Gravity Pipe to Wetland with Forcemain to Infiltration Basins Assessment
Lake Shamineau High Water Project

WSN assessed the alternative of using a gravity flow pipe to the wetland at Bugle Road and then pumping from the wetland to the gravel pit infiltration basins. This alternative was one of three routes assessed at for the Lake Shamineau High Water Outlet. Detailed construction costs estimates were developed for each of the alternatives and this alternative was found to be 20 to 25 percent higher in costs than the other alternatives.

The main reason the costs were significantly higher were due to the directional boring, additional intake screen, wetland impact costs, and earth moving costs to construct the pump station adjacent to the wetland. More details of cost elements are provided below.

The directional boring costs added around $290,000 to the overall piping cost due to the expense of directional drilling for 2,200 feet. The pipe size needed to be increased to 24-inch diameter pipe to allow flow of 4,500 gallons per minute of water to the wetland due to the low gradient needed for the pipe. The directional boring could not be completed in one run and would require two large, deep boring pits to be constructed because the pipe needs to be drilled at a low gradient underneath a ridge between the lake and the wetland.

The additional intake screen was needed because there would be one intake screen installed in the lake and one in the wetland. This doubled the intake screen cost of $30,000 each.

The wetland impact costs are due to the water level in the wetland exceeding eight feet in depth. The wetland rules as communicated to WSN by the Technical Evaluation Panel (TEP) indicate a wetland is impacted if water levels are increased to a depth of over eight feet. This would require the purchase of wetland credits for impacting the 1.8 acres of wetland at a cost of around $140,000.

The last element of higher costs is the additional clearing and earthwork needed for constructing the road and pump station at the wetland. This results in another $10,000 of construction cost not needed for the other alternatives.

Some of these costs are offsite by the lower cost to bring three-phase power to the pump station, which would lower the costs by $30,000. The sound proofing cost estimated at $20,000 would also not be needed for this alternative. These are not enough to offset the other higher costs of this alternative.

There are also other design and permitting issues that would add costs to the project. These include:

- Wetland delineation and a wetland permit application would be needed for impacting the wetland.
- The muck, wetland vegetation, and floating wood would require additional design considerations for the pumping station in the wetland.
- The additional testing and permitting required by the DNR to demonstrate this alternative is a viable option would add cost.
- The presence of two control structures, one at the lake and one at the wetland, would require more maintenance as the inlet from the lake would need to be maintained as well as the pumping location.

Finally, it should be understood that using only gravity flow to the wetland is not a viable option because the infiltration rates out the sides of this 1.8 acre basin would be inadequate to handle the 4,500 gallons per minute needed to significantly lower water levels and handle large 6-inch rain events. This means the gravity pipe by itself doesn't provide an adequate High Water Outlet so the project wouldn't be able to obtain a permit.