

## WE NEED TO IMPROVE OUR WATER LEVEL READINGS PER COURT ORDER.

### Background

(Sensors installed Fall 2016)

**Vicki performed GPS surveys....verified monuments & checked stick gages.**

*Results:*

#### Dam 5/4/17

- Top of stick gage on wall is supposed to be set at 590'
- Verified top of stick from US Corp. disc on break wall 589.98'
- Used her own GPS to measure top of stick 589.92'

*Conclusion: stick is OK within ½"*

#### Narrows 1/5/17

- Top of stick gage on bridge abutment is supposed to be at 590'
- Verified monument on bridge (now removed) 607.09' ...info only.
- Measured top of stick using GPS (should be 590') 589.71'

*Conclusion: manual readings are off by 3.48".*

*Actual lake level is lower than manual reading.*

#### Birch Point 1/5/17

- New iron stake in water by shore.
- Measured top of stake (information for future measurements) 589.32'

**Jim Johnson performed manual survey reading at narrows using USGS bridge monument.**

*Results:*

#### Narrows 4/18/17

- Survey to surface water 588.58'
- Stick gage on abutment indicates 588.24'

*difference in inches....4.08" or → .34'*

*Conclusion: manual readings are off by 4.08".*

*actual lake level is lower than manual reading.*

### State of Michigan (MDOT) performed GPS measurements

Results:

Narrows 9/18/2021

-Verified Vickie's reading to top of stick on abutment 589.45'

Birch Point 9/18/2021

-Verified Vickie's reading to top of iron stake in water 589.32'

*Conclusion: Vickie's GPS measurements from 2017 and MDOT GPS measurements are the same for Birch Point, but different for narrows.*

*Information: New monument on bridge after bridge reconstruction now is 607.02'*

### October 17, 2021 informational readings

Resultss:

Dam

Sensor reading 589.018'

Gage stick reading 589.02'

*Conclusion: Sensor is OK*

Birch Point

(using tape measure from stake-to-water)

Sensor reading 589.35'

Measurement from top of stake 588.7'

*Conclusion: Sensor reads too high* .65'

Narrows

(with County Engineer Craig Brown using survey instrument utilizing new MDOT monument). He surveyed readings of water level and also to an 'X' on the bridge surface directly above the gage on abutment.

'X' on bridge concrete surface (info) 607.14'

Sensor reading 589.01'

Survey reading to water surface 588.69'

*Conclusion: Sensor reads too high* .32'

## EXECUTIVE SUMMARY

- Manual/visual lake level stick at narrows should be replaced
- Manual/visual lake level stick at dam is OK
- Iron stake at Birch Point is OK
- Sensor at dam is ok
- Sensor at narrows needs to be adjusted
- Sensor at Birch Point needs to be adjusted

## PROPOSED ACTION ITEMS

- Raise dam and leave it up for 1-2hrs. Then....
  - Read stick gage on outside south wall at dam.
  - Measure to the water surface, from top of steel sheet piling by sensor using a measuring tape. (There is an 'X' by sensor that --Vickie surveyed to be 594.17')
  - While gate is up, measure to the water surface at bridge.
  - (There is an 'X' on bridge concrete, just above the gage on the abutment, that is surveyed to be 607.14')
- Replace stick gage on bridge abutment to correct elevation using a new survey from new monument (chisel horizontal line on abutment).
- Recalibrate narrows sensor
- Recalibrate birch point sensor.