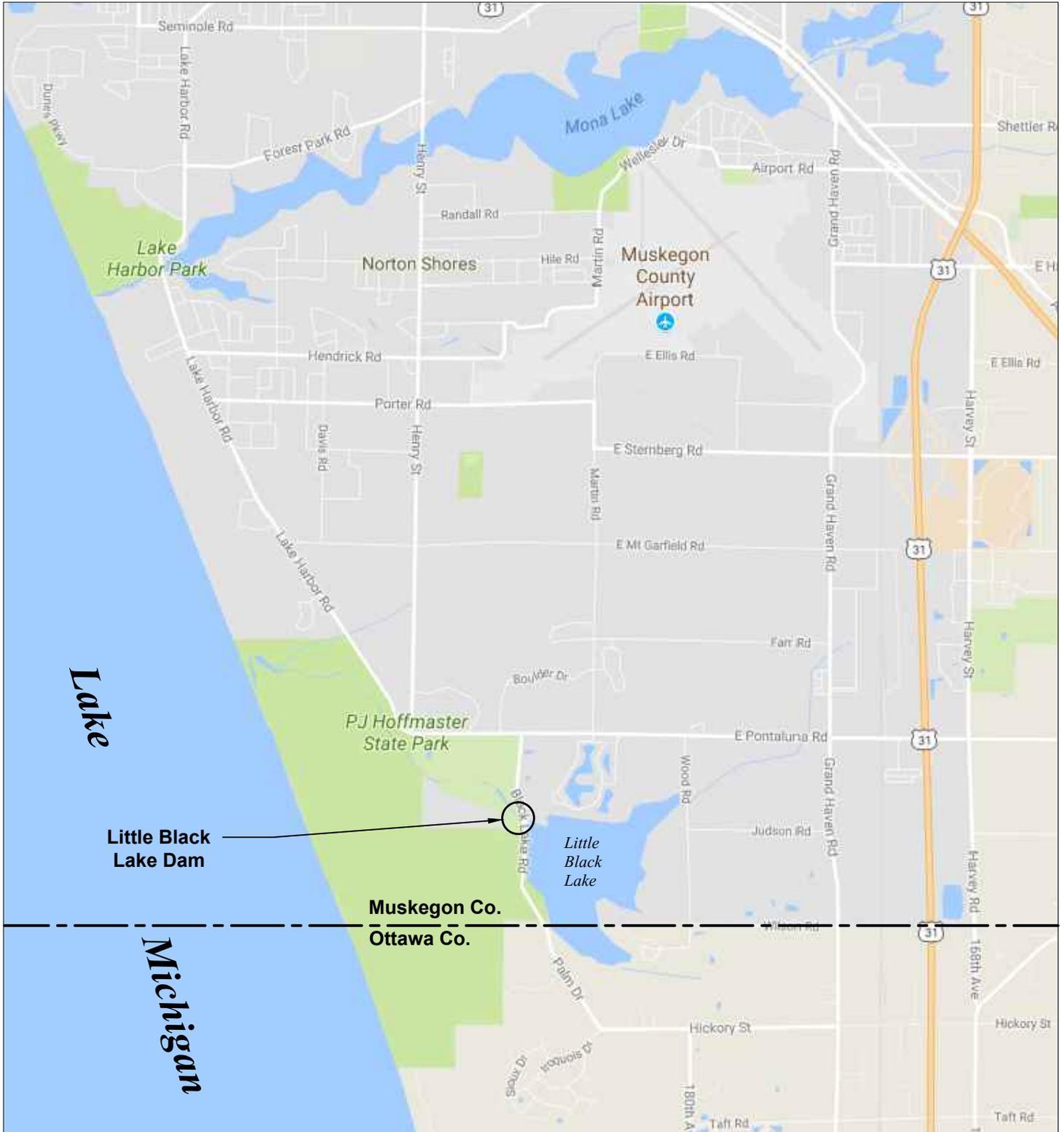
## **Operation and Maintenance**

The Little Black Lake Dam has not been maintained in the recent past to the best of my knowledge. This is not a concern, as the structure is sound, and has not required any rework since the 1997 bridge replacement project. In the same regard, no maintenance plan is presently in place, nor is one needed at this time. If the condition of the structure begins to deteriorate or show differential movement in future inspections, producing and implementing a maintenance plan should be considered at that time.

