

## Hydraulic Calculations for the Weir on Lake Irogami

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Wed 7/3/2019 4:21 PM

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2 attachments (713 KB)

Irogami Lake Sketch.pdf; Irogami Survey\_July 2019.pdf;

Aaron and Joel:

The table below summarizes our discussion yesterday (July 2, 2019) about the different hydraulic scenarios. The DNR realizes the SLSD does not intend use these calculations for operational purposes. However, the calculations will provide supporting documentation to show when (or not) flows are expected to be greater than 10 cubic feet per second (set in administrative law judge determination).

For the proposed structure configuration, compute the flowrate for each hypothetical scenario and provide supporting calculations and documentation for each:

Hydraulic Scenario	Headwater Elevation (feet)	Tailwater Elevation (feet)	Head Difference (feet)	Flow Regime	Flowrate (cubic feet per second)
1	867.83 (water 2 inches above top of weir)	865.75 (outlet unsubmerged, pipe is half full)	2.1	Weir	
2	868.66 (water 12 inches above top of weir; inlet submerged)	867.40 (outlet submerged, depth estimate from field observations)	1.3	Pressure	
3	869.16 (water 18 inches above top of weir; inlet submerged)	867.40 (outlet submerged, depth estimate from field observations)	2.3	Pressure	
4	869.16 (water 18 inches above top of weir; inlet submerged)	865.75 (outlet unsubmerged, flowing half full)	Silver Lake Sanitary District and Silver Lake Management District do not believe this is a realistic scenario		
5	Any other scenario(s) deemed necessary/useful by engineering consultant, Silver Lake Sanitary District, or Silver Lake Management District				

Supporting calculations need to include assumptions, equations, values and reasoning for selected coefficients, etc. and be stamped by a professional engineer.

Based on the scenarios, or other conditions based on SLSD experience, when the flowrate is expected to be greater than 10 cubic feet per second the SLSD needs to explain in a separate document what actions will be taken to ensure flows will not exceed 10 cubic feet per second.

I also attached the survey Tanya and I completed yesterday along with a diagram/sketch of the existing conditions.

I am out Friday, but would be able to discuss early next week (and send photos if needed). And, thank you to everyone for participating in this discussion!

Jen

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Visit our survey at <http://dnr.wi.gov/customerurvey> to evaluate how I did.

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# WEIR ON LAKE IROGAMI (EXISTING)

Located at 44° 04' 04.21" N, 89° 13' 27.62" W

Elevations obtained from SLSD survey on 6-7-2019

Elevations obtained from DNR survey on 7-2-2019; also see survey notes

Lake Irogami Water Level = 868.79 feet on 6-7-2019; 868.84 feet on 7-2-2019

Downstream (marsh) Water Level = 867.46 feet on 6-7-2019; 867.37 feet on 7-2-2019

### Riser description:

- Concrete riser with metal band around the top; elevation of top/rim/weir not completely level; varies by ±0.08 ft
- Felt like there were rocks in bottom of riser; could not feel horizontal outlet pipe
- No gate, no barrier, no locking device

Benchmark description and location:  
60d nail found on north side of power pole

Benchmark elevation and datum:  
869.12 feet, NGVD 29

Benchmark and top of riser information  
from POB; stamped by Jordan G. Brost  
on 7-25-2018

Driveway length (high point to centerline of 20<sup>th</sup> Lane) ≈ 80 feet

High point on driveway elevation = 871.54

top of rocks  
= 870.38 feet

top of riser pipe elevation  
= 867.71 feet

riser pipe diameter  
= 2 feet  
(24 inches)

distance between riser and land ≈ 5.5 feet

top of pipe elevation = 866.56 feet  
= 866.53 feet

outlet pipe diameter and material  
= 1.5 feet (18 inches) CMP

invert elevation ≈ 863.38 feet (calculated)

outlet pipe length = 131 feet

outlet invert elevation = 865.06 feet  
= 864.93 feet

lake bed elevation at entrance to  
weir = 866.88 feet

Outlet pipe description:  
Corrugated metal pipe (CMP) with apron end  
24-inch to 18-inch reducer somewhere between  
riser and outlet; exact location unknown

