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TEL: (867) 360-6338 NUNAVUT WATER BOARD
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Community and Government Services-Resolute Bay
Water Licence Application
Supplementary Questionnaire
for Municipalities

I. GENERAL

1. Date:

2. Applicant: **Department of Community and Government Services, Government of Nunavut**

   Municipality and Region: The Hamlet of Resolute Bay, Resolute Bay, Nunavut

   Contacts:

   Name of Contact: Tom Livingston, P. Eng.
   Position: Regional Engineer
   Telephone: 867-983-4156
   Fax: 867-983-4124
   e-mail: tlivingston@gov.nu.ca

3. Community Status:

   __ Village
   __ Town
   __ City
   √ Hamlet
   __ Settlement Corporation

4. Indicate the status of the municipality's licence on the date of the application.

   √ New Application
   __ Renewal Water Licence #

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
   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

j. Outline drainage basin
k. Traditional use areas outlined on site map and areas around the community used for recreation, camping, fishing, etc.
l. 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.

III. WATER SUPPLY

Water Source

1. Type of source:

√ Lake
___ River
___ Well
___ Other

2. Name of water source and alternative, if any.

Primary Source: **Char Lake**
Secondary Source: **Strip Lake (airport buildings & South Camp)**

3. Usual break-up & freeze-up period:

Break-up: **mid - July**
Freeze-up: **mid - September**

Water Intake

1. Please provide short descriptions for the following:

a. Freshwater intake facility

Char Lake is located approximately 1.5 km west of the town site. A causeway, intake line, and pump well have been built into Char Lake to place the intake in a minimum water depth of four metres. The pumps have been designed to automatically operate according to the amount of water in the reservoir, supplying the maximum daily requirements of the town site. An

insulated return line is buried alongside the supply line in the same trench.

The majority of the Hamlet is on a utilidor system. The buildings at the air terminal and administration area are served by a piped pressure distribution system from Strip Lake, a small lake located across from the runway. The south camp and buildings at the airport not on the piped system are served by trucked delivery.

A 9080 L water truck serves the south camp and some of the buildings at the airport; the service is currently under contract. Water used for the trucked delivery is taken from the piped system at the airport. The airport water storage building serves as the truck fill point. All water deliveries are metered.

b. Operating capacity of pumps used: **760 L/min.**

c. Intake screen size **diameter 8 inches (mesh size ¼ inch)**

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?
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.

3. Type of water treatment.

___ Filtration and chlorination
_√_ Chlorination only
___ None
____ Other

Description:

Chlorination is provided by dual hypochlorite solution injection pumps (one from standby) located at the water treatment and storage facility.

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	**200**	**180**	**36,000**
TRUCKED	**40**	**90**	**3,600**
TOTAL			**39,600**

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. **Needs upgrading, <u>Utilidor Upgrade</u>, Dillon 1999**

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.

Utilidor system will be upgraded and extended.
<u>Utilidor Upgrade</u>, Dillon 1999

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

Utilidor system needs upgrading due to increased demand.
<u>Utilidor Upgrade</u>, Dillon 1999

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

Sewage is comminuted prior to discharge into the bay.

For those not on piped service, liquid pumpout sewage is collected from holding tanks using a tank truck (9080 L). The service is currently contracted.

Liquid pumpout sewage is discharged by the contractor at the MOT garbage

dump, located approximately 2 KM north of the Resolute airport. The liquid sewage is separated from the solid waste. Treatment consists of the application of lime coupled with a covering of gravel in the summer.

Lagoon *(if applicable)*

1. Have 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).

   A macerator is used on the sewage discharge input line.

2. Are sludges produced?

   If yes, describe how the sludges are disposed of

Solids are removed and sent to hamlet waste disposal area for burning and burial.

Wetland *(if applicable)*

1. Describe the Wetland wastewater treatment system.

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, shellfish and other wildlife harvested in or near the discharge area?

   ___Yes _√_ No

General Condition of the sewage treatment facilities

1. General conditions

a. Sewage collection system

   _√_ Satisfactory ___ Unsatisfactory

   If unsatisfactory, explain. ***Could use some upgrading.***

b. Discharge control system

   _√_ Satisfactory ___ Unsatisfactory

   If unsatisfactory, explain.

c. Dams, diversion dykes, berms **N/A**

   ___ 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? **No**. Describe:

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.

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.

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

Waste Oil Pit

1. Describe the waste oil storage area.

Bulky Scrap Metal Waste Disposal Area

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

__ Yes __ No

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 storage area?

__Yes ___ No

If yes, describe:

a. Location

b. Structure

c. Operation and maintenance

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.

Abandonment and Restoration

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

Identification

1. 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: **July, 2003**
_√_ Community Government and Transportation Date: **February, 2004**
___ Other: Date: _____

See attached 2003 INAC Inspection Report

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

_√_ Yes ___ No

If yes, describe.