## **Emergency Action Plan**

As a low hazard potential structure, an Emergency Action Plan is not required. A golf course is located downstream of the dam, which minimizes risks to life or property during a design storm failure. Also, the shallow height of the stream banks on the drain, coupled with the extensive overbank storage volume present at the golf course will attenuate a flood wave created by such a failure.

# Little Black Lake Intercounty Dam Location Map





**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
LAND AND WATER MANAGEMENT DIVISION  
DAM INSPECTION REPORT**

This form is to be used for inspection reports required by Part 307, Inland Lake Levels, for those dams that do not meet the size criteria as defined by Part 315, Dam Safety, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Dams six (6) feet or more in height, as defined by Part 315, and impounding five (5) acres or more at the design flood elevation, must meet the inspection report format as outlined in Section 31518 of Part 315.

A person failing to comply, or falsely representing dam conditions, is guilty of misconduct in office.

DAM NAME <b>Little Black Lake Dam</b>		DAM ID <b>1687</b>	COUNTY <b>Muskegon</b>
DATE OF INSPECTION <b>7/25/17</b>	NAME OF WATERBODY <b>Black Creek</b>	SECTION, TOWN, RANGE Sec. <u>31</u> T <u>9N</u> R <u>16W</u>	LEVEL THIS DATE <b>597.5</b>
DATE ELEVATION SET BY COURT <b>Not set</b>	LEGAL LEVEL <b>Not set</b>	DRAWDOWN LEVEL <b>597.25</b>	HIGH WATER MARK ELEVATION <b>598.0</b>

**EARTH EMBANKMENTS** LEFT EMBANKMENT 0 FT. RIGHT EMBANKMENT 0 FT. TOTAL LENGTH 0 FT.  
(LOOKING DOWNSTREAM)

	UPSTREAM	CROWN	DOWNSTREAM
VEGETATIVE COVER	Good	Paved road	Good
EROSION	None	None	Minor behind wing walls
SEEPAGE			None
SLIDES, SLUMPS & CRACKS	None	None	None
ANIMAL BURROWS	None	None	None
WAVE ACTION PROTECTION	None		None needed
REMARKS*	Structure located in road crossing structure, with road acting as embankment.		

**CONTROL STRUCTURE**

TYPE <b>Free-overflow weir with stoplog capability</b>	YEAR CONSTRUCTED <b>1927. New bridge in 1997</b>	STRUCTURAL HEIGHT (top of dam elevation minus stream invert) <b>4 feet</b>
LENGTH OF SPILLWAY <b>15.4' at flood stage = 600.2</b>	FREEBOARD <b>3 feet to bottom chord of bridge</b>	HYDRAULIC HEIGHT (design flood elevation minus stream invert) <b>7 feet</b>
VERTICAL PIPE SIZE <b>None</b>	HORIZONTAL PIPE SIZE <b>None</b>	HEAD (normal headwater minus normal tailwater) <b>4 feet</b>

**DESCRIBE CONDITION OF THE FOLLOWING ITEMS.**

STOPLOG VALVES AND GATES (open and close to check condition): Check location of top stoplog in relation to top of riser pipe intake box or fixed crest, for leakage, and condition of stoplogs, valves and gates.  Slotted piers for placement of 2 stop logs to raise static water level by 12". No stop logs in place.
OUTLET PIPE: Check for damage from ice, logs, vandalism; inside discharge pipe for settlement and/or joint separation; condition of pipe coating.  None