downstream channel bed  
elevation = 865.90 feet

Opening to lake ≈ 5.5 feet wide

Note: Drawing NOT to scale



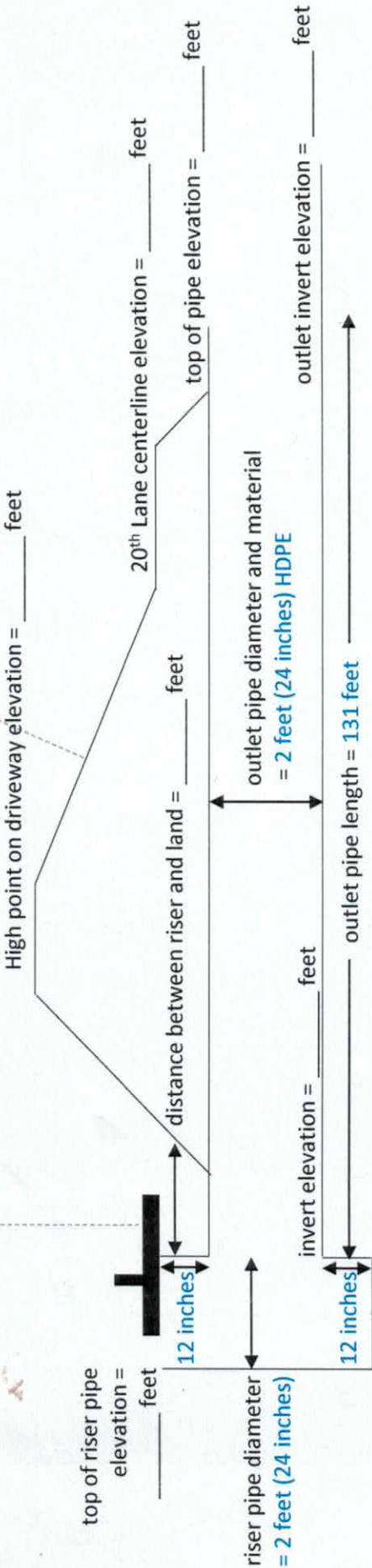
# WEIR ON LAKE IROGAMI (PROPOSED)

Located at 44° 04' 04.21" N, 89° 13' 27.62" W

Order 3-LM-95-224 decision by administrative law judge states:

- Top (crest) elevation of **867.66 feet** mean sea level
- maximum discharge of 10 cubic feet per second

- Sandbags to be placed across ≈ 5.5 foot wide opening to lake
- Riser area to be dewatered using pump prior to removal
- Attach slide gate and barrier dimensions, describe how gate attached to riser, locking device, etc.
- Attach description of when and how gate is operated
- Describe how flow meter to be used (e.g., model, where measurement taken and recorded, frequency, etc.)
- Describe how driveway will be restored
- Describe which, if any, trees will need to be removed as part of the project



Note: Drawing NOT to scale

# WEIR ON LAKE IROGAMI (AS-BUILT)

To be completed by surveyor after construction is complete.

Located at \_\_\_\_\_ N, \_\_\_\_\_ W

Lake Irogami Water Level = \_\_\_\_\_ feet on \_\_\_\_\_

Downstream (marsh) Water Level = \_\_\_\_\_ feet on \_\_\_\_\_

Benchmark description and location:  
\_\_\_\_\_  
\_\_\_\_\_

Benchmark elevation and datum:  
\_\_\_\_\_ feet, \_\_\_\_\_

Surveyor stamp with date

High point on driveway elevation = \_\_\_\_\_ feet

top of riser pipe elevation = \_\_\_\_\_ feet

riser pipe diameter = 2 feet (24 inches)

bottom of riser = \_\_\_\_\_ feet



12 inches

distance between riser and land = \_\_\_\_\_ feet

20<sup>th</sup> Lane centerline elevation = \_\_\_\_\_ feet

top of pipe elevation = \_\_\_\_\_ feet

outlet pipe diameter and material = 2 feet (24 inches) HDPE

invert elevation = \_\_\_\_\_ feet

outlet invert elevation = \_\_\_\_\_ feet

outlet pipe length = \_\_\_\_\_ feet

Describe connection and base:

Note on diagram where pipe joints are located

lake bed elevation at entrance to weir = \_\_\_\_\_ feet

downstream channel bed elevation = \_\_\_\_\_ feet

Note: Drawing NOT to scale



STA	Field Survey	Elev
BM-1, BS=7, HI=876.12		869.12
Natural Lake outlet	9.24	866.88
Top of NM Weir	8.49	867.63
Top of rocks around weir	5.74	870.38
Driveway High Point	4.58	871.54
High pt to Rt of driveway, 15ft	2.65	873.47
High pt to Lft of driveway, 10 ft	3.58	872.54
20th lane Center Line	7.42	868.7
Top of outlet pipe	9.59	866.53
Invert of outlet pipe	11.19	864.93
Tailwater	8.75	867.37
D/S channel elev, 10 ft S of outlet	10.22	865.9
11.7 feet deep outlet		
Headwater	7.28	868.84
BM-1 w(close)	7	876.12
Top of nm/weir 10:00	8.45	867.67
Bottom of riser - rocks?	11.51	864.61
Top of nm/weir 2:00	8.48	867.64
Top of nm/weir 6:00	8.41	867.71
BM-1	7	876.12

