Memorandum

Project Name: **Char Lake Flow Measurement**

Project #: FRE-00252876-A1/File No: 50.2

To: Bhabesh Roy, P.Eng.

From: Eric Bell

Date: September 24, 2020

Subject: Flow Totalizer

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Distribution: Tony Whalen, Daryl Burke

Suggested Scope of Work for Measurement of Char Lake Water Withdrawal

CIRNAC recommends the applicant follow the recommendation of EXP to replace the flow meter at the Char Lake pumphouse. The Hamlet of Resolute Bay utilizes Char Lake as its water source year-round. As such the Char Lake pump house sends water to the Signal Hill Water Treatment Plant. CGS is requesting recommendations for confirmation of the measurement of water being withdrawn from the Char Lake supply.

Application:

For the purposes of measuring water quantity being withdrawn on a consistent basis from a Lake, a flow totalizing flowmeter is the desired technology. A turbine flow meter is a widely used technology for totalizing the amount of water that flows through the pipe. With a turbine flow meter, a screen prior to the turbine is required.

The service conditions and the congestion that exists in the existing Char Lake pump house does not seem to provide options for the installation of a flow totalizer. Ideally, there would be a straight run of pipe at least 1m long that would permit the install of a flow totalizer (flanges and unions). The flow totalizer itself is 0.58m in length. This is not available in the Char Lake building.

From Char Lake, a dedicated 150mm line is utilized to connect to Signal Hill WTP. It is proposed that the flow totalizer be installed on the inlet from Char Lake just as the pipe enters the Signal Hill Water Treatment Plant. There will be no other flow measured on the line, only the withdrawal water that is from Char Lake.

In the future, a new flowmeter will be incorporated in the new Char Lake Pump House. Additionally, when the process upgrades are completed at Signal Hill, all water from Char Lake will be directed through the treatment filters and disinfection system at the WTP and a flowmeter will confirm the delivered treated amount of water.

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Temporary Flow Meter Specifications:

The two (2) variations of the flow meters that are referenced in the specification are Neptune and SENSUS manufacturers. The use of a 4" flowmeter has been selected as it has good accuracy at the 200+ USGPM range, which in the range of the current pump capacities.
The following is the excerpt recommended for procurement and supply/installation of the flowmeter:

1. General

1.1. All meters furnished shall be produced in a manufacturing facility whose QMS is ISO 9001 certified.
1.2. Acceptable meters shall have a minimum of fifteen (15) years of successful field use.
1.3. All specifications meet or exceed the latest revision of AWWA C701.
1.4. All water meters submitted in this proposal be compliant with and certified to NSF/ANSI 61 and NSF/ANSI 372.
1.5. Meters shall be made of "lead free" alloy as defined by NSF/ANSI 61 and NSF/ANSI 372.
1.6. Meters shall be of the inline horizontal-axis type per AWWA Class II.

2. Case and Cover

2.1. The maincase and cover shall be cast from NSF/ANSI 61 and NSF/ANSI 372 certified lead-free alloy containing.
2.2. The size, model, NSF certification and arrows indicating direction of flow shall be cast in raised characters on the maincase or cover.
2.3. The cover shall contain a calibration vane for the purpose of calibrating the turbine measuring element while the meter is inline and under pressure.
2.4. Casing bolts shall be made of AISI Type 316 stainless steel.
2.5. Maincases shall be flanged to 150# 200mm (8inch) connection.
2.6. Registers shall be weather protected and tamper proof construction. Flow totaling indication shall be in cubic meters. Registers shall allow for in-line serviceability.
2.7. The register box shall be affixed to the top cover by means of a plastic tamperproof seal
2.8. The turbine measuring chamber shall be a self-contained unit attached to the cover for easy removal. The turbine spindles shall be stainless steel; turbine shafts shall be tungsten carbide.
2.9. Flow meter must be a complete assembly, factory-calibrated to AWWA standards, that includes the cover, registers, and both a turbine measuring element assembly. It shall be easily field-removable from the meter body without the requirement of unbolting flanges.
2.10. Registration accuracy over the normal operating range shall be 98.5% to 101.5%.
2.11. Acceptable meters shall be Neptune HP Turbine, SENSUS OMNI T2 or approved equal.

3. Water Meter Strainer

3.1. All strainers furnished shall be produced by the same supplier as the flow totalizer supplied. The strainer is to be mounted upstream of the meter to prevent debris such as stones or pebbles greater than 3⁄16" in diameter from entering or damaging the meter.
3.2. The strainer shall be designed for minimum weight and pressure loss.
3.3. The strainer screen shall be made of perforated stainless-steel plate and be shaped for maximum rigidity against forces exerted by the flow stream.
3.4. The effective straining area shall be at least double that of the meter maincase inlet area.
3.5. The strainer shall be furnished with a direct connection to the supplied flow

meter with round flanged connections. Bolt circle, bolt hole diameters, and flange dimensions shall be in compliance with meter connection specifications contained in ANSI/AWWA C701.

3.6. The strainer bodies and covers shall be made from NSF/ANSI 61 and NSF/ANSI 372 certified lead-free nylon-coated ductile iron or a bronze alloy containing a minimum of 85% copper.

3.7. The manufacturer's name, strainer pipe size, and direction of flow (if required) shall be cast in raised letters and shall be clearly visible.

3.8. Cover bolts shall be made of AISI Type 316 stainless steel.

3.9. Strainer cover shall be equipped with a vent screw to remove trapped air at installation.

3.10. Acceptable strainers shall be Neptune, SENSUS Strainers or approved equal.

4. Installation

4.1. The installation of flowmeter and strainer shall be done on the downstream flow direction of the pump on the pipeline requirement measurement. The location of the flowmeter shall be positioned so that it is as near to level as possible and not on a down hill direction. It should not be located at a high point where an air bubble could be trapped in or near the flowmeter or screen.

4.2. All applicable manufacturers installation instructions shall be followed for both screen and flowmeter installation.

The preliminary figure attached to this memo, is the proposed location however it will be confirmed/agreed upon by the contractor and engineer prior to installation.

Submitted by:

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Preliminary Figure for location of installation of FM at Signal Hill WTP