**CONTROL STRUCTURE (continued)**

CONCRETE STRUCTURE: Check for erosion; location of cracking or spalling. If old or new; settlement; need for crack repairs.	
All concrete is in serviceable condition, although continued spalling and cleaving must be monitored.	
WALKWAY & RAILING: Check if in place or removed, condition, and if adequate protection provided.	TRASHRACK OR LOG BOOM: Check if operable.
Guard rails along road are in good condition	None
EMERGENCY SPILLWAY: Size, type, and condition.	
None	

**INLET & OUTLET CHANNELS**

	INLET	OUTLET
SIZE	25' wide approach	20' wide outlet channel
EXISTING CONDITION	Good	Good
EROSION	None	None
DEBRIS & OBSTRUCTIONS	None	Irrigation pipe at outlet weir and channel
RIPRAP PROTECTION	Adequate	Adequate
REMARKS*		

**RECOMMENDATIONS**

List work needed, how to be done, by whom, estimated cost, source of funds, recommended completion date. If emergency, to what extent. ADDITIONAL COMMENTS.

No maintenance, repairs or remediation recommended as a result of this inspection. Intercounty Board could consider establishing a lake level and assessment district to fund future inspections, maintenance & repairs.

Inspection Ordered By:

Brenda M. Moore, Muskegon County Delegated Agent

ii  


Michigan No.37243  
P.E. REGISTRATION NO.

4859 Townsend Court, P.O. Box 301  
ADDRESS

Montague, MI 49437  
CITY, STATE, ZIP CODE

(231) 893-7177  
TELEPHONE NUMBER

Please submit this completed report and photographs of the dam, downstream channel, and deficiencies cited in the report to:  
DAM SAFETY PROGRAM  
LAND AND WATER MANAGEMENT DIVISION  
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
PO BOX 30458  
LANSING MI 48909-7958

\*NOTE: If space is inadequate for remarks, attach additional sheets as needed.



Little black Creek looking downstream



Riprap bank protection on southeast side of bridge structure



Golf Course irrigation pipe, looking upstream



Little Black Creek outlet channel looking downstream (west)



Little Black Creek inlet channel looking upstream (east)



Broken concrete bank protection (typ.)



South side of weir structure looking upstream



North side of weir structure looking upstream



Minor spalling of concrete on northwest wingwall



Moderate spalling of concrete on southwest wingwall



Outlet structure - slotted piers for stoplogs (prior photograph)



Damaged concrete on slotted pier



Golf course irrigation inlet pipe



Riprap bank protection on northeast side of bridge structure



Little Black Creek looking downstream (west)



Looking upstream (east) toward Little Black Lake



RICK SNYDER  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



C. HEIDI GREYER  
DIRECTOR

March 21, 2017

CERTIFIED MAIL

Muskegon County Drain Commissioner  
Central Services Building  
141 East Apple Avenue  
Muskegon, Michigan 49442

Attention: Ms. Brenda M. Moore

Dear Ms. Brenda M. Moore:

SUBJECT: Little Black Lake Dam, Dam ID 1687

We are writing to advise you that our records indicate that the Little Black Lake Dam is overdue for inspection. As owner of this dam, the Muskegon County Drain Commissioner is required by Part 315, Dam Safety, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, to have it inspected every five years. Our records indicate the last inspection of your dam was completed on September 23, 2003.

In order to return to compliance with Part 315, inspection reports for your dam must be submitted to this office. Inspection reports must be prepared, signed, and sealed by a professional engineer licensed in Michigan and must include:

1. An evaluation of the dam's condition, spillway capacity, operational adequacy, and structural integrity.
2. A determination of whether deficiencies exist that could lead to the failure of the dam, including but not limited to potential seepage problems, internal erosion, surface erosion, embankment stability problems, and structural deterioration.
3. Recommendations for maintenance, repair, and alterations of a dam as are necessary to eliminate any deficiencies.

