

# Project Dashboard

Impacts of wastewater at Baker Lake, Nunavut (149964)

## Proposal Status: Conformity Determination Issued

- **Overview**
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### Project Overview

Type of application: **Renewal**

Proponent name:	Charles Wong
Company:	University of Winnipeg

#### Schedule:

Start Date:	2023-06-01
End Date:	2026-06-02
Operation Type:	Seasonal

#### Project Description:

This project is a scientific research endeavor to study the impacts of wastewater releases at Baker Lake, Nunavut on local and regional receiving waters. This would provide and understanding of water quality issues around wastewater and its releases at Baker Lake, and would also produce baseline information useful for planning any future potential improvements to the wastewater treatment facility. We would periodically collect water samples from the Baker Lake wastewater lagoon, and effluent in water bodies downstream of its outfall (Finger Lake, Airplane Lake, and Baker Lake itself at the effluent site, the drinking water intake site, and an offshore site), at 9 sites total. These samples would analyzed on-site for basic water quality parameters such as pH, dissolved oxygen, conductivity, and temperature. Samples would then be shipped to our laboratories at the Universities of Winnipeg, Manitoba, Waterloo and at Dalhousie University, and analyzed for nutrients (e.g., nitrogen and phosphorus content), bacterial abundances and composition through analysis of their DNA signatures, algal abundances and algal productivity, and organic chemicals of emerging concern (e.g., pharmaceuticals). Algal productivity would also be assessed by water traps deployed at the study sites, and organic contaminants would be sampled also by passive samplers deployed and retrieved from the sites. Sampling would be done in June during ice melt (i.e., when wastewater discharged during the winter unfreezes), in September when ice reforms, and potentially at a third time interval between these periods to assess temporal changes (if any). Streamflow would be measured downstream of the current wastewater treatment facility. Vegetation and wetland presence will be characterized in the vicinity of the existing wastewater treatment system and reference site. This project is funded by Polar Knowledge Canada (Dr. C Wong as Principal Investigator) and NSERC (Dr. R. Jamieson as Principal Investigator) with support from partner Agnico Eagle Mines Ltd. Other researchers include Dr. Heidi Swanson and Dr. Brendan McConkey (University of Waterloo) and Dr. Mark Hansen (University of Manitoba). We anticipate having up to 2 individuals present on-site during sampling at any given time, who would perform sampling as well as train local personnel (e.g., Agnico employees, interested community members as appropriate) in additional sampling.

#### Personnel:

Persons:	2
Days:	25

### Project Map

List of all project geometries:

ID	Geometry	Location Name
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9939	point	Shoreline Baker Lake (near drinking water intake and treatment plant)
9940	point	Baker Lake offshore water
9941	point	Input to Baker Lake (wastewater effluent enters here)
9942	point	Airplane Lake outflow
9943	point	Airplane Lake inflow
9944	point	Finger Lake outflow
9945	point	Finger Lake inflow
9946	point	Lagoon
9947	point	Upstream background site

**Planning Regions:**

Kitikmeot

**Affected Areas and Land Types**

Municipal

Settlement Area

Keewatin Planning Region

## Project Land Use and Authorizations

**Project Land Use**

Scientific Research

**Licensing Agencies**

NRI: [Scientific Research Licence](#)

DFO: [Fish for Scientific Purposes Permit](#)

**Other Licensing Requirements**

No data found.

## Material Use

**Equipment**

Type	Quantity	Size	Use
boat	1	< 20'	A small boat would be used to carry sampling equipment, including samplers, to offshore sites.
passive samplers	9	20 cm diameter x 30 cm length	Passive water samplers will be deployed at sites for up to 3 weeks each, during the sampling season. These require no power to operate, and would be deployed by cable

primary productivity measures	9	1 m <sup>2</sup>	<p>attached to fixed points on shore (e.g., poles or existing structures) or buoys if offshore. All equipment will be removed at the end of the field season. These consist of sealed bottles with known algal and nutrient compositions, and would be deployed on site to measure algal productivity. They would be removed after measurements are done.</p>
current meters	6	10 cm	<p>We will be measuring stream flow downstream of the existing wastewater treatment plant using portable current meters. Water level loggers (10 cm in size) will be deployed in the stream beds in-stream for the season, to monitor water flow continuously, and removed at the end of the summer.</p>

Hydraulic tracer testing	1	1 L	Hydraulic tracer tests may be conducted in the wastewater treatment system, using a small amount of non-reactive and non-toxic soluble dye tracer. This is to characterize water retention time in the wastewater treatment system, and ascertain flow directions. Quadrats will be used to characterize vegetation and wetland presence in the vicinity of the existing wastewater treatment system and reference site. This will involve
Quadrats	1	1m x 1m	transecting the tundra on foot, placing a temporary 1 m x 1 m PVC quadrat on the ground surface, and taking photographs, and at times collecting small soil samples (<500 g).
truck	1	standard size pickup truck	A pickup truck or similar vehicle would be used to carry sampling equipment to onshore sites.

**Fuel Use**

Type	Container(s)	Capacity	UOM	Use
Diesel	1	50	Liters	Diesel fuel for the small boat listed above. Estimated maximum amount used for sampling work during the season.
Gasoline	1	100	Liters	Gasoline for the sampling truck listed above. Estimated maximum amount used for sampling work during the season.

**Hazardous Material and Chemical Use**

Type	Container(s)	Capacity	UOM	Use
No records found.				

**Water Consumption**

Daily Amount (m <sup>3</sup> )	Retrieval Method	Retrieval Location
0		

**Waste and Impacts****Environmental Impacts**

None. Water samples of ca. 1 L each will be taken from sites. Passive water samplers, primary production measures, and stream flow data loggers will be deployed at sites and removed at the end of the sampling season. A hydraulic tracer test may be conducted to characterize retention time and flow direction of the existing wastewater treatment system, but this will be done using a small amount of non-reactive, non-toxic soluble dye. Analyses that will generate waste will be done on samples shipped to our laboratories, which will handle waste as per institutional regulations. No significant waste will be generated on site, and no environmental impact is anticipated.

**Waste Management**

Waste Type	Quantity Generated	Treatment Method	Disposal Method
Non-Combustible wastes	< 10 L total	<p>None necessary.</p> <p>These would be small amounts of waste products associated with consumable supplies for sampling (e.g., plastic wrap that seals sterile media used for collecting samples for bacterial DNA analysis), and can be disposed as regular trash.</p>	landfill