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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

Water Licence Application Supplementary Questionnaire for Municipalities

GENERAL

1. Date: _____

2. Applicant: Hamlet of Baker Lake, Kavilliq Region
Municipality and Region

3. Contacts: Dennis Zettler
Name of Contact

Senior Administrative Officer
Position

867-793-2874
Telephone #

867-793-2509
Fax #

4. Community Status: __ Village __ Town __ City
√ Hamlet __ Settlement Corporation

5. Indicate the status of the municipality's licence on the date of the application.
__ New Application
√ Renewal - Water Licence # NWB3BAK9904

II. ATTACHMENTS

1. Attach current or up-to-date detailed map(s) showing the locations of the:

a. raw water intake;
b. water storage and treatment facilities;
c. fuel and chemical storage;
d. sewage treatment facilities (lagoon, honey bag pit, wetland);
e. wastewater treatment area and discharge outlets;
f. solid waste disposal areas and drainage patterns;
g. hazardous waste disposal area;
h. transportation access routes;
i. existing water bodies/courses and any changes to these water bodies/courses that have or may occur as a result of water use or waste disposal facilities, locations of environmental monitoring sites. (Outline drainage basin);
j. Traditional use areas outlined on site map and areas around the community used for recreation, camping, fishing, etc.
k. abandoned and/or restored water treatment, sewage, and solid waste disposal facilities.

Are maps attached? √ Yes __ No

If no, please indicate when they will be available.

Indicate which organization has provided the various maps or diagrams.
Dept. of Community & Government Services

III. WATER SUPPLY

Water Source

1. Type of source: √ Lake __ River __Well __ Other _____

2. Name of water source and alternative, if any.
3. **Baker Lake** _____
   Primary Source Secondary Source

3. Usual break-up & freeze-up period: May/June October/November
   Break-up Freeze-up

Water Intake

1. Please provide short descriptions for the following:

   a. Freshwater intake facility
   The intake facility consists of a 4.5m x 11.3m building with control equipment, intake pumps, recirculation line pump, four 3410 litre emergency water tanks, truck fill station and emergency generator. The intake pipe a 160 metre long and consists of HDPE intake pipe with a 690mm dia. stainless steel drum intake screen locate in approx. 6.0 metres of water. The intake pipe is insulated and buried approx. 600mm for the first 120 metres.

   b. Operating capacity of pumps used
   Frame mounted end suction pumps, operating capacity of 1200 l/min. Total dynamic head: 13.4 m, total static lift: 6.59 m, 240V, 1 phase, 5 HP.

   c. Intake screen size
   Stainless steel static orb drum screen max. 2.54mm openings, 2.1 cm/s average slot velocity, c/w female camlock coupling for backwash, design flow 1200 l/min.

Water Storage

1. Type of water storage facility. (check where applicable)
   ___ Reservoir/Pond ___ Storage tank √ None

   ___ Other _____Description:

2. If "reservoir" checked:

Is the reservoir lined? ____ Yes ____ No

What type of liner? _____ When was it installed?_____

Water Treatment

1. Indicate the quality of the water.

Summer:	√ good	___ fair	___ poor
Fall:	√ good	___ fair	___ poor
Winter:	√ good	___ fair	___ poor
Spring:	√ good	___ fair	___ poor

2. Describe.
Excellent water quality, good colour and taste

3. Type of water treatment.

___ Filtration and chlorination
√ Chlorination only
___ None
___ Other _____
Description

Water Use And Distribution

1. Volume of water use:

Distribution	Estimated number of people on the system **A**	Estimated average water consumption (Litres/capita/day) **B**	Total water consumption (Litres/day) **A x B**
PIPED			
TRUCKED	1500	104	156,000
TOTAL			

General Condition of the water supply facilities

1. General condition of the:

a. Water supply facility

√ Satisfactory __ Unsatisfactory

If unsatisfactory, explain.

b. Storage facility

√ Satisfactory __ Unsatisfactory

If unsatisfactory, explain.

c. Distribution system

√ Satisfactory __Unsatisfactory

If unsatisfactory, explain.

Modifications

1. Are there any changes *planned* for the water supply system?

√ No ___ Yes

If yes, please attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

2. Does the community believe changes needed to the water supply, storage or treatment facilities? Describe.

No

Identification

Are there signs identifying drinking water sources presently used by the municipality ?

