

Replacement of Lake Irogami Weir

Project began: August 27, 2019

Weir operational: August 30, 2019

Weir driveway completed: September 6, 2019

As-installed elevations measured: September 10, 2019

20th Lane private road resurfaced: September 23, 2019

Project completed: September 23, 2019

Site Preparation

Pile sheeting was used to reduce water flow from Lake Irogami. The remaining water infiltration was pumped from the weir pit and returned to Lake Irogami. Sand bags were used at the discharge pond entrance to Thorstad Creek to prevent water back flowing to the discharge pond. The discharge end of the existing 18-inch discharge pipe was bent up to prevent water back flowing to the weir. Erosion was controlled using standard porous screen material.

Removal of Existing Weir and Discharge Pipe

The previous weir assembly was dug out, uncovered and removed.

Installation of New Weir Assembly

The installation followed the as-proposed plan submitted previously with the exception of a lowering of the outlet invert elevation about 0.8 feet to accommodate the increased diameter of the weir discharge pipe. This change also eliminated the need to raise the road elevation (hump) to provide sufficient cover of the discharge pipe and gave an improved drainage pitch for the discharge pipe.

Silver Lake Sanitary District (SLSD) contracted with Wagner Plumbing, N2218 State Road 22, Wautoma, WI 54982 (920) 787-3689, to do the project. The center section of the drain pipe was installed first, followed by the weir assembly, and finally the exit structure. The driveway was rebuilt as agreed upon by the contractor and property owner Mark Lemke. Mr. Lemke and members of the Irogami Lake Association Board were present during much of the installation. Stantec, 12075 Corporate Pkwy, Suite 200, Mequon, Wisconsin, 53092-2649, (262) 241-4466 provided an engineer, Christian Moring, to oversee the below-ground installation. Elevations were measured by TN Land Surveying, 116 W Main St, Wautoma, WI 54982, (920)787-3500.

A diagram showing elevations of the as-built weir system is attached.

Photographs taken during construction are shown below.



Original exit pipe bent to prevent water backup.



Sheet piling to isolate weir construction area.



Weir tee assembly.



Rebar rods to stabilize structure. Concrete added in bottom of tee up to the side discharge.



Water infiltration pumped back into Lake Irogami. Elevations continuously measured.



Middle pipe section installed first. Gravel placed under discharge pipe.



Bentonite saddles used to stabilize discharge pipe.



Discharge pipe elevation set and stabilized with gravel.



Slide gate assembly bolted to weir tee.
Top of riser pipe set at 867.60'



Weir inlet channel lined with riprap over porous fabric liner.



Exit pipe spillway.
Infiltrated water pumped to marsh.



Outlet with riprap and silt barrier installed.
(weir not flowing)



Discharge pipe outlet under flow conditions.



Landscaping at entrance to driveway.
Facing west.



Landscaping at east end of weir.
Facing north.



Landscaping at west end of weir.
Facing south.



Rebuilt driveway.
Facing south.



Slide gate lock and level indicator



Inlet channel from Lake Irogami.
Weir flowing at ~5cfs



Surveyor benchmark at 869.61' located
13' NW of center of weir opening

The private road (20th Lane) to the weir driveway was resurfaced by S & G Excavating, W6945 State Road 152, Wautoma, WI 54982, (920) 787-7410.

Initial Test Results

The suspended ball time-travel method of measuring average linear velocity was not successful at an inlet flow head of 5.5" due to turbulence occurring in the riser pipe. The ball at times actually flowed back to the riser in the turbulent flow. Results using a Global Flow Probe agreed with results using a dye time-travel method. The flow calculated at this inlet head was about 5cfs, which is in the range of what the Stantec theoretical flow calculations predict for this inlet head. At a flow of 5cfs, there is an inlet head loss in the channel from Lake Irogami of about 2.0". The dense foliage in the swamp provides some resistance to flow (back pressure) from the discharge pipe. This resistance amounts to a back pressure head of about 3.5" at 5.0cfs, but does not significantly affect flow through the 24" discharge pipe.

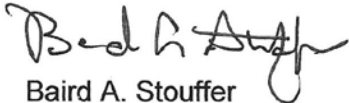
The slide gate worked well as one person can easily open/close the gate manually. When the gate is closed there is essentially no flow and the inlet flow elevation becomes the same as the level of Lake Irogami.

Ongoing Plans

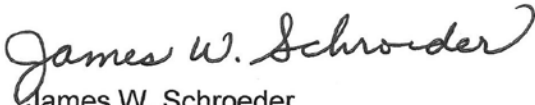
Because of recent weather conditions, Lake Irogami has decreased in level and is now about 8" above the Ordinary High Water Mark (OHWM). During the first month of operation, readings will be taken and recorded at least twice per week or more frequently if a substantial (e.g. >2") rain event occurs. Thereafter, readings will be taken and recorded at least once per week. If the lake level increases, thus increasing the flow through the weir, the slide gate position will be adjusted to limit the flow to a maximum of 10cfs. The data recorded will be stored at the SLSD office. It is intended to develop operating curves regarding the relationship of weir throughput as a function of inlet water depths and slide gate setting. A summary of the data obtained similar to the chart attached will be shared at least bi-weekly with the property owner and Irogami Lake Management.



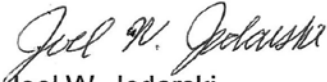
Donald F. Maes
Chairman, SLSD



Baird A. Stouffer
Secretary/Treasurer, SLSD



James W. Schroeder
Commissioner, SLSD



Joel W. Jodarski
Superintendent, SLSD

Attachments: Weir On Lake Irogami (As-Built) Elevations
Initial Weir Operating Flow Results

WEIR ON LAKE IROGAMI (AS-BUILT)

To be completed by surveyor after construction is complete.

Located at 44.067777 N, 89.224166 W

Lake Irogami Water Level = 868.10 feet on SEPT 10th, 2019
 Downstream (marsh) Water Level = 867.32 feet on SEPT 10th, 2019

Benchmark description and location:
CONCRETE IN STEEL
PIPE APPROX. 13 FEET
N-NW OF WEIR STR.

Benchmark elevation and datum:
869.6 feet, NAD 88



High point on driveway elevation 872.37 feet

top of riser pipe elevation = 867.60 feet

riser pipe diameter = 2 feet (24 inches)

bottom of riser = _____ feet



distance between riser and land = 5 1/2 feet

20th Lane centerline elevation = 868.68 feet

top of pipe elevation = 866.32 feet

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

invert elevation = 864.95 feet

outlet invert elevation = 864.28 feet

outlet pipe length = 131 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

Lake Irogami Inlet Water Depth and Weir Flow (Slide Gate Fully Open)