A list of consulting engineers offering services in dam safety may be found on our website at:

[www.michigan.gov/damsafety](http://www.michigan.gov/damsafety)

**Instead of engaging a licensed professional engineer, local units of government may request the Department of Environmental Quality (DEQ) to inspect their dam and prepare a report as outlined above. This service is provided at no charge to local units**

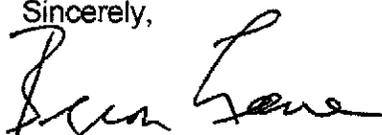
Muskegon County Drain Commissioner  
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March 21, 2017

**of government.** Should you decide to have the DEQ inspect your dam, please notify this office, in writing, by April 20, 2017.

Copies of Part 315 and its administrative rules may be found there, as well. Printed copies of Part 315 are also available upon request.

If you have any questions regarding this matter, please contact Mr. Luke Trumble, P.E. at 517-420-8923; or you may contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Byron Lane". The signature is written in a cursive style with a large initial "B".

Byron Lane, P.E., Supervisor  
Hydrologic Studies and Dam Safety Unit  
Water Resources Division  
517-281-6821

cc: Mr. Luke Trumble, P.E., DEQ



Alex Lehman &lt;alex.lehman04@gmail.com&gt;

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**RE: flood or low flow discharge request (ContentID - 168812)**

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deq-wrd-qreq &lt;deq-wrd-qreq@michigan.gov&gt;

Thu, Jun 22, 2017 at 5:25 PM

To: "alex.lehman04@gmail.com" &lt;alex.lehman04@gmail.com&gt;

We have estimated the flood frequency discharges requested in your email of June 19, 2017 (Process No. 20170317), as follows:

Little Black Creek at Little Black Lake Dam, Dam ID 1687, Section 31, T9N, R16W, City of Norton Shores, Muskegon County, has a drainage area of 7 square miles. The design discharge for this dam is the 1% chance (100-year) flood. The 1% and 0.5% chance peak flows are estimated to be 1300 cubic feet per second (cfs) and 1700 cfs, respectively. The 1% chance flood volume is estimated to be 1200 acre-feet. (Watershed Basin No. 14L Grand (Lake)).

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 Dam Safety Unit, at [517-284-5579](tel:517-284-5579), or by email at: [GreinerS@michigan.gov](mailto:GreinerS@michigan.gov). If you have any questions concerning the hydraulics or the requirements for the dam safety inspection report, please contact Mr. Luke Trumble of our Dam Safety Program at [517-420-8923](tel:517-420-8923), or by email at: [TrumbleL@michigan.gov](mailto:TrumbleL@michigan.gov).

**From:** [alex.lehman04@gmail.com](mailto:alex.lehman04@gmail.com) [mailto:[alex.lehman04@gmail.com](mailto:alex.lehman04@gmail.com)]

**Sent:** Monday, June 19, 2017 4:49 PM

**To:** deq-wrd-qreq <[deq-wrd-qreq@michigan.gov](mailto:deq-wrd-qreq@michigan.gov)>

**Subject:** flood or low flow discharge request (ContentID - 168812)

Requestor: Alex Lehman

Company: Schultz Land & Water Consulting Inc.

Address: 4859 Townsend Court

City: Montague/MI

Zip: 49437

Phone: [2318937177](tel:2318937177)

Date: 6/19/2017

F1percent: Yes

F0.5percent: Yes

ContactAgency: None Selected

ContactPerson:

Watercourse: Black Creek

LocalName:

CountyLocation: Muskegon

CityorTownship: Norton Shores

Section: 31

Town: 9N

Range: 16W

Location: Located 1000 ft. South of W. Pontaluna Rd. on Black Lake Rd. Dam is located in road crossing structure with

7/26/2017

Gmail - RE: flood or low flow discharge request (ContentID - 168812)

the road acting as the embankment.

FFR1: Dam