__ Yes √ No

IV. SEWAGE DISPOSAL

1. What type(s) of sewage treatment does the community have?

__ Lagoon
___ Mechanical system
√ Wetland
___ Honey bag
___ Combination/Other: describe

Lagoon *(if applicable)*

1. Has there been any operating problems with the lagoon?

___ Yes √ No

If yes, describe

Mechanical System *(if applicable)*

1. Describe (type, specifications, operation and maintenance program for the mechanical wastewater treatment system).

N/A

2. Are sludges produced ?

__ Yes √ No

If yes, describe how the sludges are disposed of:

Wetland*(if applicable)*

1. Describe the Wetland wastewater treatment system.

The sewage disposal system in the Hamlet of Baker Lake is located in the natural valley about 1.5 km north of the community and is composed of three ponds in series extending from west to east. The ponds are separated by areas of natural wetlands. The sewage disposal area is confined to the north, south and west by rock ridges. At the end of third pond, the effluent turns south and proceeds down to Baker Lake.

The truck-collected sewage is dumped to the bermed pond on the road side (Drawing C-1). The sewage seeps from this bermed pond. This bermed pond may partially be regarded as a primary treatment, for large particles in the sewage may settle or be screened.

The effluent from the dumping pond flowed over the slope area and down to Lagoon Lake (P1). The slope area between the dumping pond and P1 is covered by a thick layer of slime.

Effluent from the Lagoon Lake (P1) flows through a defined channel to Finger Lake (P2), proceed over a large area of wetland with abundant vegetation plants to the third pond, Airplane Lake (P3). The effluent from the P3 flows by gravity through a defined sloping gravel ditch, and finally was discharged at Baker Lake.

From visual inspection, the water in P1 and P2 appeared to be turbid and green in color due to algae boom. This was probably due to the combined functions of the rich organics and nutrients (nitrogen, phosphorous, etc.) in the water as well as the long daylight in the summer. However, the effluent from P2, after flowing over the area of wetland with abundant vegetation plants, became significantly clear when it entered the Airplane Lake (P3). No smell could be detected.

Honey Bag Pit

1. Does the municipality use a honey bag pit?

___ Yes √ No

If yes, describe the location, drainage, and operation/maintenance of the site:

Commercial, Industrial and/or Hazardous Wastes

1. Are there any sources of commercial or industrial *liquid* waste being discharged or deposited to the wastewater treatment system that may affect the quality of the effluent or leachate produced? *(The municipality should be aware that any commercial or industrial discharge has to be approved by the municipality)*

___ Yes √ No

If yes, indicate sources, types and quantities.

Sewage Discharge

1. Are fish, shell fish and other wildlife harvested in or near the discharge area ?
___ Yes _√ No

If yes, indicate species harvested, and level of harvest.

General Condition of the sewage treatment facilities

1. General condition of the:

a. Sewage collection system
√ Satisfactory __ Unsatisfactory
If unsatisfactory, explain.

b. Discharge control system
√ Satisfactory __ Unsatisfactory
If unsatisfactory, explain.

c. Dams, diversion dykes, berms
√ Satisfactory __ Unsatisfactory
If unsatisfactory, explain.

Modifications

1. Are there any changes *planned* in the sewage treatment facilities?

   √ No __ Yes

   If yes, please attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

2. Does the municipality or residents believe changes are needed to the sewage treatment facilities? Describe.

   No

Abandonment and Restoration

1. List and describe abandoned or restored sewage treatment facilities. Refer to original attachment maps.

   N/A

Identification

Are there signs identifying past and present sewage disposal sites ?

__ Yes __ No

V. SOLID WASTE DISPOSAL

1. Briefly describe how solid wastes are collected and delivered to the disposal area.

   Solid waste is collected by garbage truck and delivered to disposal site.

2. Is the solid waste site fenced? √ Yes __ No

3. Is the fence adequate? √ Yes __ No

   If no, describe

Waste Reduction

1. Does the municipality burn garbage?

√ Yes __No

If yes, describe how and when this is done.

Burnable material is gathered together and a controlled fire is ignited. Burnable garbage is burned as required (weekly).

2. Has the municipality considered measures for waste reduction such as recycling or reuse?

__ Yes √ No

If yes, describe

Animal Carcasses Pit

1. Does the municipality have an area for the disposal of animal carcasses ?

√ Yes __ No

If yes, describe the location, drainage and operation/maintenance of the site

Located at solid waste disposal site in isolated area, drainage is good, carcasses are buried and covered with gravel.