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

_√_ Yes ___ No

If yes, describe.

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? **See previously submitted spill reports.**

Monitoring Program

1. Is water sampling and analysis done?

_√_ Yes ___No

If Yes, answer questions a through e

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

Once a month several samples are taken throughout the community, packaged at the health center and flown to Iqaluit.

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

Done annually by government bodies. Indian and Northern Affairs Inspector Community Government and Transportation

c. Who is responsible for water sampling?

Name: Paul Diamond
Position: Settlement Maintainer/Supervisor
Telephone: (867) 252-3655
Fax: (867) 252-3622
Level of training: **Water and Sewerage Certification Level I**

d. Recognized laboratory performing analysis of samples.

Name: Government of Nunavut
Address:

Telephone:
Fax:

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.

The community feels that the current waste disposal area is too close to the high tide line.

VIII. PUBLIC HEALTH

Help may be obtained from the Regional Environmental Health Officer if you have difficulty with this section.

1. Date:
2. Municipality: Iqualuit, NU
3. Contact: Philip Reeve
   Telephone: (867)-975-4800
   Fax: (867)-975-4830

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 _√_ Yes

   If Yes, answer questions (a) to (e)

a. Briefly describe the sampling methodology.
   Same as Section 1-B page 13.

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

c. Who is responsible for sampling?

Name: Paul Diamond
Position: Settlement Maintainer
Telephone #: 867-252-3655
Fax #: 867-252-3622
Level of training: **Water and Sewerage Certification Level I**

d. Recognized laboratory performing analysis of samples.

Name: *GN*
Address:

Telephone #:
Fax #:

e. Are any changes planned in the water quality monitoring program?

___ Yes _√_ No

If yes, describe.

IX. TECHNICAL INFORMATION

Assistance may be obtained from the Regional Community Government (CG&T) office if you have difficulty with this section.

1. Date: **March 4, 2005**
2. Municipality: **Department of Community and Government Services, Government of Nunavut**
3. Contact: **Tom Livingston, Regional Engineer**
   Telephone # **(867) 983-4156**
   Fax # **(867) 983-4124**

4. Population (according Hamlet Government: **240**
5. Estimated growth rate over next 5 years: **8.6%**
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:

Please see previously submitted study proposals and reports.

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

Please see previously submitted study proposals and reports.

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 ***Not sure.***

If yes, provide details below.
Please see previously submitted study proposals and reports.
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:
c. Details of the drainage basin, and existing and proposed drainage modifications:
d. Details of all decant, siphon mechanisms etc., 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 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:
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):
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?

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:

What is the average elevation of the drainage basin?

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.)

Cornwallis Island is in the Innuition Region. Most of the land has been worn to a peneplained surface. There is a general slope toward the coast, with high bluffs up to 260 m in the southeast and lower elevations toward the north end of the Island. The shores of Resolute Bay are low and composed of Palaeozoic limestones and shales. The land surface slopes gradually from the shore in a series of gravel ridges, which appear to be raised beach lines. Rising to an elevation of 195 m, Signal Hill, a prominent landmark, is situated at the north end of the bay.

Bedrock is typically 1.5 to 9.5 m below the surface. Aggregate materials above the bedrock consist of gravel-sized frost-shattered material, cobbles averaging 20 cm in diameter and fines, which are mainly non-plastic.

The depth of the permafrost active layer varies between 0.5 m and 1 m. The ice constant varies between 10% and 25% by volume.

Vegetation is limited to lichens, mosses and grasses. Grasses tend to grow in wetter areas near lakes and streams.

3. Channel characteristics:

Is the course of any channel changed?

____ Yes ___No

If yes, describe measures to maintain streambed 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?

36 m^3/day from Char Lake

3.63 m^3/day from Strip Lake trucked to South Camp. Water used for the delivery is taken from the piped system at the airport.

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)? **50,000m² (Char Lake)**

6. At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn.
No effect.

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?

3. Does the proposed dam create a reservoir in a natural watercourse?

If yes, what is the storage capacity and surface area of the reservoir?

4. Will the dam or dyke affect fish migration or movement?

   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: **760 L/min.**

2. What is the capacity of the water storage facility: **530,000 L**

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.

   Chlorination is provided by dual hypochlorite solution injection pumps (one from standby) located at the water treatment and storage facility.

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 CGS 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: **Up to 500L/min**

3. Based on current population projections, the facility will meet the needs of the community until the year: **2100**

4. Average depth of the wastewater lagoon **N/A**

5. What is the design freeboard: **N/A**

6. Indicate the retention time of the sewage while in the treatment facility days: **No retention time. It is a flow-through operation.**

7. Indicate the estimated rate of discharge of wastewater: **Averages 150L per minute.**

8. Indicate the location of the discharge point **North wall of building.**

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 CGS Capital Plan if available.

Solid Waste Disposal

1. Indicate the capacity of the disposal area:

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

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

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?

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 GCS 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 its review.