Waste Oil Pit

1. Describe the waste oil storage area.

The preferred method for disposing of waste oil is to give it to a local contractor to burn in their waste oil furnace. If the contractor can not accept the waste oil it is stored in 205 l drums within a 12m x 12m x 2m deep area immediately south of the general disposal area. The drums are placed on wooden platforms. When the pit is full it is covered with a min. of 0.5 m of material.

Bulky Scrap Metal Waste Disposal Area

1. Does the municipality have a scrap metal or bulky waste disposal area?

√ Yes __ No

If yes, briefly describe its location and operation plan.

Scrap metal or bulky waste is stored west of the general solid waste disposal site in a level area approx. 80m x 70m in an organized manner and staked when ever possible to conserve space.

Commercial, Industrial and/or Hazardous Wastes Disposal Area

1. Are there any commercial or industrial waste being discharged or deposited in the solid waste disposal area? *(The municipality should be aware that any discharge of commercial or industrial waste has to be approved by the municipality)*

___ Yes √ No

If yes, please indicate sources, types and quantity.

2. Will the municipality use a hazardous waste disposal area?

√ Yes ___ No

If yes, describe its:

a. Location

A 20m x 40m fenced area within the bulk waste disposal area.

b. Structure

A water take has been cut in half for the disposal of paints, houdedold hazardous wastes, aerosol containers, etc. Used batteries are placed on pallets and collected by a local contractor during the summer and shipped out for disposal.

c. Operation and maintenance (describe special handling/disposal methods for these wastes)

The hamlet follow environmental guidelines set out in publication issued by various government departments.

General Condition of the Solid Waste Disposal Area

1. Comment on the general conditions of the:

a. Solid waste disposal area

√ Satisfactory __ Unsatisfactory

If unsatisfactory, explain.

Modifications

1. Are there any changes planned for the solid waste disposal area?

   √ No __Yes

   If yes, attach a copy of the plan, or describe changes. Provide information on the implementation schedule.

2. Are changes needed to the solid waste disposal area? Describe.

   No

Abandonment and Restoration

1. List and describe abandoned or restored solid waste facilities. Indicate their location on a map.

   N/A

Identification

Are there signs identifying past and present solid waste disposal sites ?

__ Yes __ No

VI. INSPECTION AND MONITORING

1. When were municipal facilities inspected by:

   √ Indian and Northern Affairs Inspector Date: August, 2005_

   √ Community and Government Services Date: July, 2005__

   ___ Other: Date: _____

2. Is there a system in place for reporting spills?

   √ Yes ___ No

   If yes, describe.

   Spills are reported to local wildlife officer.

3. Is there a contingency plan for clean up of spills?

   √ Yes ___ No

   If yes, describe.

   The 24 hour spill line is called and standard government procedures and guidelines are followed.

4. Have any spills occurred in the past five years?

___ Yes _√ No

If yes, describe and show on a map the locations of the spills. What action has been taken to clean the affected areas?

Monitoring Program

1. Is water sampling and analysis done?

√ Yes ___No

If Yes, answer the questions a to e

a. Briefly describe how samples are taken and sent to the laboratory.

Samples are taken at intake site in Baker Lake and periodly before water is placed into water truck after it has been chlorinated in bottles provided for sampling and are shipped to a lab in Winnipeg with in 24 hours.

b. Briefly describe any monitoring done for wastewater effluent and leachate.

Samples are taken at designated monitoring stations in bottles provided for sampling and are shipped to a lab in Winnipeg with in 24 hours.

c. Who is responsible for water sampling?

Name: Jeremy Singaqti

Position: Settlement Maintainer

Telephone #:867-793-2744

Fax # : 867-793-2278

Level of training:_____

d. Recognized laboratory performing analysis of samples.

Name: The National Testing Laboratories Ltd.

Address: Winnipeg, MB, R3Y 1G4

Telephone #: 204-488-6999

Fax #: 204-488-6947

e. Are any changes planned in the water quality monitoring program?
___ Yes √ No
If yes, describe.

VII. PUBLIC CONCERNS

1. What concerns does the municipality or residents have regarding the municipal water supply or waste disposal facilities? List the concerns and describe what steps have been taken to address those concerns.

None

VIII. PUBLIC HEALTH *(Help may be obtained from the Regional Environmental Health Officer if you have difficulty with this section.)*

1. Date:

2. Municipality: Hamlet of Baker Lake

3. Contact: Bob Hanley, Environmental Health Officer

Telephone #: 867-645-2171

Fax #: 867-645-2409

4. Have there been any problems or health/environmental concerns with drinking water ?
___ Yes √ No

If yes, describe

5. Have there been any problems or health/environmental concerns with sewage disposal/treatment?

___ Yes √ No

If yes, describe

6. Have there been any problems or health/environmental concerns with solid waste disposal?

___ Yes √ No

If yes, describe

Monitoring Program

1. Does the Regional Health Board perform water quality sampling?

√ No ___If Yes, answer questions (a) to (e)

a. Briefly describe the sampling methodology.

Bacterial testing done in Rankin Inlet by EHO

b. Briefly describe any monitoring of wastewater effluent and leachate.

Samples taken by CGS at designated monitoring stations

c. Who is responsible for sampling?

Name: Jeremy Singaqti

Position: CGS's Settlement maintainer

Telephone #: 867-793-2744

Fax # : 867-793-2278

Level of training:

d. Recognized laboratory performing analysis of samples.

Name: Environmental Health Services

Address: Rankin Inlet, NU

Telephone #: 867-645-2171

Fax # : 867-645-2409

e. Are any changes planned in the water quality monitoring program?
√ Yes __No
If yes, describe.

Increase sampling to two sets sampling/month

IX. TECHNICAL INFORMATION *(Assistance may be obtained from the Regional Community Government (CGS) office if you have difficult with this section).*

1. Date: October 18, 2005

2. Municipality: Hamlet of Baker Lake

3. Contact: Wayne Thistle
(Community and Government Services Representative)

Telephone # 867-645-8178

Fax # 867-645-8196

4. Population (according to most recent census results): 1500

5. Estimated growth rate over next 5 years: 2%

6. Has any baseline data collection and evaluation been undertaken with respect to the physical, biological, and chemical characteristics of the main water bodies in the area?

√ Yes ___No

If yes, provide a summary of program details or site title, authors, cities, and dates:

Prepared by	Title	Completion Date
Jianguo 'George' Zhang	Site Investigation Report for Water & Sewage System Baker Lake, NU	September, 2005
Jianguo 'George' Zhang	Site Investigation Report For Sewage Disposal System Baker Lake, NU	September, 2005
Jianguo 'George' Zhang	Site Investigation Report For Water Supply System Baker Lake, NU	September, 2005

If no, are such studies being planned?

___ No ___Yes (If yes, when and by whom):

7. Have Elders been consulted in the collection of baseline data on main water bodies in the area?

√ No ___Yes

If yes, specify.

8. Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project?

√ No _Yes

If yes, provide details below.

Prepared by	Title	Completion Date

If no, are such studies being planned?

√ No __Yes.

If yes, specify:

Attachments

1. Attach detailed plan or drawing(s) of the present *solid waste disposal area*. Include the following information:

   a. details of pond size and elevation;
   b. details of all retaining structures (dimensions, materials of construction, etc.);
   c. details of the drainage basin, and existing and proposed drainage modifications;
   d. details of all decant, siphon mechanisms etc., including sewage treatment facilities;
   e. details regarding direction and path of wastewater flow from the area;
   f. distance from watercourses and fish bearing waters;
   g. location and construction of liners;
   h. leachate and groundwater collection systems; and
   i. control structures.

2. Attach detailed plan or drawing(s) of the present *sewage treatment system*. The drawing(s) should include the following:

   a. details of all retaining structures (dimensions, materials of construction, etc.);
   b. details of the drainage basin, and existing and proposed drainage modifications;
   c. details regarding direction and path of wastewater flow from the area;
   d. indications of the distance from watercourses and fish bearing waters;
   e. all sources of seepage presently encountered near these areas, including volumes (m^3/day) and directions.
   f. The volume of seepage flow (m^3 / day); and
   g. The direction of each flow.

3. Are drawings for the solid waste disposal area and sewage treatment system attached?
√ Yes ___No

If Yes, who has provided them ?
Dept. of Community & Government Services

If no, indicate when they will be available.

Hydrology

1. Effects on surface water flow:

Are any stream channels altered?	__ Yes √ No
Is the natural storage or water level of any lake or pond changed?	__ Yes √ No
Are there changes in water flow downstream of the project?	__ Yes √ No
Is a storage reservoir created in a natural channel?	__ Yes √ No

If yes to any of the above, briefly describe the expected change in flow or storage:

2. Drainage Area:
What is the drainage area? _____km^2
What is the average elevation of the drainage basin? _____metres
Is the drainage basin outlined on an attached map? ___Yes ___No

Describe the drainage basin characteristics, (vegetation, general soil type, lakes, swamps and permafrost areas, etc.)

3. Channel characteristics:
Is the course of any channel changed? ___ Yes √ No

If yes, describe measures to maintain stream bed and bank stability.

4. Will the cross-section of any watercourse be changed? ___ Yes √ No
If yes, describe the change and its effect on the flow capacity of the channel.

Water Supply

1. What is the rate of withdrawal from the source? 156 m^3/day.

2. Is water drawn from the source ___ intermittently √ continuously

3. If it is drawn intermittently, during what month(s) is it drawn? _____

4. For what period is it drawn (days/weeks/months)? _____

5. What is the rate of flow of source (if river) or size (if lake)? Unknown

6. At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn.

None

Water Intake

1. Please provide short descriptions of the following:
   a. freshwater intake facility

   b. operating capacity of the pumps

   c. intake screen size

Water Storage

1. Is a dam or dyke being used to store or alter the flow of water? ___Yes √ No

2. What are the dimensions of the dam or dyke?
   Length:_____ Width: _____ Height:_____
   U/S slope: _____ D/S slope: _____

3. Does the proposed dam create a reservoir in a natural watercourse?
   ___ Yes ___No
   If yes, what is the storage capacity and surface area of the reservoir?
   _____ m^3 _____ ha.

4. Will the dam or dyke affect fish migration or movement?
   ___ Yes ___ No
   If yes, describe all measures for compensation of fish habitat lost due to the dam or dyke, and mitigation for fish migration or movement.

Water Treatment

1. Indicate the capacity of the treatment facility. _____ L/min

2. What is the capacity of the water storage facility._____ m^3

3. Describe the method of water treatment (i.e., backwash, flocculation, sedimentation, chemicals used), and provide the results of the most recent bacteriological and chemical analysis. Attach a diagram, if possible.

4. Are there any changes planned in the water treatment facilities?
   √ No ___Yes

If yes, attach a copy of the plan or indicate changes and include an implementation schedule.
Include excerpt from MACA Capital Plan if available.

Sewage Disposal

1. Indicate the level of sewage treatment:
   _√_ primary ___ secondary ___ tertiary
   Pre-treatment (if applicable): ___ screening ___ maceration
   Lagoons (if applicable): ___ anaerobic ___ aerobic ___facultative

2. Indicate the capacity of the sewage treatment facility_____ m^3

3. Based on current population projections, the facility will meet the needs of the community until
   the year __2050_____ .

4. Average depth of the wastewater lagoon _____ m.

5. What is the design freeboard? _____ m.

6. Indicate the retention time of the sewage while in the treatment facility_____ days.

7. Indicate the estimated rate of discharge of wastewater_____ L/sec.

8. Indicate the location of the discharge point_____.

9. Is the discharge: ___seasonal ___continuous

   If the discharge is seasonal, during what month(s) is it done? _____
   What is the duration of the discharge (days/weeks/months) ? _____

10. Are there any changes planned in the sewage disposal facilities?
    √ No ___Yes
    If yes, attach a copy of the plan or indicate changes and include an implementation schedule.

    Include excerpt from MACA Capital Plan if available.

Solid Waste Disposal

1. Indicate the capacity of the disposal area _____ m^3

2. The *average* depth of the solid waste disposal site _____ m.

3. The current facility will meet community needs until the year __2050__.

4. Do any natural watercourse enter the solid waste disposal area? What methods are used to decrease the amount of runoff water entering these areas?

   No

5. Indicate the volume of water that may enter these areas from any source(s) and attach all pertinent details of the diversions.

Source	Volume

6. Please describe any diversions of watercourses:

   None

7. Are there any changes planned in the solid waste disposal facilities?

√ No ___Yes

If yes, attach a copy of the plan or indicate changes and include an implementation schedule

Include excerpt from MACA Capital Plan if available.

Other

1. Describe any additional details on the existing municipal facilities which should be considered by the Nunavut Water Board during it review.